From the Editors of Easyriders

$14.95

TECH TIPS & TRICKS

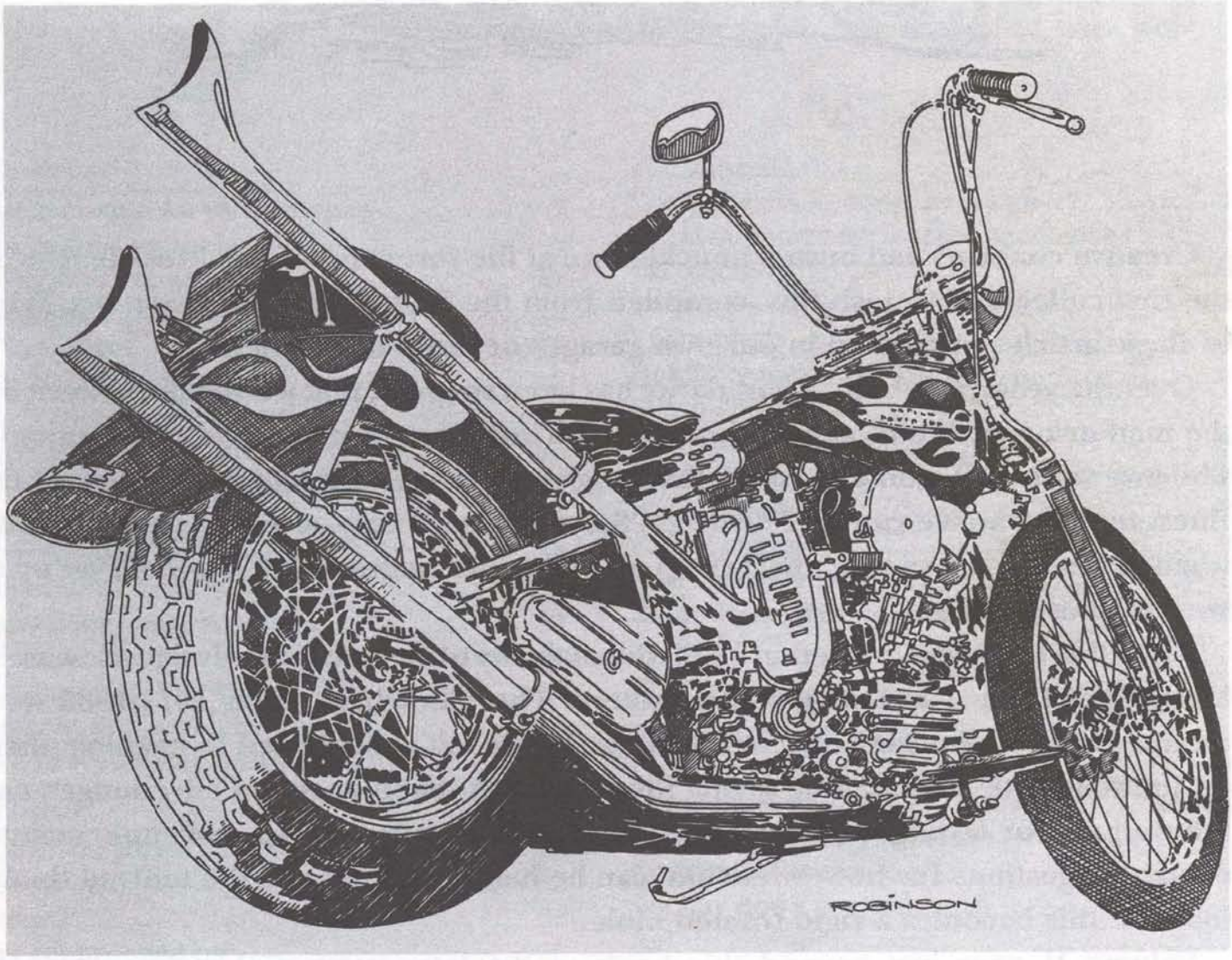
Tricks On Keeping Your Scoot Puttin'!

Wiring Diagrams

Grass Roots Mechanicals



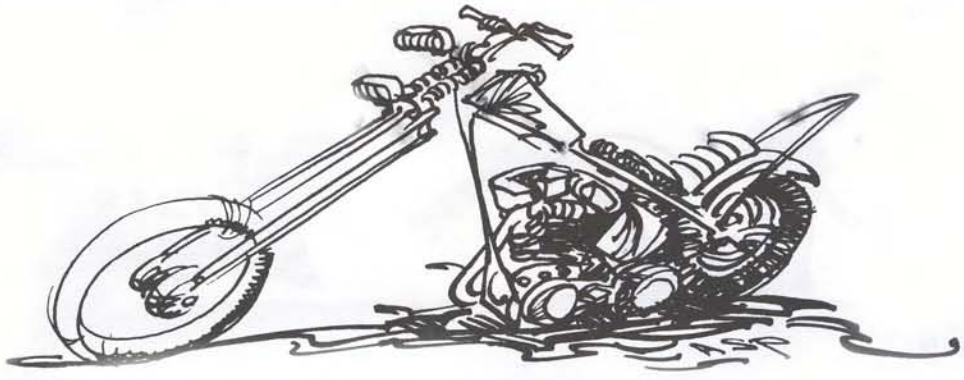
11 Years Of How-To-Do-Its For Your Harley-Davidson



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Special thanks to the staff of *Easyriders* and our great readers for the information that made this book possible. This book was originally published in the mid '70s. Some of the numbers and addresses may no longer be correct.

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Creative concepts and busted knuckles are at the forefront of this lifestyle. Here's the first collection of tech tips compiled from the first 10 years of *Easyriders.* Many of these articles originated in our own garages or those of brothers'.

Over the years, this book's popularity has been so great, that we've now taken it off the mail order rack out back and reprinted it for massive newsstand distribution—while we work on Volume II. Yeah, that's right, we're creating another volume of the finest tech tips we've run in *Easyriders.* So you'll have easy access to pertinent info when ya need it, an' ya won't hafta slop up those slick pages of the rag when yer up to your elbows in grease.

Since this book was created in 1983, the majority of the techs are designed to assist knucklehead, pan, and shovelhead owners. The bikes built from 1971-1983 were clean, simple, no-nonsense asphalt cutters. This book is dedicated to keeping them on the road with simple, time-saving ideas, articles that'll keep'em alive longer, and innovations for lasting performance. Toss in a coupla articles on simple maintenance, suggestions for how wrenchin' can be handled easily and the tools to do the job, and this becomes a rigid-framed bible.

Volume II goes just beyond this book to the later years and an emphasis on performance. Suggestions are made on how to keep shovelheads on the road, tire performance, and hopping up Evolution motors. With all the new technology, we've filled another milk crate with new ideas and upkeep options.

Many of these ideas come from you, the readers and veteran riders who are constantly testing the bikes and parts on rough roads and freeway lanes. Let us know when you come across unique ideas, and/or new ways to save time . And don't forget tools. Just the other day, Chris Schelb, from Kasilof, Arkansas, sent us shots of a wrench he heated and bent specifically to reach and adjust the troublesome clutch cable—it's a lifesaver. Keep 'em comin'.

—Wrench

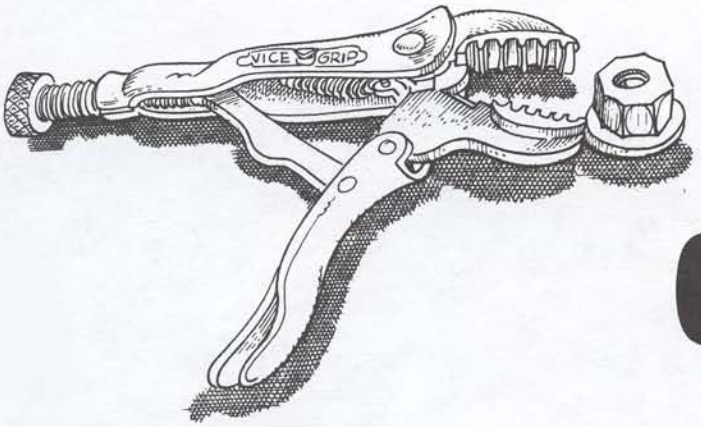


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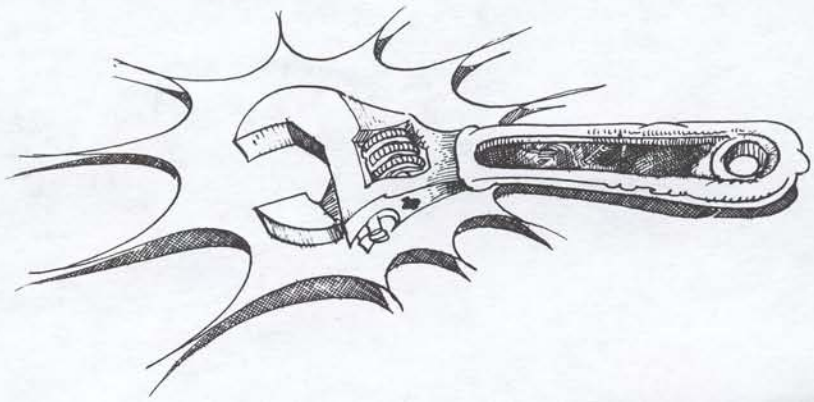
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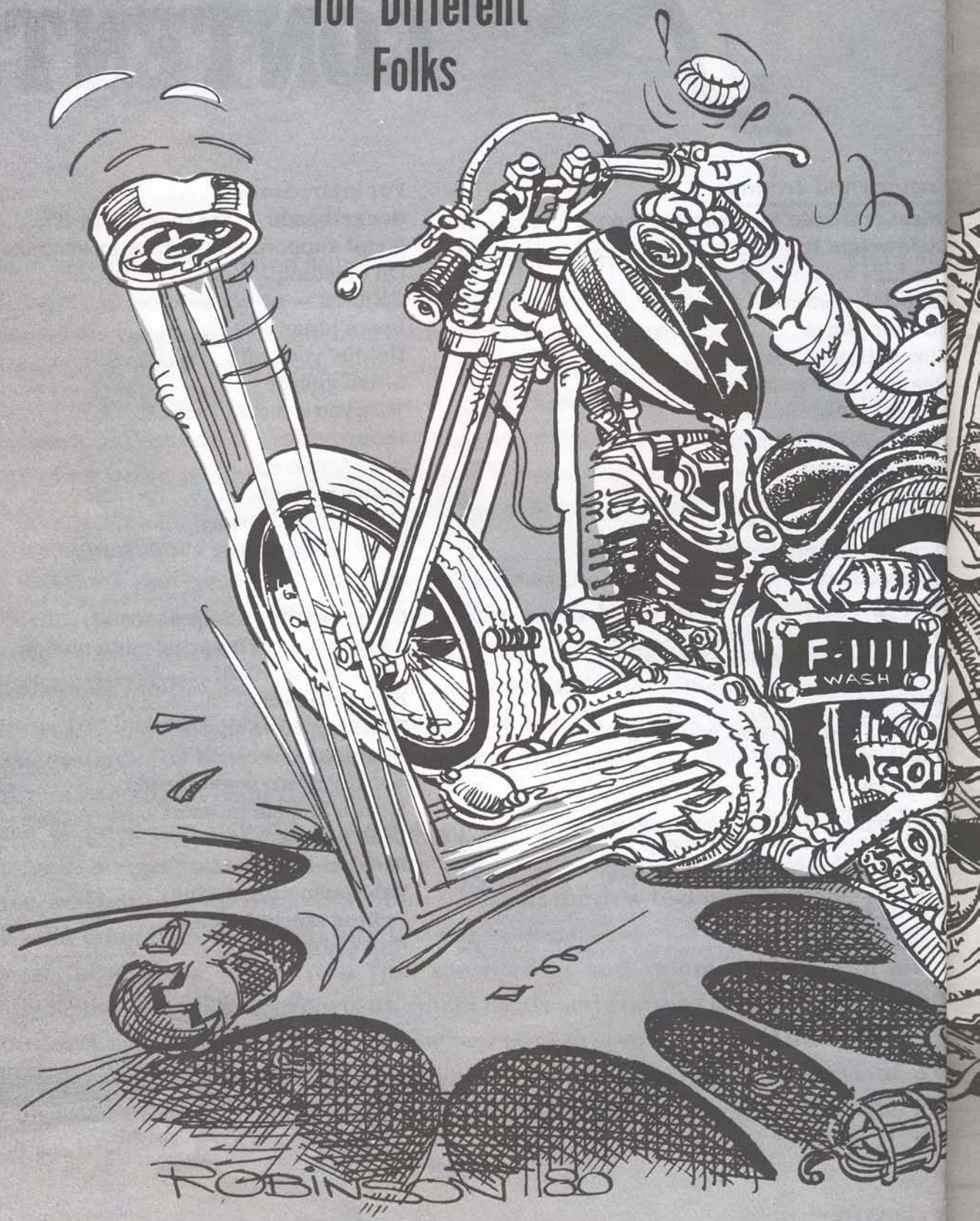
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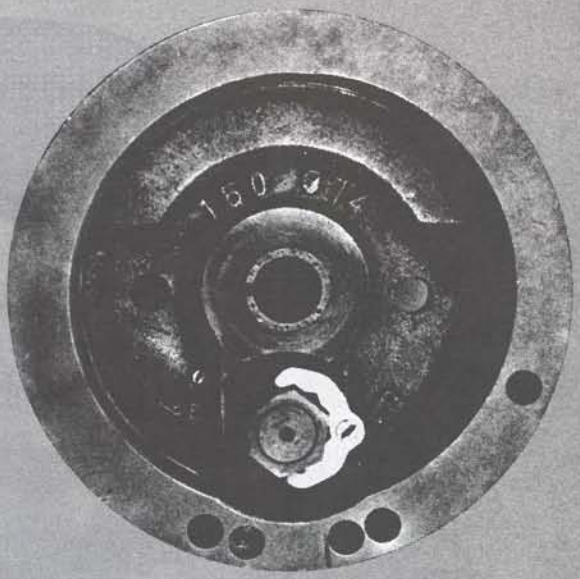


Different Strokes for Different Folks

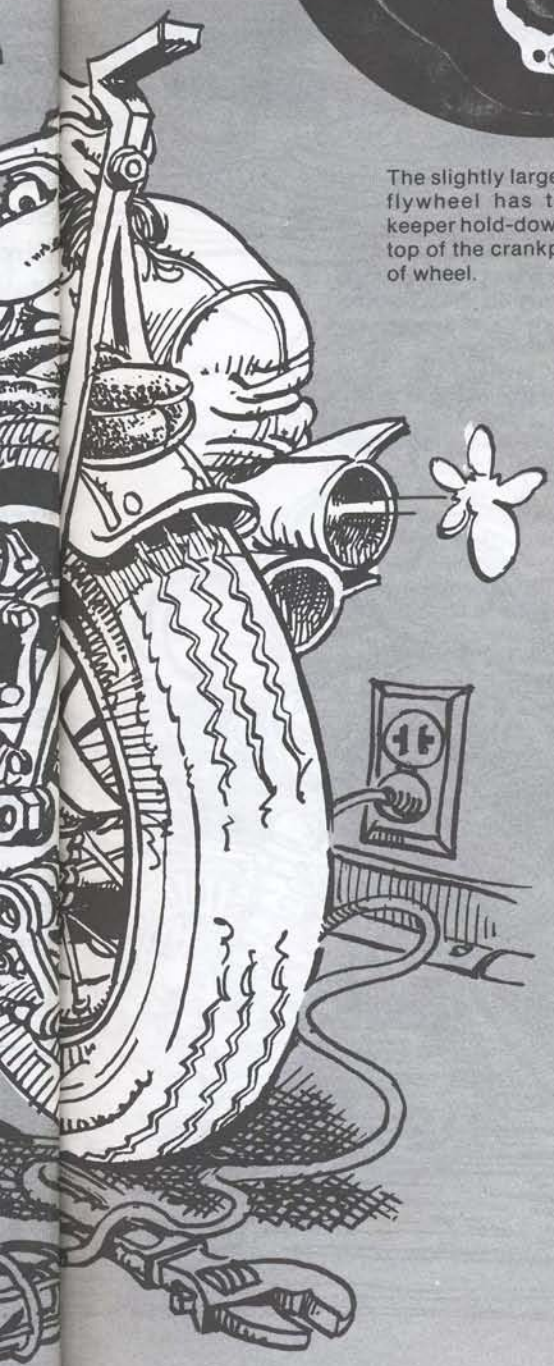




The slightly larger diameter 74 flywheel has the crankpin keeper hold-down screw at the top of the crankpin, near edge of wheel.



The smaller diameter 80 flywheel also has a crankpin keeper hold-down screw, but it is located at the side of the crankpin hole.



There are two basic ways of getting more power out of an engine once you have gone through the different hop-up routines. Redesign the engine with all the trick stuff, like overhead cams, all-alloy constuction, etc., or simply make it bigger. Since redesign equals all-new engine, a factory operation, going big, bigger and biggest is the hot setup for the individual.

Eventually, in every conversation about making Harleys faster, the subject of strokers comes up. You hear about the magic "Eighties" and "Eighty-sixes," and while most bull sessions are just that, bull, most of the stories told about the power, smoothness and sound of the big-inchers are true.

There are many methods of lengthening the stroke in a Harley engine, all the way from using offset crankpins in Harley flywheels to installing a set of new, billet, flywheels. The most common way of increasing the stroke of a 74 Hog, however, is using flathead 80 UL flywheels. This applies whether the engine is a knucklehead, pan, or new shovelhead.

Flathead 80 flywheels are fairly easy to come by, if you know what you are looking for. They aren't exactly common, and just where you are liable to find a set we can't tell you, but they are around. We can tell you how to recognize a set when you have them in your hands, though, and if you check out the photos and keep in mind the following three tips you, too, can go the big-inch route.

1. The 80 flywheels use a smaller crankpin than the 74s, and it is "stepped," with about a 1/16-inch shoulder where it fits into the wheel. This is not conclusive evidence that you have a set of 80 wheels, though, as the 61-inch Hogs use the same crankpin as the 80s.

2. The 80 wheels are 8¼ inches in diameter, while 74 wheels are larger, just under 8½ inches in diameter. This is not a misprint. The 74 wheels are larger in diameter despite having a shorter stroke.

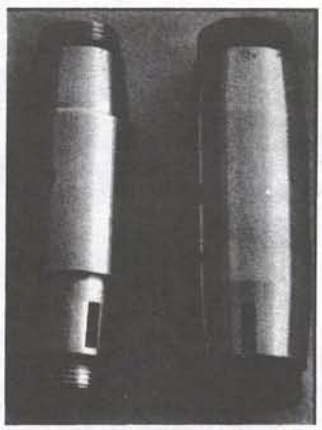
3. The final point is the clincher, and is shown in the photos. The 61 and 74 wheels have a crankpin nut keeper with the hold-down screw located toward the outside of the wheels. The 80 wheels will have the hold-down screw hole located at the side of the crankpin hole. ■


USDA
CHOICE

Different Strokes for Different Folks

"Where can I get a set of 86" wheels?" That's a good question. The answer is that you're not going to find a set. You're going to have to find a set of 80" wheels and modify them to 86". Then you ask, "Is it worthwhile, just for a lousy added six inches?" Answer: You bet your li'l ol' tuckus it is; not only are you going to pick up six inches, but you are going to have a crisper sounding and reacting engine, probably smoother, and you are going to definitely solve the wheel shifting problems that plague 80" owners.

The wheel shifting usually occurs when you drop the clutch on a revved-up engine. As you probably know by now, Harley wheels are two-piece and are connected and held in line with each other by a tapered crankpin — so, when your engine is turning up around 5000 or 6000 rpm and you drop the clutch, the left wheel has the same effect as if a brake were applied to it; at the same time, the right wheel tries to pass up the left wheel and as a result shifts relationship to the left wheel on the tapered crankpin. To cure this problem you should install a late model crankpin which has **crankpin with the stepped shoulder (see photo).**

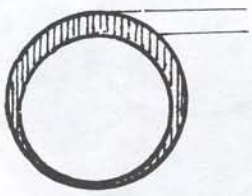


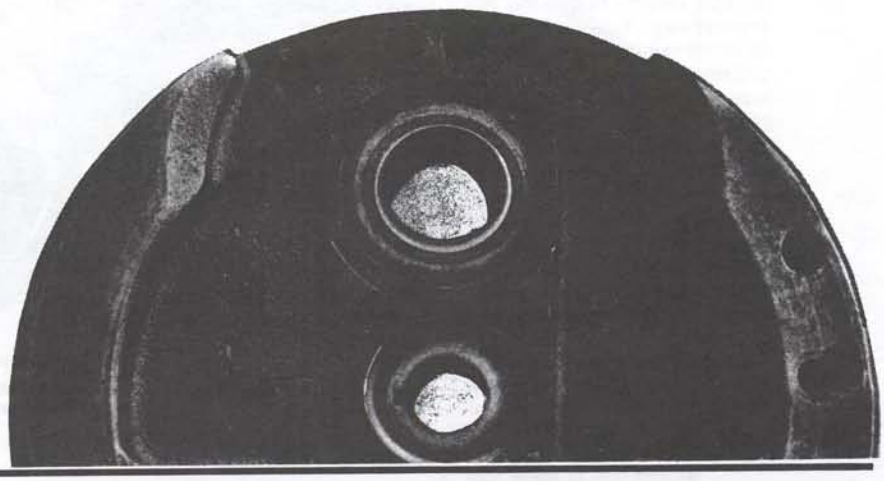
a larger tapered area than the stock 80".

To do this you will have to bore the crankpin hole in the wheels out to the larger diameter taper. Here is where the additional stroke comes to be — instead of boring on center you bore as far off center as possible toward the outside of the wheels (approximately ⅛"; see diagram). The ⅛" movement of the pin will actually increase your stroke by ¼"; i.e., your piston will travel ⅛" higher out of the jug and ⅛" deeper into the cases — which will of course require a thicker stroke plate and reclearancing of the skirt of the pistons to the flywheels.

If you've ever had a set of shifted wheels you already know how they chew up your case rollers, make your engine run out of balance, and make it impossible to focus your eyeballs at highway speed because of vibration. The magic number for Harley seems to be 86"; as for smoothness and power, even after moving the crankpin and lousing up the factory balance job, they still usually run smoother than a stocker. (I would recommend electronic balance after moving the pin; just remember to tell whoever is balancing it that it is a big-inch Harley and that you want it to run smooth at 2500 to 3000 rpm. They all think, it seems, that because it's a bike, you will be cruising at 5000 to 6000 rpm.)

The crispness of the exhaust is near unreal, and it remains distinctively Harley. The best part of the whole deal, though, is when you're riding with a bunch of the boys and at 80-90 mph you can just throttle it on and carry the front wheel about six inches off the ground with sheer torque until you've gone out of sight.





Different Strokes for Different Folks

Most guys misunderstand just what it is that light flywheels will do for engine performance. Because lightening of valve train components (such as valves, pushrods, cam follower) is effective in gaining additional rpm, it is taken for fact that a light set of flywheels will give the same effect. This is *not* true.

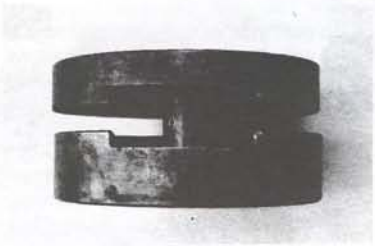
Light flywheels will not gain you any additional r's; what they will do is allow you to get your r's quicker. For example, let's say you have an engine that turns 7000 rpm max, and from a 1000-rpm idle it takes two seconds for the engine to reach 7000. Now, without changing any other components, you lighten the flywheels. The engine will still only turn 7000 max, but now when you crank wide open from 1000 it takes only *one* second to reach the 7000. (The figures used here are for the purpose of explaining the overall effect of light wheels; they are not intended for use as a guideline of what the actual benefits would be.)

I think the reason for light flywheels is obvious. You and a buddy are out riding. You have identical bikes: same goodies in the engine, same gears, same total weight. The only difference is that your buddy has lighter flywheels than you do. So you decide to get on the expressway. You both crank on at the same time to get up to cruising speed. Result: you lose buckwheat. Why? Because his engine gained r's quicker. Both bikes topped out at 130 mph at 7000 rpm, but he was an eighth of a mile ahead of you when you finally got wound up to 7000. Because he was going faster sooner, on a declining scale, he covered more ground in a given amount of time.

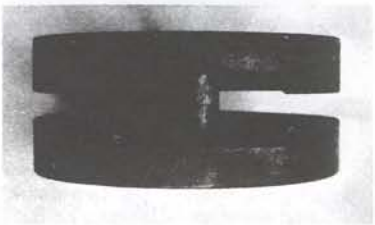
So why the hell doesn't the factory just put light wheels in stock machines? The answer to this comes under the heading of "You can't have your stash and smoke it too." The purpose of a crank is to take a source of power that is being hammered up and down (the piston) and convert it to power that goes around in circles (your wheels.) The purpose of a flywheel is to store and smooth out this power; and the heavier the flywheel, the better it does its job.

What this means to you is: (1) with light wheels you may have to get up a few more revs before letting your clutch out; (2) you'll be downshifting rather than lugging your engine; (3) you'll feel the pulsation of your engine more at a steady throttle. (1) and (2) can be overcome with big inches and horsepower to a point where they don't even exist; (3) will only be added to by inches and horses. But to my way of thinking, there's a hell of a difference between pulsation and vibration, even though both are definite opposites of smooth. I can live with a pulsating feel to a bike, but vibration drives me up the wall.

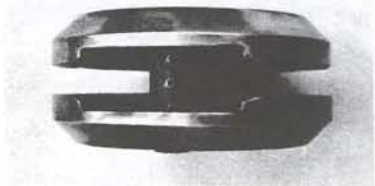
There are several ways to get light wheels into your engine. You can buy a set of new wheels, which come in all different shapes, sizes, and metals from many different manufacturers; or you can run two right-side wheels; or you can just start whittling on your stock ones. But if you start whittling, use your head, don't get so close to crank-pins and what-have-you that you'll cause a failure. And keep in mind that your wheels have to be in balance when you get through. Whenever you start removing more metal from one side of the wheel than from the other, the balancer is going to have to drill holes opposite to bring them back into balance and if you're not careful, you can make this job impossible (see photo).



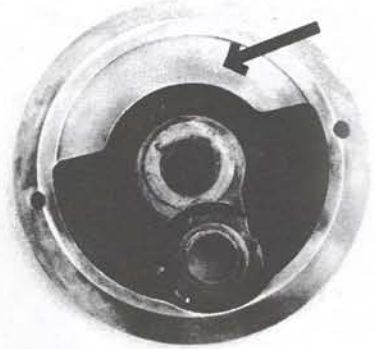
Stock flywheel.



Two right-side wheels.



Shaved flywheel.



Weight removing must be in balance. Do not machine into this counterbalance.

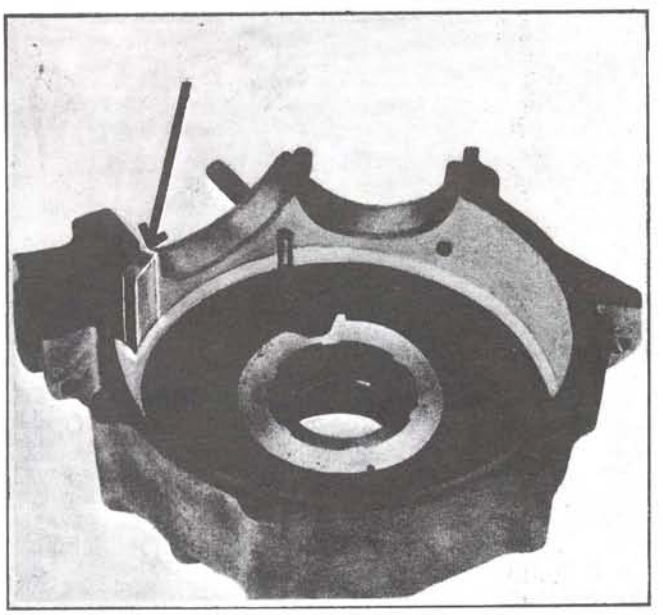
Different Strokes For Different Folks



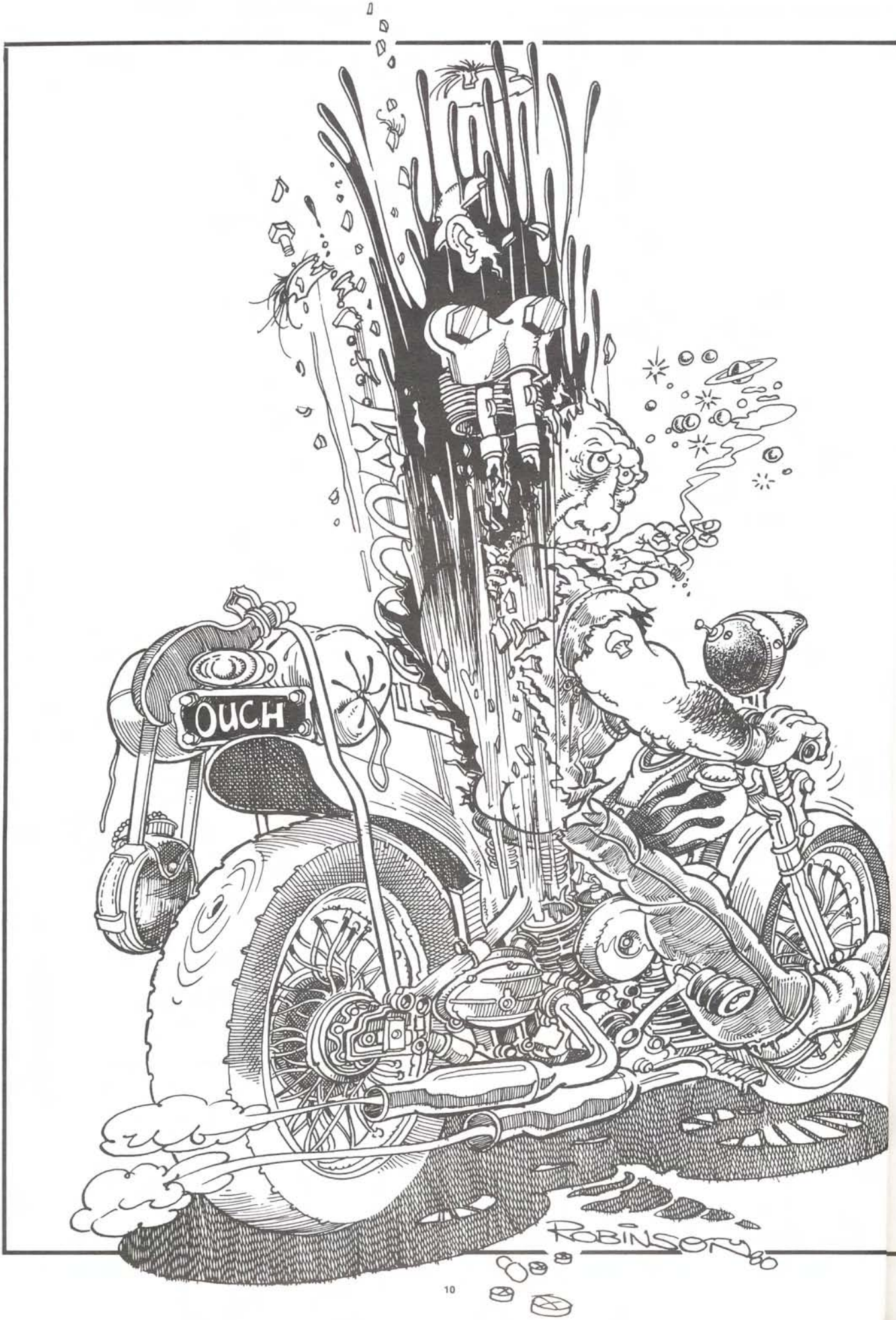
The one thing that is overlooked more often than any other by the amateur engine builder (when building a stroker) is the installation of scraper plates. As a matter of fact, probably 25% of the strokers running around today are doing without them. If you happen to know someone who is belching oil smoke out of the rear cylinder and fouling plugs as if he had a two-stroke, you might do him a favor by showing him this article.

To understand what scraper plates are and why you need them, you should first be aware of how a Harley 74 oil system works. The thing we're interested in right now is how the oil gets back out of the crankcase after it has been pumped through all parts of the engine and has accumulated through gravity in the lower end. The answer is that the oil is picked up by the spinning flywheels and then scraped off by a ledge at the rear of the cases. It then runs through an opening cast into the cases and over to the oil pump, where it is pumped back up into the oil tank for cooling and recirculation. All this is great and works just fine, except that when you use a set of smaller-diameter 80 wheels — approximately ¼" smaller in diameter than the 74 wheels (see June '71 Easyriders, p. 46)—you have a ⅛" gap through which the oil can slip, and slip it does—it slips past the scraper and flies off the wheels at the next big opening, the rear cylinder. The result is more oil gathering on the forward wall of the rear cylinder than your oil ring can fight; this, in turn, causes the rear jug to smoke and foul plugs.

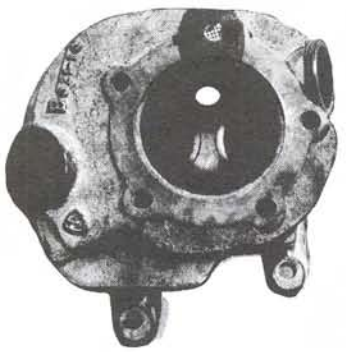
The answer, of course, is to build the ledge out to meet the smaller-diameter flywheels, restoring them to their stock relationship to each other. This is done by welding two small pieces of aluminum into the cases and then machining or hand-working them into shape. (These are called scraper plates, but they do not actually scrape the wheels —.020 clearance should be allowed, to be safe.) ■



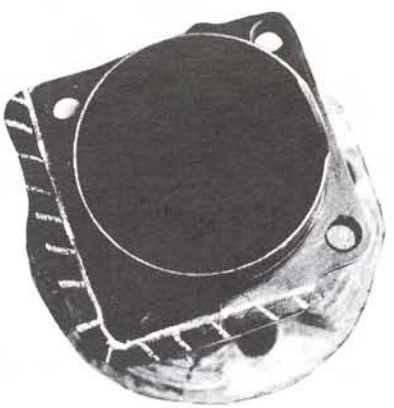
Weld scraper plate in and machine to stock clearance to prevent over-oiling of rear cylinder


OUCH
ROBINSON

Different Strokes For Different Folks







Knucklehead owners building strokers have a problem that could prove to be fatal, enginewise, but this bummer can be prevented by using panhead barrels rather than the stock ones.

Knuckle barrels have in most cases, because of their age, been bored out to at least 50 over when you get hold of them, and usually require a cleanup bore to 60 or 70 over. I personally wouldn't even trust a set of 10 over on a healthy stroker, and I guarantee that barrels bored 60 or 70 over will blow sooner or later. And when I say blow I mean like *boom*, man. I've seen entire barrels, pistons, and sometimes a chunk of the cases just disappear, leaving a gaping hole in the engine, the heads left swinging from the top motor mount. Usually the rider lucks out and doesn't catch any of the shrapnel, but I have dug metal out of one unlucky dude I know — and he was wearing leathers at the time, or it could have been worse.

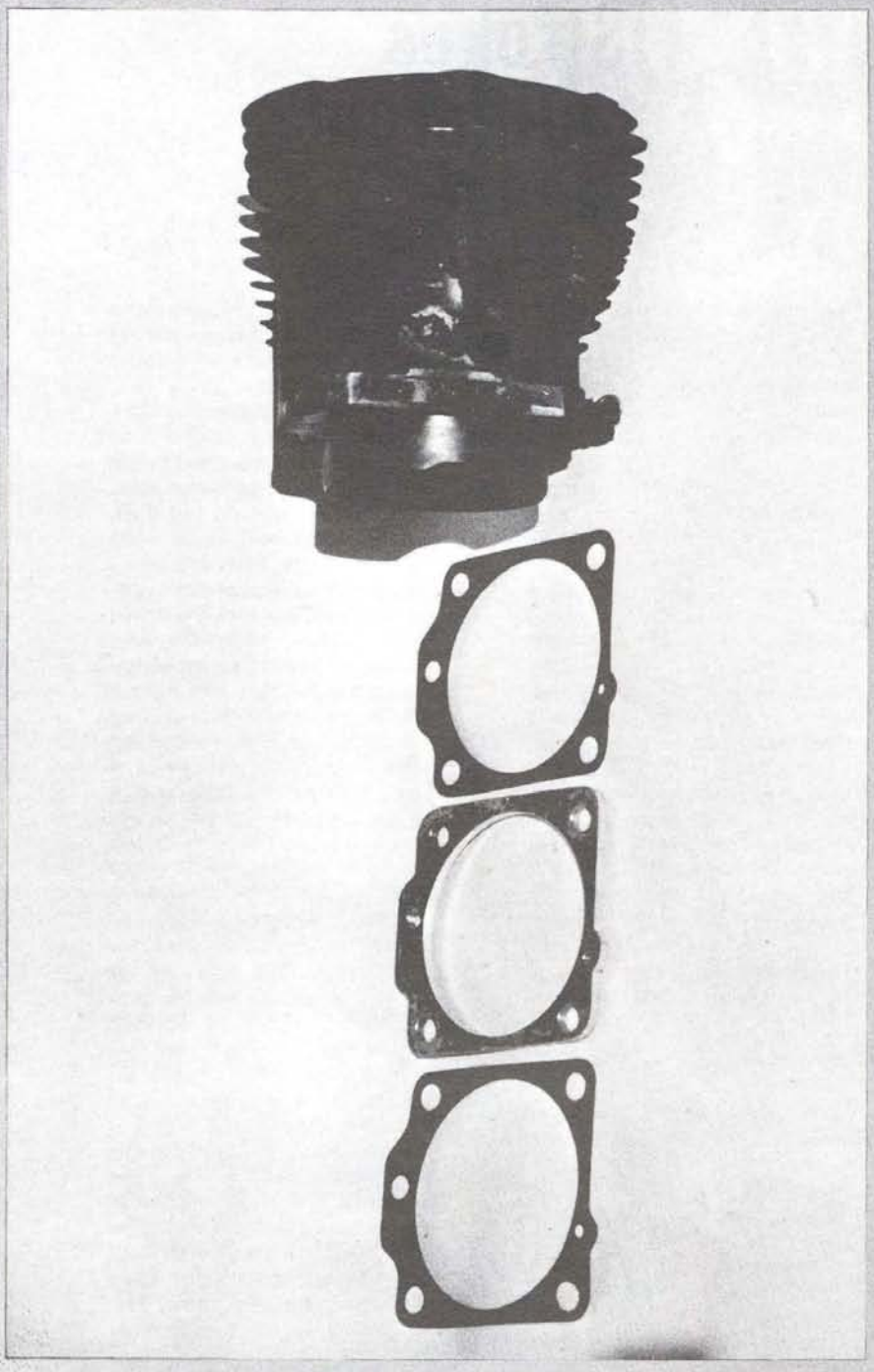
By now you have probably guessed that my advice is to shine on the knuckle barrels and get a set of panhead jobs. Installing a set is no big deal, but it does require a little machine work. First off, you'll find that only four of the headbolts match up with the holes in the head; the fifth bolt misses by about its own width. The best way to get around this is to run a headbolt down into this hole and cut it off flush with the surface of the head. If you can find a screwed pan barrel, you can cut off the top of the jug and use it for a drill fixture; if not, make an accurate template of the top of a good pan barrel. And be careful. *Don't* use a head gasket for a template! Drill and tap for 7/16 x 20 panhead bolt (knucklehead bolts are of oddball thread size and you'll play hell finding a tap). Next, the lip on the top of the pan barrel has to be taken down flush like that of the knuckle. You can do this trick with a hand grinder, but be cool and don't screw up the gasket surface. Don't sweat the oil holes in the pan barrel; you don't need them, but they won't do you any harm. The last thing is for appearance only, and that is to trim the rear jug around the base to match your cases.

With a set of pan jugs installed, you can be fairly certain you're not going to scatter an expensive mill because of a jug giving up, and you can safely bore to 60 over if you have to.

—Joe Teresi

Pan Barrel On A Knucklehead

There's a trick to it



To the owner of a tired, smoky knuckle, the idea of using pan barrels must sound like a reprieve from death row — well, maybe not quite. But a knuck jug is one of the worst pieces the factory ever made: some of 'em are practically useless after .030 over. How many times has your ride been turned into a bummer by a dull clanking noise? Like the one a barrel makes when it breaks off at the base. So you find a set of pan units and start over. After all, all ya gotta do is move that fifth bolt and cut the lip off, right? Takes 2 hours and 17 beers — almost.

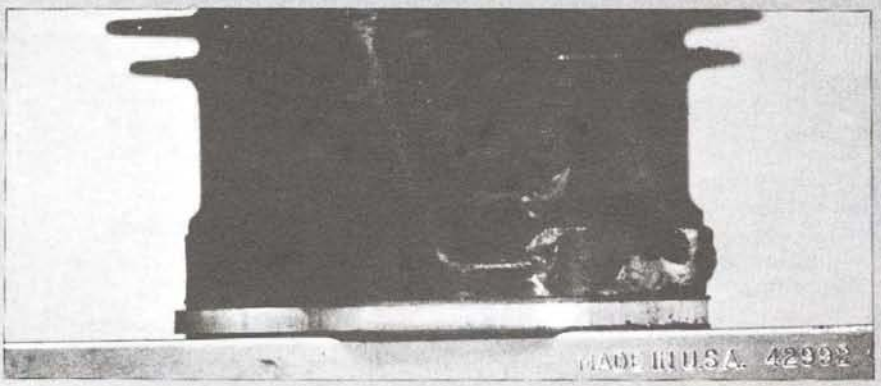
But that's only stage one. There's another problem. If you put it back together the way it is, everything will trash itself when you ride it. The expensive noises you hear will be the pistons, valves, and heads playing Russian roulette for keeps.

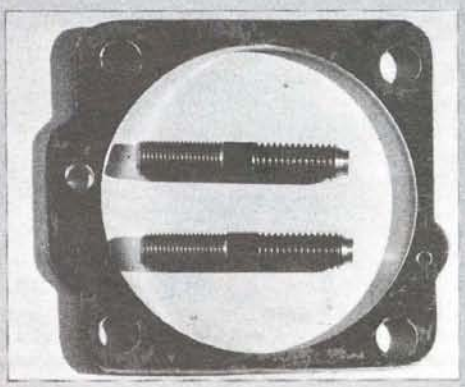
The cure is very simple: You need a few more parts. They're cheap (under $20) and easy to find (S & S Cycle has them). The reason for these pieces is obvious if you put a pan barrel next to a knuck barrel on the edge of a table (let the mouth hang over the edge so the base flange is flush with the table top) (1). The knuck is taller, .205 inch, to be exact. So the pan is too short. So the piston is a lot higher in the barrel. So it tries to take out the valves. Get a pair of 3/16-inch stroker plates for a pan, an extra pair of base gaskets, and a set of longer cylinder base studs. The plates plus the extra gasket total just about what you need (.1875 inch plus .020 inch = .2075 inch). Put one base gasket on each side of the plate, of course. Your manifold, motor mount, and pushrods will still fit. Remember, the pan barrels alone are too short.

If you have the urge for more surge, you can get away with a 1/8-inch plate for slightly more compression. Best check your clearance with a piece of clay on the piston dome before running it hard, though (if you haven't done this before, ask a hot-rod buddy). That'll add about 3/4 of a point of compression to an FL motor.

Now, who do you know that just put a shovel top on his tin-can motor, and is hurtin' for bucks? Buy him a beer before you ask for his old jugs; he'll be in a better mood.

—R. Dunn





Pistons For Flathead 80s

Tired of paying close to a hundred dollars for a set of pistons and rings for your flathead 80? How does less than ten dollars per set sound? That's what they cost when we bought three sets, less than a year ago. The only problem is that the cylinder must be bored .010" over to accommodate the standard size. If you can locate the pistons in oversize stock, there's only the problem of boring to be considered, but if the old 80 is quite a bit oversize in bore, it must be re-sleeved back to stock. Here's how it's done.

The pistons we used are stock Chevrolet Corvair Silv-Lite #6-1417, 3⅜" Std. They're manufactured by United Eng. and Machine Co., 310 Preda St., San Leandro, Calif. Rings were Pacific Piston #6497, and came in a set, which also includes wristpins.

As mentioned before, the cylinder must be bored to .010" over if the standard Corvair piston is used. The Harley-Davidson wristpin bushing must be reamed out to approximately .801" since the pin measures .8005". Once close, ream to fit.

Wristpin keepers are not used with this piston. Chevy presses the wristpin into the wristpin bushing. Consequently, it's best to



make either aluminum or Teflon plugs that press into each end of the wristpin. They graze the piston walls and prevent the wristpin from slipping to one side or the other. The inserted end of the plugs should be a tight fit into the inside diameter of the wristpin. The protruding portion need only be machined to the size of the outside diameter of the wristpin. With plugs tightly in place, the overall length of the pin and plugs assembled should be approximately .005", less than the bore. Teflon may be a hassle to locate, but usually a well-stocked machine shop will have it or know where to get it. They should have no problem making the buttons for your wristpins if you have no lathe available.

The Corvair piston is of the permanent-mold type, far better than any motorcycle piston manufactured today, and it is of the "slipper-skirt" design. One-eighth inch must be machined off the tip of each skirt to allow for flywheel clearance.

Assemble the pistons on the rods without rings. Then slip the barrels over the pistons and rotate the engine to make sure the pistons don't hit either the flywheels or themselves at BDC.

Piston should be fitted to cylinder with .003"-.004" clearance, and once installed should never have to be replaced.

—Watson

Knurling Pistons

With the price of factory-made Harley-Davidson pistons nearing one hundred dollars per set, they're becoming as costly as gold caps for teeth. Since aluminum wears much faster than cast iron, the aluminum piston becomes an earlier target for remedial action.

The trick of knurling piston skirts has been around for a long time, but few who perform their own surgical repairs on their scoots ever use it as an adjunct to engine survival. There are drawbacks to this process, though. Usually, when friction between the piston and cylinder walls amounts to excessive wear and the bike begins to smoke or lose compression, the owner bores the cylinder and replaces the piston, re-establishing the once-close tolerances. Knurling is the cheap way to stay on the road for a short period of time. If we analyze the process of knurling, we find that it amounts to an effort to obtain the effect of puffing up or enlarging a worn-out piston skirt. But it won't last. It's a temporary way of keeping the ol' mill alive for another 500 to 1000 miles if you're out on the road. Methods of knurling are simple enough that the service can be performed right in your own back yard.

The simplest way to get a piston knurled, of course, is to take it to your local machine shop and have it done by what you hope are experts, making sure that they knurl only the front and back side of the skirt, where wear normally occurs at a point ninety degrees to the wristpin.

If piston-to-cylinder-wall clearance is, for example, .007", have the machinist enlarge the diameter of the piston by that amount. If the knurling exceeds the requested amount, there is no harm done. Simply file or sandpaper the knurl lightly until—using a feeler gauge—you reach the proper clearance. Install new rings the same size as the originals and re-assemble.

If both piston and cylinder are worn in excess of .008", install .010" oversize rings, making sure that the end gap is no less than



the required .012". The ends of the rings can be filed or ground, so long as care is taken to insure their being square with one another. A larger end-gap will cause over-oiling and contribute to smoke from the exhaust, as well as sparkplug fouling.

To knurl pistons at home, nothing is needed other than two fairly new bastard files, a bench vise, and a ballpeen hammer.

Place the files in the vise, pointing in opposite directions, with the piston held snugly between them. Very little pressure is required. Too much pressure may distort or even crack the piston.

Once things are in place, lightly tap first one file tang and then the other. The piston will rotate between the files, leaving a cross-hatch pattern in the aluminum wall of the piston, which presses the metal outward, thereby increasing its diameter. (See photo.)

While the heads are off the motorcycle, it's always a good idea to remove the valve springs and reseat the valves. If no valve-grinding equipment is available, simply lapping them, using an abrasive lapping compound available at all auto supply stores, will work just as well but may take a bit longer. Make sure to wash thoroughly before reassembly.

Most auto repair shops carry tools for knurling the inside diameter of valve guides, so before replacing worn guides, it's best to check on this, too.

If the valves feel somewhat loose in the guides, and no knurling facilities or funds for new guides are available, buy a set of Chevrolet valve seals and slip them over the valve stems when reassembling the heads, being sure to lubricate every part thoroughly. Valve seals are nothing more than small "O" rings that have a tendency to cut down on excessive oil seepage along the valve stem during operation.

Clean your valves before reassembly, but just wire-brush off the soft carbon. Buildups of hard carbon act as an insulator, and will keep the engine from overheating until a new layer of carbon is formed.

Remember, this is backyard stuff, although it really works. If you have the bucks and can afford to have the work done, great. If not, these techniques can keep you on the road until the green flows again.

—Watson



Different Strokes for Different Folks



Do stroker plates alone do anything to add cubic inches to an engine? Do they increase the horsepower? The answer to both questions is no. As a matter of fact, just throwing a set of plates under your barrels without doing anything else will lower your compression and horsepower.

Stroker plates are deliberately used in sections of the country where premium gas is not available — deliberately used, that is, to lower the compression ratio and prevent pre-ignition knock. Another situation where stroker plates alone may be used is with the installation of can barrels on a knucklehead engine—but that's a different story. (Then, of course, there's the guy who uses a set just to make people think he's got a stroker; he will naturally be found out the first time he goes "off" with someone and gets gobbled up.)

The reason for using plates with stroker wheels is to compensate for the additional travel of the piston; i.e., you have installed a set of UL wheels and gained approximately an additional ¼" stroke. This means that your piston is going to travel ¼" further than it did stock—⅛" deeper into the cases and ⅛" higher out of the cylinder. (See diagram.) The additional ⅛" travel into the cases is taken care of, because the UL wheels are smaller in diameter than the 74 wheels (June Easyriders, p. 46). You must check this to be sure of enough clearance, since skirt lengths on pistons do vary. Be sure, also, to check the clearance between the front and back pistons at the bottom of the stroke: 99% of the time the skirts will kiss. Once you get everything clear down below, remove another .030" for heat expansion.

With this out of the way you can concentrate on doing something about the pistons where they are sticking out the top of the jugs. This is where you slap on the stroker plates—⅛" thick—making sure you have all oil holes (if any) lined up. With this done, your cylinder-top/piston-top relationship is back to where it should be.

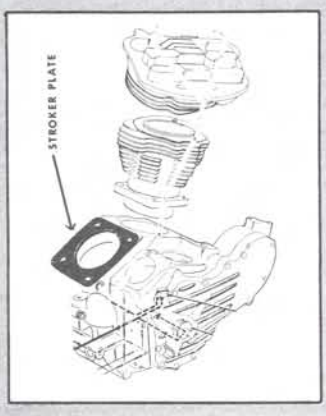
I know what you're thinking, but don't do it! Sure, if you left the piston sticking out of the hole and up into the head further, you'd gain compression — right? Right. But here are four good reasons why you shouldn't:

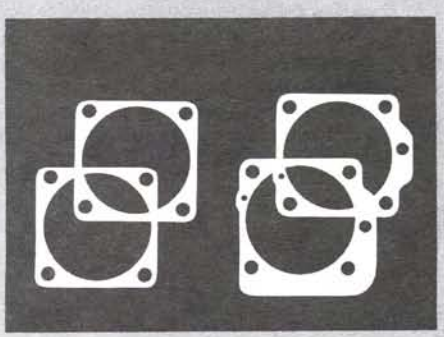
1. Consider the fact that your stock valves with a stock cam are going to run into the top of the piston. Yes, you can machine the valve pockets deeper so your stock valves will clear—but what about those big valves and that hot cam with high lift and more duration? You're going to need them to feed the big-incher, and by the time you machine deep enough for these additional goodies you'll have a hole in the top of your piston—or you will certainly burn some in a hurry once you get jammin'.

2. The top ring gets up too close to the combustion chamber, and you'll burn hell out of it in no time at all.

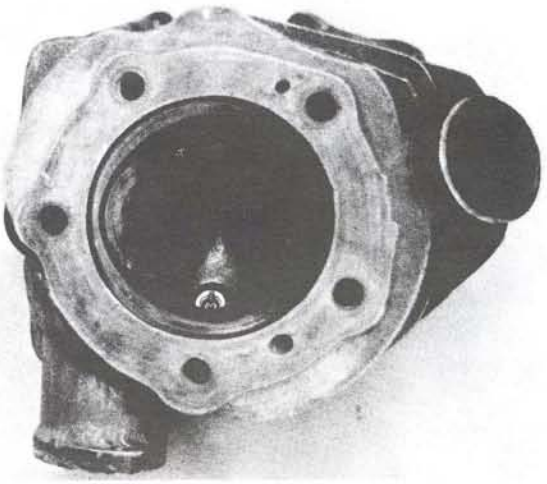
3. You just added approximately three cubes per cylinder, and you're pushing it into the same size combustion chamber that you had stock. This means that when using late model FLH pistons (stock 9½:1) you have a pretty healthy compression ratio—and without a lot of added nonsense.

4. If you're a compression freak, then you should buy a set of high compression stroker pistons, which come with short skirts and relocated wristpin holes. These even eliminate the use of the stroker plates (except that, with a set of ¼"-stroke wheels, any more stroke than ¼" will require the use of plates also). I, personally, do not prefer the short-skirted stroker pistons; they tend to rock and slap because of their short overall dimensions and will consequently gall and seize.

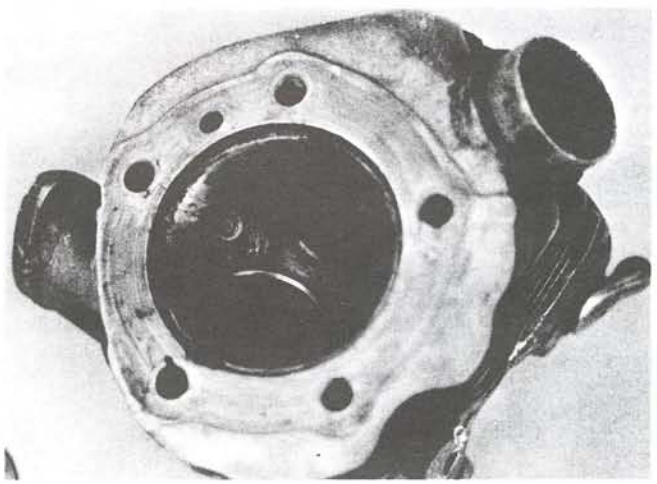




Different Strokes for Different Folks



Big valves are helpful, but you can overdo it. Photo shows 74 head with 1-15/16" intake and 1¾" exhaust, a good all-around combination.



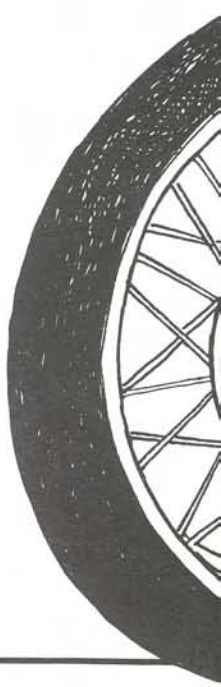
Ports and seats should be as large as possible in relation to the valve being used. Note thin seats.

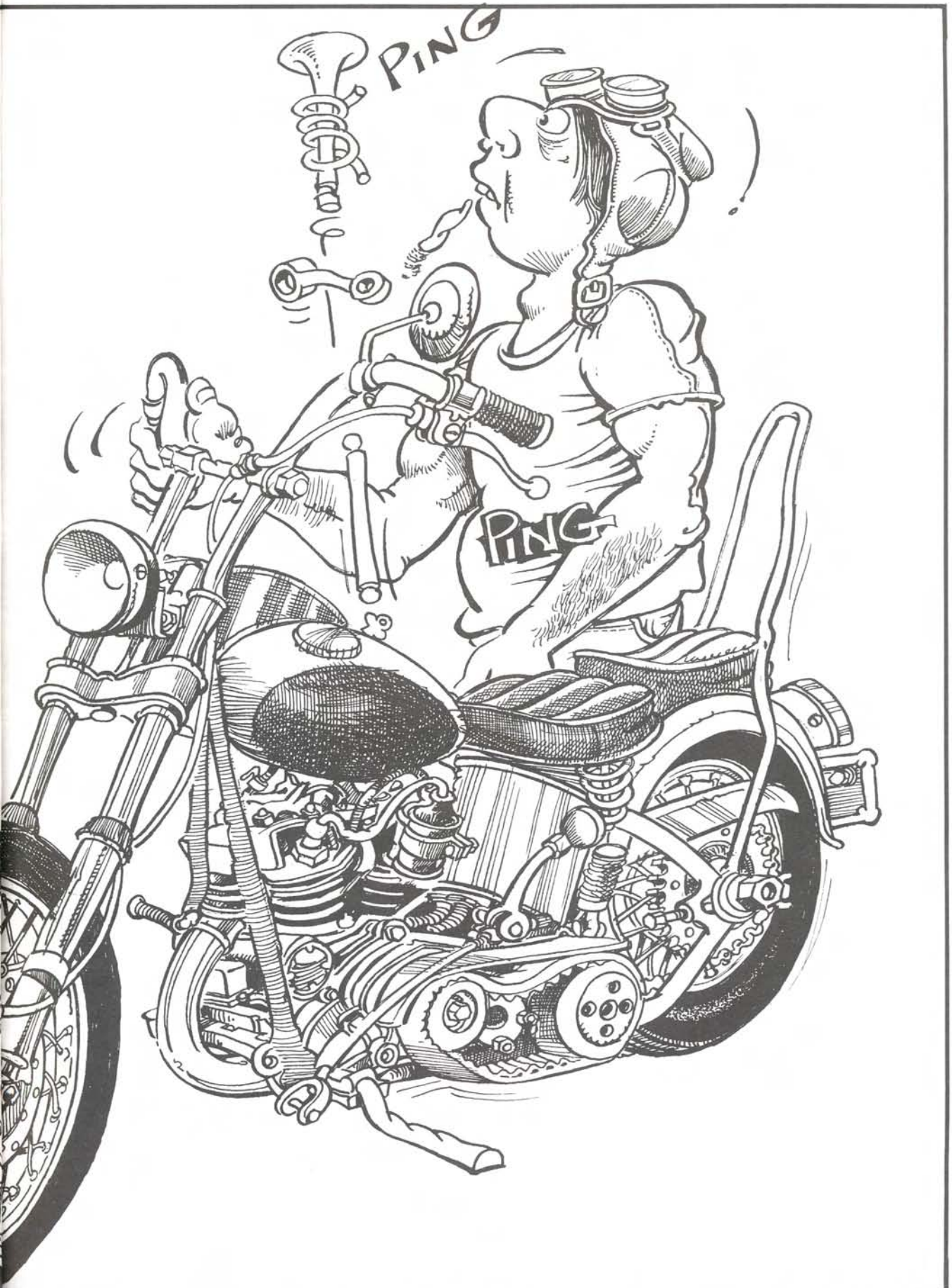
Big valves are an important part of a stroked engine, but more often than not builders go overboard with the big-is-good-so-bigger-must-be-better line of thought. There are other things to consider, such as cam lift, overlap, and timing. A too-large set of valves limits you as to how wild a cam you can run, because of clearances (valves touching each other or the piston). The best combination I've been able to find is 1-15/16" intake and stock 1¾" exhaust.

Now, it might seem that if you have a large intake, you should do something for the exhaust too, but the fact of the matter is that in a Harley 74 head all that seems to happen when you use a large exhaust valve is that you block the exit of the expanding gases that are being forced out (it does help to open the port up and run a thinner seat), whereas the intake charge is drawn in around the valve on the downstroke of the piston, and an oversize valve does a hell of a lot better job getting the mixture into the engine.

Another thing that is sometimes done—a downright stupid thing—is installing big valves without enlarging the ports or seats. This will only lose horsepower. The function of a large valve is to stop up a large port at the right time and allow the engine to go through its four cycles. A big valve by itself doesn't do anything but block the entrance and exit of mixture and add weight to the valve train.

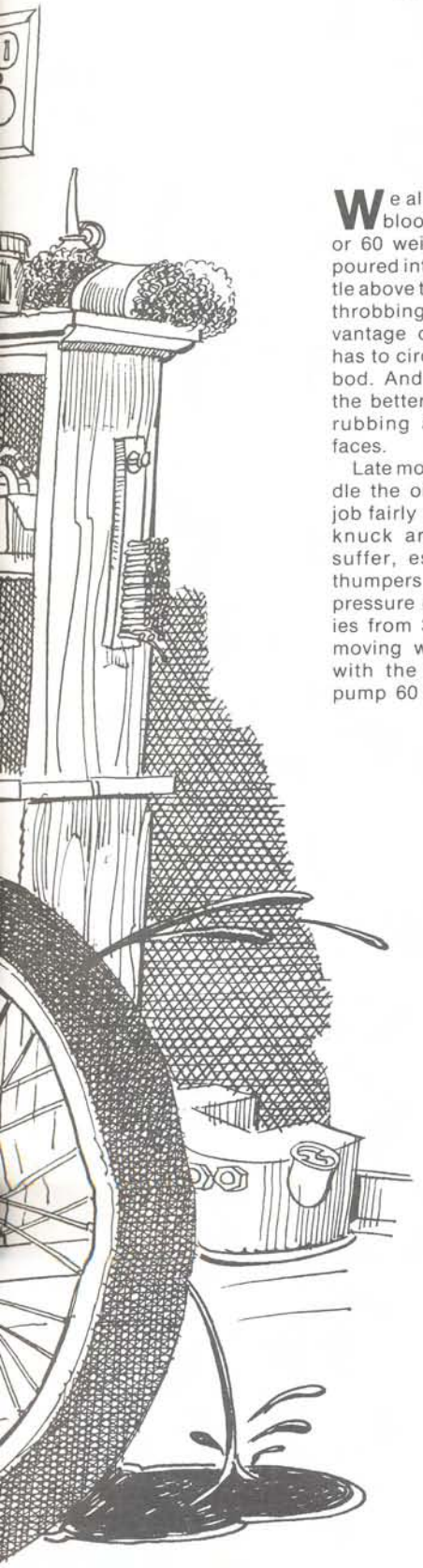
When choosing oversize valves, keep in mind that you want the lightest in weight but strongest valves you can get hold of (never run an intake valve for an exhaust or vice-versa). Spare no expense in this area: A snapped-off valve head at around 7000 r's can really make a mess in the cylinder. ■




PING
PING


Robinson

CIRCULATION BOOSTERS



We all know that a 74's life blood is that gummy 50 or 60 weight oil that's slowly poured into the chrome oil bottle above the tranny. But for the throbbing engine to take advantage of its slipperiness it has to circulate like blood in a bod. And the faster it moves the better for all those metal, rubbing against metal surfaces.

Late model cone motors handle the oil flow and pressure job fairly well. But the ol' pan, knuck and flathead motors suffer, especially when the thumpers get warm. The oil pressure on early motors varies from 30 pounds to barely moving when hot, compared with the late models which pump 60 pounds down to 30 once the engine heats up. But there are a couple of possible solutions for early mills.

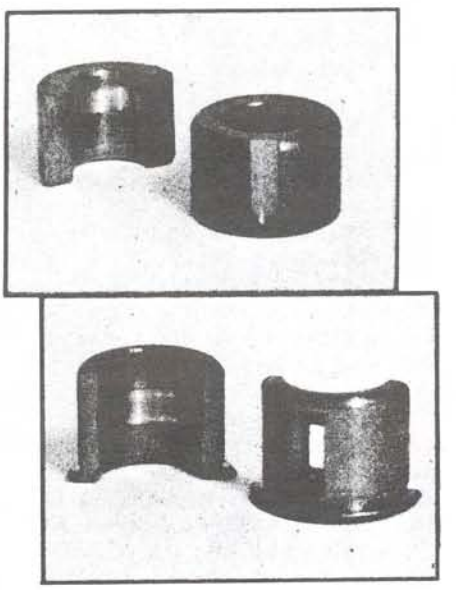
During a rebuild a constant flow pinion shaft bushing can easily be installed in a flathead, knuckle, pan or early shovelhead engine. Shown in the accompanying flicks are the two brass bushings (1). The one without the lip fits flatheads, knuckles and pans to early 1953, 74s and 61s. The one with the lip fits late 1953 and later motors. The way the theory goes is that pinion shafts have only one small orifice in the side of the shaft as it protrudes into the cam cover. The bushing also has only one opening. Consequently oil flows to the lower end only once in every complete revolution. But the bushings shown here are machined so oil is flowing around the pinion shaft constantly, thereby allowing direct flow to the crank pin and bearings. The bushings run about eight bucks and are manufactured in Culver City, California, at H.E.S. Performance Products. And your local Hog shop should be able to replace the old with the new in the cam cover in a matter of minutes — 'course you know how that usually goes.

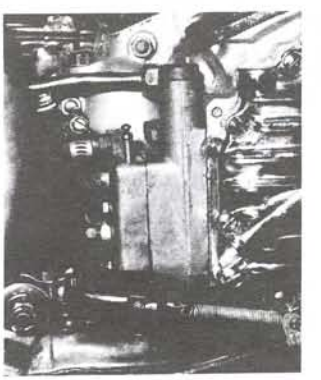
Any means to increase the overall oil pressure would increase the amount of crude generally pressed between all those moving hardened surfaces. On knuckles, pans and early shovels there is an easy possiblity for increasing oil pressure. Simply replace the early pump with the late model shovel pump (2).

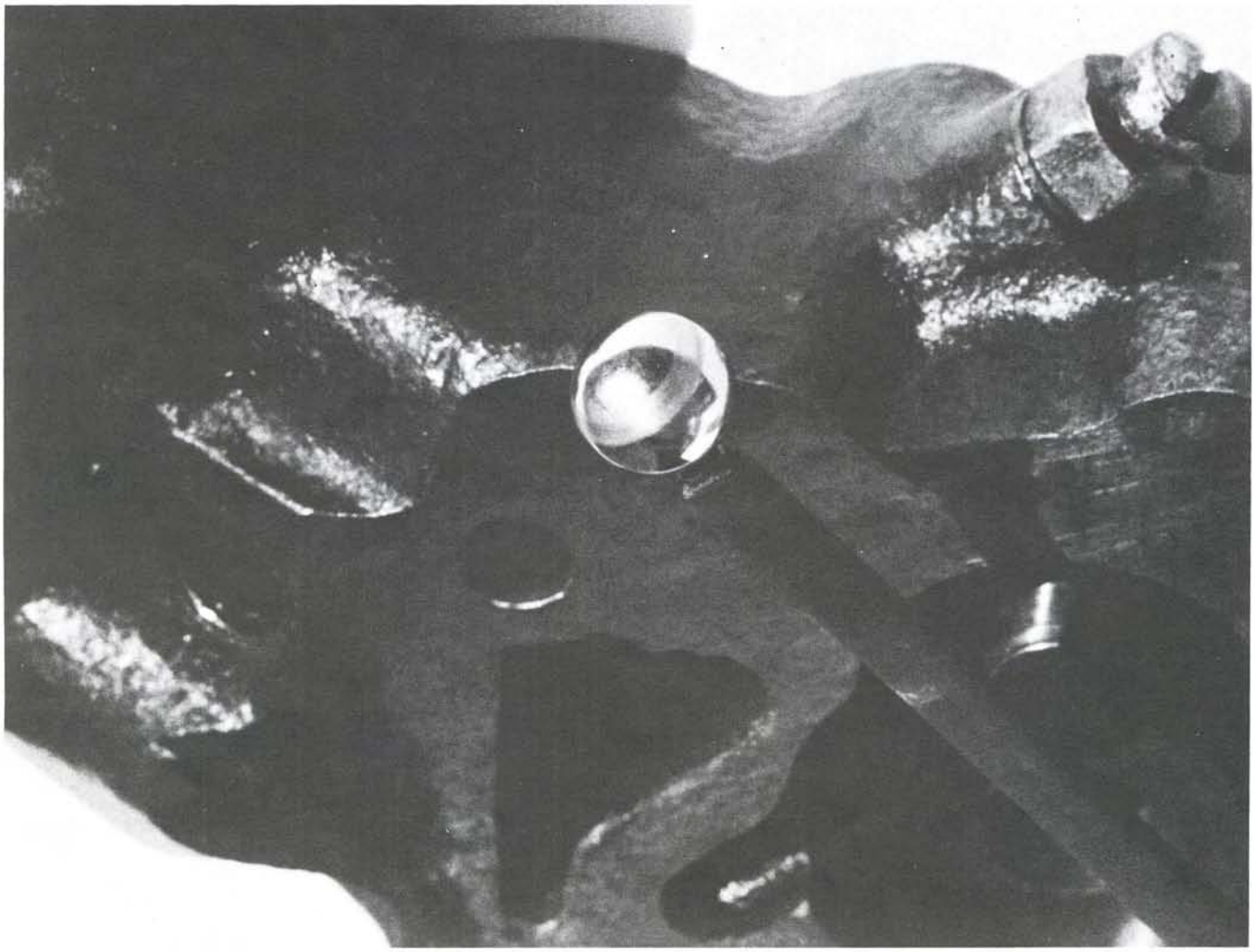
The difference between the cast pump of the past and the newer alumimnum one is basically the size of the gears used, the size of the passages and heavier check ball springs. So if you can cop one of the aluminum pumps with studs and bolts, the shaft that slips into the gear case and a couple of gaskets, then it's just a matter of replacing one with the other. But be careful that the gasket lines up with the oil passages correctly. Also be certain that the pump shaft spins freely in the engine. Then as you tighten the new pump into place, unlike the old, it can only be tightened to 70 *inch* pounds. Any tighter can and will damage the pump body.

That's it, it now costs so damn much money to rebuild, it sure as hell doesn't hurt to assist the life of your mill any time you get a chance. Ride safe.

—Weed







Oil Pump Check Valves

Is there a small lake of oil under your 74 from sitting overnight? Are the major oil companies hitting you up for drilling rights while you're spending a couple of bucks a quart for the life blood of every Big Twin? On late-model oil pumps, '68 and up, the round tower that sticks up out of the oil pump body is for controlling the gravity flow from the tank. On early-model pumps, this check valve is on top of the oil pump body. Under this cap is a spring and slide or check ball. This check valve has to seal against a seat at the bottom of the tower. When it doesn't, and the bike sits for a while, gravity forces the oil past the check valve into the engine. This oil loads up the lower end and comes out through the crankcase breather into the primary. If the bike has tin primary covers, the oil usually ends up on the ground.

The easiest way to find out if this is the problem with your Big Twin's heart is to remove the check valve and see if there is any dirt or foreign material on the valve seat. Next, inspect the check ball or slide. Check balls are better than check slides because slides can hang up against the sides of the pump body, causing oil to drain from the tank into the engine. The ball should be replaced if there is a groove worn on it. Before dropping the check ball back in and letting it go at that, you should check out the valve seat, because if it isn't right, oil will still leak even with a new check ball. The pump body should be removed, disassembled, and cleaned. Then relap the seat with some fine lapping compound and a tool made from an old check ball with some good surface area. The lapping tool in the photos was made by Dave Presly. You can make one by touching an electric welding rod to the old check ball on about 65 amps, using a buzz-box welder. Now smear a small amount of lapping compound on the check ball and insert it into the tower. Spin the electrode between the palms of your hands as if lapping a valve in a head. When you pull the tool out, wipe the check ball off and see if you get a consistent seat pattern. A couple of spins should do it. Clean the pump body, making sure to remove all the lapping compound. Replace the pump and keep the oil where it will do the most good — in the engine.

—Wrench

Making Every Noise Count



For those of you bros who own shovelheads from 1966 to today, you've had to notice a ticking noise from your top end. This noise might vary in sound from something like a loose, vibrating bolt to *the piston* trying to bust its way out of the plug hole. About eight-and-a-half times out of ten this teeth-gritting tapping can be traced to the rocker box, or more specifically, the end play of the rocker arm inside the rocker box.

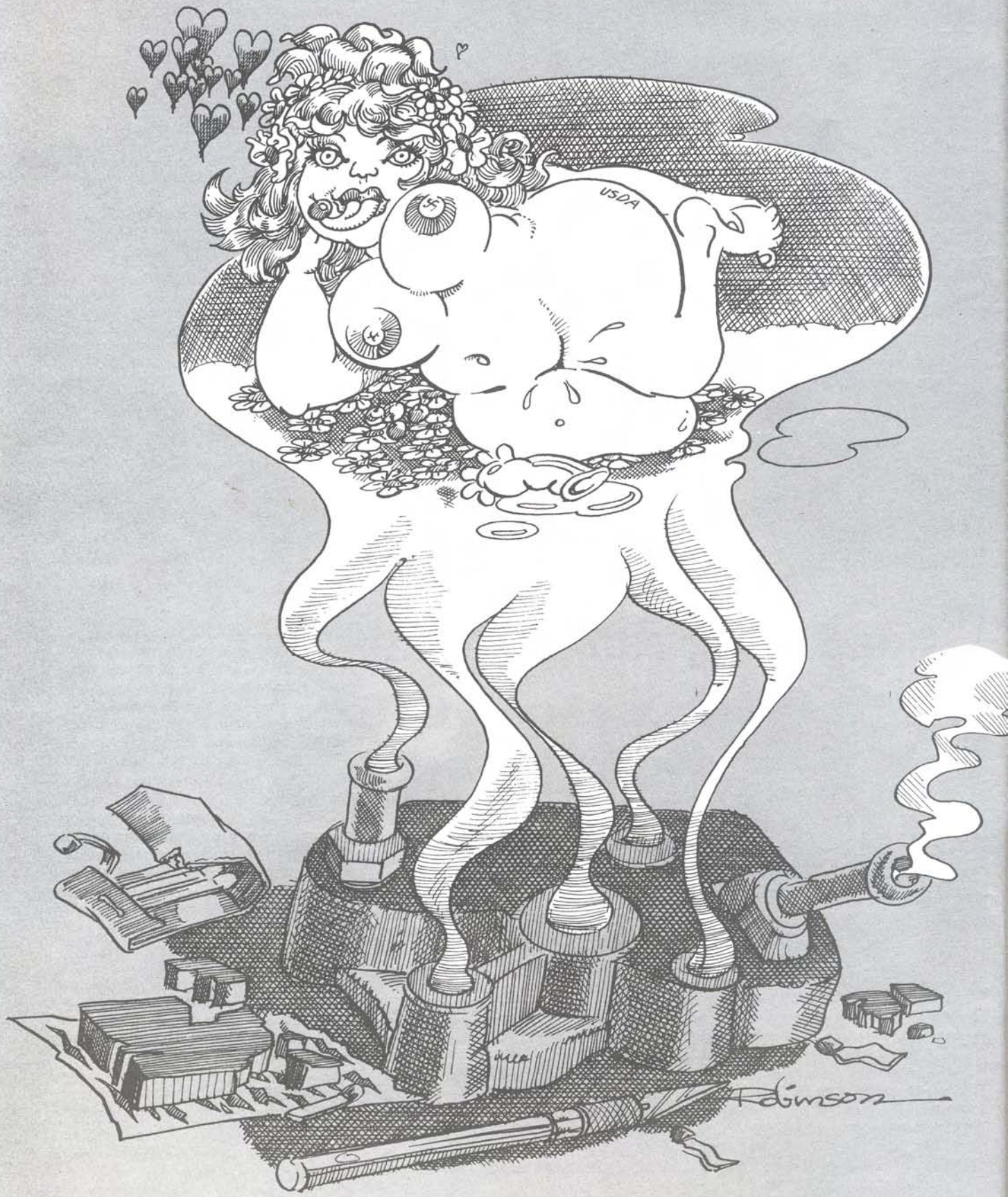
The factory lists the end play at anywhere from .004 to .025. Now ya gotta admit that they can make everybody happy with specs like that. But if you want a quiet-running shovelhead, you ought to bring the rocker arm end play down to three or four thousandths. Before you go pounding on your local dealer's head for shims that should have been in the engine in the first place, I'll tell you now—H-D doesn't make 'em. To solve this problem a long time ago, ace Harley wrench and bro Andy Hanson (P.O. Box 2794, Culver City, Calif. 90230) had a whole saddlebag of these tiny washers made up. They come in .005 and .007 thicknesses. Depending on how loose your present setup is, it should take only three or four shims per rocker arm to bring it down to a quiet tolerance.

When you install the shims on the rocker arm shaft, they should go against the big end (closest to the pushrod). This will keep the rocker arm centered on the valve stem. Then reassemble the rest of the box as the manual says, using a little white grease on the shaft. It wouldn't hurt to replace the O-rings on the end of the shaft at the same time.

It's fuckin' amazing how much quieter your shovel can run with so little work—and you can bet that when work is mentioned around here, it'll clear a room quicker than free brew across the road.

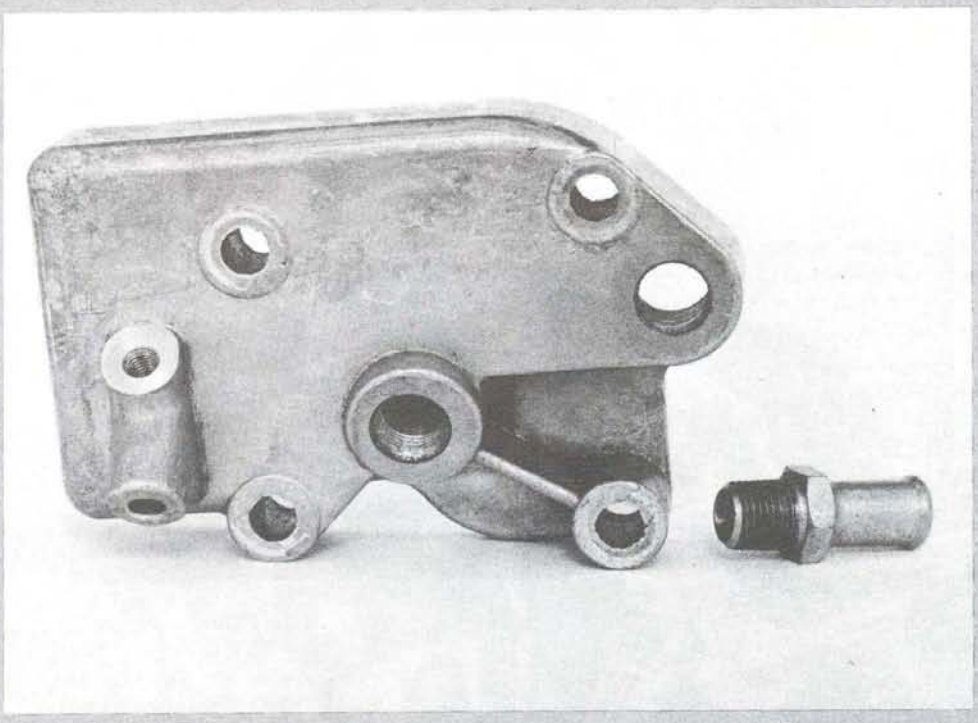
—Wrench

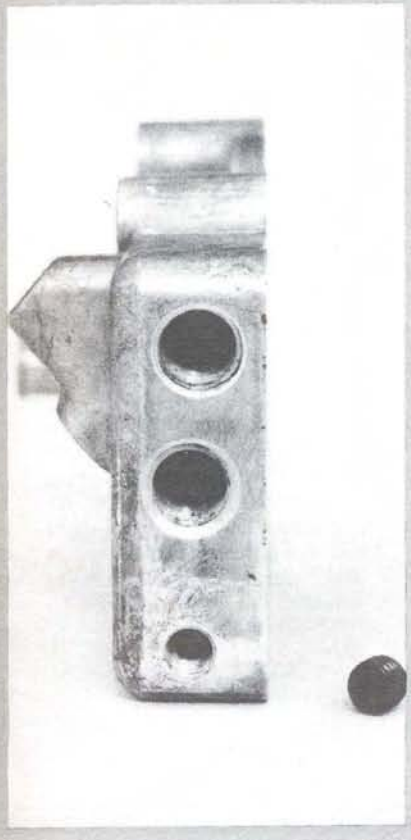
Improved Oil Pump Appearance.

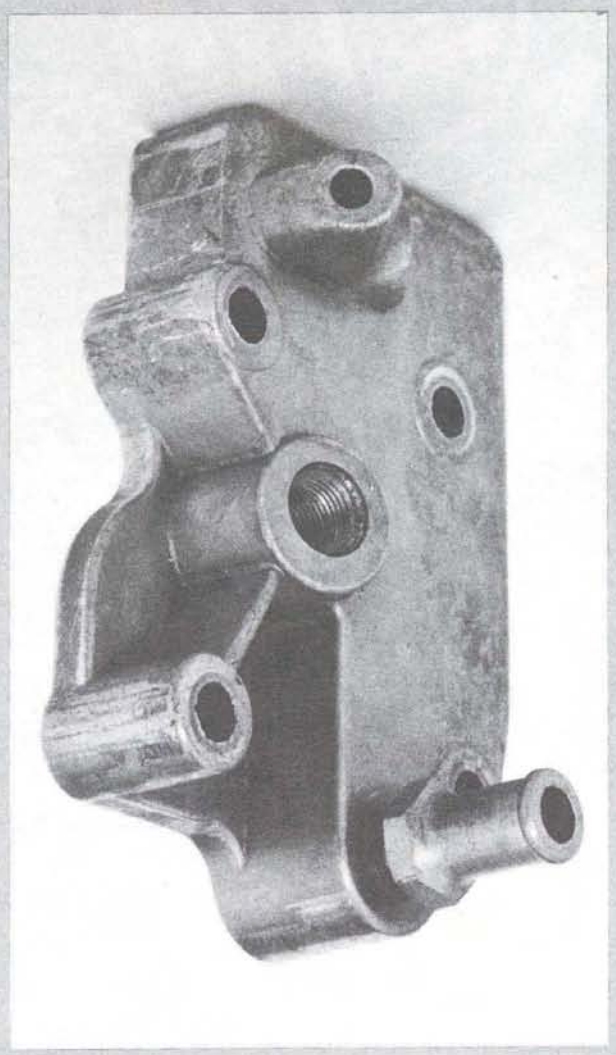


People make cosmetic changes to almost every part of a bike. But this is a tear-yer-engine-apart first. It does have its practical purpose, though. The oil pump you see here has been modified to enable one unsightly oil line to run under the transmission as did the earlier model cast iron pumps.

This modification is designed for '68 and later oil pumps. Remove the pump cover — this is what we'll modify. Notice how the feed (marked 'F') passage is routed. Oil flows into the top and then down to the bottom where it makes a 90 degree into the pump housing. Here is where we'll enter our new line. Drill and tap (1/8x27 N.P.T.) the cover at the intersection of the two passages. Don't run the tap too deep; you have only a quarter of an inch to work with. Now plug the original feed entrance. PN 87708-S is an allen plug and works very nicely.







After you've completed this job, you'll be able to run standard rigid-frame, stock-oil-bag braided-steel lines to your oil pump — or simply run a rubber hose under the tranny, keeping it out of sight and away from the rear exhaust pipe.

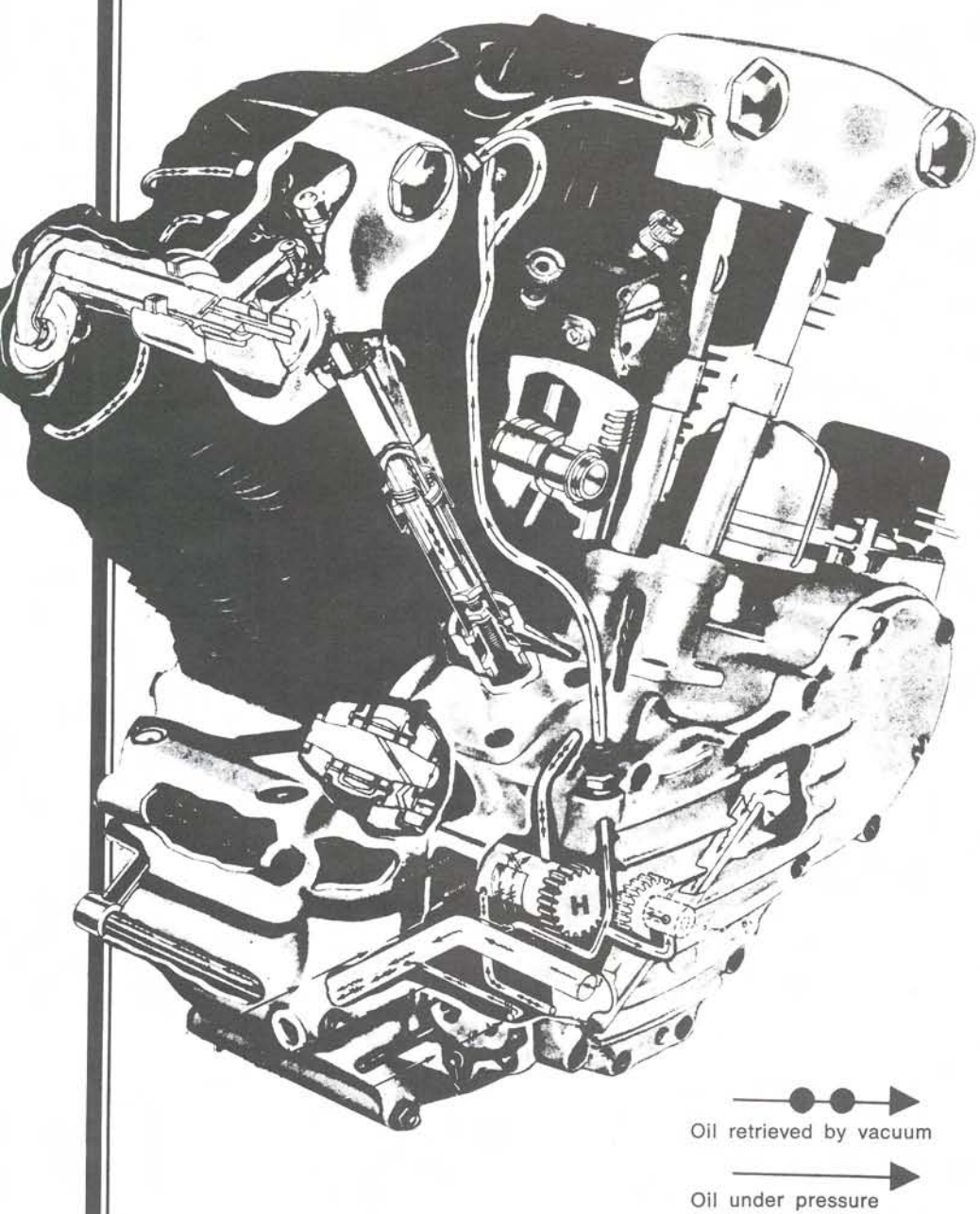
The next stage in Roy Engel's oil pump (it was his creation) modification series is to remove the primary chain oiler tube and replace it with an allen plug. This modification is all right if the bike has a belt drive or the owner has developed an alternate front chain oiling system.

Drill and tap 1/4x28 for a set screw H-D #3233. You needn't drill too deep; later you may want to use the passage again — then you can just remove the set screw and press in the tube again. It's deep enough. Make sure you put some sealant (Locktite) on the threads to prevent leaks.

Before the pump cover is replaced, buy a new gasket, clean meeting surfaces, and don't over-tighten an aluminum body or pump. The torque specification is 50 inch-pounds.

Knuckle Gusher

by Super Hog



"Knuckleheads are oil-leaking mothers; no matter what I do, the dirty bitch springs oil leaks . . ."

Almost true. Knuckles do have more places to leak from just because of the way good ol' Harvey designed them. But if you understand how the oil returns from the top end, and if you're very careful in putting one together, you won't have many more leaks than you will with any other Hog engine (though that may not be saying much).

Unlike pans and shovelheads that use gravity to return the oil from the top end, the knuckle depends on vacuum created in the lower end by the pistons moving up and in conjunction with the timed breather (H). As you can see in the illustration, the top end oil is pumped up under pressure through the V oil line to the rocker arms. It is then drawn by vacuum through the steel lines on the rocker boxes to the knuckles and down the pushrod covers.

There are two major things that happen to louse this system up and create top end leaks. One is air leakage in the pushrod covers and rocker boxes; this can be cured by being careful with gaskets, using gasket sealer, and making sure the steel covers are straight. Also be sure to replace all the corks on the pushrod covers, including the corks in the middle of the cover.

The other common problem is carbon-clogging of the steel lines on the rocker boxes. This problem can be cured sometimes, without disassembling the heads, by using a piece of throttle cable about six inches long in a drill motor. Disconnect the steel lines at the knuckle and give them the Roto-Rooter treatment. If the carbon is too hard, shoot some solvent into the lines and let it sit over night and then try again. If this fails, you will probably have to take the heads apart and let them soak in solvent. If these lines carbon up often, you had better look into valve guides and seats, because these are no doubt causing the quick-carboning problem. ■

Knucklehead Oil Control

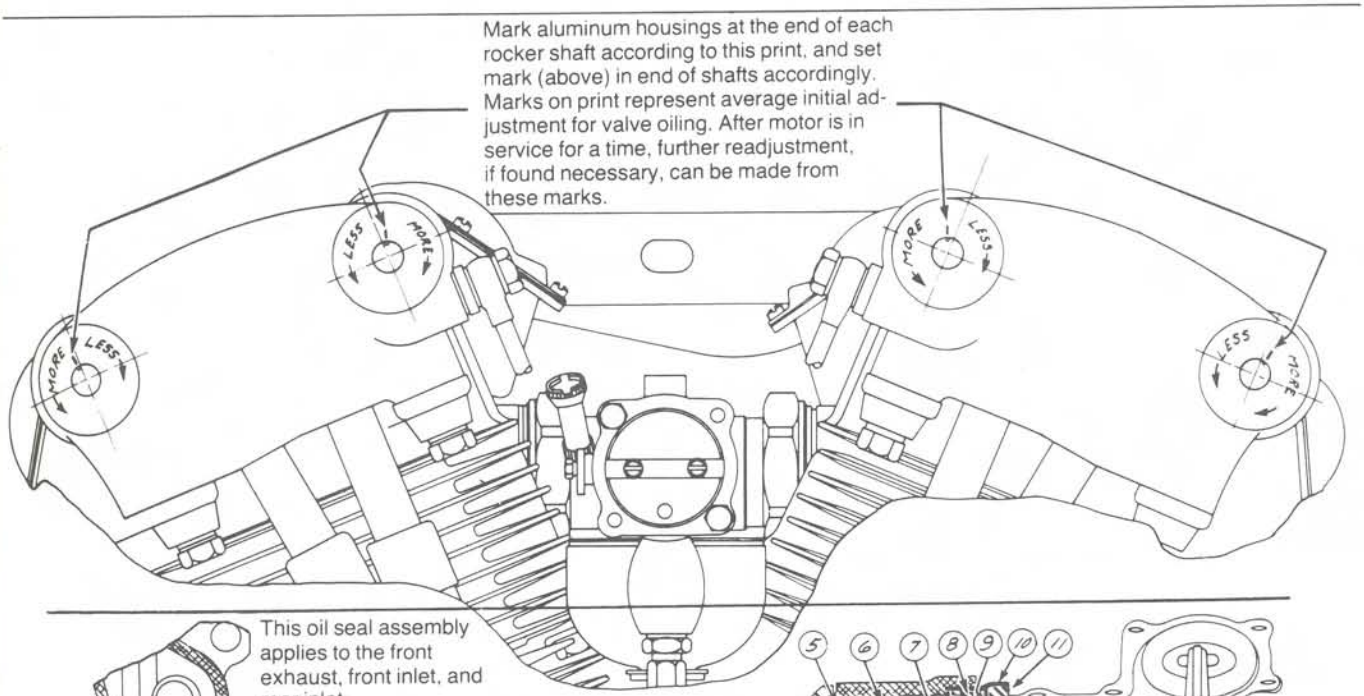
What we have here is not a fold-out of a naked knucklehead, but an almost foolproof diagram showing how to set up knuckle rocker arm shafts so the right amount of oil gets to the rocker arm and valve springs.

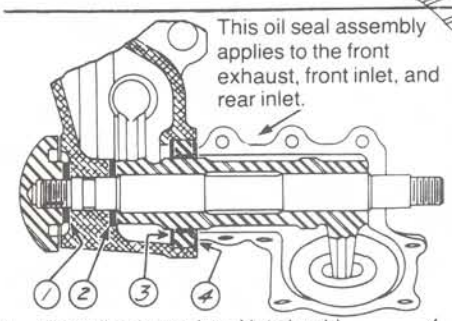
Another way to make some sense outta this mess is to suppose ya got a couple of your seals or gaskets leaking on the rocker box. You may have done a fine job of rebuilding the heads, top to bottom, but it's just possible that the rocker arm shafts are in such a position that the oil is flowing too heavily, unchecked, and ending up all over your shiny new chrome or rust, whatever. Or, if the rocker arms are squeaking, or you feel they are not getting the necessary oil, an adjustment is available. All that has to be done is to remove the large nuts on the right side of the engine, loosen the rocker arm nut on the left side and, with a small centerpunch, mark the rocker box itself, using this diagram as a guide. Then rotate the rocker shaft in the direction it needs to go, amount of turn depending on the oiling requirements of each individual rocker arm assembly. Tighten the left-side nut to hold the shaft where you want it.

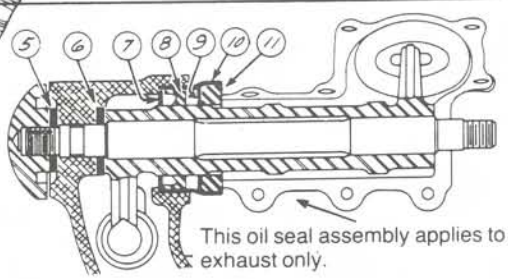
Replacing the large nuts on the rocker boxes should be done after checking the fiber washers that seal the right-hand side of the box. Shop manual specs indicate that there should be .010 clearance between the corners of the nuts and the aluminum rocker housings. If the corners of the nuts hit the housing, you're not getting a tight seal and a leak will develop before long, and besides, the chrome will get scratched.

Add enough fiber washers behind each nut to obtain the .010 clearance the manual calls for, and you're on the road again. The whole operation could be done in one afternoon while you're resting from the night before.

—Wrench

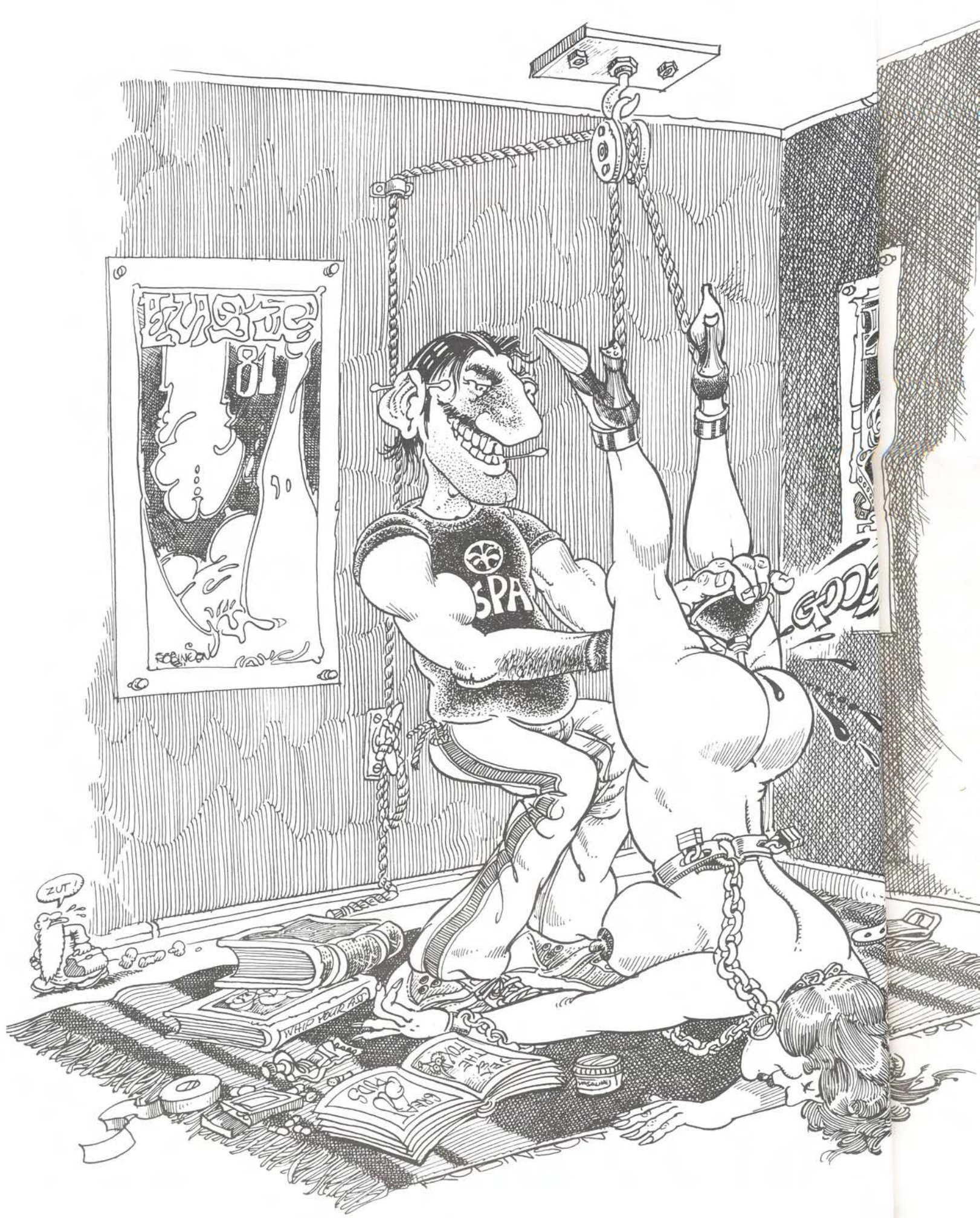






1. Fiber oil seal washer. Nut should bottom against washer, not against aluminum housing. It is sometimes necessary to use two washers.
2. New 1/16" steel spacing-thrust washer.
3. Steel oil seal retaining washer (from original assembly). See description No. 3 in shop dope.
4. New rubber oil seal—to be fitted with fabric side against end of spring cover.
5. Same as No. 1.
6. Same as No. 2.
7. New steel oil seal retaining washer.
8. New rubber oil seal. Apply aluminum paint where it enters housing to seal it oil tight.
9. Same as No. 3.
10. Tubular spacer. Apply aluminum paint where it enters housing to seal it oil tight.
11. New rubber oil seal. This seal can be fitted either side against end of spring cover.

1938 oil seal assembly


81
SPA
ZUT!

Top End Oiling Trip

Whether it's a late alternator engine or an early knuck, cleanin' up the Big Twin's act can burn up more midnight oil than Miraculous Mutha's antique furnace. It takes a lotta time to plan, place, and conceal stuff like wires, cables, and oil lines. And 'cause ya gotta have at least a few brain cells workin' to do it right, this sorta operation ain't good to do it right, this sorta operation ain't good to do in the midst of a party, on a weekend run, or with three or four young yummies brushin' impatiently against ya.

But rather than snivel further about this sometimes sorry state of affairs, I got the finger workin' in the nostril and came up with a new, effective, easy, and asbestos-free scooter improvement. Well, at least it won't put ya in the poorhouse or the doghouse. The trip goes something like this: Any scooter tramp who can tell the difference between the shovelhead and a swelled head knows that this engine uses a top-end oil line. It comes out of the crankcase and runs up to the back of the rear rocker box. And there's a second, short line that carries the feed from the rear box to the front, over the intake manifold.

It all looks a trifle busy, and there's also another disadvantage. When the engine starts up, the oil pressure has to go up through the rear line, across both rear rocker shafts, through the transfer line, then through yet another shaft before it finally gets to that starvin' front rocker arm. Of course, some oil remains upstairs from the last time the engine ran; but it can be a long time before the front rocker gets a full shot of goo, at least with the full force that Mutha Harley intended.

Here's a way to improve the situation: That rear line is relocated to run forward and up behind the carburetor (photo one). The original hole in the rear rocker box is plugged (photo two). With the use of a pipe tee, the oil line is split in two, to go around the manifold (photo three). These two new lines then feed both rocker boxes from the center biz 90-degree pipe elbows. This setup lets the oil reach both rocker boxes in equal amounts and at the same time, improving lubrication. There's a cleaner appearance as well, for two reasons. First, the center oil feed is now largely concealed by the carb and air cleaner. Second, you've eliminated the transfer line between the heads and replaced it with two inconspicuous fittings.

The parts you'll need for this changeover include: a 1/8-inch pipe (NPT) plug to close off the rear tapped rocker box hole (photo four); a 1/8-inch pipe (NPT) tee for dividing the line in two (photo five); and two 90-degree pipe elbows (1/8-inch NPT) to bring the center rocker box lines down toward the tee. Most of these things are available in cast iron or brass from your local plumbing, gas fitting, or automotive parts supply house. Brass is easier to polish and plate. Aluminum fittings are sometimes available; but use lots of care an antiseize on the tapered threads when assembling. Depending on the fatness of your wallet, these fittings can be hooked up to regular flanged steel tubing ends (also photo five) or (with the appropriate adaptors) to the aircraft-type braided stainless line shown here.

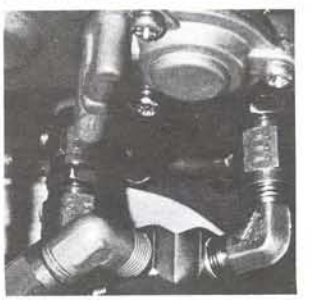
This stuff is available from places like Earl's Supply in California and Henry's Engineering in Maryland.

In either case, you've done two good things for your scoot — without wreckin' a whole weekend of Harleyin' and honey-dippin'!

— Mystery Man


1

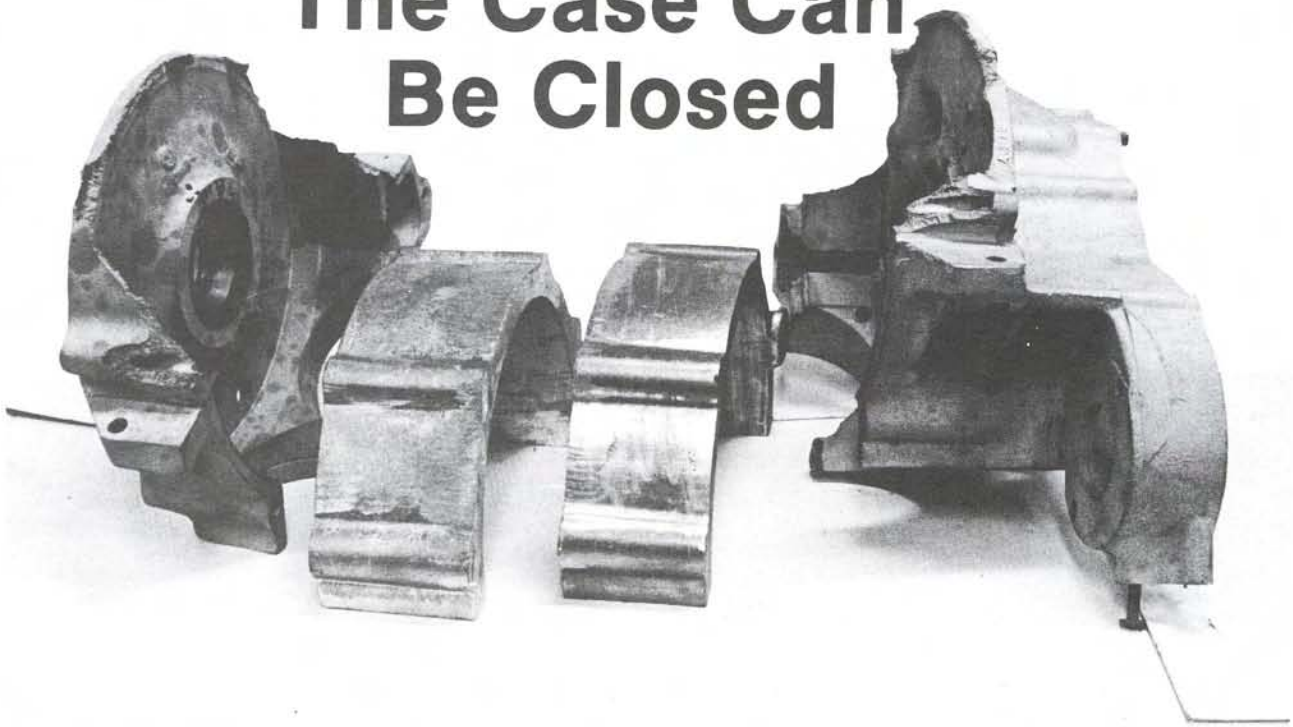

2




4

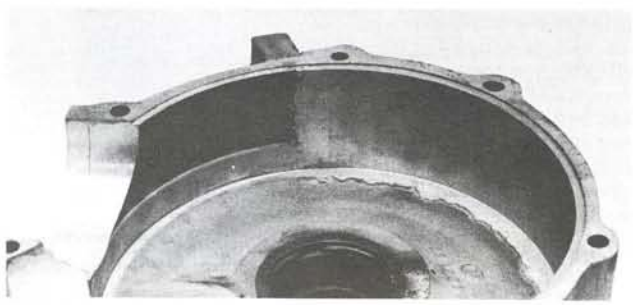

5

The Case Can Be Closed



The dude's '82-incher shattered glass for a city block before he locked the binders to the stops, crossed up his smoking Goodyears, and brought the smoldering pan to a stop in front of Oil Can Charlie's beer bar. It was there, in the middle of the cracked asphalt street, that Snake turned his tangled-mane-framed face at us, and his chipped ivories twinkled in the neon and twilight, and he grabbed so much throttle that our ears began to crystallize from the scream. And with all the glee that a new carburetor can bring to this poor racin' fool, he dumped the clutch. The noise of the explosion made Vietnam vets hit the dirt as the end came to Snake's engine cases. Flashes of price tags passed before his eyes.

But he was in luck. Hans Hanson of Harley Engine Specialties recently spent a year developing replacement



case inserts to close up and save exploded cases. You see, about 95 percent of all over-zealous lower ends shatter the belly of big-twin cases. Since new cases can be out of reach and out of stock for early models, the idea of repairing blown engine cases ain't bad. But it takes equipment and expertise to complete a motorcycle repair job of this magnitude. Unless some fool turned me onto his machine shop to play around in for a year, I wouldn't attempt it. Not counting the experience, you also need a heliarc welder, a serious mill, and a horizontal-vertical rotary table as minimum required machinery.

What we are showing you in the photos are before and after shots. I am sure you can see by the first photos that these engine cases are seriously hurt. The two pieces in between the case halves are the new inserts, which will be fitted and welded to each case half to keep the flywheels from getting cold. Every step of this operation is conducted on special alignment jigs, designed specifically for this purpose. All tolerances are considered with maximum strength and long life in mind. The after photo shows what looks like a new or undamaged case. Believe it or not, this is one of the actual cases in the photo above. H.E.S. buffs up the outside of the completed job on a belt sander to remove the ugly welds. The only sure way to tell that the cases have been repaired is to look inside.

Now, if yours or a brother's lower end hears a voice in another world calling it and it attempts to escape its assigned duty within your thundering 74, you have a couple of choices. H.E.S. will install their inserts on your originals or, if you have a machine shop available, they'll ship the case savers to you — or you can spring for replacement cases at twice as much. The inserts are made of 356 aluminum and can be ordered separately or in pairs. For more information, contact H.E.S. at Box 66294, Los Angeles, Calif. 90066. Peel out!

—K. Ball

Late-to-Early Primary Oiler

The bros out there who have installed a late-model oil pump on their early-model cases, and are wondering how to hook up a primary-chain oiler so they won't have to squirt the chain down by hand, should check out this minor modification. Harley Bob from Texas brought this easy little tip to our attention. It consists basically of running a tube from the new pump's primary-chain oiler to the old breather spout.

If you already have an H-D breather tube in your oil mill, you're on the downhill side. If you don't, you need four pieces of H-D hardware (listed with H-D part numbers): (1) breather stud #24914-58, (2) breather spacer #24925-58, (3) breather collar #24922-58, and (4) rubber boot #24918-58. The only other items needed to complete this setup are a length of 3/16" O/D steel brake line, one foot of 3/16" I/D rubber hose, and some silicone seal. A drill and a couple of wrenches would tend to assist in completing the project.

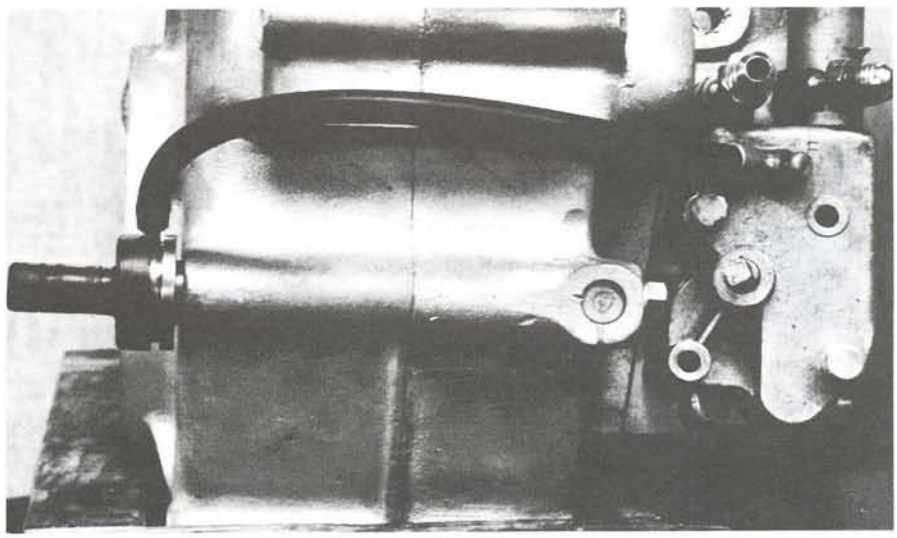
When you look into the breather collar, you'll spot four holes. Drill a 3/16" hole in the side of the collar so that the bit will enter a hole on the inside (1). But watch out for the metal spacer (part #24925-58) that fits on first before you install the breather assembly in the cases. This steel ring seals against the case, and the breather collar seats against the ring. If you have drilled your 3/16" hole too close to the inside edge of the collar, when you tighten the finished assembly it will leak because of interference with the new oiler tube.

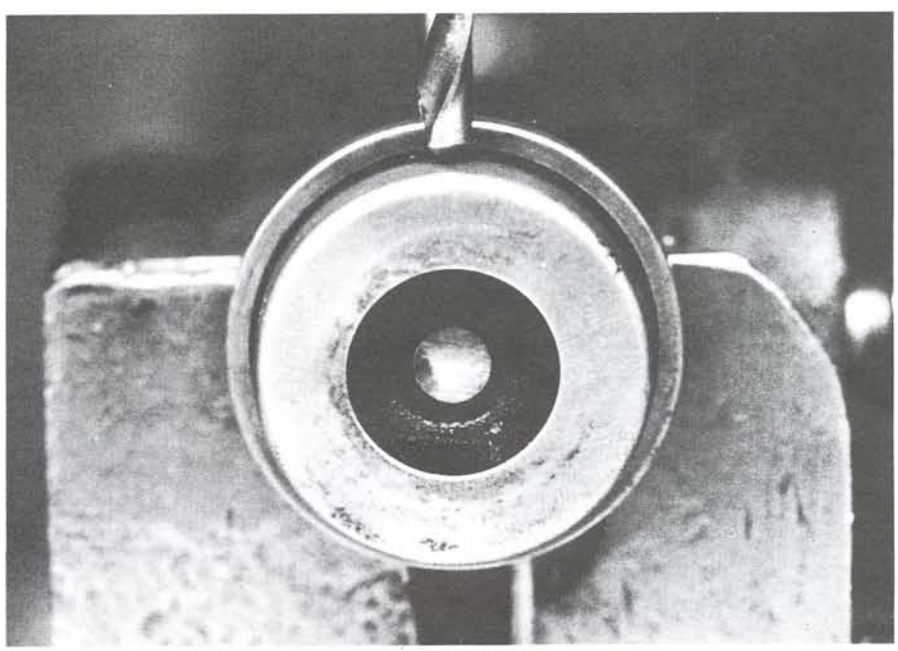
Okay, ya got the 3/16" hole drilled. Now, cut off a piece of your 3/16" brake *line* about one inch long (2). It's a good idea to use a piece that still has a flare on one end. Coat the other end with silicone seal and gently press or tap it halfway into the hole you've drilled in the collar. Tap the tubing in only halfway, or you'll restrict the oil flow from the pump. Trim out a small notch on the rubber boot to clear the tubing on the side. Remember that the opening in the boot must be aimed down, dumping oil directly onto the chain. When you put it all together, use a little silicone seal on the metal spacer where it seals against the cases *and where* the collar seats against the metal ring. The tin primary cover will hold the boot in place, but it wouldn't be a bad idea to use silicone there, too.

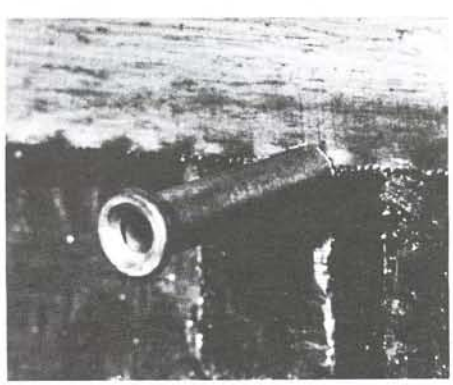
Now, hook up the rubber hose from the new breather tube to the oiler fitting on the pump cover. Set the adjusting screw for the amount of oil you want slinging on the chain—and the job is done. That is, except for replacing the inner primary, primary chain, engine sprocket, and clutch.

If someone was overly energetic or just up from a two-day nap, he could probably handle all that in an afternoon. But the way I move from barstool to barstool, it took me a couple of days and a night just to find the drill.

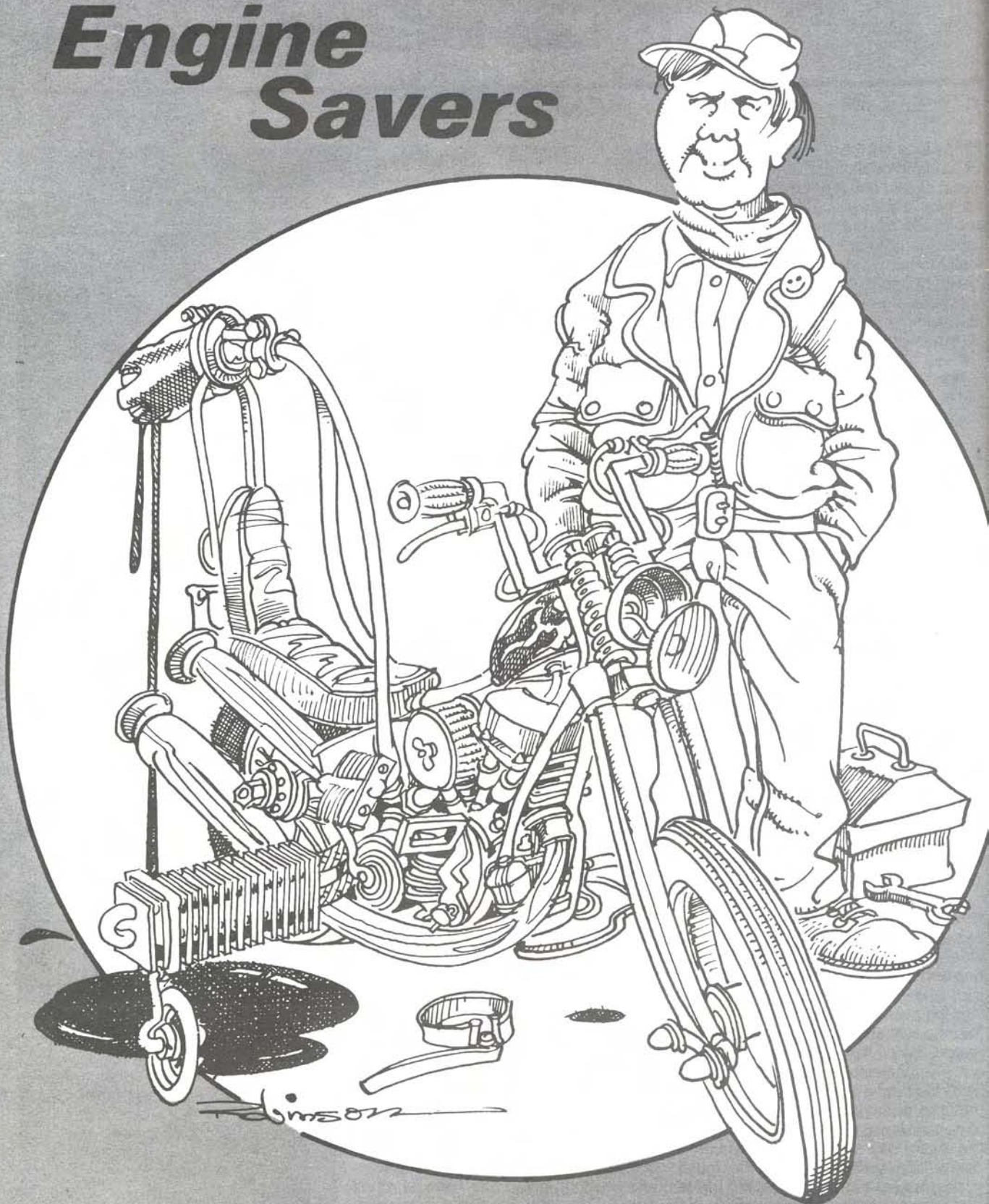
—Wrench

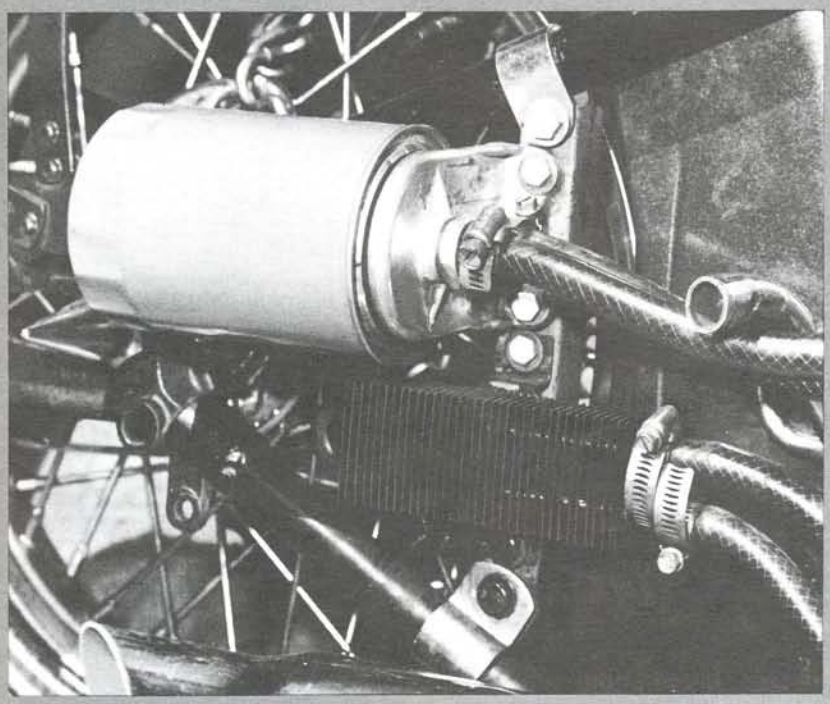


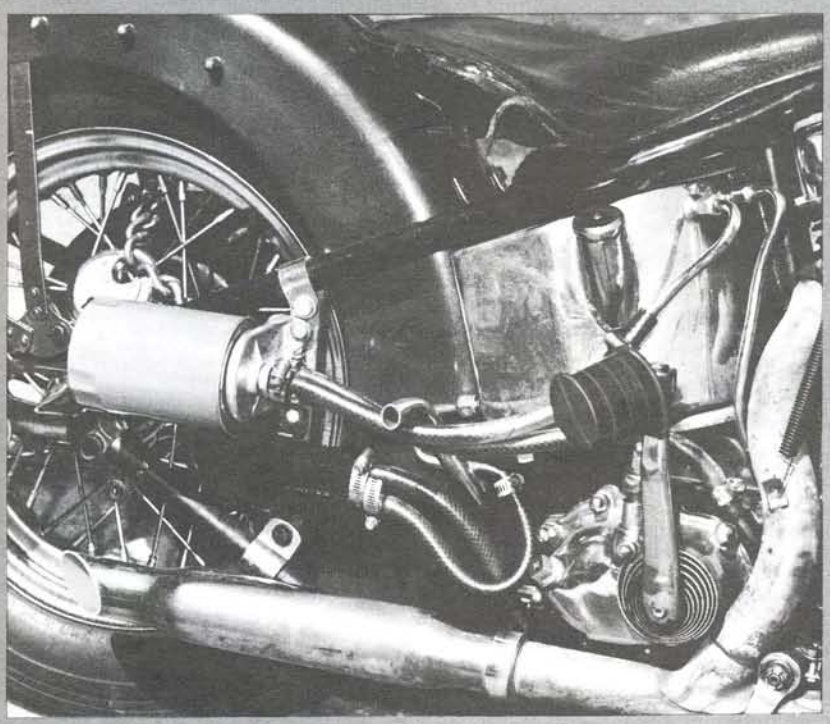




Engine Savers







All right, they're weird, ugly, bulky—all sorts of downers. But they're not for takin' or holdin' reds. They're to keep my pan together longer — hopefully. The stock oil system for old 74s doesn't lend itself (too much) to cleaning or cooling the oil.

So there you have it, an EMPI (sold in K-marts and discount stores) VW accessory oil cleaner mounting and a Cad power steering oil cooler.

There are smaller filter elements that can be had, which will fit the EMPI bracket. But basically I said, "Screw the looks, I want this '48 to stay on the road."

So the cooler is spliced into the main oil feed line and the filter to the main return. The only modification to the filter is that the oil holes in the fittings (supplied with the mounting) must be drilled out for better flow.

Look at it this way. The EMPI doodad costs about seven bucks, the filter element costs four, the cooler costs five, and the lines and clamps run about five or six bucks. So there was around twenty bucks sunk into that horrible-lookin' unit. But dig it. How much does it cost, just for the parts, to rebuild an engine—huh?

—Weed





1.



2.

Tappet Troubles

It's Saturday. The day of the run. As usual everything important has waited until the last second. So out of the rack early, and after a couple of cups of something thick and brown, it's time to pack and check out the scooter. Everything is fine, except when it comes to adjusting the valves. They need to be lengthened almost half an inch. And as the V-twin starts, the gear case sounds as if someone is in there popping popcorn. It could be that the cam or tappet follower (1) bearings bought the farm.

It's one of those teeth-gritting, irritating breakdowns. They don't need to be replaced or checked often, so they can be easily forgotten. Could be that few lower-end workers check them on every rebuild. But they should be eyeballed every tear-down, while replacing the cam or having the gear cover chromed. Rock the roller that contacts the cam. It should run free but not sloppy—you'll have to be the judge. Also check the face of the roller for pits and grooves. If they're not downright shaky but don't seem to be in great physical shape, it would be a good number to change them. It's not even a two-hour job. Say they did take a dive. They might just shut the valves. Or they could get jammed in the gear case and leave you stranded in the sticks with a chunk of right case as a souvenir.

Custom parts manufacturers have made a replacement kit for around $21.00, for all four roller kits. H-D's price is $8.51 (part #18534-29A) for one roller set. The kits will fit all 74s, all sportster and K models and all 45 and 80 flatheads.

So if they look like they might be headin' south, pull the lifter blocks. Then one at a time, slip out a tappet follower. There is only one crucial item to watch out for. Be sure the ears on both sides of the roller are always well supported while switching the rollers, punching out the axles, and peening the axles—they're fragile. Countersink drill one side of the roller axle (2), and tap it out with a narrow punch (3). Replace the unit with a new one. Then carefully peen the axle ends over (try to keep both ends protruding from the holes even in length) (4). Then file or grind the axle ends flush with the tappet body. Finally, with a wedge or old screwdriver, tap a portion of the flush axle into the groove on the follower ears. It will prevent the axle from working loose and spinning (5)—and that's it. Do the same number to each tappet. Drop in the hot cam and whatever pushrods, and the thumper should have positive, efficient cam action for a few more riding seasons. And that's one less item to wonder about while doin' 90 mph on a deserted highway in Montana, at two o'clock in the morning.

—Weed



3.



4.



5.

Different Strokes for Different Folks

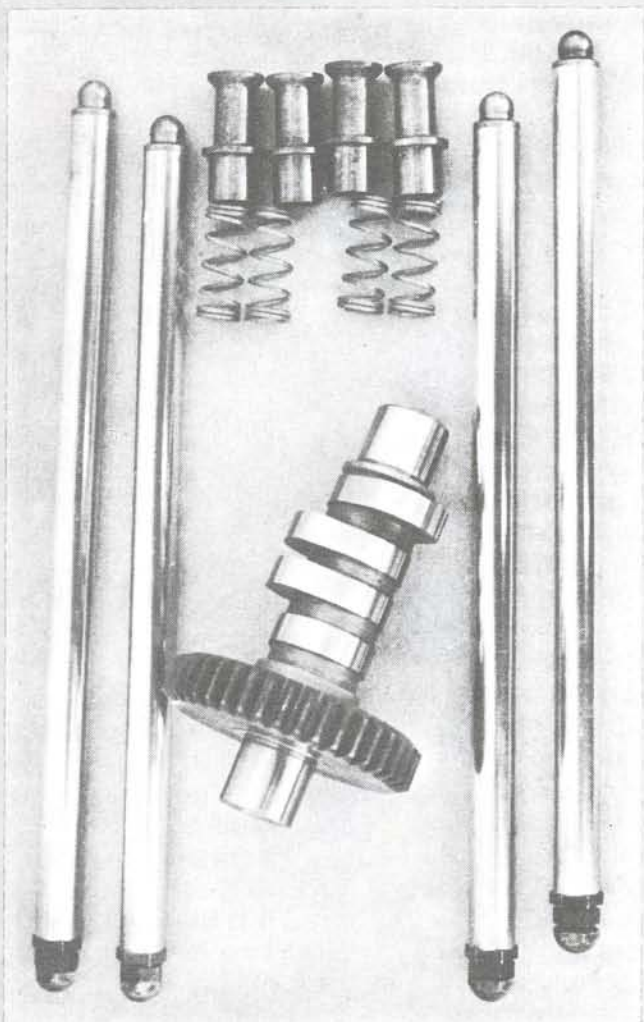
Most stroker freaks seem to go the visual speed equipment route after getting the extra inches stuffed into their engines. By visual I mean things like dual carbs and other goodies that show. Now, all this stuff is okay if the important internal components haven't been overlooked. Most important of these internal components (especially in a stroked engine) is a good cam. For dollars spent per horsepower, you can't find a better deal than a hot cam (even in a stock-inch engine). The cam is the heart of your engine, and all your inches, big valves, super ports, and dual carbs aren't going to come to life if you've used a halfassed camshaft.

You, no doubt, have heard tales that go something like: Yeah, man, I had a cam so hot my bike wouldn't run below 3000 r's, etc. Bullshit! What he's really saying is, Some dumdum ground me one with big duration and lift numbers and no other thought put into it, or, I had a good cam but I was too dumb to get it tuned in.

If you have a stock engine and you want to get a few easily added horses without getting into valve clearancing, spring packing, and other digging-into-the-engine-type work, then the best bet for you is something like a Sifton 412. A 412 will slip right in without any hassle, and if you add the use of solid lifter kit and light pushrods, you'll get some horsepower you can feel in the seat of your pants when you screw it on.

On the other hand, if you've got big inches and a lot of good stuff planned, then you had better get hold of something that's up to the chore—like a Sifton 468S or even one of the "plus series" (and follow to the letter the instructions that come with it).

There are several good name brands to choose from besides Sifton, and I'm not going to get into the pros and cons of whose is best and why, but I do advise against welded-up and reground stock cams —you wind up becoming part of an experiment that usually doesn't pay off. You'll be money, time, and races ahead by going with a company that has already done the experimenting and furnishes you with instructions and recommendations on how to make their product work for you the first time around. ■



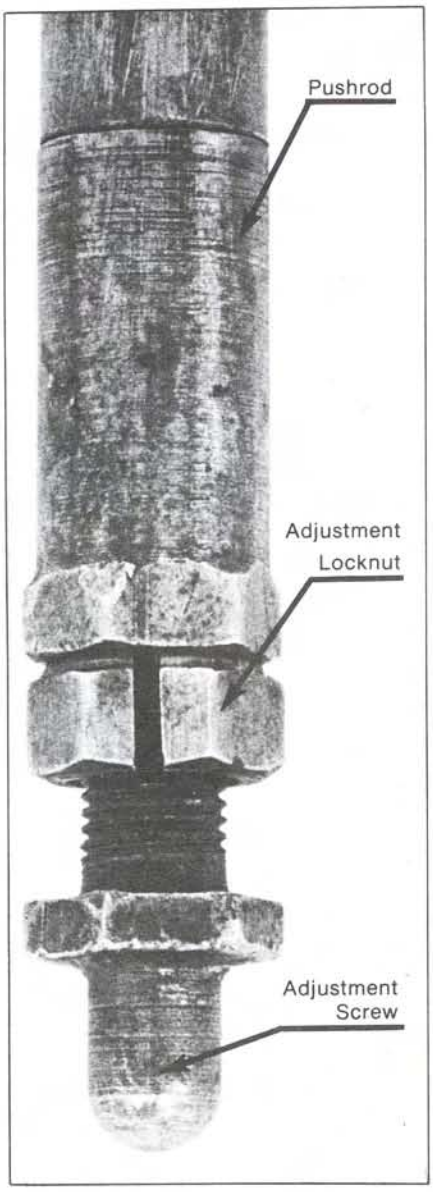
A hot cam and valve train components are heart of a strong running stroker.

Hydraulic Lifter Adjustment

Adjusting hydraulic lifters is on par with raising the dead. Being about half dead myself, I looked up Dave Presley, an old wrenching partner of mine who has made a couple of trips to the H-D college in Milwaukee. After half an hour of my sniveling about hydraulic lifters, he broke down and enlightened me on the mysteries of adjusting the damn things in my not-so-tip-top 74. Now I'm gonna enlighten you. So sit back and pay attention.

First, to make the entire effort easier on yourself, remove the spark plugs from both cylinders so the engine will turn over easily. Starting with the front cylinder, remove the pushrod cover clips so you can get at the adjustment nuts. Turn the engine over until the front piston is on the compression stroke. There are a couple of ways to determine the compression stroke. One is to see if the intake valve is closed. If it is, the piston is on the compression stroke. The other is to check out the points cam. When it is just beginning to open the points, you know the compression stroke is coming, because the points fire on the compression stroke. The small lobe on the points cam is for the front cylinder; the wider lobe is for the rear cylinder.

Okay, so you've got the piston on the compression stroke. This means that both the intake and the exhaust valves are closed. You must adjust both pushrods for each cylinder at the same time. Loosen the locknut on the pushrod and turn the adjuster up until there is some up-and-down play in the pushrod. Then turn the adjuster down just to the point where there's no up-and-down play in the rod. There is a cut made through the adjustment locknut. Turn the nut around till the cut faces you. Turn just the locknut, not the adjustment nut. Using this cut-mark on the locknut as a guide, turn the adjusting nut down four full turns.



This sounds like the H-D manual, doesn't it? But hold on — turn the adjusting nut down one-half-turn more. This extra half-turn will compensate for the slack when you lock down the pushrod adjustment nut. After you have locked everything down, you will have the correct four full turns. Don't move anything, don't touch anything, after you have adjusted the front two pushrods, because what you have just done was open the valves. Since there is oil already in the lifters, this adjustment had to move something, right? Well, it moved the valves off their seats. What happens now is that the valve-spring pressure will pull the valves closed, which pushes the unnecessary oil out of the lifters. Kick back for a couple of minutes and take a brew break. Then, when you can spin the adjusted pushrods between your fingers, you will know that the excess oil in the lifters has drained out. If you try to turn the engine over before this excess oil drains, you can bend a pushrod or a valve. Just be sure that both the pushrods spin freely between your fingers before turning over the engine.

All right, you're half adjusted. Now repeat this same procedure for the rear cylinder. Replace the pushrod covers and clean and check your spark plugs before sticking them back in the engine. Don't forget to let the rear pushrods sit until the excess oil drains and you can spin them before cranking over the engine.

— Wrench

Shimming 74 Motors

Spike slammed the door shut and pulled up a cinderblock on the opposite side of my sled close to the cooler. Zipping the cap off the bottle of Jack, he declared, "I feel like getting fucked up." The way he was chugging it down, it looked to me like no one had ever told him that Jack Daniel's was sippin' whiskey. He acted like he thought it was the last bottle to be had in the state. After a while, Spike seemed content just to balance himself on the cinderblock with the help of my scooter's rear wheel. He looked like he'd lost his best friend. Ten minutes later he mumbled something about his knucklehead's dying.

"What happened? Did you have a flat or something?" I asked.

"No, man, it went all the way south. The rear motor mount on the cases cracked."

"Well, I asked, "didn't you shim the motor when you put your scoot together?"

Spike jumped up and screamed, "What do you take me for, a dummy or something? Sure, I shimmed the motor — everything was set to factory specs."

Seeing a physical situation starting to develop, I thought a quick explanation might just save me some teeth. "Hey, Spike, what I mean is, did you shim the motor so it wouldn't rock back and forth in the frame?" The only response from Spike was a blank stare, so I told him to sit down, roll a bomber, and let me explain how to shim a 74 motor.

First, you should set the motor in the frame and install all the lower mounting bolts. The bolts should be in place, to locate exactly where the engine will sit in the frame. Then set the frame on some 2x4s and check out the engine and frame. Then tighten the rear mounting bolts. If there is a large gap under the front engine mount, you may have to use a flat washer; but nine out of ten times, all you will need is a beer can for shim stock. Cut five or six shims out of the can and slide as many shims under each motor mount as needed to take up the space between the engine mount and frame. A little patience here will go a long way. Take your time and don't over-shim. The whole idea is to have the engine sit flat on the frame. Once the engine is shimmed, tighten the front motor mounts down. Don't overdo it the first time. Once all four mounting bolts are about even, go back and go over all four lower mounting bolts and make them super-tight.

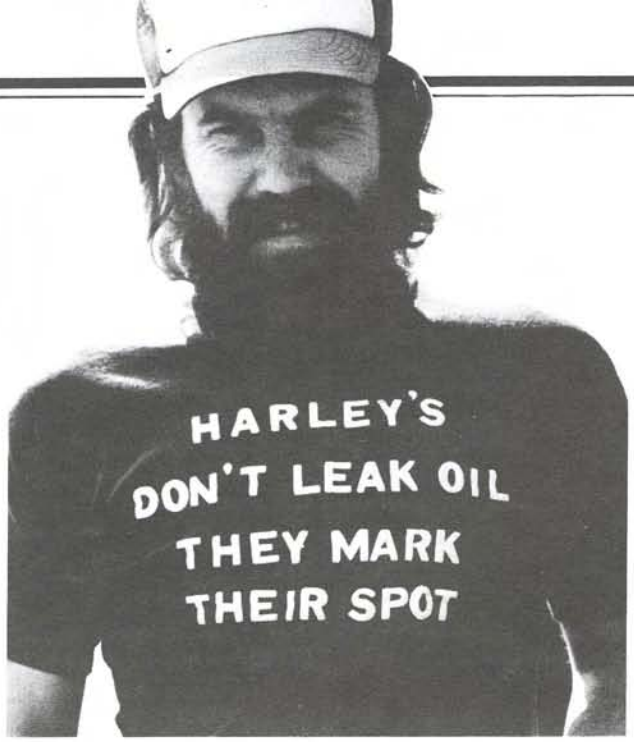


Okay, the lower motor mounts are squared away and the only one left is the top mount. The top motor mount is a little tougher, in that it requires finding some large flat washers. Set the top motor mount on the heads and slip on all the proper hardware to hold the mount on the heads. Then snug the bolts down to hold the mount in place. Check to make sure that the bolt holes in the frame and the top motor mount will line up. Next, measure the distance between the motor mount and the frame. Make up this distance with flat washers so that they just slide in between the mount and frame, like a feeler gauge through points. You may have to cut a shim or two from the trusty brew can to make up the distance, but that's about it. Install the top motor mount bolt with the proper hardware, but just snug it down. Go back now and tighten the bolts on the heads evenly, then tighten the top motor mount bolt.

My personal preference whenever I reinstall an engine is always to use new lock washers, aircraft safety locknuts, and red Loctite. Just mounting the engine solid in the frame will reduce vibration and help keep the rest of your scooter tighter, reducing everyday maintenance and rider fatigue. Furthermore, it reduces the chances of cracking the frame or engine mounts.

This last thought struck while I was writing this bullshit. Everything I just explained can be applied to 45 engines as well. Now, don't you 45 riders think I'm trying to slight you — it's just that 45s don't fly like 74s.

—Wrench



The Oil-Drip Blues

I got them blues,
I got the oil-drip blues,
On the bottom of my shoes.
Blew my head gasket, too!

Yeah, I got them blues,
Got nothin' to lose,
I done paid my dues.
Still got the oil-drip blues!

Yes, I've got them blues,
From my Hog, oil does ooze.
Ninety-weight I did use —
Still smokes when I cruise.

Got them oil-drip blues,
Ain't got no good news.
Can't get no cooze
With the O.D. blues.

Been to the Brea pit
Checking petroleum shit
For the year 2002.
Yeah, I got the oil-drip blues.

Traditional biker blues by
Juicehead Jones





Can You Believe It? An Oil-Pump Tech Tip!

With all the years that H-D has been pumping out big twins, and with all the great bikin' brains figuring out how to customize, cut down, or clean up that raw material, it seems likely that no single part has escaped the shifty-eyed gaze of some scoot crafter. I mean, you can buy or build everything from close-ratio gears to allen cylinder-head bolts to single-loop frames.

But what about the lowly ol' shovelhead oil pump? Sure, you can polish the sucker, maybe slap on an oil pressure gauge, or adapt it up to a panhead if you're really serious. But to a detail freak like me that was no answer. There had to be a trip that would improve the fucker and bend bros' brains. Well, recently I found it. This is an oil pump mod that not only looks good, but also is good for your scoot.

The routine goes like this. Sittin' on top of the shovelhead pump are two large slot-headed screws. Normally they do the job just fine, but, after umpteen rebuilds, the slot heads tend to get chewed up because it is unusual to have a screwdriver on hand that's big enough to fit the slots precisely. And the worse the slots get, the harder it is to torque the screws down, making oil seepage a possibility, particularly when the engine is cold and pressures are higher.

It turns out that an east coast bro (Dave Perewitz of Cycle Fab in Brockton, Mass.) made a setup that converts these oil-pump screws to socket heads, and a matching item for the nearby crankcase screw ('70 and up engines) to boot. It consists of the three screws (counter-bored to accept the internal spring), plus the necessary O-rings and washer.

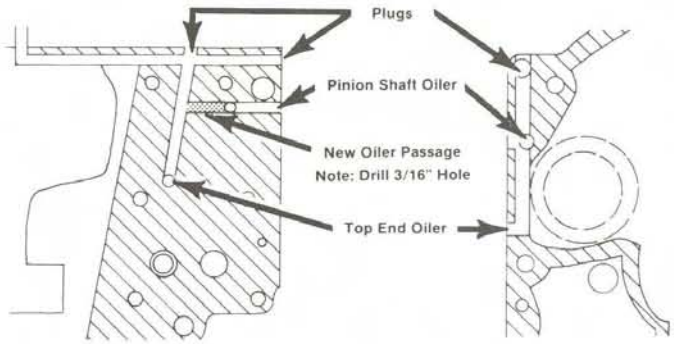
The longest fastener replaces the topmost oil-pump screw; it is assembled with the original brass washer beneath the thick retaining disc. The two remaining screws are fitted with the O-ring supplied. One has a slightly lower head, making it easier to fit underneath the crankcase oil-line fitting. Dave suggested wrenching it in with a Bondhus ball driver, which allows you to tighten it down on an angle. The other two fasteners can be put in with a regular socket driver. For added insurance against loosening or leaking, thread-sealing or locking compound, like Loctite pipe sealant or Vibratite, is suggested, but it isn't mandatory.

The result is an oil pump that even a detail freak won't snivel about, and three screws that can be accurately torqued from now until kingdom come. And the good news is that the bro who made these fuckers has a few extras kicking around, if you'd like to do the same.

—Mystery Man

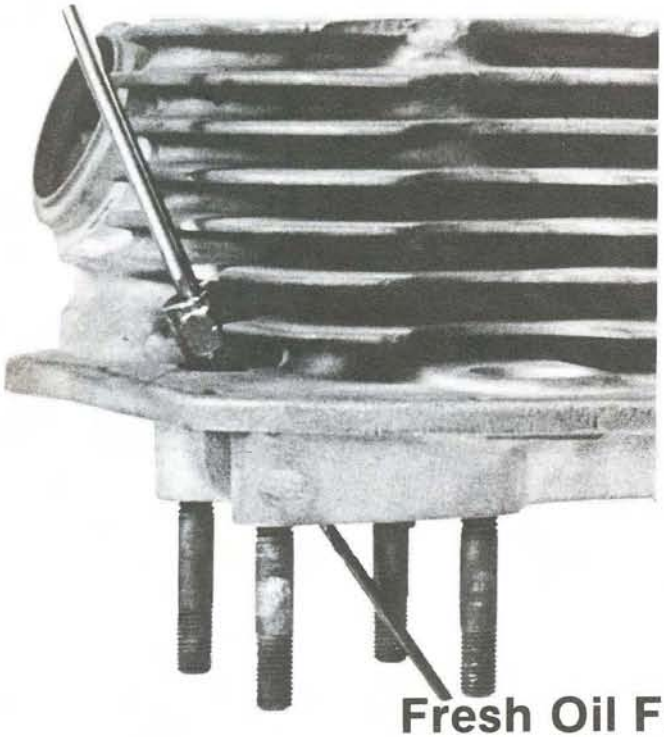
Shovel Pumps For Pans

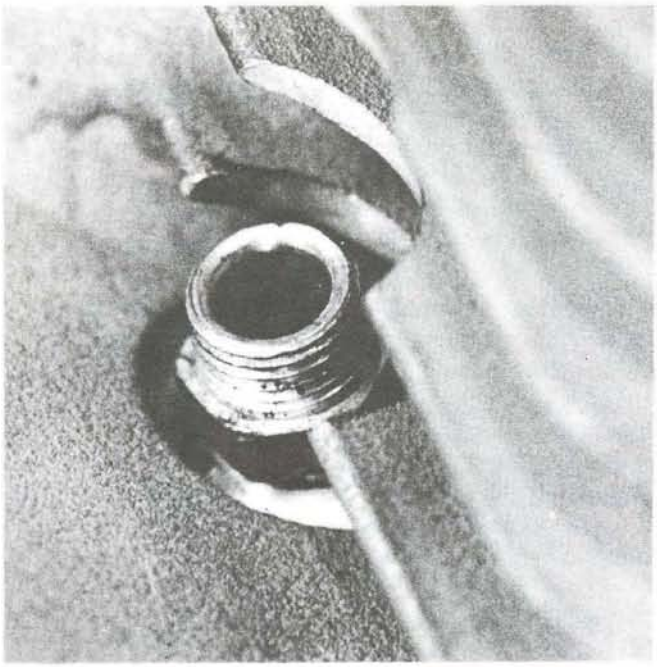
Panhead owners who want to update their engines by installing later-model oil pumps have run into some problems in getting oil to the top end, mainly on the big-twin engines from 1948-1954. The problem is the lack of an oil passageway from the pump body to the oil passageway drilled into the engine case for the top end. The engine cases have two oil holes, one for the top end, one for the pinion shaft. The later-model pumps have only one oil passageway that matches the engine case oil passage. The one passageway that lines up on both the pump and engine is for the pinion shaft. The easy solution to this problem is to connect the two oil passageways in the engine case so that the one oil hole coming from the oil pump will feed both the top end and the pinion shaft.



The process for connecting these two oil passageways is easy. All you have to do is drill through the engine case from the timing cover-gasket area, using the existing hole as a guide to the oil passageway to the top end (see drawing). This could take ten minutes tops, and could be done with a hand drill. But the whole trick to this operation is that you have to disassemble the entire engine to clean the metal shavings from the oil passageways. When cleaning the engine case, be sure to use plenty of cleaning fluid and *air*. There is nothing an engine hates worse than a stray metal chip. I'd like to thank Andy Hanson from H.E.S. for this tech tip.

—Wrench



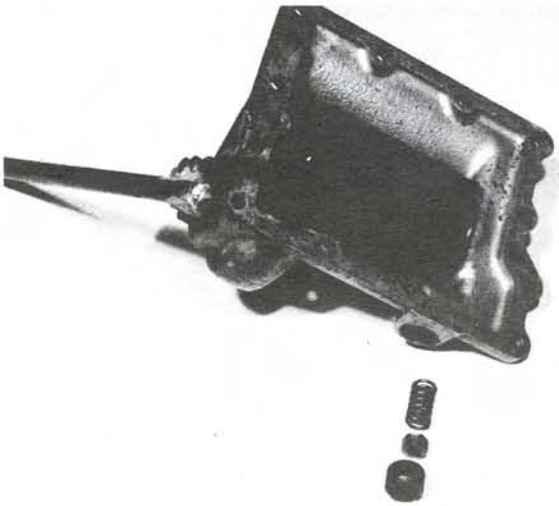


Fresh Oil For Panheads

This tech tip should be of some interest to you big-twin owners who own panheads from 1948-1965. Andy Hanson called and told us that he had a cure for getting oil to panhead top ends. I didn't know there was a problem with this, so I swung by his shop. He was building a big-inch engine for one of his customers and the heads had to be cut out to fit on the larger cylinders. After he cut out the heads, the oil-feed hole was too close to the compression lip, so Andy closed off the oil-feed hole in the head gasket surface and re-drilled it from the rocker arm mounting surface to make it exit between the barrels and behind the carb (see drawing).

Andy then put the head in a mill on a specially-designed jig and faced off the head where the oil hole had come out. After the head had clearance for a fitting, the new oil hole was drilled and tapped for 1/8 pipe. Any type of oil-line fitting can be used. When the engine is assembled, both heads are fed from a fitting on the timing cover, like on a knucklehead. The advantages are obvious if you are installing a set of big-bore cylinders; but if you're interested in better oil flow to the head at a cooler temperature, this is the way to go. Oil can get pretty hot as it flows through a cast iron cylinder. Andy said this operation can be done at home on a drill press — or Andy will do both heads for thirty bucks, if you send him the bare heads. You can contact Andy at H.E.S., Box 66294, Los Angeles, Calif. 90066.

—Wrench



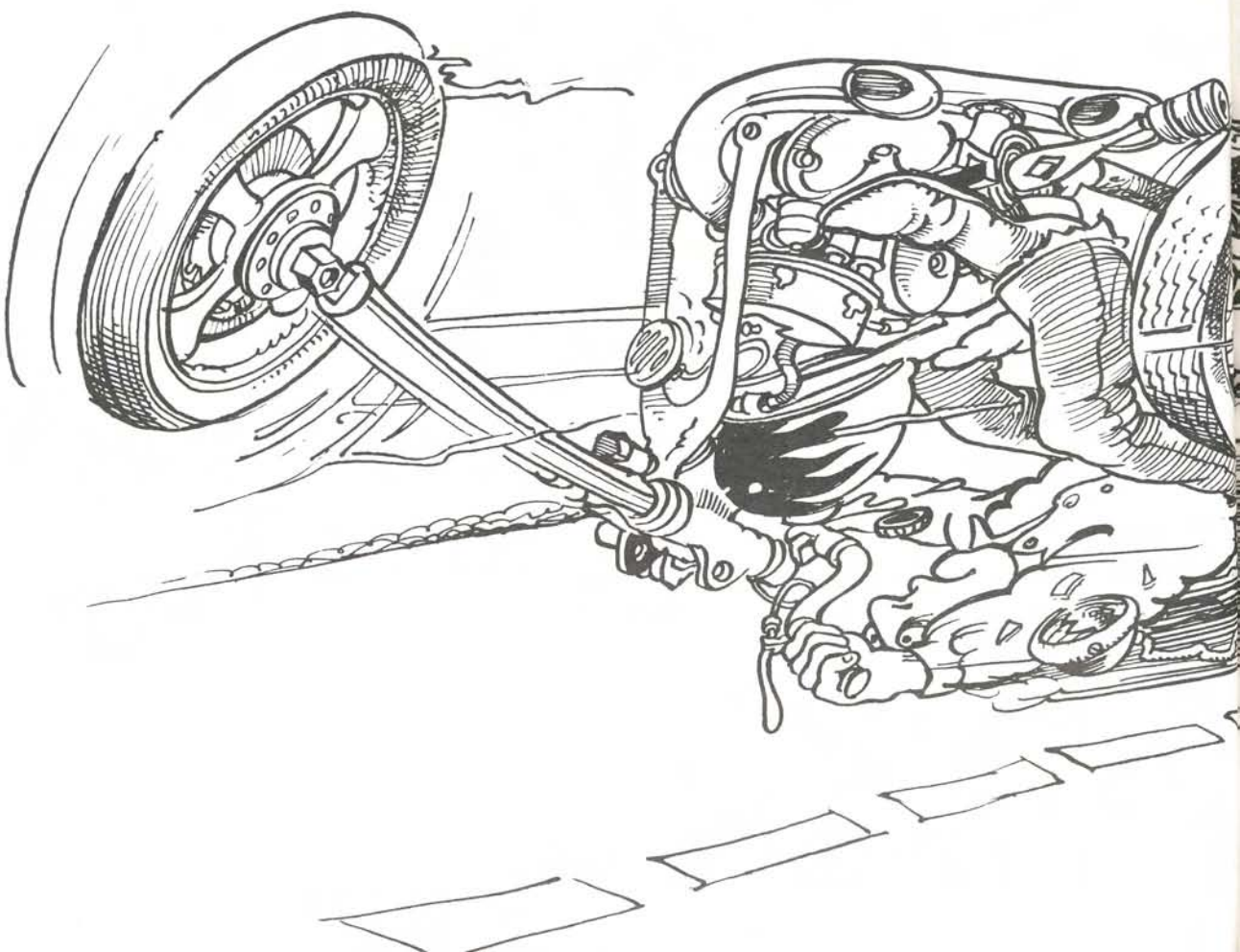
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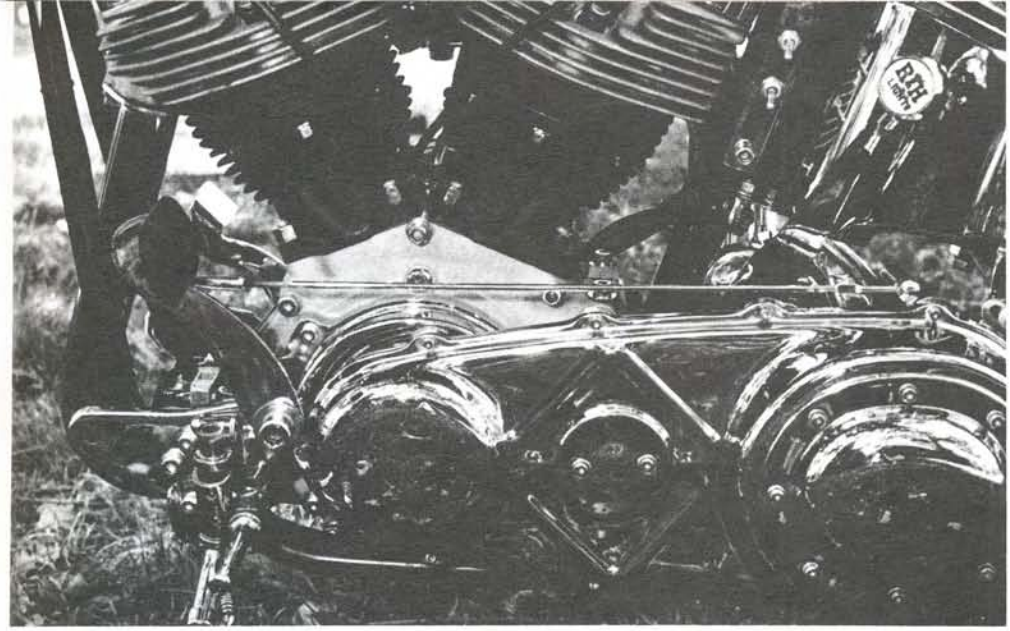


2

Where in Hell's Neutral?

—a nice thing to know when you're about to kiss a Chevy





3

If you run a jockey top with a gearshift extending off the mutha, you've got to be guessing when you reach for that neutral area between gears. And who needs to be unsure whether you're really in neutral when that old codger hangs a left right up front of your Avon? Also, if you're hip to the way Harley put those jockey tops together, it's pretty obvious that even a small hump in the road could knock that dude back into gear. And it don't help none if you're into a gearshift knob made from a bowling ball. There is no for-sure solution. But there are a couple of things that can be done to the top to keep it in neutral and make it a taste easier to find.

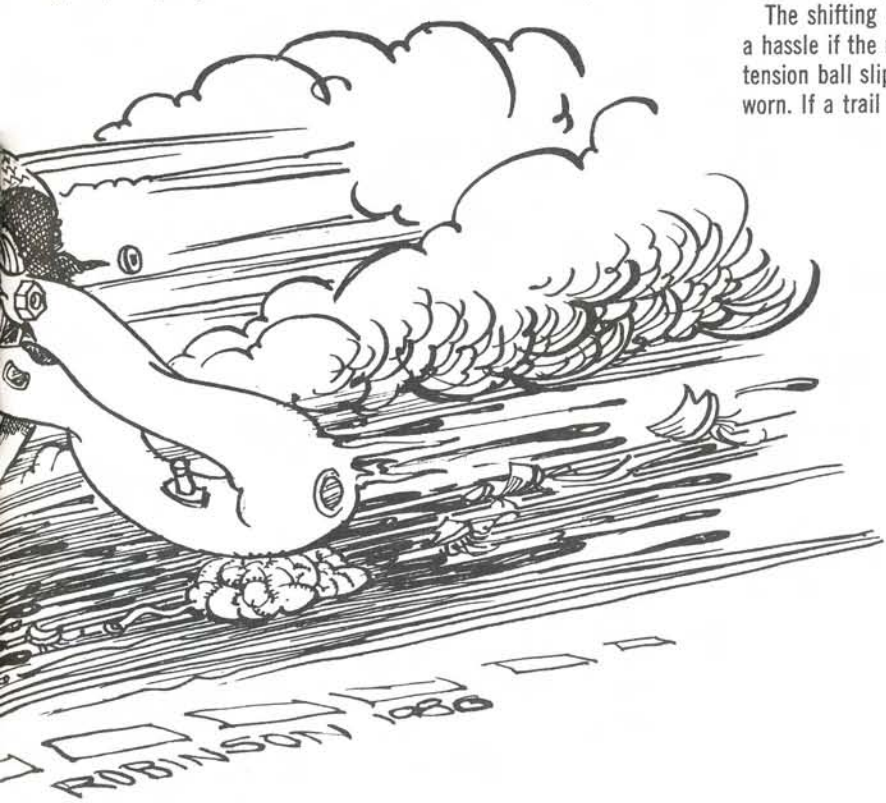
If the top is off the trans for one reason or another, the modification is lightweight and won't take but fifteen minutes. First, back out the tension ball cap and check (1) the spring. If it doesn't seem to have a whole lot of life left in it, replace it. If it seems all right, the cap can be tightened down to the tension that you dig, or you can put a spacer between the cap and the spring for increased tension.

The shifting barrel can cause a hassle if the notches that the tension ball slips into are badly worn. If a trail is worn from the outer edge of the notch (from the ball riding in and out of the notch), it may slip out of gear. That problem should be repaired with some braze and filling, or you should dig up another one.

Enough of checks; we're lookin' for neutral. As you search for that area between gears, the barrel pushes the shifting forks into neutral, but the ball has no slot to hold it there, or to indicate whether the trans is just a toenail-thickness close to fallin' in one gear or the other. So with a drill (2) or grinder, a small slot can be made between gears to give you some indication of where the shifting forks are hanging, and to keep the barrel from slipping. The slots have to be small so they won't interfere with normal shifting, but other than that they can be just as deep as needed to indicate to you that you can coast.

Another Flash-Jockey-Shift-Civil-Defense-Code that ol' Super Hog laid on me at a party the other night was the clutch-it-into-neutral gig. You can set up some jockey handles so that when you shove the early model, long clutch lever forward (from 1st) with a suicide clutch pedal, it will punch your fancy jock handle into neutral (3). It kicks the trans only from number one to neutral, so it's a good trip for trippin' wasted in bottleneck traffic or a parkin' lot.

There is a helluva lot of clutch lever movement with a suicide. And it doesn't take but a third of that throw (if adjusted correctly) to engage and disengage the clutch, so the trans ain't spittin' teeth. So a portion of that distance will work to pop that shiftin' fork out of first right into neutral with a snap of the suicide pedal. No doubt some shift handles won't reach, so if you're puttin' together a suicide, keep it in mind as you install the lever (with an old oil pump as a shifting knob). — Weed




Oh Shit!
DEMONS M.C.
THC

Different Strokes for Different Folks



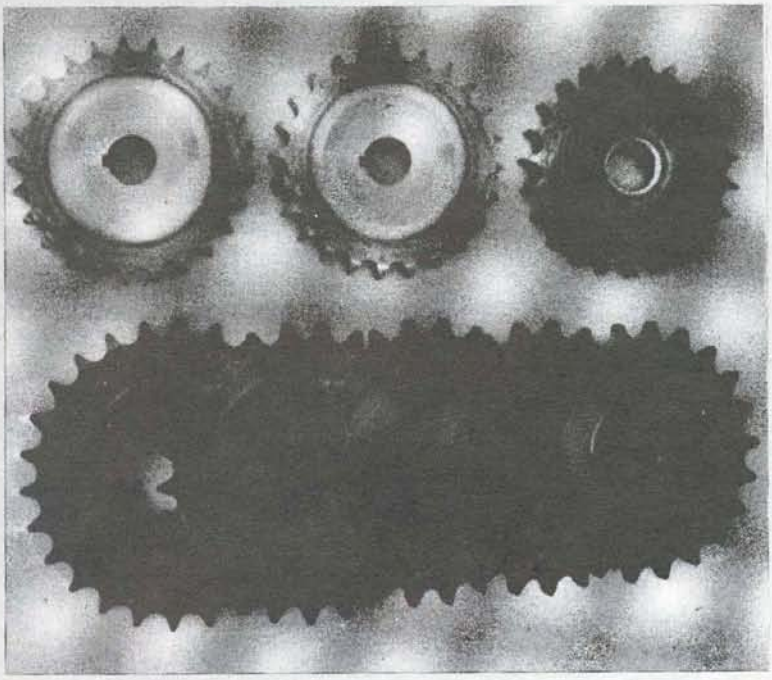
How you gear a stroker is a very important part of the overall performance and comfort you will wind up with when you're jammin'. If you gear too low (high numerically), at least three things are going to happen: 1. Your scoot's going to vibrate and shake hell out of you at highway speeds; 2. You'll lose top-end speed; 3. Strange as it seems, your bike will probably be slower out of the hole. An 80" (or bigger) Hog putting out some heavy ponies doesn't need as low a gear to get it out of the chute as a full-dress 74 does to just take off normally — you can always use taller than stock gears on a chop because you're hauling around a lot less weight to begin with. So even a stock-engined 74 chopper can gain in comfort, if not in performance, by using tall gears, which let your engine turn fewer revs per mph; this in turn cuts down vibration.

To my way of thinking, it's almost impossible to overgear a strong-running 86-incher using the parts available today — there's not a damn thing you can do about the size of the clutch or rear wheel sprockets without getting really into it (stock sprocket sizes are: engine — 23T or 24T; clutch — 37T; transmission — 22T; rear wheel — 51T). For taller gearing you have to increase the size of the engine sprocket or the transmission sprocket or both. You are limited to how large you can go by chain clearance on both engine and trans — a 25T engine is the largest I've seen; 25T trans (foot shift) and 26T trans (jockey shift).

A strong stroker can easily pull a 25/25 and will usually perform best at any speed with something close to this — 74s may lose a little acceleration but will be a lot smoother around 65-75 mph with a 23/24 or 24/24. Keep in mind when playing around with sprockets that a one-T change on the engine will have greater effect on the overall ratio than one-T on the trans.

Engine sprockets are a lot more expensive than trans sprockets. Even though engine sprockets are easier to change, it is usually advisable to do your zeroing-in at the trans.

Tall gears are a big help in smoothing out engine vibrations at highway speeds — a pretty fair variety of ratios can be had from sprockets available on the market today.



Tall 74 Gears



There are a lotta ways to improve your scooter over factory specs, but one of the simplest is to lengthen the final gear ratio. Many modified sleds have big inches or a hot cam lurkin' inside those greasy cases, and almost all of 'em are lighter than stock because of all the garbage that's been removed. In either case, a long-legged sprocket setup will take advantage of lower engine revs at that idiot 55 mph speed limit—meaning less vibration and less wear with no decrease in street performance.

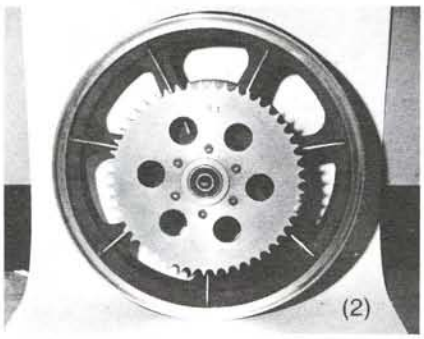
On a big twin you can take several routes to taller gears. Internal ratios in the transmission can be changed without affecting the final gearing by using Andrews gears. The close-ratio first gear set does the trick by bringin' low up from 3.00:1 (stock) to 2.45:1 or 2.60:1. Makin' the ratio taller makes the gearing more useful in traffic, and the shift from first to second is smoother and easier. The special third gear clusters (1) even up the intervals between second, third, and fourth cogs for better snickin' through them, also.



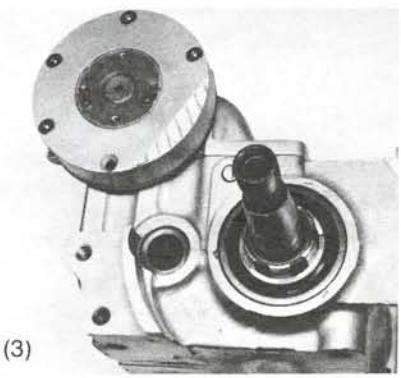
(1)

To lengthen the final drive on most sleds, it's easiest just to stick on a rear sprocket with fewer teeth. With a late model 74 rear wheel with disc brake, or a custom wheel (2), you can do just that. But a lot of Hogs run the standard rear brake drum, which limits ya to the smallest sprocket that will fit over it—the stock item with 51 teeth.

Lookin' elsewhere on the 74, it's possible to stretch your gearing by increasing the size of the front engine sprocket or the transmission sprocket. The front double-row job is easier to get to, but a helluva lot more expensive. Stock size is 23 or 24 teeth (22 for sidehacks). Up to 26 teeth are available from some places, but anything over 25 will probably require notching of the ratchet top so that the trans can slide far enough forward to allow the primary chain to fit over this huge mutha.



(2)



(3)

Screwin' around with the trans sprocket means that all the clutch crap has to be moved out of the way, but the cog itself will take less of a bite outta your wallet. Usually, a one- or two-tooth jump over the stock 22 (23 on late FXs) will do the trick, but you can go all the way to a 28 with a jockey top gearbox. To use this size with a ratchet lid, you'll have to mill a radius out of the ratchet drum and eliminate one of the screws (3)—not such a terrific idea. The biggest that'll squeak by on a late trans with ears on the clutch side is a 26, and only if you mill the bosses where the inner primary or bearing support mounts (4).



(4)

When you're decidin' which approach to take, keep in mind that, because of the multiplication factor through the primary drive and trans, two more teeth on the engine sprocket is the same as an increase of about three at the trans, and a reduction of almost six at the rear wheel.

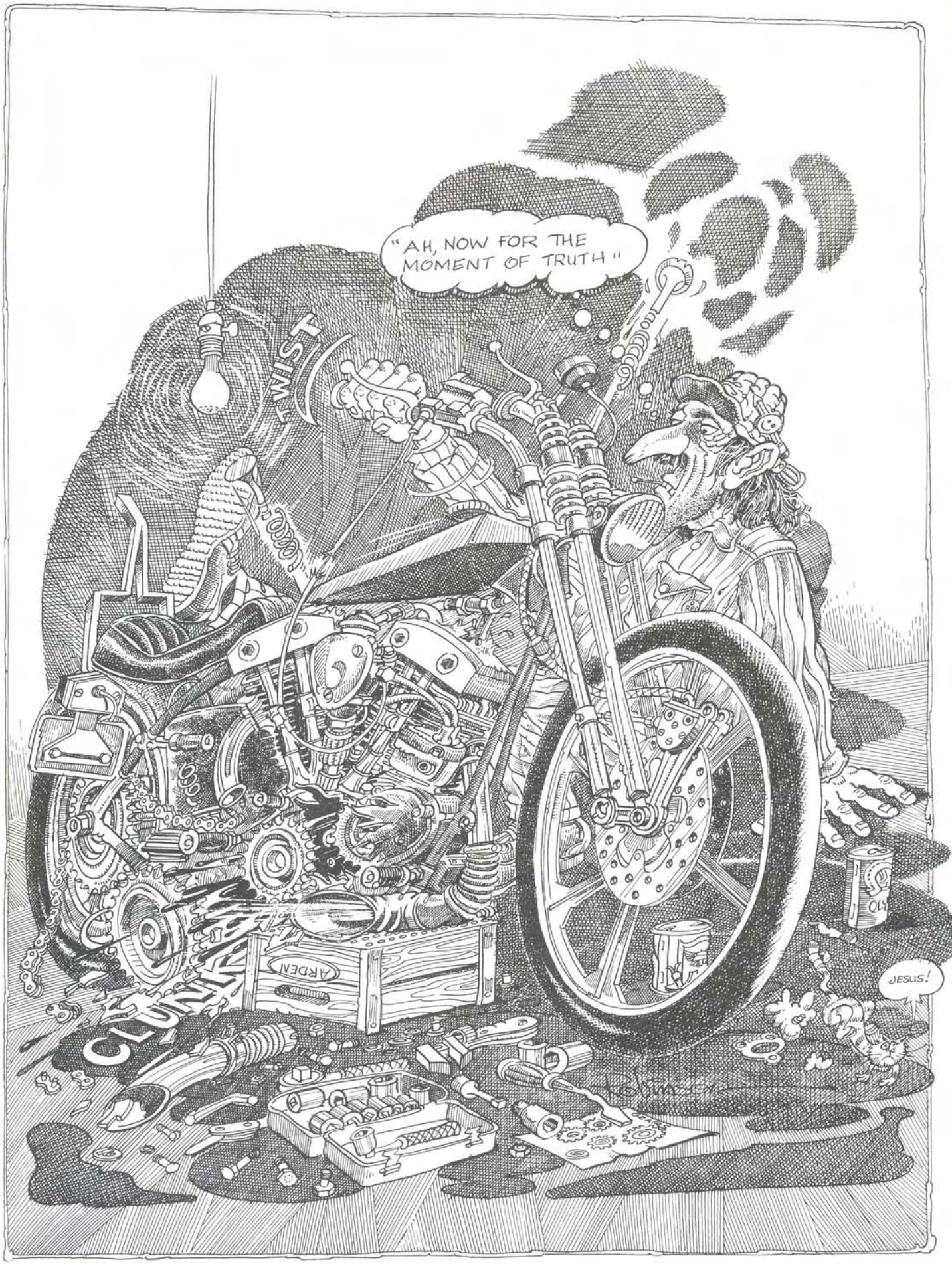
After truckin' around awhile in search of the cog you need, you'll probably notice that some aluminum sprockets are available. These may not be as strong as a heat-treated steel number around the bolt holes or spline area, but if everything is kept tight they'll hold up okay. You can also have 'em hard-anodized (trade names are Martin Hardcoat and Sanford Process), which will reduce tooth wear and give a pretty good-lookin' grey surface.



(5)

One final note—some of the belt primary drives on the market shorten the overall gear ratio of big twins because they use an oversized rear clutch pulley, which has the same effect as reducing the engine sprocket size. This change can be partially or completely offset, depending on how much it is, by a bigger trans or smaller rear wheel sprocket. One particular drive ends up with the equivalent of a 21-tooth engine sprocket; you would need a 26- or 27-tooth trans sprocket just to get you back to stock gearing. If you don't want the hassle, ask 'em what their reduction is. It should be about 1.60 to equal a stock primary, and around 1.55 for the equivalent of one tooth taller (23) engine gearing. At least two units are in the ballpark with these figures. You can usually tell by lookin' at the size of the rear clutch pulley. It it's smaller than the clutch basket's diameter by even a taste (5), then everything should be cool.

—Gearhead


"AH, NOW FOR THE MOMENT OF TRUTH"
TWIST
CLUNK
ARDEN
JESUS!

Threaded Holes

This month's tech tip is short and sweet. What you have here are two different charts for the threaded sizes of Harley engines. One chart is for Big-Twin engines and the other chart is for Sportsters. The Big-Twin chart covers knuckles, pans, and shovelheads. These charts take all the guess-work out of chasing threaded holes that have been jammed up with chrome from the plater's or glass from the bead machine. Andy Hanson has these charts hanging on the wall of his shop and allowed me to copy them so I could pass them along to the readers. These charts have already helped me out and I hope they do the same for you. —Wrench

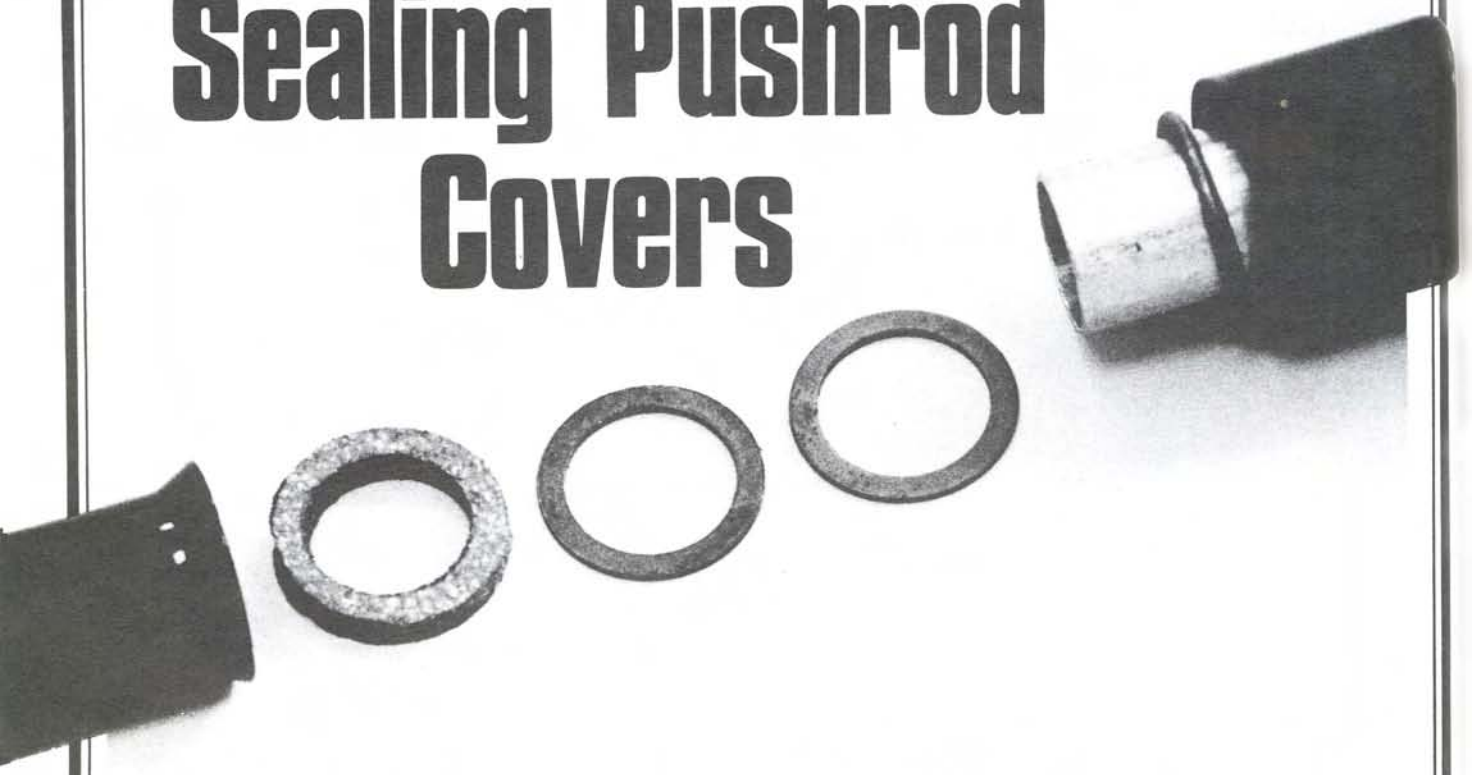
Tap Sizes For Sportys 1957-Present

Head bolts	1957-Present	7/16-20
Rocker box bolts	1957-Present	5/16-24
Lifter stools	1957-Present	5/16-18
Top motor mounts in heads	1957-Present	7/16-20
Cylinder base studs	1957-Present	3/8-16
Trans trap-door bolts	1957-Present	5/16-18
Primary chain adjuster bolts	1957-Present	3/8-16
Engine case bolts	1957-Present	5/16-18
Rear motor mt. bolts and studs	1957-Present	3/8-16
Primary cover screws	1957-Present	1/4-20
Cam gear cover screws	1957-Present	1/4-20
C/Shaft sprocket cover bolts	1957-Present	3/8-16
M/Shaft sprocket seal cover screws	1957-Present	10-24
Oil pump bolts and studs	1957-Present	1/4-20
Ignition plate stud	1971-Present	8-32
Timer cover screw	1971-Present	8-32
Oil line fittings	1957-Present	1/8 pipe

Tap Sizes For Big-Twin Harleys

Camshaft cover screws	1941-1969 1970-Present	1/4-24 1/4-20
Lifter stool screws	1941-Early 1976 Late 1976-Present	1/4-24 1/4-20
Oil pump bolts	1941-1978 1978-Present	1/4-24 1/4-20
Dist. drive stud	1941-1958 1959-1969	1/4-20 1/4-20 L.H.
Knuckle head bolts	1936-1947	7/16/16
Pan and shovel head bolts	1948-Present	7/16-20
Dist. mounting stud	1941-1969	1/4-24
Idler gear stud	1941-1969	1/4-20
Shovel rocker box studs	1966-Present	3/8-16
Engine case bolts	All years	3/8-16
Cylinder base studs	1941-Present	7/16-14
Motor mount studs on heads	1948-Present	7/16-14
Timing plug hole	1941-Present	5/8-18
Exhaust port shovels	1966-Present	5/16-18
Primary chain cover to case	1941-Present	5/16-18
Panhead cover screws	1948-1965	10-24
Alt. mounting screws	1970-Present	10-24
Ignition plate stud	1970-Present	8-32
Timer cover screw	1970-1979	8-32
Oil line fittings	1962-Present	1/8-pipe
Crankcase breather fitting	1965-Present	1/4-pipe
Trans top cover screws	1941-1979 1979-Present	1/4-24 1/4-20
Trans C/shaft cap screws	1941-1964	6-32
Speedo drive mount screw	1941-Present	10-24
Trans kicker cover	1941-Present	5/16-18
Trans drain plug	1941-Present	3/8-24
Trans adjusting screw	1941-1964	3/8-16
Trans case stud bottom	1941-Present	3/8-16 7/16-14O.S.

Sealing Pushrod Covers



Monday morning, my day off. Actually, I was off Sunday too, but I had been suffering from an overdose of tech tips and decided to cut back the pressure in my shovel's big-bore cylinders. I wasn't real eager to do it, but that mixture of water, yeast, and stale beer the gas stations sell nowadays caused my engine to ping so bad that the only way I could escape was to flee. So what the hell, I figured — I could collar Frank for some help and we could throw a couple extra head gaskets on the stroker in three or four hours.

I knew I was in trouble when Frank showed up with a joint stuck in his mouth and one behind his ear — both of them lit. Actually, he was in pretty good shape — for him. We pulled the front head, installed two new gaskets, and buttoned it back up in no time. The rear head, however, was a little more involved. There was a clearance problem between the rocker box and frame caused by the .020-in. longer cylinders, a problem that Frank wouldn't let me cure with my flame wrench.

Seven joints, two cases of beer, and nine hours later, we had the engine back in the frame and running. It was worth the hassle, though. A hard night of bar-hopping with a couple of buddies didn't produce even the slightest ping. I even made a mental note to stop by the Harley shop Monday and pick up a new set of thick head gaskets (.030-in. thicker — part #16769-82) for my ol' lady's '73 Sportster. (Sorry , but they fit only 1000cc Sportys produced after May 1, 1973. 1972 and early 1973 Sportsters have a different head bolt pattern.)

Anyway, back to Monday morning. Still burnt out from the night before, I stumbled out to the garage for my scooter, hoping that a ride through the country would clear the cobwebs from my brain and keep my breath away from my nose. My vision blurred even more when I noticed that the pushrod tubes had started to leak oil. Hell, I never had that trouble before I added an extra gasket to each cylinder.

Then it hit me like a 60mph June bug in the teeth — the cylinders are longer, but the stroker kit also included longer pushrod-tube retaining clips to keep the same spring pressure on the cork seals. All I needed was an extra cork in each tube and a gorilla to put the retaining clips back in. Since I knew Frank was out of town that week, the next best thing was something about as thick as the extra head gaskets to retain the stock spring pressure.

After a quick search among my spare junk, I found one of the four parts I needed — a steel washer, H-D part #6762B, that fits between the spring and middle cork of each pushrod cover. They measure about .037 in. and add a little more spring pressure to the corks.

Sure enough, after a three-hour test ride at speeds considered illegal, there wasn't a sign of oil leakage around the pushrod tubes. I even remembered to buy three more washers to replace the ones I boosted from the ol' lady's bike. There isn't anything that makes me happier than having the oil stay inside the bike, where it belongs.

Well, I'm headed out for another three-hour test ride and a couple of test brews.

—Hatchethead

Transmission Mainshaft Lengths

	Shaft Out Of Trans	Shaft In Trans From M/Drive Gear
1950-1964	11-3/4"	2.388"
1965-1969	12"	2.638"
1970-1974	12-1/2"	3.138"
1975-Present	12-1/2"	3.138"

1975 and later shaft has a bushing in each end, and the 1974 and earlier pushrod will not fit in the 1975 mainshaft.

Transmission Pushrod Lengths

1938-1964	13-1/4"
1965-1969	13-5/8"
1970-1974	14"
1975-Present	14-1/8"

1975 and later pushrods use a new type of throw-out bearing. This pushrod and throw-out bearing come as a kit from H-D, Part No. 37305-41 or 65 or 70.

Engine Sprocket Shaft Lengths

1930-1954		Flat roller shaft for keyway sprocket
1955-1964	3-1/2" long	Splined and threaded
1965-1969	3-3/4" long	Splined and threaded
1970-1971	4-1/4" long	Splined and threaded
1972-Early 1981	4-1/4" long	Larger dia., no keyway
Late 1981-Present	4-1/4" long	Different taper

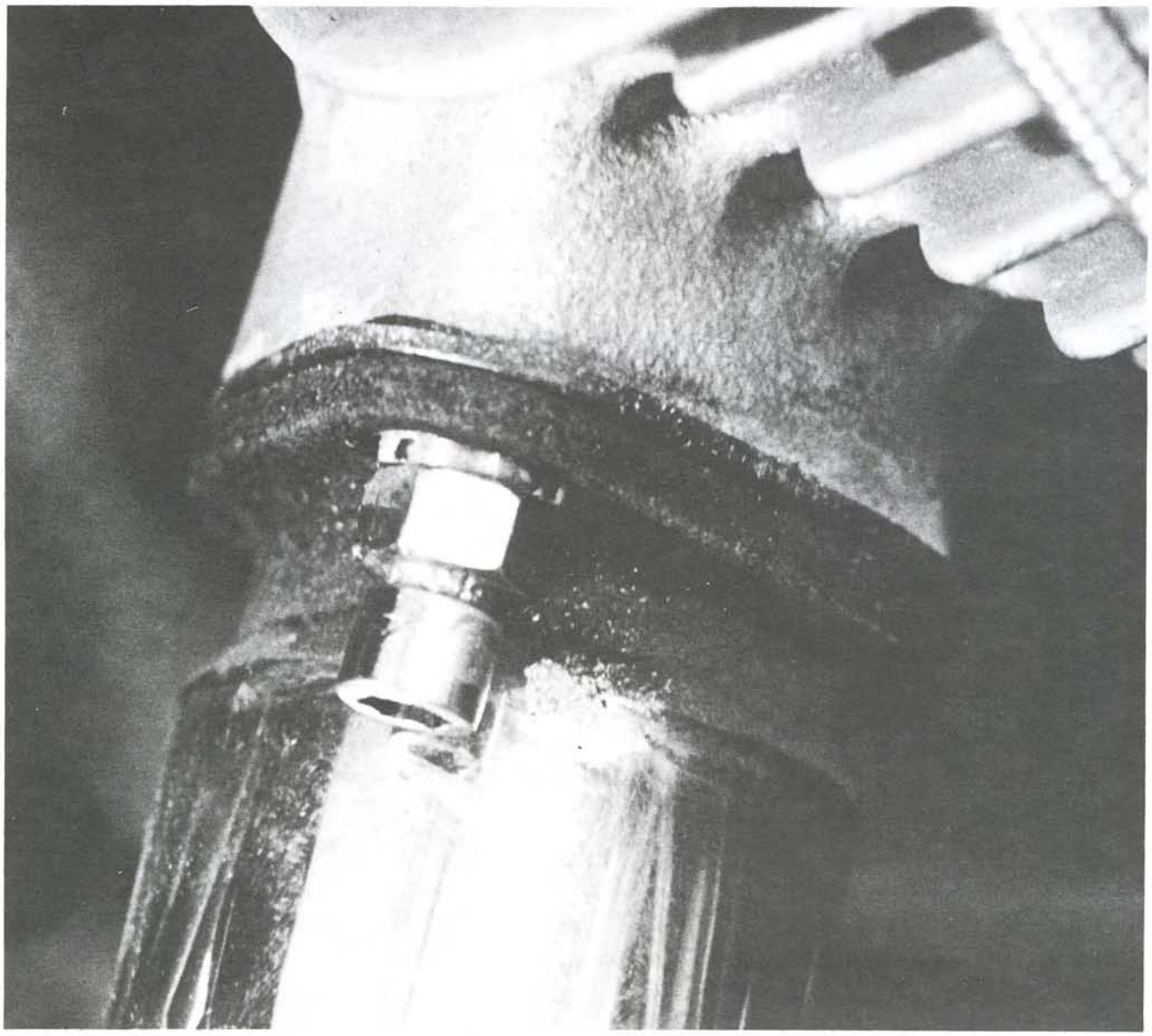
Shaft Charts for Big Twins

Okay, I've got a couple more charts for you. They should help you identify big-twin transmission mainshafts, transmission pushrods, and engine sprocket shafts, using only a tape measure. Just imagine yourself wandering through a swap meet looking to score a tranny or a mainshaft to replace the one that took a shit last time you went down. You spot a tranny mainshaft on a rag with five or six other mainshafts; you want the right one, don't you? Well, with the aid of this handy chart from Andy Hanson of H/E/S, and a tape measure, you can easily identify the right shaft for your scooter.

These charts aren't too hard to figure out. Look close and you'll pick up a pattern. The 1950-1964 mainshaft is 11 ¾ in. long, right? Well, in 1965 when the factory added the electric starter, they had to allow a little room for the starter ring, so they added ¼ in. to the mainshaft and the sprocket shaft to move the primary out for clearance. Still with me? Okay. In 1970, the factory introduced the cone style engine with an alternator, but where did they put the alternator? Between the engine case and the primary chain, requiring another ½ in. on both the mainshaft and the engine sprocket shaft. Do you see where I am coming from? Good. Whenever the factory lengthened one shaft, they had to add the same amount to the other shaft to keep things running straight.

I hope these charts will save you some irritation next time you go looking for a shaft.

— Wrench

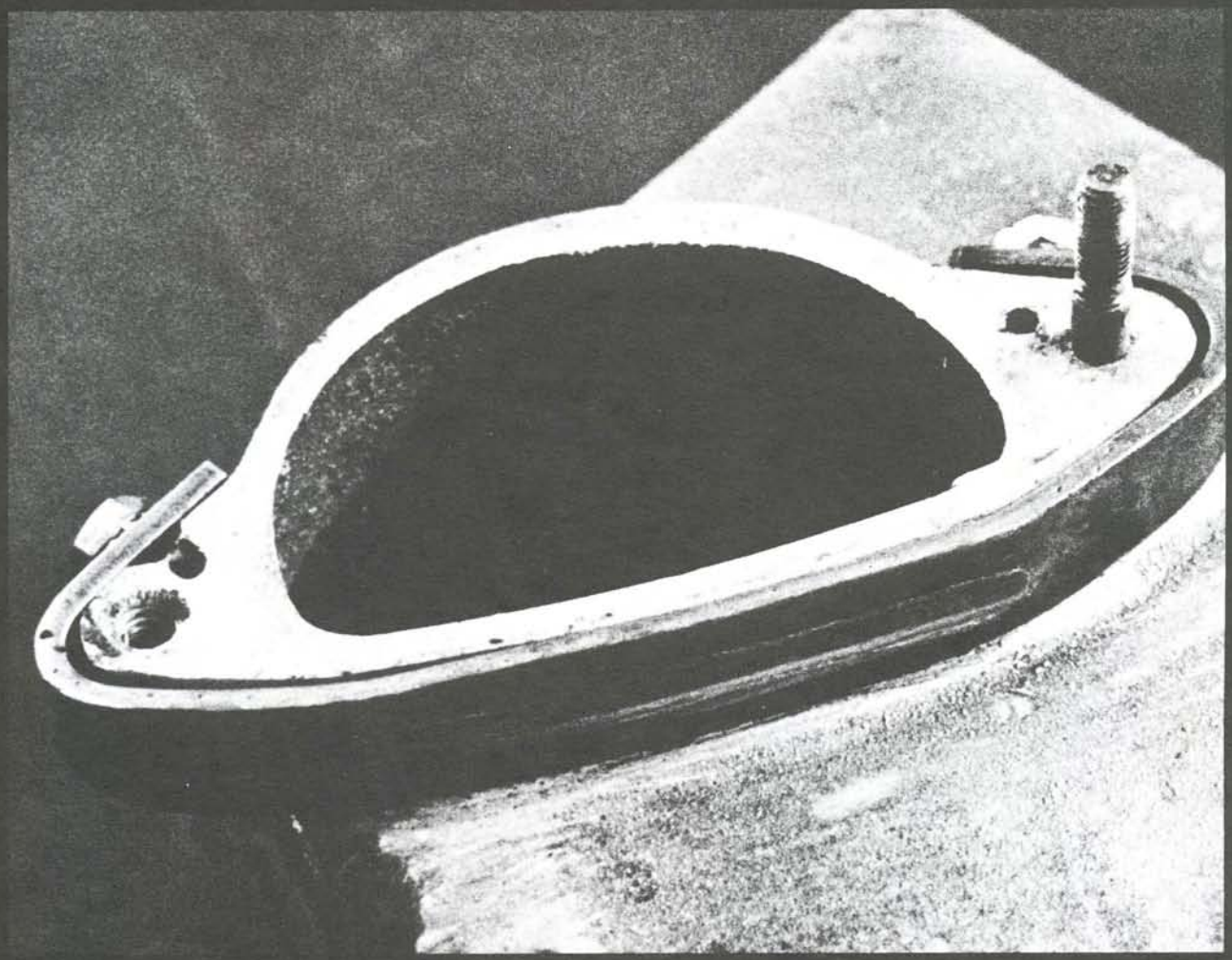


AN EXHAUSTING PROBLEM

Stripped-out bolt holes are a pain in the butt. Aluminum is usually worse than steel, but it can happen in either. Anyhow, this tech tip can help solve one of the most common problems of stripped bolt holes, the shovelhead exhaust pipe flange hole. The exhaust flange hole comes from the factory tapped 5/16-18. But after you change exhaust pipes once or twice, besides tightening up the pipes when they loosen from vibration, the threads tend to pull out of the head. The easiest way to fix the problem is to install a heli-coil insert in the head itself. Such a coil, properly installed, will last almost forever, but to make sure the heli-coil threads stay in the head, replace the exhaust flange bolt with another bolt, 3/8" to 1/2" longer. Before you install the new bolt, put on a 5/16 nut and run it down on the bolt as far as it will go; then screw the bolt into the head till it's snug (not tight). Now tighten the nut down against the exhaust pipe flange till it's good and solid. This way, when you remove your exhaust pipes, all you have to do is loosen the 5/16 nut and unscrew the bolt with your hand. One last note: To keep the threads of the bolt from corroding, coat them with a little Never-Seiz before installing the bolt in the head.

I'd like to thank Arlen Ness for turning me on to this tech tip.— Wrench

How Not To Score



For all electric-start primaries excluding FLT, FXR, and FXRS.

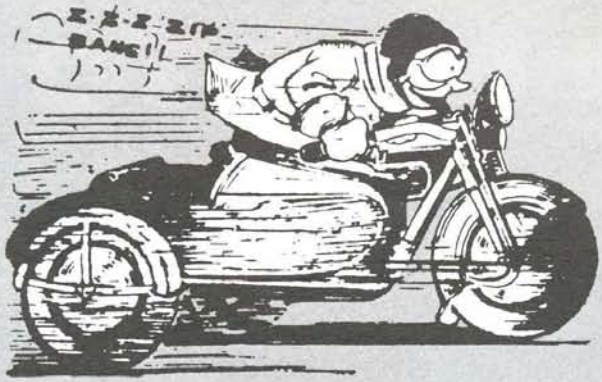
The next time you remove the inner primary cover, take a look at the back side below where the starter motor is bolted to the cover. More than likely there will be some score marks on it from not adjusting the secondary chain properly or from running a large transmission sprocket with a loose chain. For years I had two inners because one was always in the shop being heli-arced. The welder would cut out the bad section and then replace it with a chunk of aluminum.

One afternoon, I was at Terry's house (a bro who does my welding) when he came up with this idea. As you see in the picture, the area that catches the most hell is wrapped with a 1/4-inch steel strap. The bolts holding the strap to the cover are 1/2-inch long and the thread size of the bolts is ¼/20. The strap is 8 inches long and less than 3/4-inch wide.

What Terry did was hand fit the strap by bending it and then trying it over the area to see how snug he could get it. After about ten minutes with a hammer, vise, and pliers, he had it fitting like the proverbial glove. Next, he clamped the strap to the cover with two vise grips and drilled two pilot holes through the strap into the cover, where the two locating holes are. (That's where the starter motor housing bolts up to the inner.) Then he removed the strap and drilled it out, using a No. 3 drill. Next he took a No. 7 drill and cut the pilot holes approximately 1/2-inch deep, then tapped the holes with a ¼/20 tap. After bolting the strap back on, he took a 1/8-inch drill bit and drilled the bolts holding the strap on the cover to about 1/4-inch deep. This is necessary to keep the bolts holding the strap from backing out. With the starter motor housing in place, the locating pins went into the bolts holding the strap.

I've found that it works better than any lock washer. Be sure to clean the primary cover of all aluminum chips, dirt, etc. And be extra careful when drilling and tapping aluminum.

— Rip

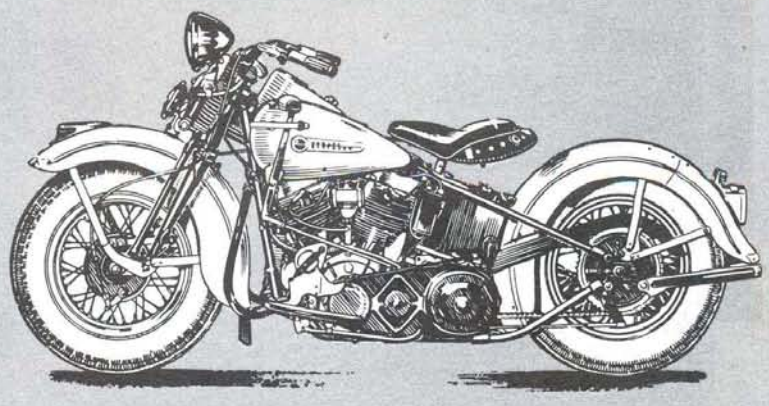


Break-in Recommendations for 74s

1. Install engine with all the proper bolts, washers, spacers, and nuts. Do not tighten any mounting bolts until all are in place. Always use new lock washers and/or new lock nuts. And if you can get your hands on Loctite, use it.
2. Readjust chains, check chains and sprockets for excessive wear—now is the time to replace them. Lubricate both chains.
3. Tighten transmission mounts and rear wheel.
4. Check oil in transmission and replace if necessary.
5. Check and replace (if shovelhead) intake manifold O-rings (also O-ring-style panhead intake manifolds). Be sure the manifold is sealed properly and that there are no air leaks. Replace all hose clamps. Replace distributor and any previously disconnected wires; check connections.
   Check gas tank for rust. If it is dry or rusty, flush it out, seal it, and replace gas filter. Torque heads and follow by checking valve adjustments several times.
6. Make sure the carburetor is in good working order. Clean air filter. Make initial setting on carburetor per factory specifications.
7. Flush out oil tank. Refill with clean non-detergent 50-wt. oil. If it is extremely hot, use 60-wt. oil.
8. Be sure there are no tight bends in any oil or gas lines, and that the lines are clean. Make sure oil lines do not touch exhaust pipes.
9. When hooking up throttle cable make sure there are no kinks in the housing and that the throttle closes completely. Over-revving will damage a new engine.
10. Replace all exhaust manifold gaskets where needed. Check all exhaust pipe connections for leaks. Make sure that the pipes are mounted securely. Exhaust leaks **will** burn valves. If necessary, shim any loose fits.
11. Remove spark plugs and kick engine over until oil returns to oil bag. (Another idea is to remove the return line and collect the first quart of metal-shaving-filled oil to prevent it from returning to the oil tank.) Replace spark plugs.
12. Once the bike is started, let it run at a fast idle. Watch for oil leaks, air leaks, or exhaust leaks. If the intake manifold is leaking, the bike won't idle. Shut it off and cure the problem.
13. After the engine warms up, shut it down, retorque the heads and barrels, let it cool, then readjust the valves.
14. Break the engine in slowly. A good idea is to let it run several times at a fast idle until warm, letting it cool before starting again. Change the oil, then ride it for the first time.
15. While riding, back off throttle every few miles to let engine wash itself down and cool somewhat.
16. Avoid heavy stop-and-go driving in high-temperature weather for the first 500 miles.
17. Change the oil as often as possible (every 100 miles) for the first 500 to 700 miles. Then replace the 50-wt. oil with 60-wt., unless living in a cold climate.
    If all those steps are carefully followed the engine should last through approximately 4,500 bar stops. Unless you fall down a lot.

—Weed 'n' Wrench

MOTOR
HARLEY-DAVIDSON
CYCLES



Low Buck Headlight Bulbs



All right, ya got your sled unlocked from the telephone pole. The six-pack inside your jacket is gettin' warm and the pint of Jack Black in the hip pocket is missin' a couple of fingers. The cute blonde honey at your back is just dyin' for a ride to wherever. As the motor sits there idlin' on about a quarter choke, ya reach for the light switch for a glow so ya can roll one for the road. After tryin' that, ya go fer the high-beam switch — nuthin'. Ya finally realize that your headlight has gone south. Just fuckin' great, not bein' in the area of a 24-hour Harley shop, if there is one; ya may want to run the risk of no front lamp. Most cops will not take to this type of performance and want you to carry slips of yellow paper to show you the right way. In addition, citizens crave runnin' over lightless scooters — it's fuckin' dangerous.

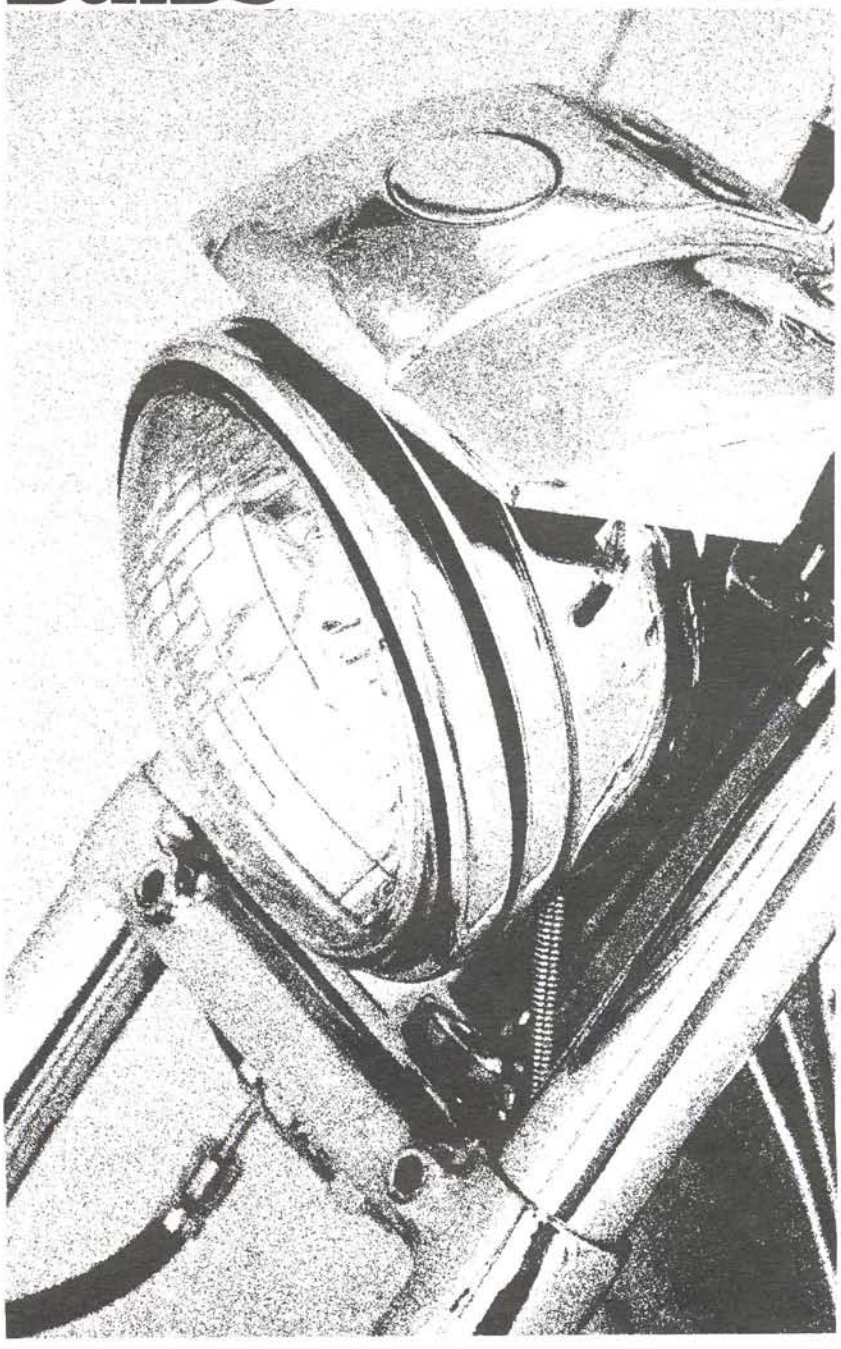
If you happen to run a 12-volt system, you're halfway home. And if you're ridin' a Sportster or a Super glide, or even runnin' a Bates-style light with a sealed beam, help might not be farther than the nearest parkin' lot. It just so happens that most automobiles fitted with four headlights have some parts in common with H-Ds. This common part is the outside headlights. Now, only the two outside lights will work, 'cause they are the only ones with both high and low beam.

My first auto parts bulb came from a '67 Chevy, but don't think import cars are special; my present bulb is from a Datsun pickup. The local Harley shop wants about six or seven bucks each for a new sealed-beam. At the auto parts store, the same replacement bulb is only $4.50. Whenever I find a couple of extra soda bottles, I run by the parts store and pick up a spare. Weed is always losin' his lights at my spot. It's generally listed as headlamp number 4000, which replaces 4002. Either one will do the job.

In the Bates-style light there is a metal ring that centers the bulb in the metal housing. This metal ring is notched once for a locating stud that is part of the glass bulb itself. The sealed beam that comes with the Bates light has only one of these locating studs. Automotive sealed beams have two or three of the studs, so if you change to an automotive type of sealed beam in your Bates light, you'll have to cut one or more notches in the metal locating ring. A pair of dikes, pliers, or scissors is all you would need.

The first year I tried this, I had a bad regulator an' went through nine sealed-beams in one fuckin' week.

—Wrench



BOOSTIN' THE AMPS ON YOUR H-D



Think about the last four hundred breakdowns you've encountered. How many of them had to do with a lack of zots? Well, Jammer has an alternator solution for the old systems—

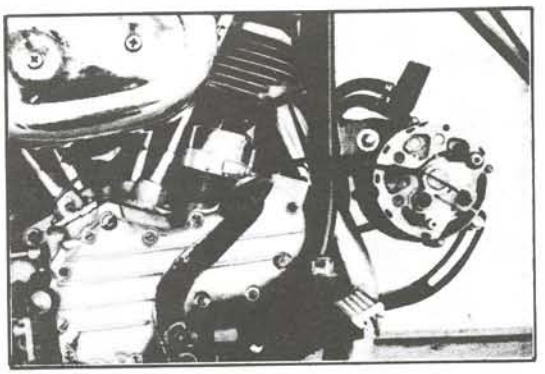
A gutted 3-brush generator works well for a jackshaft. If not, a 2-brush may work. Simply remove the cap end for the brushes and adapt an aluminum plug countersunk for the same bearing as on the drive end of the generator. Both are 5/8 i.d. and a 3" pulley slides on the old armature so easy I couldn't believe it. A small spacer between the housing and pulley is necessary for proper belt clearance from front exhaust pipe. The 3-brush armature is threaded on both ends, and with a flat washer and lock washer, tighten the whole assembly together. You will have to drill holes and thread them to bolt the adapter and generator housing together just like the old generator is bolted together.

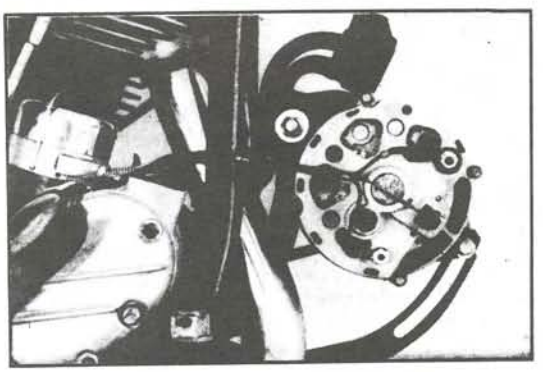
Now then, weld two tabs on your frame so that the alternator hangs upside down from how it would go in the car. An alternator will charge in either direction so it doesn't matter up or down, but hung this way the fan will still cool the alternator, even though it isn't necessary. The tightening bracket is from a '66 Chevy pickup and a twist in the end that is bolted to the motor makes it easy to bolt to the front motor mount on your frame. Then a 26" belt like on a reel-type lawn mower, and your unit is set up. Then mount a Delco-Remy voltage regulator in a convenient spot and wire it just like it came out of the car. Here in Arizona an alternator can be bought for as cheap as $20 rebuilt; the regulator is around $13. Both alternator and regulator cost less than what a regulator for your Harley would cost and is $10 cheaper than a 6v armature. The alternator works only when there is a demand, so it is easier on your battery and it doesn't need water as often. Any Jap 12v battery that will fit in the battery box in your oil bag will work. You even save money on the battery.

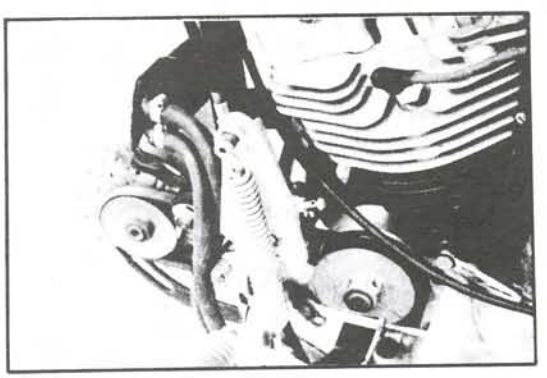
This unit has been on my bike for two years now without any trouble at all. No one has to mention how a Harley generator can be a pain in the butt. With this setup you can even charge the battery on the run truck in case everyone passes out and leaves the 8-track playing all night.

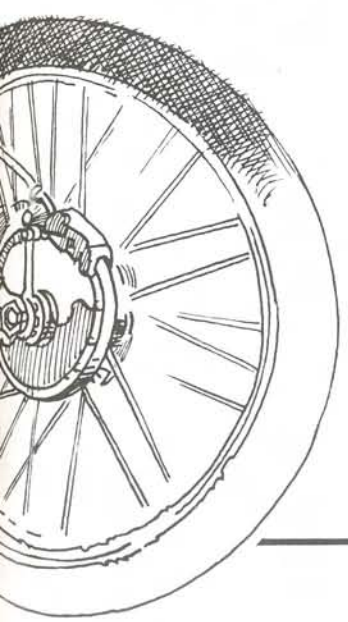
The big mess hangin' out front looks fucked-up compared with the compactness of a generator, but the whole idea of riding is to get it in the wind and keep it there as cheaply as possible. Besides, you can't see that mutha from where I sit.

—Dog Breath.

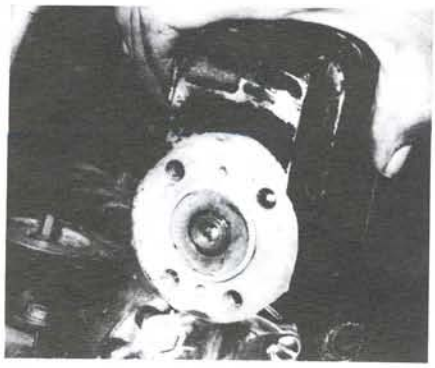








Magneto Trick



Do your pipes glow in the dark? Can you light a smoke off your pan covers? Does your kicker make your knee swell up like a cantaloupe? Can you hear castanets in your top end when you nail it? If your scoot is a generator-equipped 74 (1936-1969), with a magneto, and you answered "Goddam right!" to any of these questions, best take a close look at your timing. Not enough advance makes for lots of heat, and too much makes that noise like marbles in your cylinders. Too much puttin' with either problem and your mill starts to go away. If you had trouble getting the timing right on when you put the mag in, there's one more thing you should try.

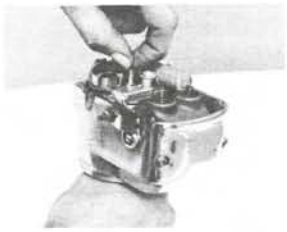
The problem usually goes about like this: When you drop the mag in one way, you can't get enough advance before it hits the exhaust port. So you pick it up and drop it back in one tooth ahead. Now it's so far advanced you can't retard it enough—it hits the intake pushrod cover, right? What you need is a place in the middle, and here's how to get it. The idea is that one tooth on the magneto drive gear is 72°, and every time you move the mag one tooth, you advance or retard the spark by 72°. (The mag turns at half the speed of the engine, so one complete rotation of the mag is 720°, not 360°.) But there's another adjustment you might not know about—the hex drive in the magneto base (where the head and driveshaft bolt together with allen screws from underneath). Find your allen set, and take that joint apart. You'll see that the bottom of the rotor and the top of the shaft each have a six-sided hole, with a short piece of hex stock joining them. Guess what happens if you rotate either end slightly before putting the key back in? Each flat of the key is 120° advance or retard—sounds much worse than one tooth, doesn't it? But you can add and subtract teeth and flats, and use the difference between them. To get more advance, try one flat ahead and one tooth back (120-72=47) or one flat behind and two teeth ahead (72+72-120=24). To retard, reverse the directions. Check it out, it works! And if it seems like a pain in the ass to get it right, it's a helluva lot easier than rebuilding your motor.

—R. Dunn



Magneto Madness

Magnetos have been praised and pissed on ever since someone took a Fairbanks Morris off a Sporty and plugged it into the distributor hole on a 74. And since I also have had my ups and downs, starts and won't starts with magnetos, the search for solutions and remedies for mag problems has continued for some moons now. I haven't run into any "this will do the number" products, or wizard-like ways of setting them up. But I have discovered a couple of possible problems with custom mag setups, possible helpful tune-up procedures, and one spark-boosting product to assist the tractor mag. If anything else—carburetion, timing, valves—isn't right with the bike, nothing can be done to a mag to override the other problems. But if the scooter is up to par in the rest of the departments and simply lacks the umph to get started the way it should, these tips may help.



1



2



3



4

Just a slight alteration in the timing procedure can possibly make the difference. Try setting the gap on the spark plugs at between .018 and .020. The bossman at Bomar Magneto said that a .014 point setting will put out the hottest spark for his mag. According to Bomar, to have a magneto shoot the strongest spark to the plugs, the points must be set as close to the magneto flux, or peak, as possible. A distributor system works on dwell, whereas the magneto has this peak to contend with. Consequently, to set the mag for the strongest possible zap, it must be set per the peak and not the dwell setting as prescribed by H-D. However, the people at Joe Hunt have experimented and find that a .018 or .019 point gap setting works better for low end, which would effect starting. So if you've been setting your points at .022 or .020 (H-D setting) and you have trouble getting the bomb started, you might try .014 for the hottest spark and a .018-.020 spark plug gap. If the scoot then starts with reasonable ease, you have nearly the strongest spark possible flashing down on top of the pistons, which would be the way to go for racers. If the sled continues to be rough to start, try a larger point gap, say .018 to .019, which may iron out the starting problem and still give the bike a stronger spark than a distributor will.

The next problem is not (hopefully) common to all custom mags, but it still is a hassle that can easily go unnoticed and cause the bike to be one big-assed dog when it comes to starting. The next time the plastic top is off the ol' mag body, jiggle the point lobe back and forth (1), without swinging the entire shaft. Just jiggle it lightly. There should be very little play there. If there is considerable play you can see what it could be doing to the timing while you're kicking the monster. If it's bad, it means separating the base of the mag from the stool it sits on and shimming the allen wrench type stud (2) with anything from tinfoil to shim stock to take up as much of the play as possible. There is probably enough lash in the timing gears to throw the timing off slightly without the point lobe flopping around in the mag.

And lastly, a magneto's spark depends on the speed at which the mag is whipping around in its cage. The faster it spins, the hotter the spark. So while you're kicking the turkey over, it may lack the spark needed to turn the poof backing out the carb into a solid rev. Some bros have started using a heftier condensor on their bikes to assist that feeble spark at lower revs. This condensor (3) is made by Mallory, and the part number is 25010. Call around to the different auto parts houses in the area and ask if they carry Mallory parts. If you pick one up, disconnect the old condensor and mount this unit to an outside cover screw and hook the lead to the grounding screw on the outside of the mag. (4). Follow the instructions with the condensor and be sure that it's grounded correctly. If everything else is right, the heavy-duty Mallory condensor will boost the mag while your foot is in action getting the bike running. And it's a wonder, but the Mallory part is guaranteed for as long as it's installed!

These suggestions won't add any inches to a 74. And they won't keep it from running out of gas. But if the ol' mill isn't starting within 20 or 30 kicks they might save you a right leg or the kicker gears in the trans. We all know how sweaty, and embarrassing it is to kick your guts out in front of a bunch of bros or the sweetest thing you've wanted to hold onto in a week.

—Weed

BATTERIES

by E.K.B. and Gnarly

It's probably been some time since you gave thanks to the dead frog responsible for the spark of life so necessary to your scoot's continued operation.

You would, in fact, almost certainly be willing to bet that no such reptile has anything to do with your lovingly built and polished Hog.

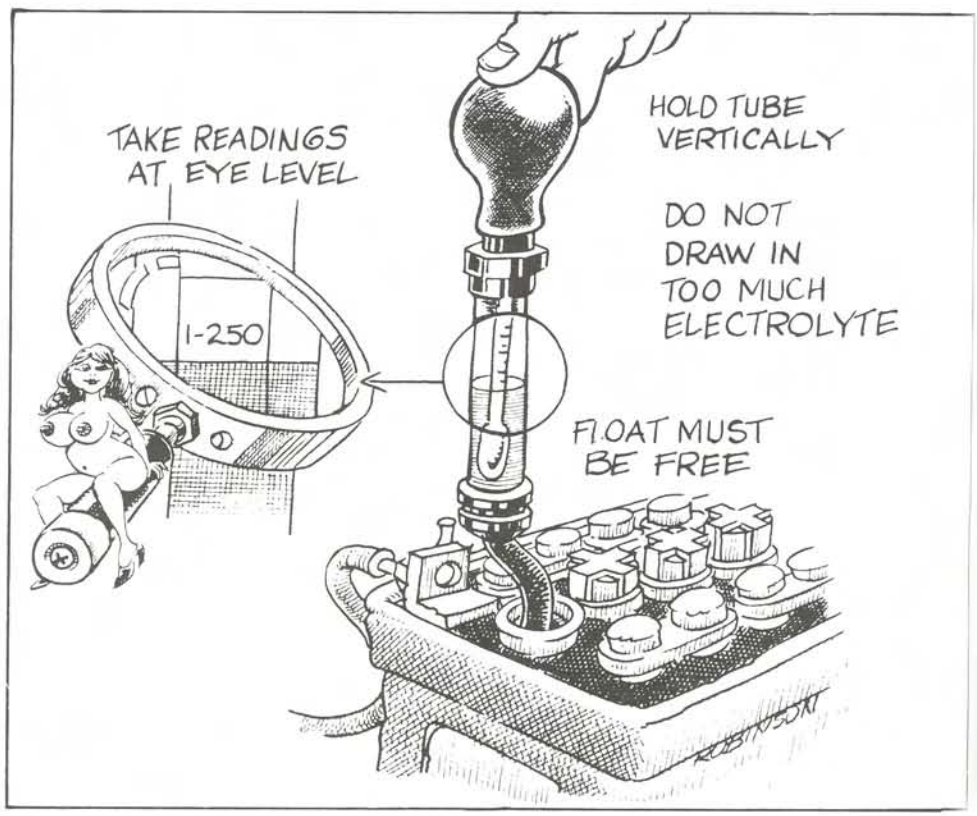
Well, bro, you'd be wrong.

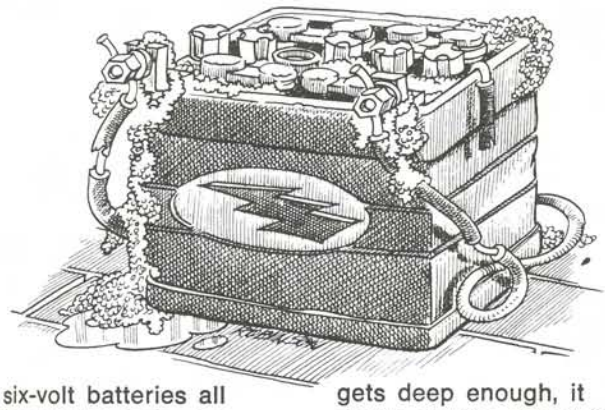
About two hundred years ago, these two Italians got into a little barroom disagreement. Seems one of them, Luigi Galvani, while experimenting with a machine that created electricity by applying friction to glass, discovered he could get a dead frog to hop around by applying electricity to its legs. Galvani determined to see if lightning would have the same effect but, while trying to pin the frog to his iron balcony with a copper skewer he saw the legs start to twitch the moment the copper touched the iron. Impressed, Galvani declared that the electricity existed in the tissues of the frog.

The other dude, Alessandro Volta, was less impressed. Volta claimed the electricity was actually produced by the contact of the two different metals. To prove his point, he placed a piece of copper on his table, laid a piece of cloth soaked in sulphuric acid and water on top of it, and covered that with a zinc disk. Next he added copper, cloth, and zinc again until he had built a pile of pairs of zinc and copper disks, each pair having a moist cloth between them. Then he fastened a wire to the zinc disk at the top, and a second wire to the copper disk at the bottom. Presto! History's first battery.

Surprisingly, that plastic-resin-encased rectangle stuffed inside the frame of your Hog isn't that much different from the pile of power Volta concocted all those years ago. Two types of lead plates—a lead-peroxide positive plate and a spongy-lead negative plate—have replaced the copper and zinc disks, but the electrolyte—a substance that conducts ions between the battery plates—is still diluted sulphuric acid. More important, the principle by which batteries generate electricity is also unchanged since Volta's time. The electrolyte combines with the plates to form sulphate and water, and during this process the positive plates acquire extra free electrons, while the negative plates lose electrons. This unbalanced condition results in electricity—measured in volts (see, I told ya Volta was important).

All wet-cell batteries used in bikes and cars produce two volts per cell (a cell is one set of positive and negative plates filled with electrolyte), which is why





six-volt batteries all have three holes for you to add water, and twelve-volt batteries all have six holes.

Technically speaking, for those of you interested in trivia, it is impossible to have a single-cell battery. The word **battery** itself means a combination of simple instruments used to produce a compound instrument. Remember Volta's stack of disks? Each set was one cell of a battery, just like each 16-incher on the deck of a battleship is one of a battery of guns. Those 1.5-volt jobs that power the ol' lady's vibrator? Actually, they're just cells.

Okay, you ask, if the battery is such a great idea that it has survived intact for 200 years, why do I have so much damn trouble with mine?

Lots of reasons, most of them due to the fact that many riders don't realize that a battery needs regular maintenance and inspection just like any other part of a motorcycle. One of the things that needs to be checked regularly is the acid level. Letting your battery dry out causes the plates to drop hunks of their active material to the bottom of the battery. Excess lead peroxide and spongy lead collects in a puddle on the bottom, and when this puddle gets deep enough, it shorts out the cell plates and your battery is ready to become the last four letters in the phrase "New Harley batteries $59.95 exch."

Riding with your battery only half dry poses its own problems. Your scoot's generator or magneto produces more electricity than necessary to operate the ignition and accessories (lights, etc.). The excess juice is what keeps your battery charged and happy. A properly filled battery of the right size is designed to absorb all these extra volts and store them (that's why you sometimes hear it referred to as a storage battery). A half-filled or otherwise defective battery won't suck up all those voltage surges and they'll go elsewhere—like straight to the light-bulb filaments, which will be immediately fried by the excessive current.

Fortunately, we don't usually have to fool around with sulphuric acid which, in addition to changing your fingerprints in a pinch, can easily burn your eyes out if improperly handled. You see, plain, ordinary distilled water (never tap water, which contains impurities that could shaft your cells), when added to a battery, undergoes an electrochemical reaction that draws sulphuric content from the plates and becomes a perfect electrolyte. Incidentally, this process causes the water to break down into hydrogen and oxygen, gases that escape from the battery's vent hose. (Without some kind of vent, these gases would build up until the battery exploded; even so-called sealed, maintenance-free batteries have pin-sized vent holes to allow the gases to ecape).

All this brings us to another problem caused by improper battery maintenance: over-dilution of the electrolyte. The fluid in a fully charged battery has a specific gravity of 1.275 to 1.30. (Specific gravity is density of the battery fluid compared with water; in other words, a fully charged battery's electrolyte is about 1¼ times the weight of water.) A half-charged battery shows a specific gravity of about 1.21 to 1.275, and a totally discharged battery will give a specific gravity reading of below 1.15. Usually, run-down batteries with a specific gravity above 1.15 when checked with a hydrometer will hold a recharge, while batteries in worse shape than that won't. (But they may, so give the recharger a shot.)

Going back to over dilution: Remember that the level of fluid in a battery should just cover the top of the plates. Trying to lengthen filling intervals by adding distilled water to the top will result in only two things—dilution of the electrolyte level with a resultant loss of power, or the leaking of acid, possibly right onto your

Continued on page 58



Two-Cent Funnel

Technically speaking, a funnel is defined as an instrument consisting of an inverted cone with a hole at the small end for pouring liquids and powders into containers that have small openings.

Funnels are necessary at times, but who carries one on a scoot? Recently I had trouble filling the battery in my wraparound oil bag. After spilling water all over, then using aluminum foil and finally tryin' rolled-up newpaper, I devised a simple. efficient funnel. It's collapsible, disposable, and cost less than two cents. Yep, that's it, a baggie—preferably a Ziploc—with the corner cut slightly smaller than the size of the hole you intend to pour the liquid into. Works for oil, gas, and even wine. A tiny hole lets you use the bag as a bota, and pressure on the bag will shoot the liquid wherever you need it. Only your imagination limits this tool's uses.

—Woody

Battery Tech Tip

chrome transmission, from your battery vent tube.

One important caution when working on your battery: Never short it out on purpose. If it's got any kind of charge in it at all, shorting it out could cause the top to blow right off it, giving your face a blinding, skin-stripping acid rinse.

One smart thing to do about four times a year is to remove the battery from the bike and give the outside of its case a good cleaning. That way, any cracks in the case will become apparent. Scrub the corrosion off the posts and clean the ends of all the wires connecting to the battery. Before reinstalling it, squirt some silicone lubricant (available at auto supply stores) around the posts, being careful not to cover the areas where the wires hook up to the battery, and around the overflow tube (leave the tube connected to the battery while doing this to avoid blocking off the overflow hole).

Some of the larger batteries, such as the ones Harley uses, have a thin piece of plastic tape with writing on it stuck on them. Remove the tape and squirt some silicone over this area, which has a tendency to dry out and leak acid when it gets hot. Store your tube of silicone in the refrigerator; cold temperatures will prevent it from drying out.

Also, always add water with the battery in the riding position, to keep the acid level at the proper point. And remember, use just enough distilled water to cover the plates.

After the battery is back on the bike and reconnected to the electrical system, coat the posts and wires with grease or some of the vinyl-type paint made especially for that purpose.

Some bikes with generators need to be repolarized after the battery has been disconnected. Never touch the field post on the generator when you are doing this — touch a wire from the positive side of the battery to the generator post marked "Arm" or "Reg."

Also, older Harleys had a three-brush generator system, which sent juice to the battery without a regulator to shut it off when the battery was fully charged. If you have one of these systems, one thing you can do to prolong your battery's life by keeping it from overcharging is to wire the bike so that two of the brushes are working when the motor is running and hook up the third brush to operate when the lights are on.

(You can rig an inline switch to control the charging system manually.) If you do a lot of riding, leave the lights on all the time.

So you've checked your electrolyte level, you've washed your case, and you've greased your wires. You push your bike out of the barn after six long winter months and it's dead. How come? Simple — unused batteries discharge. Slowly, yes, but surely nevertheless. The lead sulfates cover the plates with white crystals and the crystals block any chemical activity of the battery. But don't despair. Hooking the battery up to a charger with a slight overvoltage — say, fourteen volts on a twelve-volt battery — should restore your battery to primo shape unless it's hopelessly gummed up.

Even then there's one old-timer's trick left you can try, before giving up and accepting the fact that it's $59.95 exch. time. Put some baking soda inside each of the cells and let the battery stand for about half an hour. Then wash it all out with plenty of clean water (be careful not to let any of the shit coming out of the batterty splash on you, because it still has some acid in it), refill the battery with new acid, and charge very slowly (like on a trickle charger). As noted earlier, batteries are killed by the crap that builds up and shorts out the plates. As long as the plates aren't worn out themselves, this method should remove that sludge and add much useful life to your battery.

If you've read this far, you're probably wondering why you can't get one of those new "miracle" maintenance-free batteries for your bike and be done with it. The reason is something we haven't mentioned yet: amperage.

Amperage is simply the strength of an electric current. Think of the relationship between amperage and voltage like this: a twelve-ounce beer is a twelve-ounce beer, but twelve ounces of nine-percent-alcohol European brew is more powerful than twelve ounces of Joe Coors' three-two-percent-alcohol piss. In other words, twelve volts at one amp will give a hell of a lot less jolt than twelve volts at twenty amps.

Batteries are rated in ampere hours. That means, for example, that a twenty-ampere battery will produce a one-amp current for twenty hours. The higher the rating, the stronger the battery. The amperage of a battery is determined by the sizes of the plates — the larger the plates, the higher the ampere-hour rating.

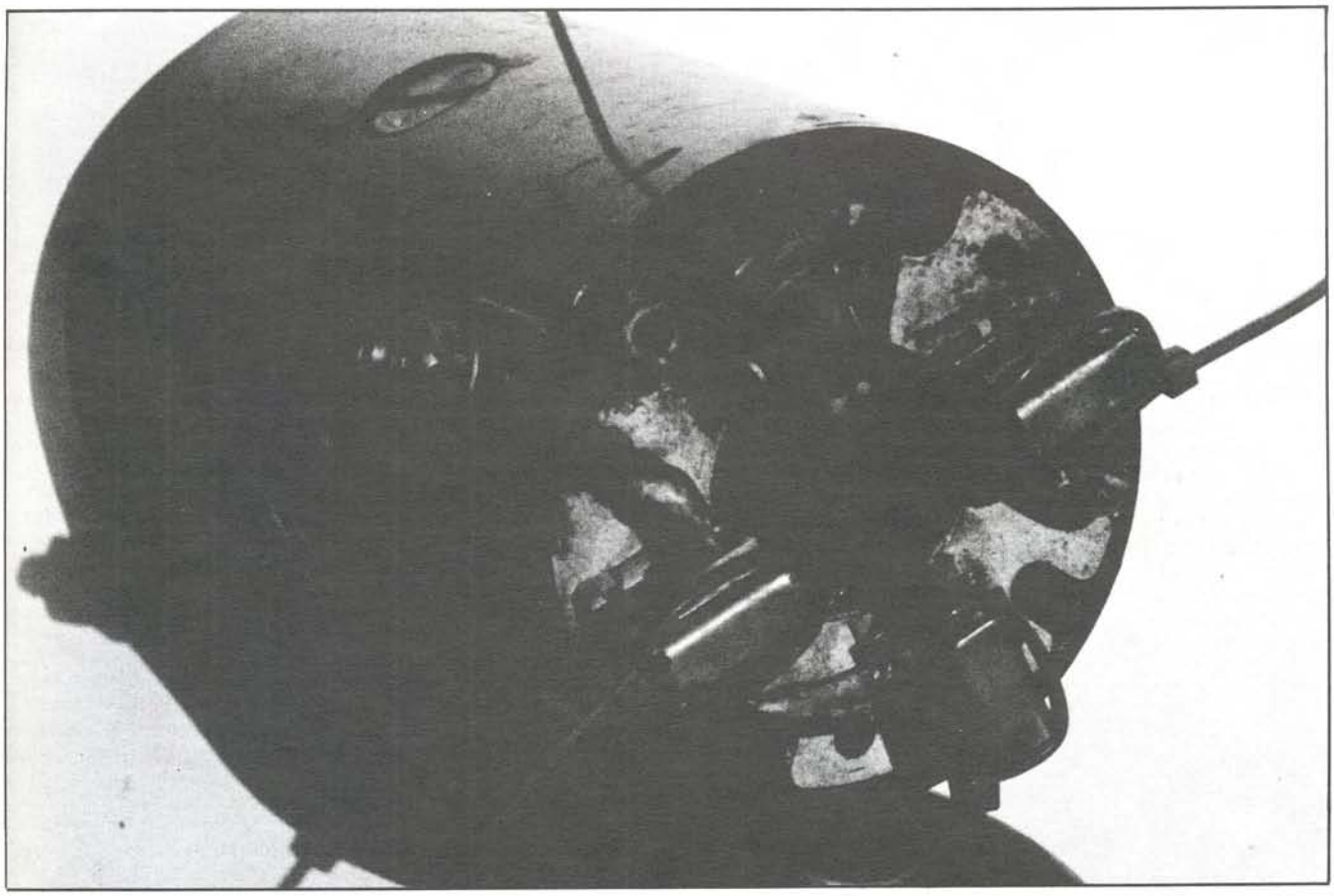
As you can see, this poses a problem for the builders of bike batteries; they have to cram the biggest possible plates in the small case they have to work with. As we've already noted, maintenance-free batteries aren't really sealed; they have tiny ventilation holes to let out certain gases and through these holes, just as on a regular battery, battery fluid evaporates. Manufacturers of maintenance-free batteries for cars just calculate how much evaporation will take place over the expected life of the battery and design it to hold that much extra electrolyte. With motorcycle batteries, some of which hold as little as half a pint of fluid to start with, the designers have no such luxury.

Anyway, battery maintenance isn't anywhere near as much a pain in the ass as it may sound. The important things are remembering to check the fluid level regularly, more frequently in hot weather, and keeping the cells filled to the proper level.

Things could be worse. Where would we be if Volta hadn't decided to show up that dummy Galvani and his crazy theories about bodies having electricity in them? Galvani, what a fool.

Not really. Actually, the progress of science has treated Luigi Galvani, who died in 1798, rather kindly. For instance, those blood-shot baby blues you're reading this page with; they're sending messages, hundreds of thousands a second, to your brain, and those messages are being transmitted along your optic nerve impulses.

Yep, it's a fact. You, me, and every frog in the pond are chock-full of electricity. Just like Galvani said.



Don't Get Brushed Off

If you currently own or have ever owned a Sportster or a Big Twin (69 or earlier), I'm sure that at one time or another the brushes in the generator have gone south. Installing a new set of brushes is no sweat. All you need is two pairs of hands to do the job — one pair to hold back the spring-loaded brushes and another pair to slide the armature into the housing. But what about the bros who have the number-one luxury on their scooters, the easy-to-appreciate electric foot? In the electric-starter motor there are four brushes. That works out to six hands. Personally, I don't know three bros who like to work and would also be in any condition to lend a hand for a four-brush operation. Checking the ever-present H-D manual, you may catch a glimpse of these small finger-clamp tools to hold the brushes in place, making it possible for only one set of hands to slide the armature into place. There is no getting around the fact that those finger clamps are a trick item; but at three or four bucks a clip, that's a lot of brew sitting in the old ammo box of a tool chest. Mauro, who comes up with choice little time-and-money-savers every other week, showed me how this four-brush operation can be handled easily by one person and four small cable ties. Cable ties are plastic and come in every size and color seen in a good acid trip. The small cable ties are easier to work with. Take a cable tie and make a loop with it. Slide one of the brushes into a brush holder and push it in until the brush is almost flush with the brush holder. Then take the cable-tie loop and slide it over the brush holder and the brush, holding the brush in place. Tighten the cable tie until the brush is held far enough into the brush holder that, when all four brushes are held in place, the armature will slide into place easily. Once the armature is in place, take a small screwdriver and slip the cable ties off the brush holders, letting the brushes come out and contact the commutator. Simple, ain't it?

Later — I'm headed for a cold case and a hot half-pint.

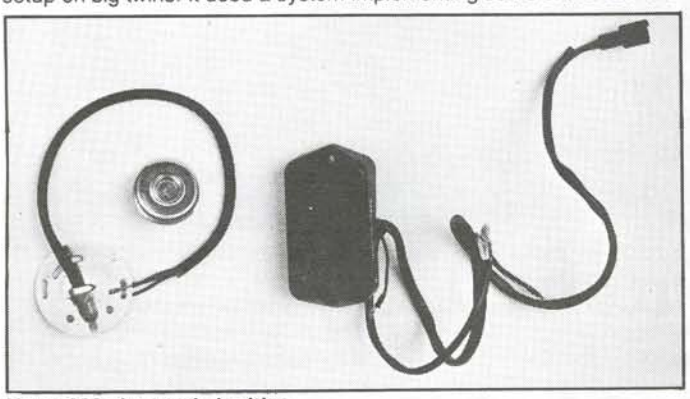
— Wrench

Timing Electronic Ignitions

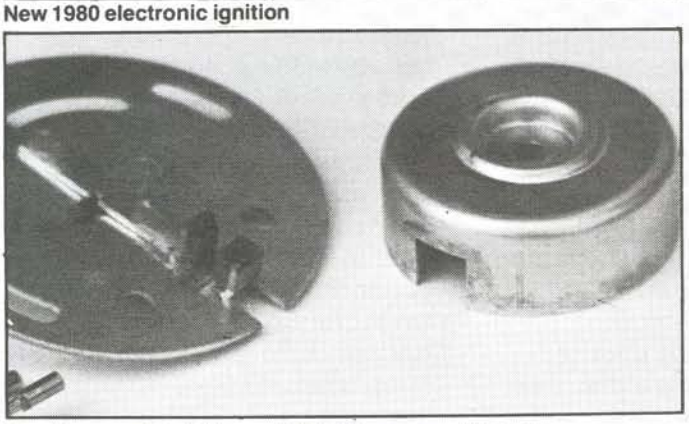
Electricity has always scared the shit out of me. The wiring on my bike used to burn every year, religiously. Timing was always hit or miss — something like when ya have to talk to the heat. When H-D came out with their new electronic, computerized ignition I thought, another smoke 'n' burn possibility. Not so, though. H-D may have cured some problems.

Seems the space-age doodads boost spark. The new system (not the late '79 electronic system) eliminates all moving parts associated with the mechanical-advance points setup. Ya don't have to worry about the flyweights sticking or the points burning if someone should forget to turn off the ignition switch.

We've got to note here that in late 1979, H-D tried their first electronic setup on big twins. It used a system implementing some of the new and some of the old (flyweights and mechanical advance). We won't go into that system much here, but the basics are still the same.



New 1980 electronic ignition



Electric eye plate (left), and 1980 trigger cup. When the leading edge of cutout on cup just breaks electric eye, engine is statically timed.

The new system is almost foolproof. Almost, 'cause somebody's bound to fuck it up. Timing an electronic ignition is a breeze; the only requirement for right-fuckin'-on timing is a timing light. Instead of points and condenser, there's a magnetic field (electric eye) that's broken when a rotor with two slots or notches (one for each cylinder) passes it. It then sends a signal to a solid-state electronic brain. (Heavy, huh.) The electronic brain figures out what's happening and notifies the coil at the right time to cut loose with a mighty charge for the plugs.

The trigger slots for the electric eye are on the rim of a small, stamped metal cup. The smaller notch times the front cylinder; the wider notch times the rear cylinder. Now, just as with the early systems, both plugs fire at the same time, each time the coil is charged. The notched cup is held on the camshaft by a single bolt, same as the mechanical-advance flyweights. On the bottom of the cup is a tit that locks the cup on the camshaft and insures that the cup is in sequence with the opening and closing of the valves.

To time the sucker so it will start, make sure the front cylinder is on compression stroke. Put the correct flywheel timing mark in the center of the timing hole. On the other side of the engine, locate the small notch on the trigger cup; the leading edge of the small notch should be just breaking the field of the electric eye. Loosening the two screws that hold the electric eye plate will make lining up the leading edge of the trigger cup easier. Snug down the two screws and ya can start it up. Give the motor some time to warm up before hooking up the timing light. Hook up the timing light to the front plug wire and the battery. Start the engine and run it up to 2000 rpm. This will make sure that the electronic brain is sending the coil full-advance signals.

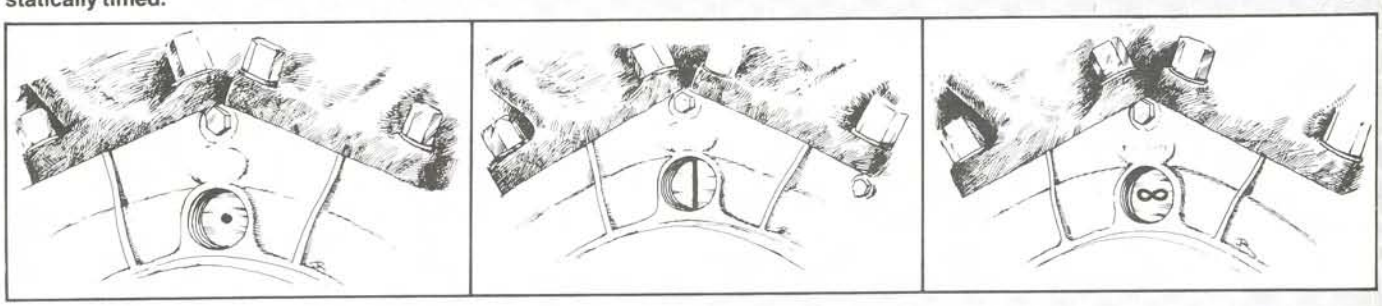
Aim the timing light in the timing hole and check out the location of the timing mark. If the mark is not dead center in the hole, rotate the electric eye base plate until the timing mark appears in the center of the hole. Tighten down the plate screws and ya got it. When ya think it's right on, go back and check it one more time to be sure as hell it's all dialed in.

Here's one more H-D curve ya ought to know about. In 1980, the H-D factory changed the timing marks on the left-hand flywheel in big twins and Sportsters. Big twins with crankcase part number 1480-128-001 and above (on bottom of crankcase), and Sportsters with 780-108-001 and above, have these new timing marks. On these new engines there are three timing marks. The front cylinder timing mark is a 1/8-inch-drilled dot. The straight line now indicates top dead center for the front cylinder. And the third timing mark is a lazy 8, which is full advance for the rear cylinder.

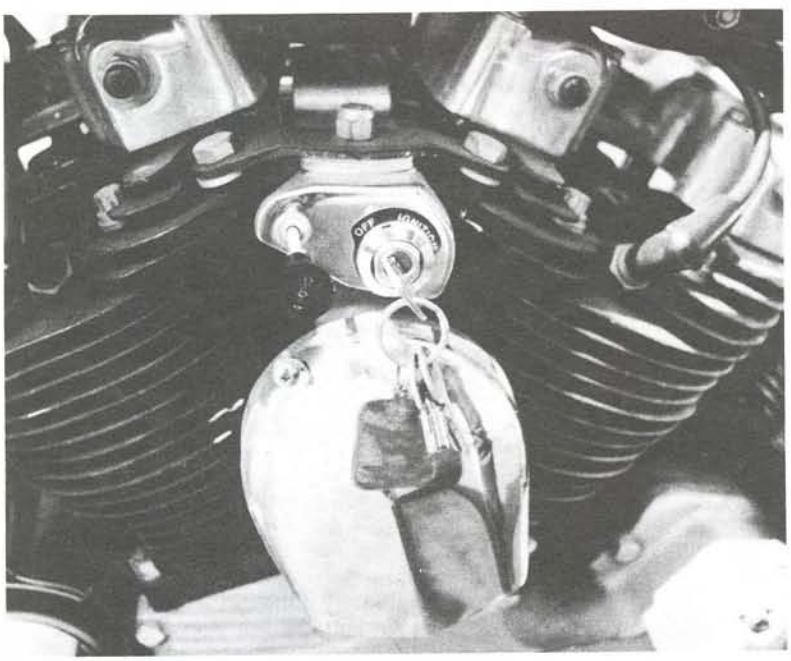
On engines prior to these, there is only one timing mark to worry about, and that is a straight line up and down.

This tech tip wasn't intended to hype the sale of timing lights; a four-buck discount store special will do the job. Or you can go in with a couple of bros and split the cost of a good light. Take the guesstimates out of timing. Electronic ignitions are a breeze, once ya understand the damn things.

— Wrench



KEYS AND VINEGAR





It's a fuckin' bummer to have to carry forty jagged objects around in your pocket to secure every little dipshit thing you own. There are locks now on everything—from clasps on purses to padlocks on shoes. Man, it's ridiculous—if you don't have a lock through your nose, someone's gonna snatch your snot.

Recently, we received a letter concerning the keys on Harleys. Seems a bro, Jon Worhul, stumbled out of the local dive to catch some sleazy bastard about to ride away on his H-D. After all the physical shit went down, Jon discovered that the dude hadn't hot-wired his bike. He'd just inserted another H-D key (with identical numbers) into the ignition switch and proceeded to do his thing.

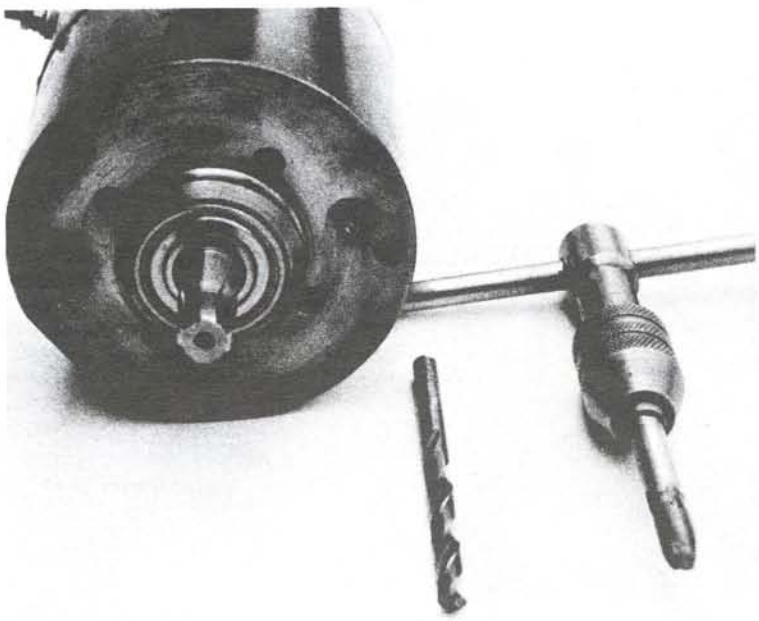
Jon was baffled beyond words. But he ran down the terrifying tale to his bro, Roach, when Roach showed up in the bar. Bummed, they compared keys. You got it—they matched. Immediately, they started an extensive investigation amongst the local scooter people. They discovered a '69 Sportster, a '70 Sportster, a '72 Sportster, a '76 Super Glide, and two more H-Ds at a swap meet, all with the same keys. All the bikes would fire with the same key—unreal.

Jon took the expensive AMF product out of his machine and pitched it in a river, replacing it with a VW ignition switch, which installed without any hassle. It may not keep people from snatchin' his putt, but at least they just can't take possession as if they owned it. It's bad enough to have to lock every goddam thing, but to lock something with a key that isn't worth a damn is dangerous, because it gives you a false sense of security.

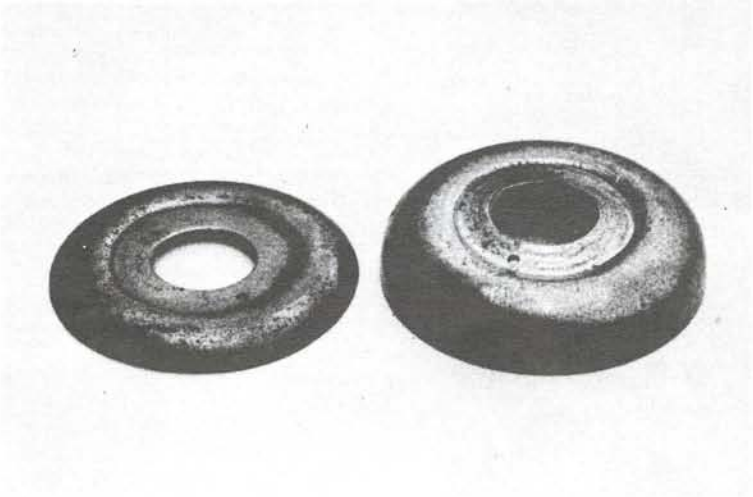
Shit, I almost forgot. Gramps wrote and told us that white vinegar cleans exhaust pipes. We tried it on hot pipes (as he instructed), and it worked. But only on my front pipe. It didn't faze the rear one. Still, ya might give it a try.

—Weed

3-Brush/2-Brush Swap



Stock mounting holes must be drilled and retapped for larger bolts.



Oil deflector on (left) trimmed to fit through late cases.

Installing an earlier model 3-brush generator in place of the later 2-brush model is fairly common among chopper freaks. The object is to eliminate the large automotive-looking voltage regulator needed to operate the 2-brush and use the smaller relay, which is easier to mount.

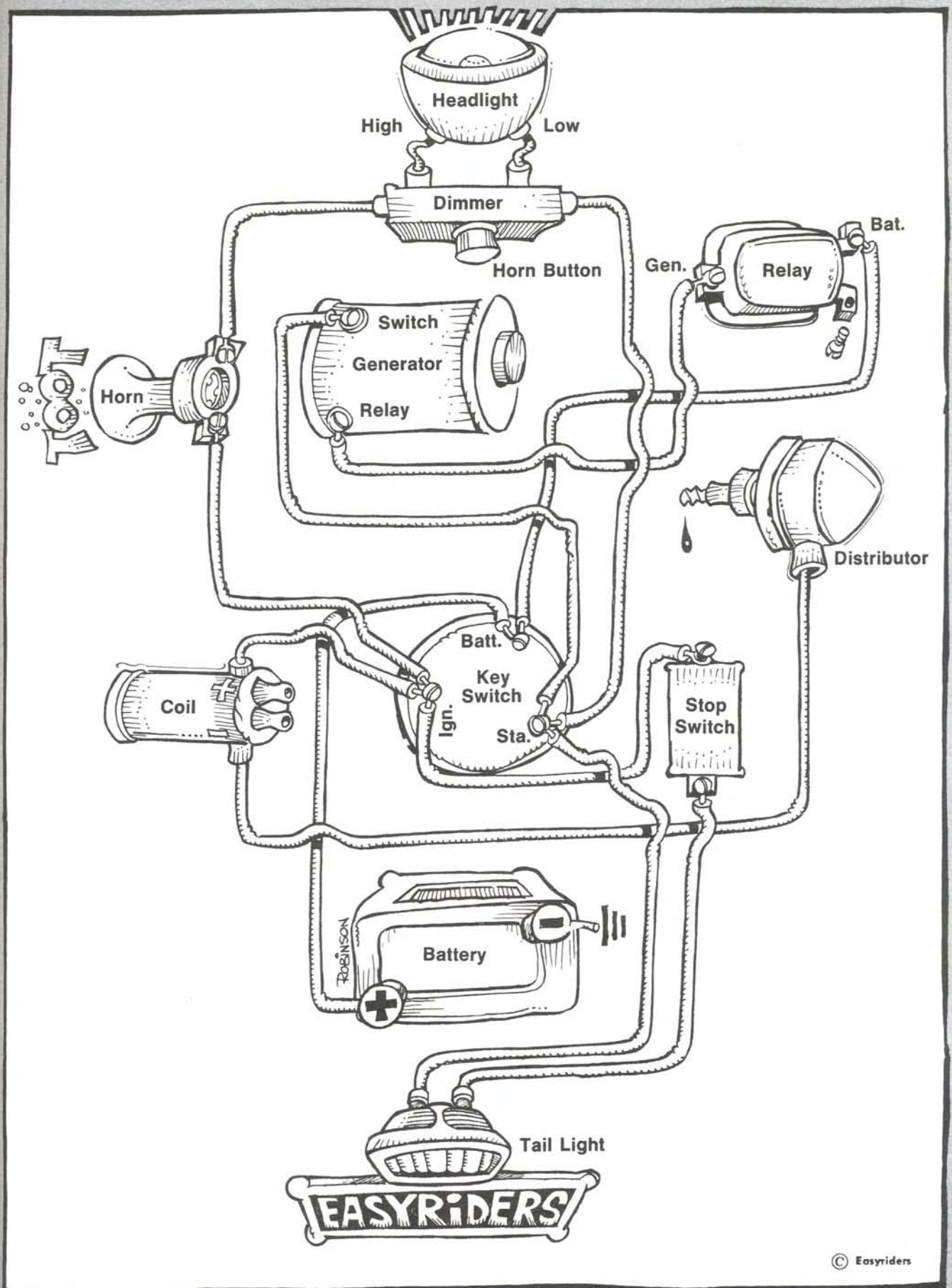
The swap is an easy one (after you manage to get your grubby hands on a 3-brush generator, a job that may turn out to be a bitch). All you need to do the swap job is a 17/64 drill, a 5/16 x 24 tap, and a bench grinder. First, redrill and tap the existing holes in the 3-brush generator to accept the larger, late-model bolts that were holding your 2-brush to your engine. Be careful not to get shavings and crud inside the generator; you can usually avoid having to take the generator apart if you drill slowly and have the generator facing in a slightly downward position while drilling. A dab of grease on the end of the tap will usually pick up the chips from the tapping operation.

Next, you have to remove the generator gear so you can trim down the diameter of the stamped steel cup shielding the end bearing. (A gear puller is great here, but you can hassle it off without one.) Be careful in removing the cross pin, so that you can re-use it. The function of the steel cup is to act as an oil deflector to keep the generator from being flooded with engine oil. The reason it must be trimmed down is that it will not fit through the opening in the later model cases.

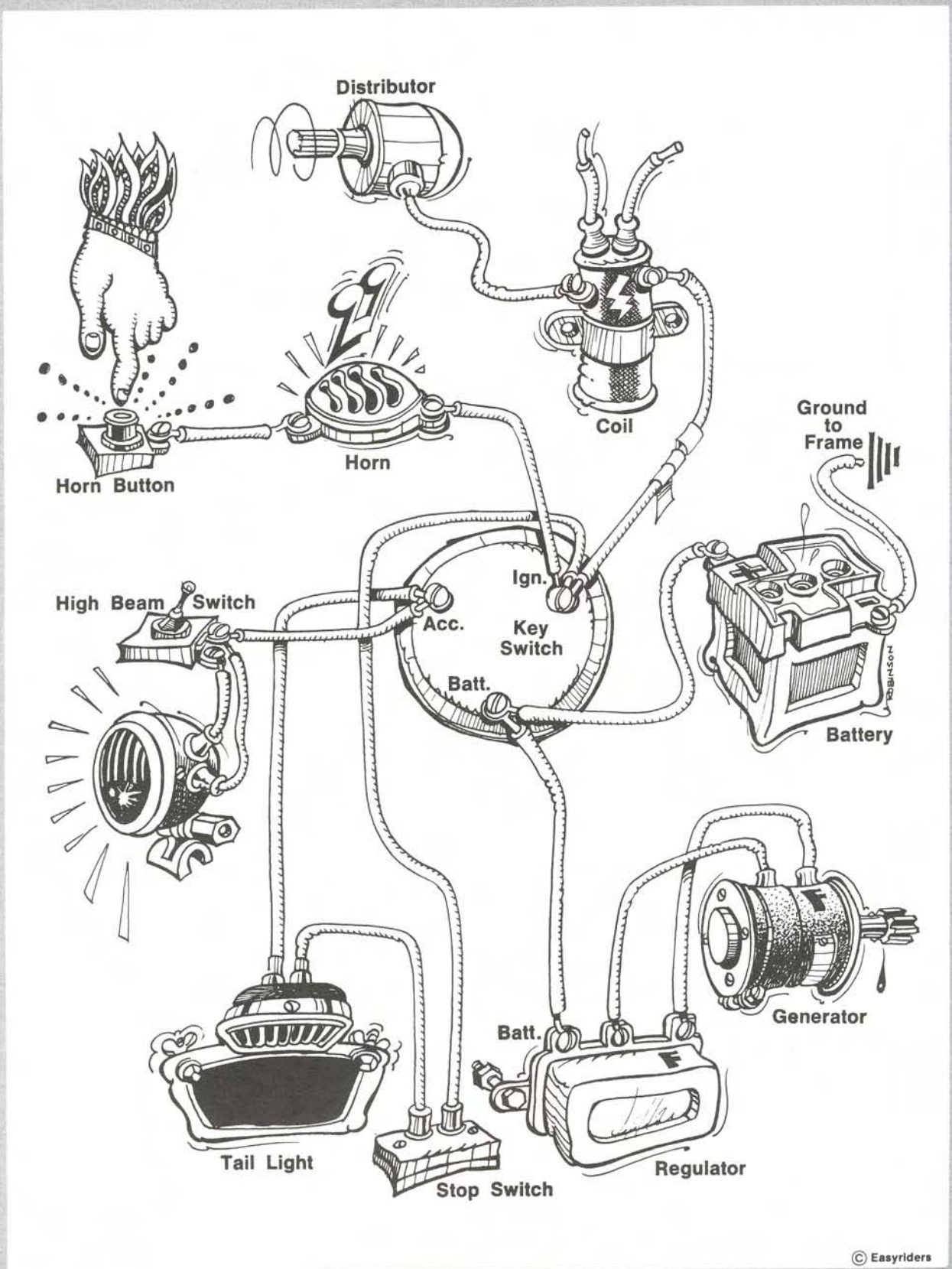
With the oil deflector trimmed so that it is no larger than the portion of the generator holding the bearing, reassemble the deflector and gear (don't forget the spring between them).

Install the generator just as you would the 2-brush. From here on, wire the bike using the relay. Follow a 3-brush wiring diagram (see **Easyriders,** Oct. '71, p. 31.) ■

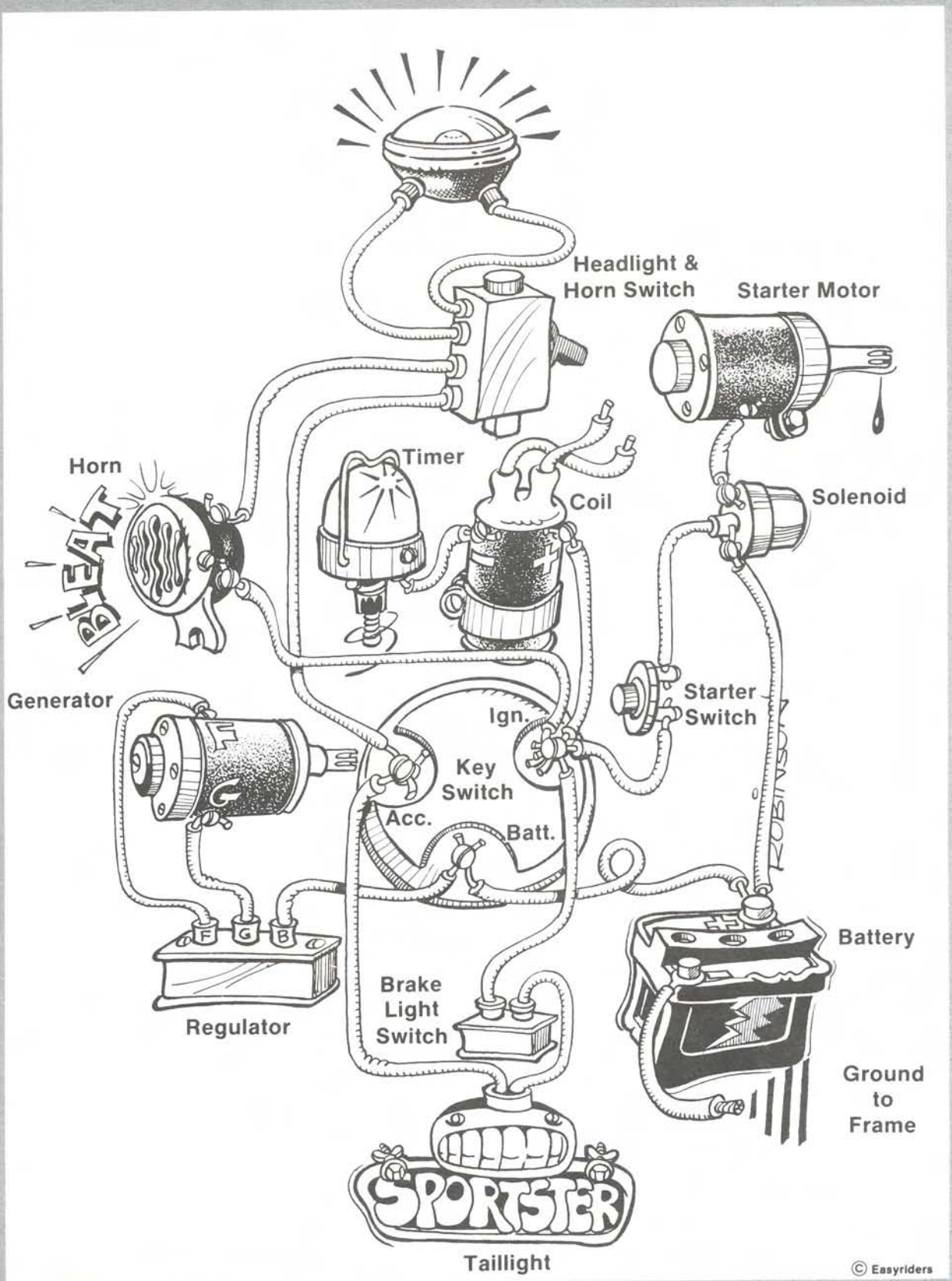
by Super Hog



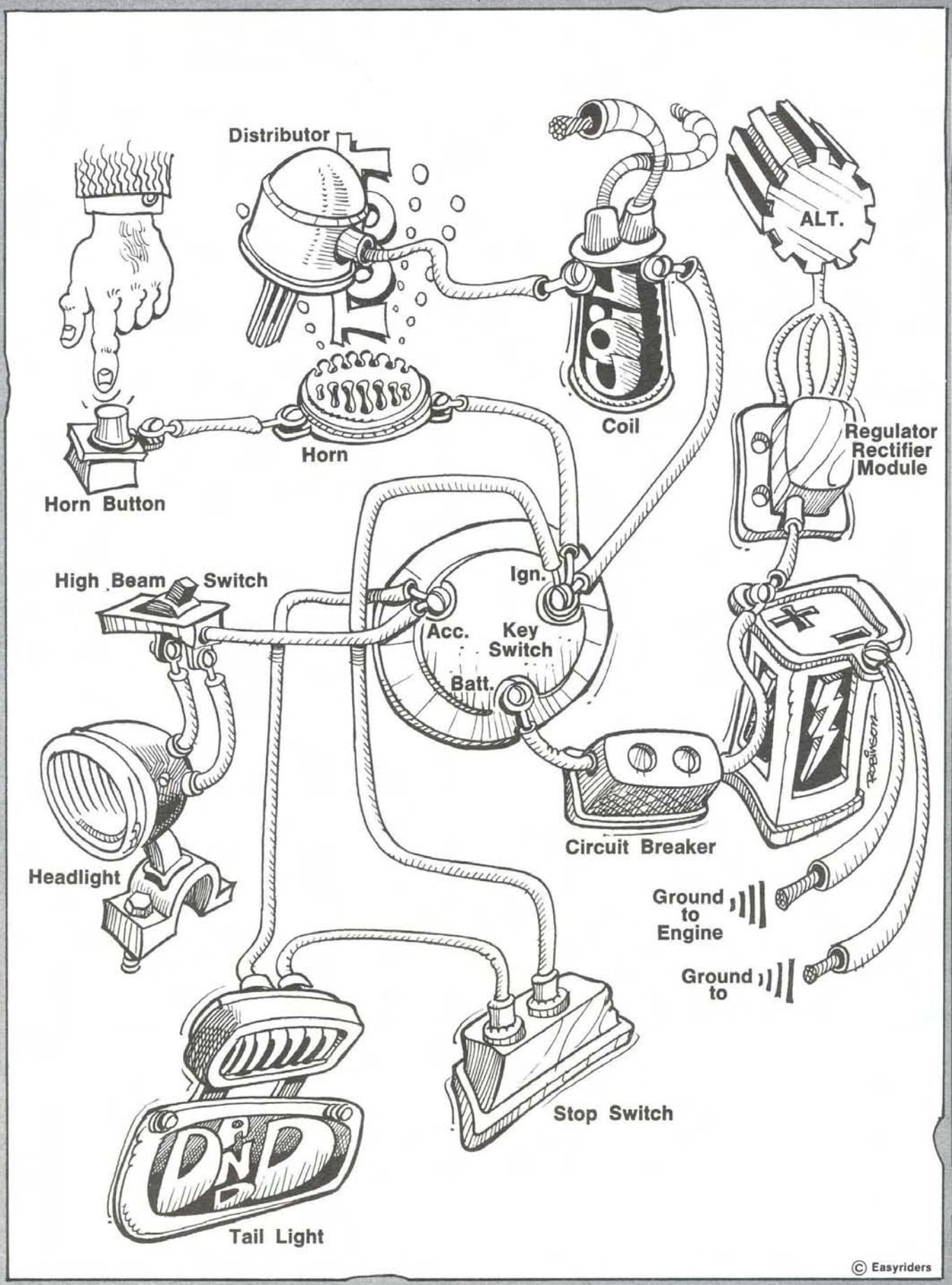
Simplified Wiring Diagram for 74's with Three-brush Generator



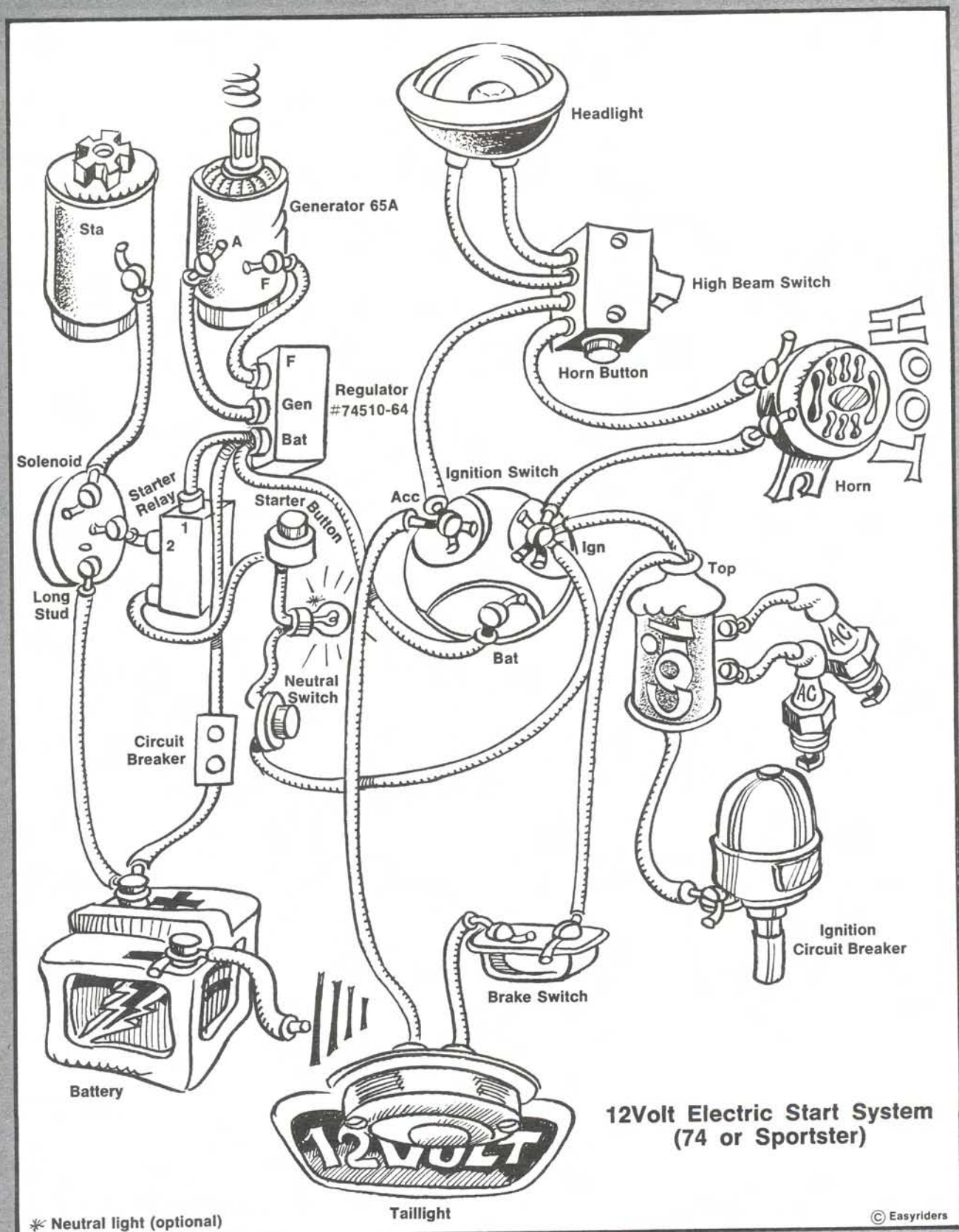
Simplified Wiring Diagram for 74s with Two-brush Generator

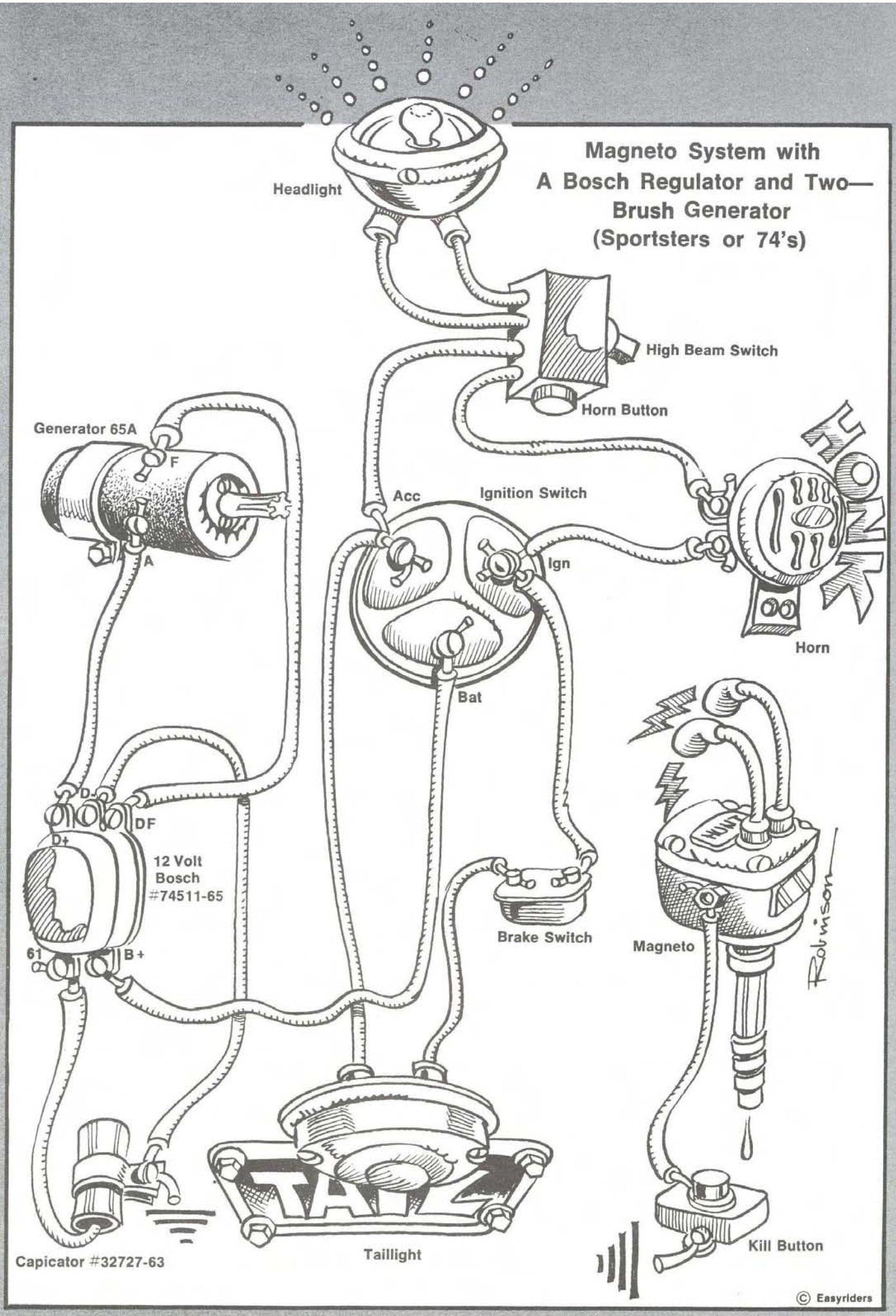


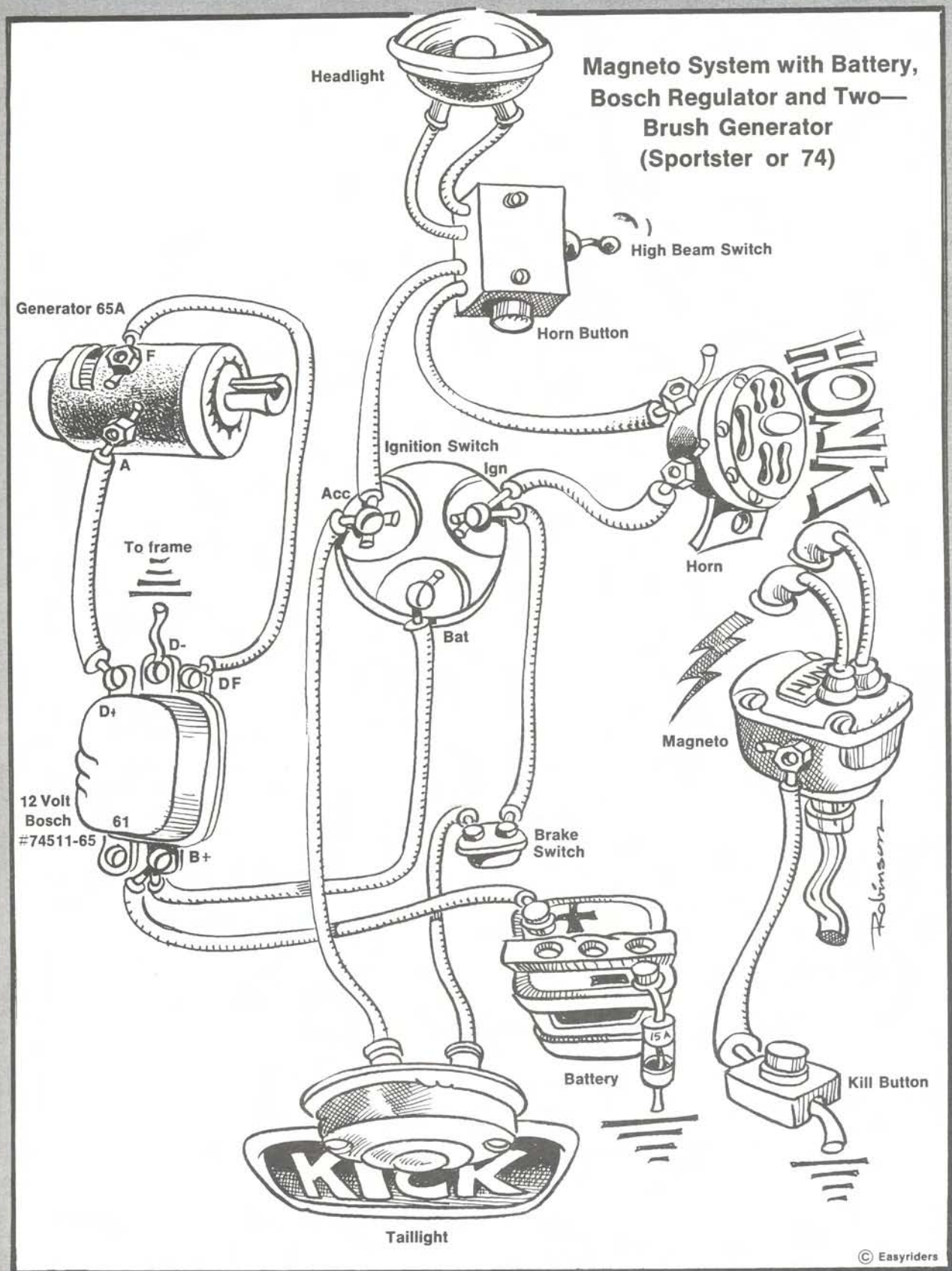
Wiring Diagram for an Electric-start Sportster

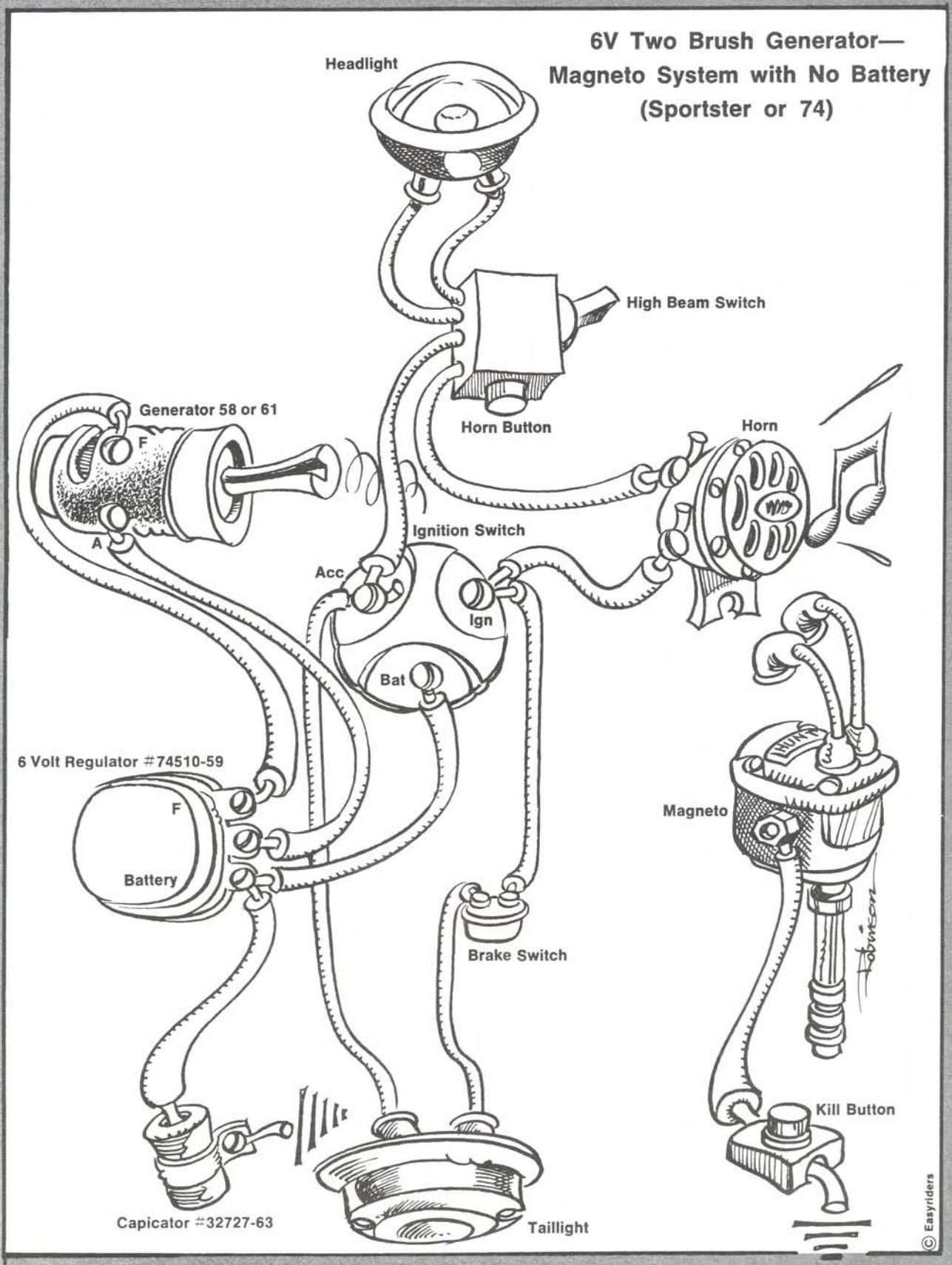


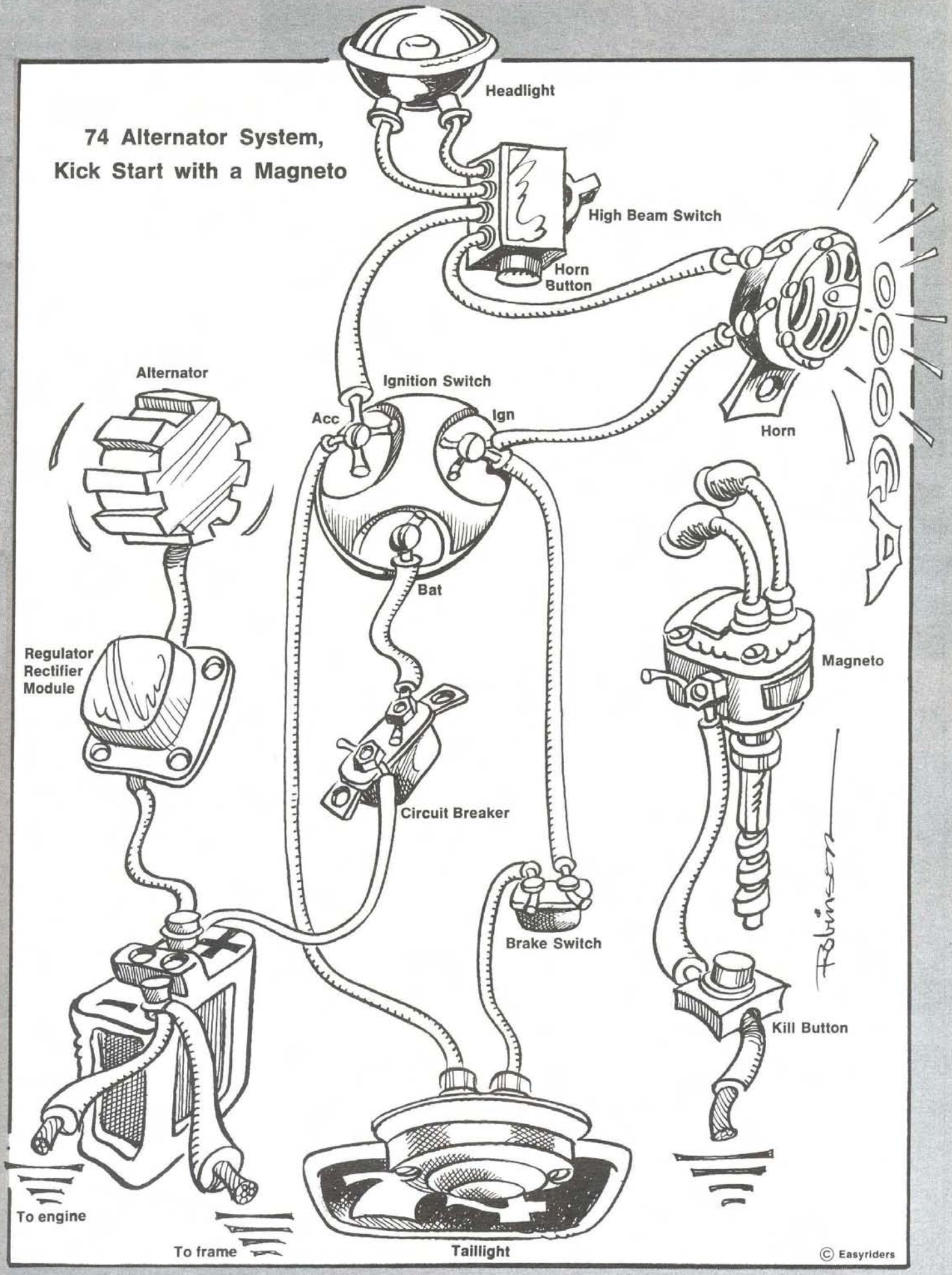
Simplified wiring Diagram for 74s for 70 & Later Alternator


Headlight
Generator 65A
Sta
A
F
High Beam Switch
Horn Button
Regulator
#74510-64
F
Gen
Bat
Horn
Solenoid
Starter
Relay
1
2
Starter Button
Ignition Switch
Acc
Ign
Bat
Top
Long
Stud
Neutral
Switch
Circuit
Breaker
AC
AC
Ignition
Circuit Breaker
Brake Switch
Battery
12VOLT
Taillight
12Volt Electric Start System
(74 or Sportster)
* Neutral light (optional)
© Easyriders


Magneto System with
A Bosch Regulator and Two—
Brush Generator
(Sportsters or 74's)
Headlight
High Beam Switch
Horn Button
Generator 65A
F
A
Acc
Ignition Switch
Ign
Bat
HONK
Horn
D-
DF
D+
12 Volt
Bosch
#74511-65
61
B+
Brake Switch
Magneto
Robinson
TAIL
Capicator #32727-63
Taillight
Kill Button
© Easyriders


Magneto System with Battery, Bosch Regulator and Two— Brush Generator (Sportster or 74)
Headlight
High Beam Switch
Horn Button
Generator 65A
F
A
To frame
D-
DF
D+
12 Volt Bosch #74511-65
61
B+
Ignition Switch
Ign
Acc
Bat
HONK
Horn
Magneto
Brake Switch
Battery
15 A
Kill Button
KICK
Taillight
Robinson
© Easyriders


6V Two Brush Generator—
Magneto System with No Battery
(Sportster or 74)
Headlight
High Beam Switch
Horn Button
Horn
Generator 58 or 61
F
A
Ignition Switch
Acc
Ign
Bat
6 Volt Regulator #74510-59
F
Battery
Magneto
Brake Switch
Kill Button
Capicator #32727-63
Taillight
© Easyriders


74 Alternator System,
Kick Start with a Magneto
Headlight
High Beam Switch
Horn Button
Horn
Alternator
Ignition Switch
Acc
Ign
Bat
Regulator Rectifier Module
Circuit Breaker
Brake Switch
Magneto
Kill Button
To engine
To frame
Taillight
Robinson
© Easyriders



IT CAN BE FIXED?

Beat and Brokedown, but there's a solution

I had just pulled away from 100 miles of uninhabited mountains tall enough to make an F-101 pilot wonder whether he could clear the jagged peaks. Momentarily relieved after leaving the winding roads that could almost kink a snake, I spotted the 75-mile-wide desert I was entering—bleak. The last sign of civilization I spotted was a billboard stating that the next services were 50 miles farther along.

Although the sun was on its way out for the day it was still an impressive 110° in the shade of a scorched, two-foot-high cactus plant—the only growth around. The putt was becoming a taste apprehensive and my map had blown overboard some mountain ranges back. The 75mph oven breeze had the desert sand working its way through my paint job to the primer below. My eyes peered intently through glasses so sandblasted that it was like searching for the details of a nude woman's figure through a shower door.

About 30 miles into the sand, it happened. I heard the sound of a fuse burning through the sheets of sand whistling past my scoot. Except, unlike a firecracker fuse, it continued to hiss while my eyes end ears fought to find the source. Just as they did, the bike quit. I caught the last three or four inches of insulation burning feverishly toward my battery and, suddenly, like an electrical fuse, the wire turned red hot, melted, and fell apart. The predicament left me just enough time before total night fell to discover that the main battery wire to my ignition switch had shorted. And no smiling moon replaced the blistering sun. I couldn't even make out my pan, let alone find the scorched wire. And since I had no spare wire anywhere, trying to fix it would be. . . well, you get the idea.

Ah, but like a flick of my Bic, I had a flash. While I was stranded, I would think up an article on how to makeshift—fix a bike on the road. Something like using hairpins or paper clips for cotterkeys. Or the art of wrapping a fuse with tin foil to keep the circuit alive. I began to reminisce about the times I had used part STP and part 30-weight oil to keep my oil supply up. Or using a hose clamp or busted bedspring to replace a cracked or broken bracket. I remembered distant tales of patching tires with bubble gum. As my weary eyelids got heavy and I began to fall asleep, the ideas became more obscure. Carving hunks of wood to wedge in leaky holes to prevent a busted crankcase from going dry. . . . My tired back slid off my rear tire and I landed, eyes shut, in the soft sand.

Startled, I awoke the next morning with a mouth full of sand for breakfast, a tarantula to share my meal with, and the intense morning sun staring down at me. The lumbering spider took off as I spat the warm grains back to the earth. I sat up, hoping to be across the street from a shiny new gas station. No way. If it hadn't been for the highway splitting the sea of sand, I could've sworn I was on the moon.

I stood up and stretched my creakin' bones. I gazed down at my sand-blasted bike and the blistered wire. Then I spotted something stiff and valuable lying just under my ancient panhead. For some reason beer cans and coat hangers can always be found along highways. Inspired by my discovery, I wired my bike temporarily with the hanger. Insulated it with paper and spare gas tubing and was on my way.

Suppose it just goes to show that, with a little imagination, a scooter can be made to keep going no matter what happens—I hope.

—Haystack

On Scrap Metal







When you want a special part made for your sled, it's easy to hassle your brains out tryin' to find a metal warehouse that'll sell you the stuff you need, especially if it's something besides raw pig iron—like stainless steel or heat-treated aluminum. Most outfits have a $25 or $50 minimum order, or in some cases this is the minimum per item. And unless you come on like Benjamin Bigtime wantin' 60 zillion feet of the stuff, you'll usually have to take time offa work, truck down there, and plunk out cash before they'll even think about cuttin' off a piece for you.

Well, there is a way to beat this bum trip. Industrial junkyards, metal salvage outfits, and surplus houses are lurkin' in even the most half-assed burg. And a lot of 'em specialize in small leftover pieces of alloy steel, aluminum, and stainless. The chunks ain't big enough to interest ordinary industrial high-roller types, but they're just the ticket for those future footpegs, fasteners, and filigrees you need. These places ordinarily won't bug you about minimum charges, and since they sell most material by the pound—regardless of how expensive or exotic it started out—you can stretch that measly unemployment check a long way.

The hang-up is knowin' what kind of metal you've grabbed with your greasy mitts and are draggin' to the cash register. If the slab is big enough it'll usually contain the mill numbers identifying it—such as 4130 (chrome moly steel), 1018 or 1020 (cold rolled steel), 304 or 316 (stainless steel) or the various high-strength aluminum numbers (2024, 6061, and 7075). Sometimes a bar or plate will be stamped on the end—I scored some 420 stainless steel marked this way: #420 s/s.

Smaller scraps may have one end color coded. Here's the code for aluminum.

black or purple	7075	(strongest alloy, about the same as mild steel)
blue	6061	(best high-strength aluminum for welding)
red	2024	(strongest alloy above 200° F)

The other color codes vary so much from each supplier that they don't provide any real help, but a magnet in your pocket and some recent rain will. Anything that's magnetic and rusty from being cut and stored outside is obviously some kinda alloy steel. There may be pieces that aren't exactly rusted where they've been rained on, but look dull and still pull the magnet. These maybe 400 series stainless, which can usually be heat treated and is good for axles and other stuff that's gotta be bulletproof. 300 series stainless (304, 316, 18-8, etc.) will be shiny, non-magnetic as my wooden skull, and the same weight as most other types of steel. By the way, don't let a scaly mill-finish fool you—look for the brightness where it was cut off. The 300 stuff is not much stronger than mild steel, but it will stay as shiny as chrome for years if you polish it once. Finally, there's aluminum, which is about half the weight of steel, and ain't even on speakin' terms with magnets. It develops a thin milk-white scale where exposed to mutha nature, and the high-strength varieties will likely have the color code we laid on ya.

That's about it. So when you cruise outa the yard with a bar of stainless at five cents on the dollar, all you gotta do is break your ass findin' a shop to machine it.

—Jake

For Injured Bros



If we ride long enough, we're bound to meet a bro who has lost a leg or in some way has been severely injured. And whether or not his accident occurred on a bike, he may still want to ride. We want those bros to ride. The bike shown here belongs to Paul, a rider since 1947, who was not about to stop riding because his back was broken in three places as a result of a bike accident three years ago.

As soon as Paul escaped the hospital, he and his ol' lady, Judy, began building this trike. He has no control of his legs or lower back and thus lacks the balance needed to control a two-wheeler. So he set about constructing this trike with his '69 shovel engine, a 45 trike rear frame section and a 45 trike modified rear end.

The 1956 swingarm frame was grafted to the 45 trike rear section (1). The rear chain on the '69 tranny puts the sprocket on the left side of the bike, whereas on a 45 trike, it puts the sprocket on the right. So the rear end had to be flopped.

Naturally, the shovel is electric start. All controls were constructed so they could be operated by hand. The rear brakes were designed so that a single Harley dual front disc brake master cylinder (2) would push enough fluid to actuate the two Lockheed calipers adapted to the rear discs (3). The rear wheels and lug pattern on a 45 rear end are the same as on a Ford; consequently, it wasn't a major problem finding wheels or discs to fit the lug pattern.

The major obstacle was finding one handlebar, hand lever, master cylinder which would push enough fluid to activate both rear brakes.





The dual disc H-D cylinder did the job well enough to lock up the large tires. His front glide brake is stock.

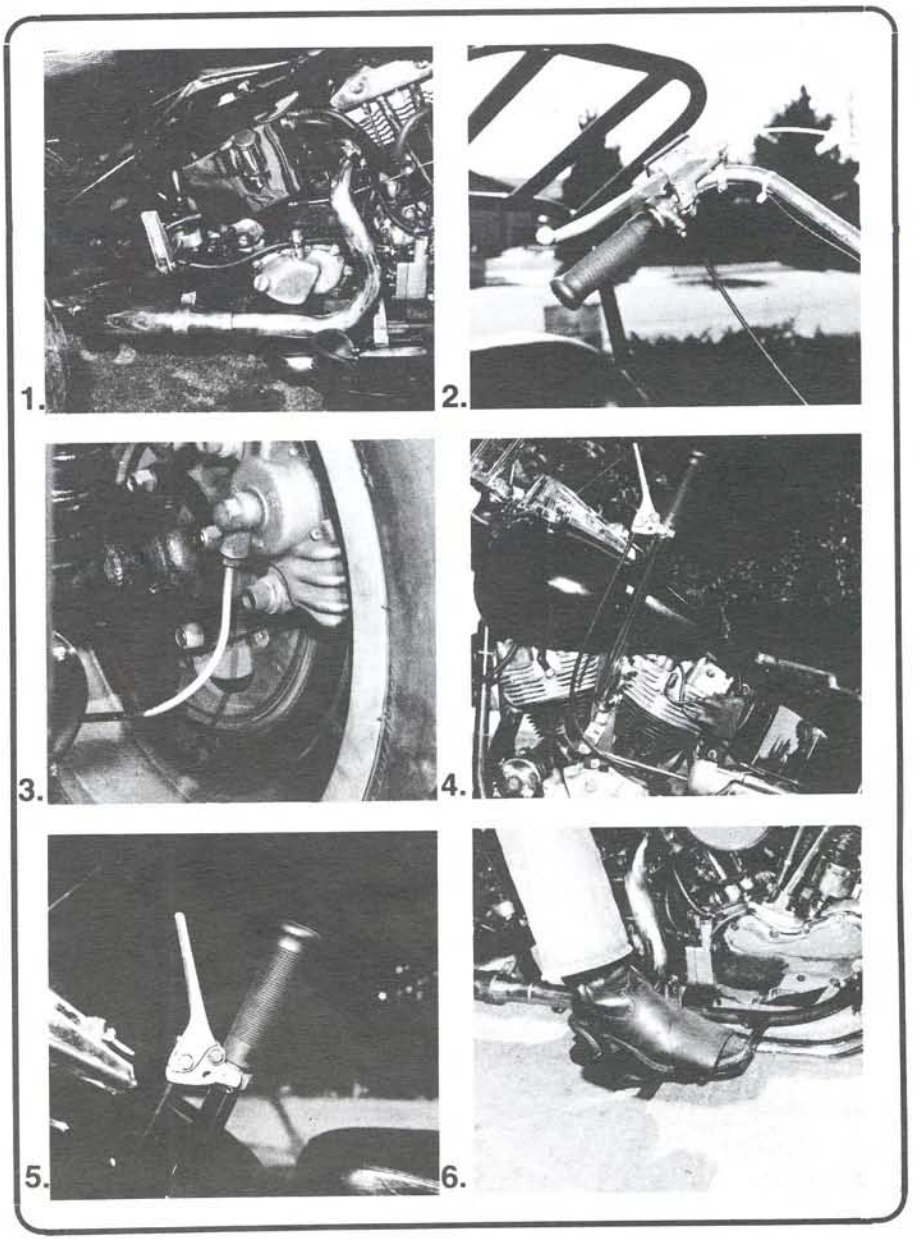
A jockey top was exchanged for the ratchet top on the tranny. Then a gear shift (4) was constructed to pivot on a bracket attached to a case bolt and the top motor mount with linkage running back to the tranny. Once in operation, the bike shifted somewhat like the old style tank shift—except that the handle had to be placed in such a position that a mousetrap eliminator lever (5) could be mounted, allowing Paul to clutch and shift simultaneously. Only the cable had to be shortened.

Water ski footholds (6) keep Paul's feet in place while riding. For the weight of the trike, the '69 shovel engine and tranny gearing was changed to 18 teeth on the engine sprocket and 19 on the tranny. The thick wall, two-inch tubing cage above the seat and extending out behind the scooter has two purposes. The frame above the seat allows Paul to pull himself out of his wheelchair and into the heavily padded seat. And the section behind the seat affords a place to store and protect his wheelchair while on the road.

Lastly, a tip for all trike owners lies in the manner in which the rear chain adjuster was designed. A Teflon primary chain adjuster was taken from another shovelhead inner primary and mounted on a frame rail so that the rear chain could be adjusted without moving the entire rear end. It also kept the long chain from snapping with the jerking motion of the engine.

Accidents are a bummer, but with knowledge and desire, many injured bros can ride again.

—Weed


1.
2.
3.
4.
5.
6.





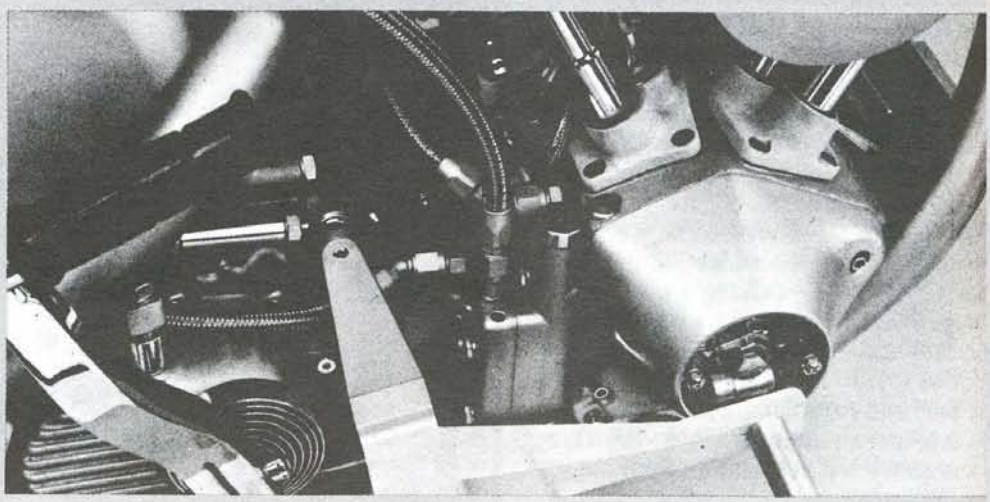
Socketheads, internal hexes, allens —are they worth it?

If ya ain't been on the smoke recently, you'll notice from checkin' out some of the scoots you see in this rag that a lotta bros are usin' sockethead bolts on their sleds. How come? Well, besides bein' easy on the ol' retina, allen heads can be torqued down properly, whereas puttin' a measured arm to a slot or Phillips-head screw in this manner is practically impossible. Using sockethead bolts allows you to seat sidecovers and gaskets evenly, with a minimum of leaks and distortion in any part. Even if there are no torque figures listed in that grimy owner's manual, most bolt manufacturers and machinist's handbooks print ratings you can follow instead.

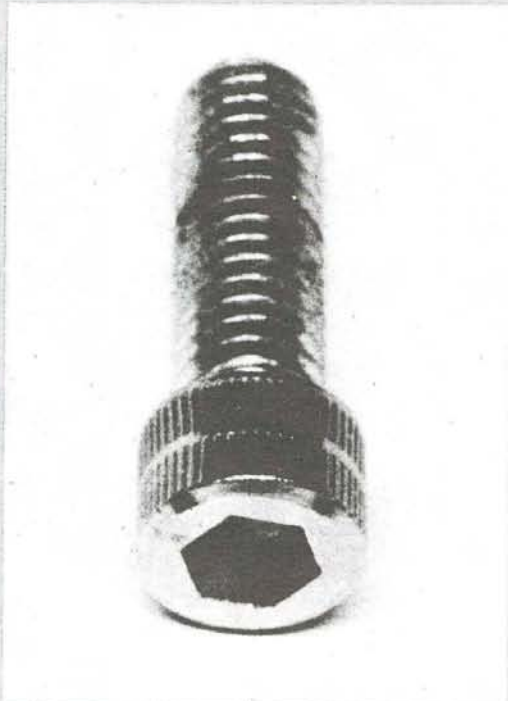
In some cases where side clearance is limited, wrenchin' down a sockethead with a key is the only way to go if a box-end or open-end wrench won't fit easily. For places with tight overhead space, some fastener companies make button-head, low-head, and flat, countersunk-head socket screws that may help ya out. These do, however, have the disadvantage of taking a smaller-size hex key (see photo).

Finally, if there is enough meat in the casting being held, these little beauties can often be countersunk. This means more strength because not only are the bolts clamping the part down, but they're also positively locating it, as a dowel pin does.

If you decide to spend a small fortune on socketheads, first find a local industrial or fastener outfit that will sell 'em to you in quantities less than the usual boxes of 100—a little fast-talkin' often helps. It's best to get 'em in stainless steel or have 'em plated later because the recessed hex in the head tends to hold water when you hit a puddle and the standard black-oxide finish will rust quicker'n naked steel in a salt marsh.



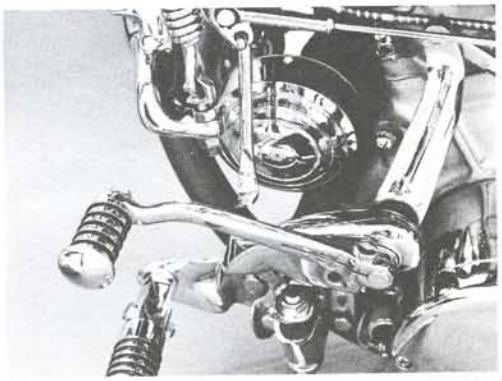


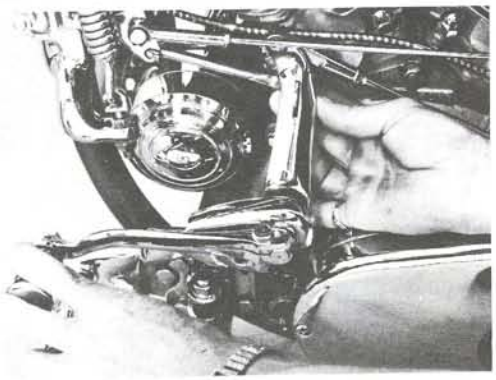


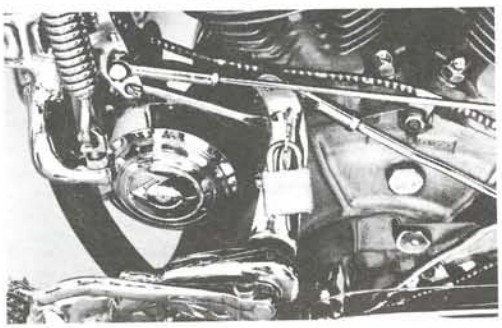
For the smaller sizes you can even get these babies with what's called a socket-spline head. The wrench that you need for these looks like a shrimpy version of a big-twin sprocket shaft. It ain't exactly available at your local hardware store, but likewise it probably won't be in the pocket of that scum who'd like to unbolt your magneto and cart it off—even as you're sittin' there readin' this rag with that brew in your mitt.

—Grime

BAR LOCK









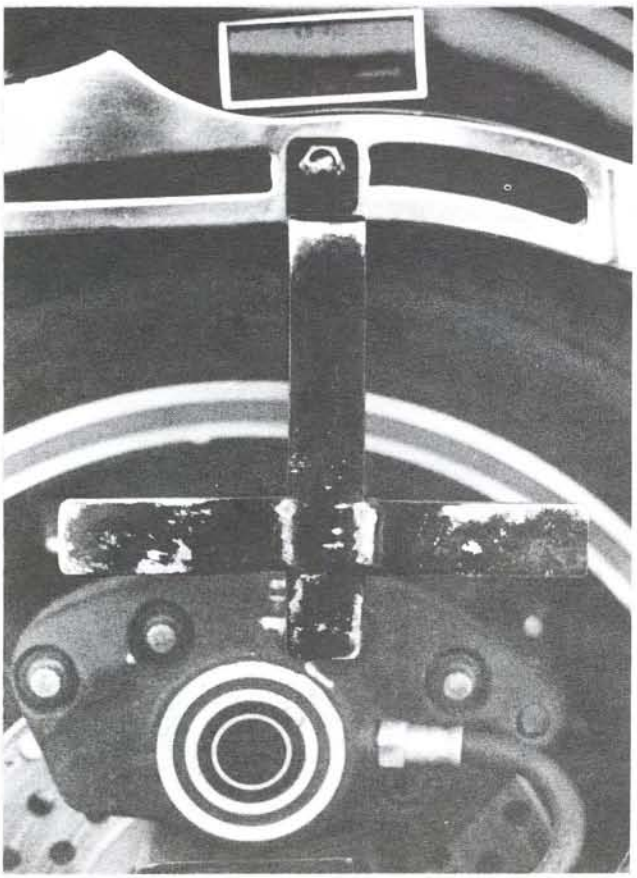
People have been screaming about various bike lock devices since boltcutters were invented. Some such locks are good, some are great, some lousy, large, electronic, etc. But here's a different one.

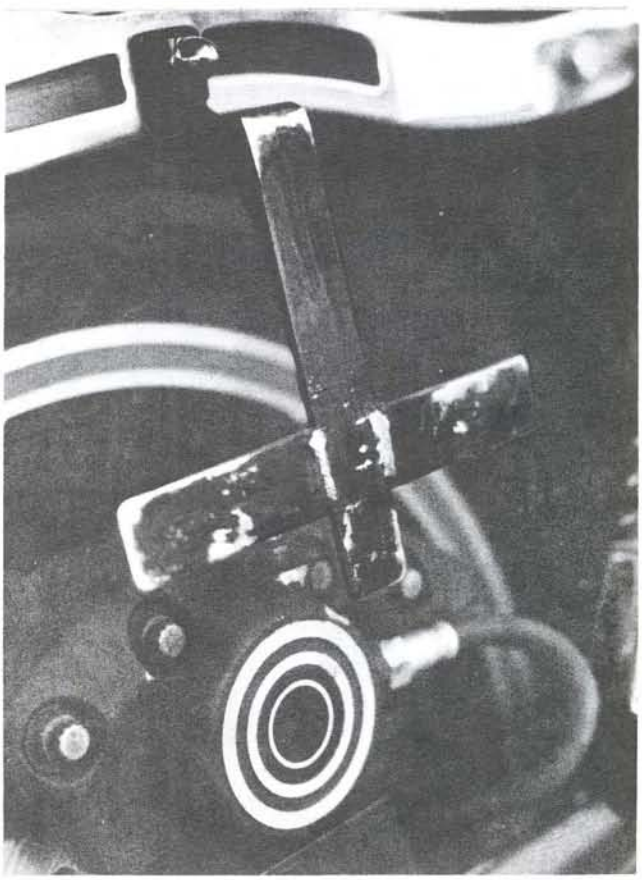
This one will fit in your pocket and it will work only on Harley Davidson 74s with mousetraps. Sound odd? Well, it's an odd setup that will work to lock up a bike for a short period of time—I wouldn't trust it any longer.

Here's what it does. First, it freezes the clutch booster and holds the shifter in first gear. The bike can't be rolled, shifted or kicked over. And if the owner has an electric start (since the lock holds the bike in gear) the starter won't work.

If you've fallen in love with this unique locking mechanism, don't reach for your wallet. This is a one-of-a-kind, fabricated by Hedge, the owner of the bike it's locked to.

—Weed.





Metal Support For Leather Saddlebags

I rode to the beach last weekend with a loose bunch of fifteen riders. We left around dark on Friday night and I was all set for a nice three-hour putt, since the beach is only 150 miles away. I knew I should have rolled more joints when it took us four hours to go the first 80 miles. During that first four hours on the road, the need for various tools came up quite often. This never-ending supply of tools came from the leather saddlebags on Chuck's Sturgis. As I watched the roadside activity, I finally realized that Chuck must be carrying some serious weight in his bags. My next thought was to wonder how the hell he kept the saddlebags from hanging down against the rear caliper and the rear belt guard. Chuck must have read my mind while my eyes were glued to the shiny buckles on the side of one bag. He walked over to his bike and lifted up the bag, exposing a rigid support, the one you see in the photos — a simple bracket made out of 1/8-inch by 1-inch strap steel, held on by one of the fender bolts. As all this info was clicking through my brain, Chuck started telling me about his first trip with leather saddlebags and how the right-hand bag hung down against the rear brake caliper and wore out a set of brake pads in less than five hundred miles.

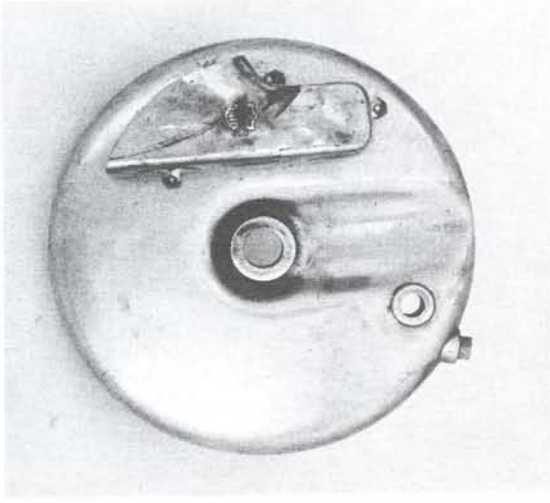
One bracket took about 30 minutes to construct from some cold-rolled strap steel. The center section of the bracket started off as an 8-inch piece of metal, drilled 3/8 inch on one end. The drilled end was measured down 3/4 inch and bent 90 degrees. Or you can measure over on the long part 1 3/4 inches and bend the steel at a 90-degree angle going the opposite way, as in the photos. A small triangle of the same steel is used as a support under the second bend to keep the bracket from folding in toward the wheel. If you have stayed with me through this tech tip it shouldn't be too hard for you to figure out how the cross-pieces are welded on to support the saddlebag longways. The total length of the cross-piece is seven inches.

About the only improvement Chuck could think of would be to rivet a couple of snaps or some Velcro fasteners to the bags and the support brackets to keep the saddlebags from flopping up and down like the wings of a chicken trying to take off in a tail wind.

By the way, we made it home in record time from the beach. The only casualty was my clutch cable 20 miles outside of town.

—Wrench

Keep the Smoldering Shoes Cool with a Front Brake Vent





I owe this brain hurricane to an old biker who still rides a sanitary, stock, rigid-frame pan. His name is Shorty, and for years every time I saw his bike resting on the antique center stand, I studied the vents on his front drum brake.

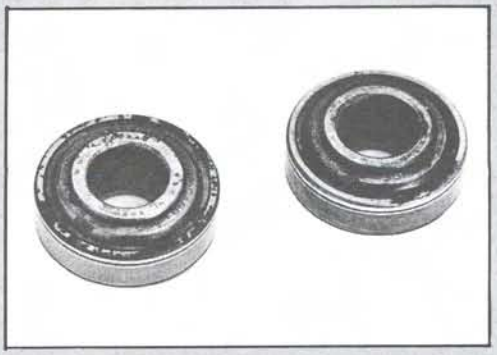
I'm in the process (long and expensive) of building another scooter. And since, after years of faulty rear brakes, I won't be without a front one, I dug up a drum brake for the glide. But the bastards are so fuckin' ugly I had to do something to help it. That's when Shorty's vents came to mind. Off to the trash heap I call a garage and before long I had the drum drilled for air passage and the pieced-together scoop to gather the smog.

Presto! An air vent to keep the smoldering shoes cool and give the blank-looking backing plate some detail. One thing though—when does a front brake overheat?

—Weed


Oh no !!
DEMONS M.C.
THC

Are your brakes going south?





Sooner or later the rivets on any brake shoes start turning down the inside of that rear brake drum. That's about the time they need some work. And there are three or four ways to do the job. You could purchase the parts from H-D and do it yourself. Or if you have mechanical brakes, custom shops may have linings. Then again you could have a Harley dealer do the work or find somebody else to do it—which we did.

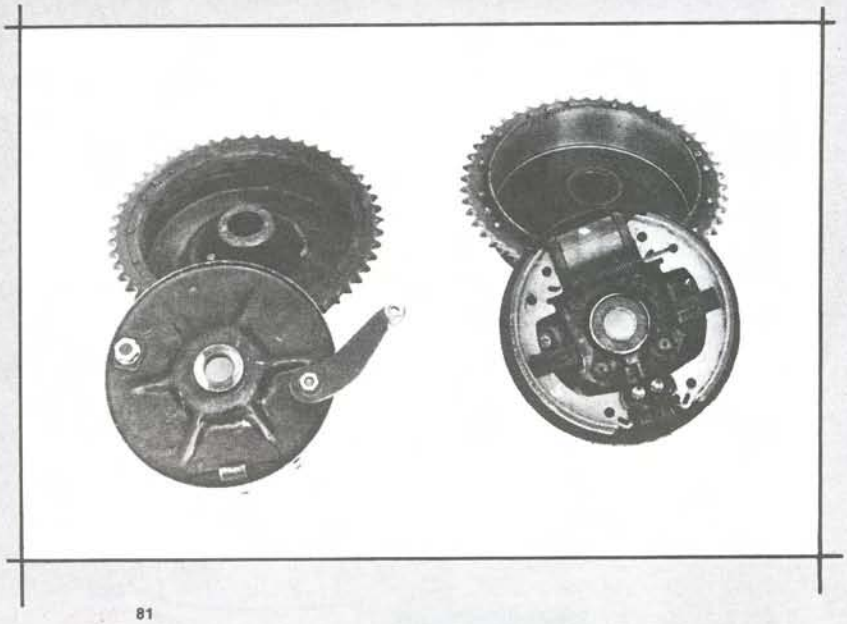
The project we were working with consisted of replacing the linings on a set of H-D mechanical shoes, and a set of juice brake shoes for a 74. The drums needed to be turned, and the rear juice brake hub was due for a new set of sealed wheel bearings. The H-D prices, for just the parts, without Uncle Sam's cut, turned up a bit strange. The 1967-to-present wheel bearings were $11.95 apiece (part #43577-65). Brake parts included: juice brake linings (bonded type, by themselves), $5.95; one set re-bonded juice brake shoes, $11.95 exchange (part #41801-63); one set of riveted mechanical shoes (exchange), $11.95; a set of juice brake linings with rivets, $12.95; outright replacement juice brake shoes, $37.00.

The money situation got out of sight of the budget. And three wheel bearings were needed. The drums had to be turned and that was another $8.50 to $15.00 (labor) for each drum, depending how bad they turned out to be, at the dealer's. If only the mechanical brake shoes had needed linings, the price would have decreased to $4.35 (at a chop shop) for a set, and we could have done the work. But the work had to be more extensive to see that the job was done right.

In the past someone had suggested an automotive machine shop or brake shop to perform the labor, so that was the next step. It didn't take long, even in a small town, to find a shop that could and would do the labor **and** had the parts. The linings were replaced (mechanical and juice), both drums turned and even the shoes remounted on the backing plates in less than five hours. And they would bond or rivet the pads—whatever the request. The total cost for labor and parts came to $8.69, and that included the government's 6%. They also pointed out the way to a bearing house, where the wheel bearings were ordered and received in a week at $4.31 apiece.

Not all automotive or brake machine shops can or will do the job. But if there isn't a dealer in the area (if you have old mechanicals), the linings can be had by mail or at a chop shop. Or possibly the auto shop downtown can do more than just adjust the points on a Ford.

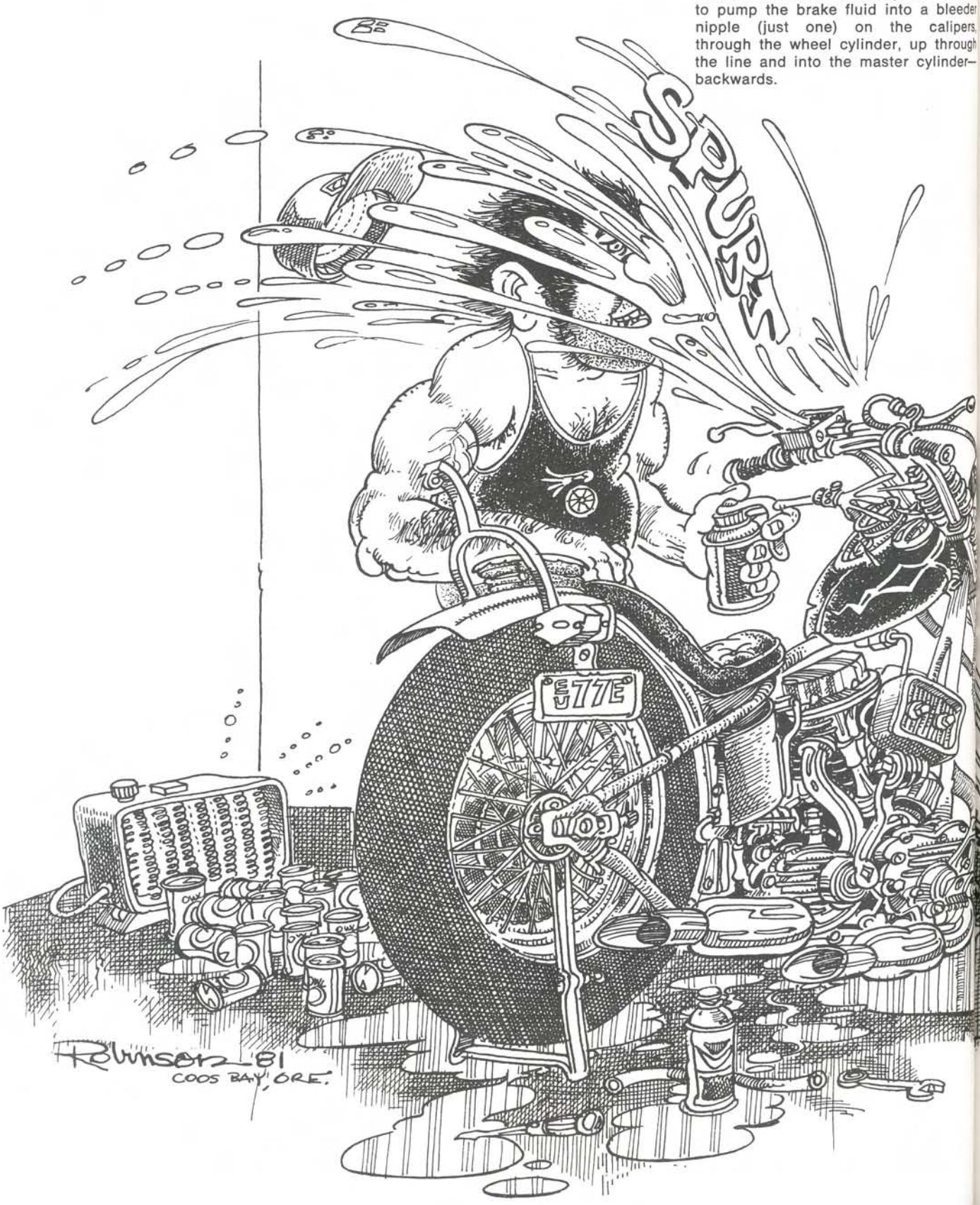
—Weed

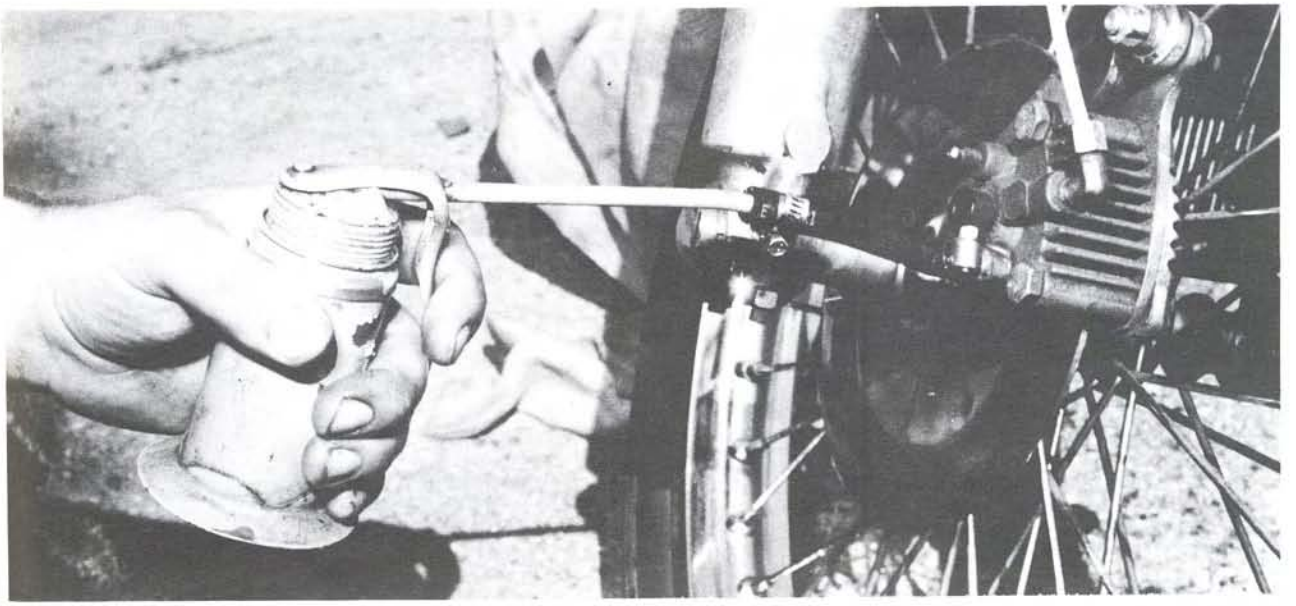


ON BLEEDING

Custom disc brakes usually work all right if the calipers float properly. But once everything is mounted in place, getting the fluid to flow from the master cylinder on the handlebars to the wheel cylinder can be a bastard.

Now wait. Before you start biting holes in your hydraulic brake line, here's a solution. Generally, the idea is to pump the brake fluid into a bleeder nipple (just one) on the calipers, through the wheel cylinder, up through the line and into the master cylinder—backwards.

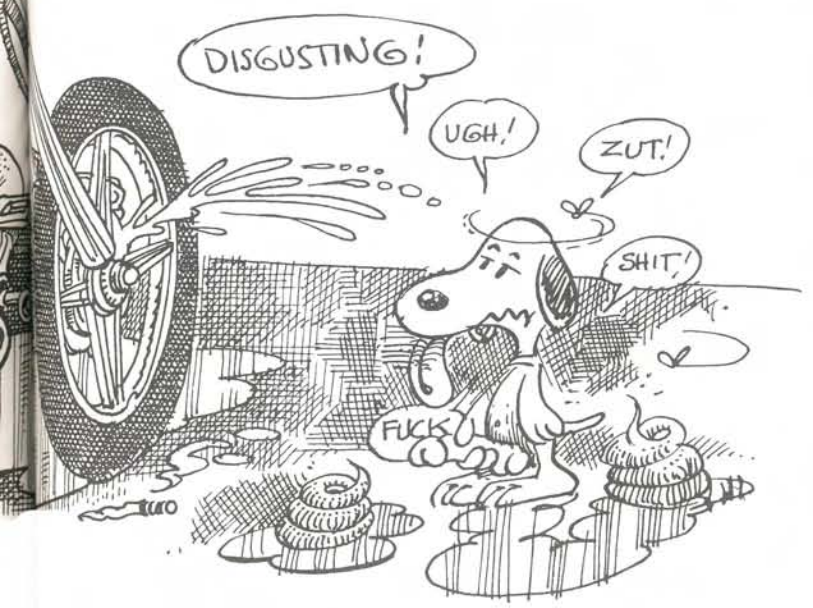


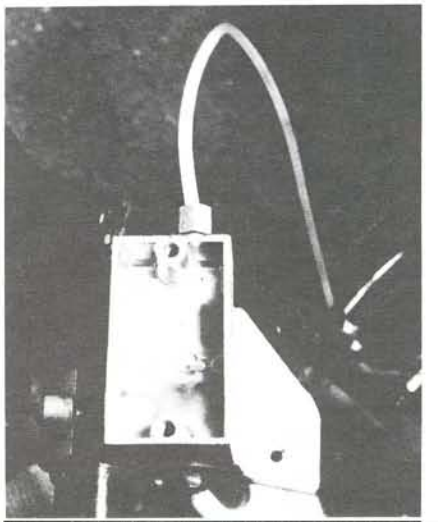




Start by bleeding the master cylinder. Make sure there is no air in it. Take the cap off the master cylinder and protect your paint job with rags. Open your lowest bleeder nipple and attach a three-inch section of quarter-inch I.D. hose to the open bleeder with a hose clamp. Attach the other end of the hose to a clean pump oil can filled with new, heavy-duty, hydraulic brake fluid. Gently pump the fluid into the caliper and watch it climb up through the hose into the master cylinder. If you notice air bubbles lingering in the hose, tap it with your finger to work the bubbles loose. Be sure the line is free of all air, and no more bubbles are popping to the surface in the master cylinder. If you pump the oil up through the line too quickly, it may squirt and overflow out of the handle reservoir, so take it easy. Once the air is completely out of the line, close the bleeder nipple. And finally, to remove any air that might be trapped in the wheel cylinder, bleed the line once the conventional way. But be careful not to create new bubbles in the line adjacent to the master cylinder while you're at it. Button the system up and you're on the road again.

—Weed





To Juice, or Not to Juice?

Mechanical brakes or juice brakes —which are better? Will the juice brakes stop any quicker? Are they more dependable? These are some of the questions often asked about 74 brake systems. Most of the reasoning that's used to come up with the answer is based on the fact that Harley went to juice on their later models, and therefore the juice brakes must be an improvement over what Harley was using before . . . Or: All new cars have juice brakes, and old ones that didn't have always been converted . . . Well, this reasoning has some big holes in it!

If Harley is completely sold on juice as being the best system, then why haven't they gone to it on their other models? The Sportster is supposed to be the hybrid of the line as regards performance—and it has mechanicals. As a matter of fact I can't think of any other make of bike that has juice rear brakes.

There are several damn good reasons for juice on a car: First, you have the problem of stopping four wheels all at the same time, with one pedal and with an equal amount of pressure applied to each wheel. Juice, of course, is the perfect answer. (On a bike, you stop one wheel with one pedal; no need to equalize the pressure applied.) Another good reason for juice on a car is simplicity. Can you imagine what the linkage would have to look like on a modern car with power-assist brakes, parking brakes, etc.? For these same reasons, juice on a trike makes a lot of sense, and most guys do convert.

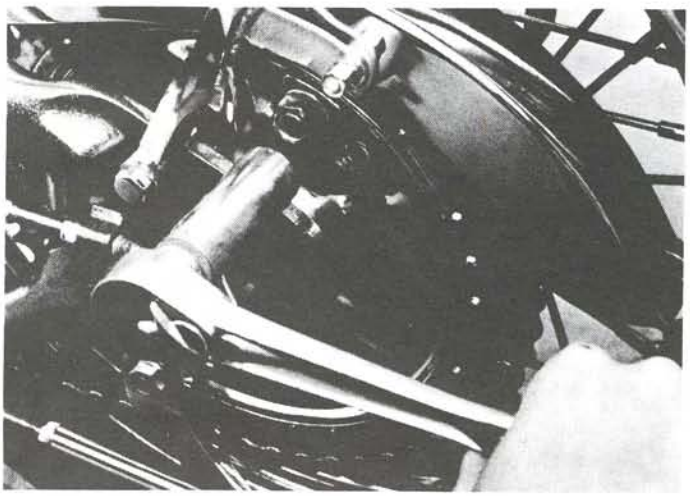
Getting into the area of dependability, again it's six of one and a half-dozen of the other. Mechanicals have more moving parts that can wear out; juice brakes have seals in the master cylinder and wheel cylinder that can give out. Steel juice lines have been known to crack from vibration (especially when chrome and not baked), and you still have some mechanical linkage in the juice system that can wear out.

Being able to get replacement parts for mechanicals was a problem a few years back, but today there are several companies manufacturing new replacement parts, and you can get anything from a clevis pin to a new brake drum.

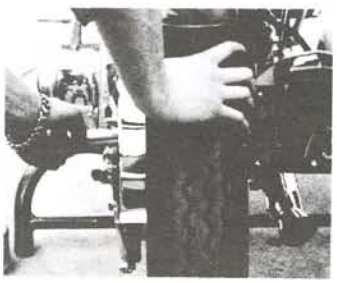
Mechanicals have, of course, a great advantage in the looks department. The mechanical setup is far cleaner and looks more as if it belongs than does the juice system.

As for stopping power, it's a toss-up: you won't find any difference if both systems are in good working order.

There is a little something that has to be done to mechanicals that a lot of builders overlook, and that little something is the centering of the brake shoes in the drum. So, if your brakes are clicking when you step on the pedal, or if they just seem to be less than you think they should be, pick up on the captioned photos and give this a try.



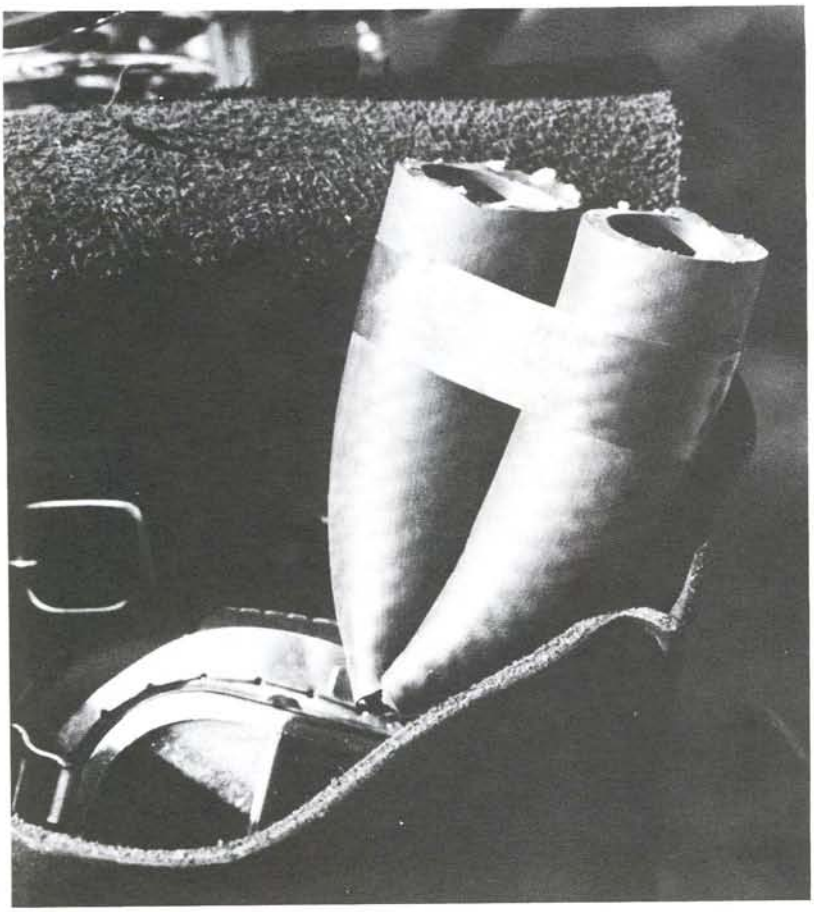




After getting scoot up on old beer case, stand, or what-have-you, loosen pivot stud nut.

Spin rear wheel by hand in a forward motion and have a Brother (ol' lady or average-sized kid okay too) stab brake pedal while wheel is spinning—just stab it, don't hold it on. This will shake everything loose.

Turn wheel by hand and have shanghaied helper apply brake slowly until you cannot turn wheel (no need to strain your hernia trying to overpower brake). While helper continues to hold pressure on brake pedal, retighten pivot stud nut. Check brake pedal for travel and readjust linkage if required.





"Spare Plugs"

I always keep a set of extra spark plugs on my bike, although I don't need them for my sled. I carry them for my riding partner's stroker.

Leaving the bars at night, my partner Mike develops a nervous twitch that ends up fouling one of both of the plugs in his bike. It's to the point now where he doesn't have to ask if I'm holding an extra set of plugs; all he has to do is look over at me and I know that he can't clean it out with the throttle. By then I'm already digging in my tool bag for the spares already gapped for his stroker.

Usually I carry the spares in one of those 79-cent K-Mart special plug wrenches. But the other day, when I was going to lock up the sled in front of the tavern of my choice, I pulled the lock and chain from its resting spot in the tool bag and the top half of a spark plug came out stuck between two links in the chain.

Well, I guess it's better to find out now than for Mike to need a plug later and not have one. Dumping the lock and chain into the tool bag must have upset the plugs to the point of coming apart, but then you'll have that sometimes. Besides, Mike likes to remind me when I screw up.

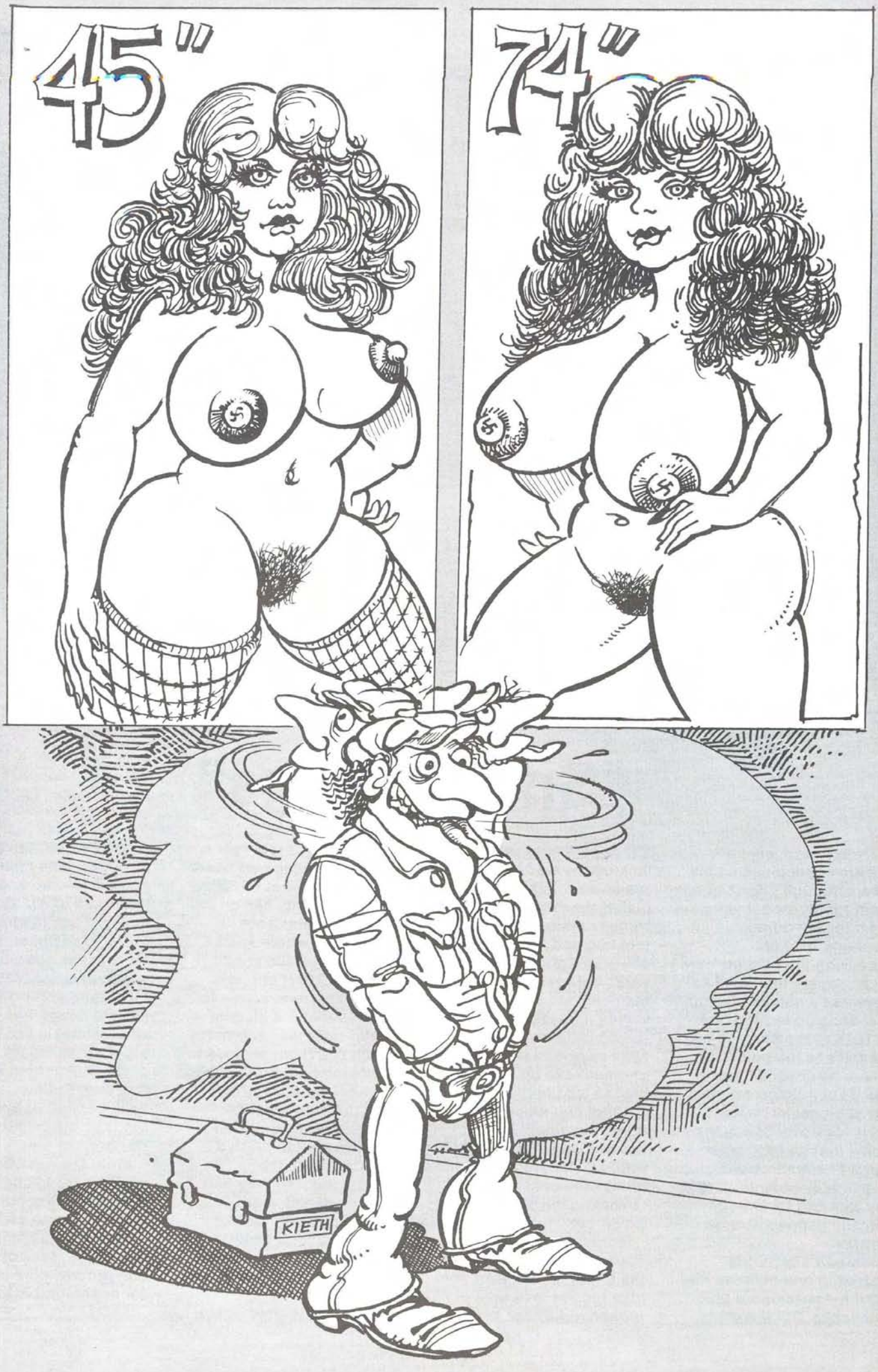
So, after countless hours of counting bees in the loft of an old barn, the idea for this tech tip passed in front of me in a red blur, like a real religious experience. In fact it was simple: what I needed was something, like an old piece of heater hose, to protect the whole spark plug. Back at the shed I went head first into the parts department, only to find out that the biggest heater hose was 3/4 inch, which didn't come close to what I needed. So I jumped back on my scooter and shot down to the local auto parts place. I even remembered to bring a plug to check the fit.

True to form, they had what I needed, eight inches of 1-inch heater hose. The dude behind the counter laid it on me for a cold brew. It sounded like a deal to me.

Back at the shed again, I cut the hose halfway through in the middle to make it fold up and take less room in my tool bag. I fixed up two fresh plugs for Mike's stroker, put them in the hose, and wrapped some black electrical tape around the hose to hold it together. The whole thing is just a tad bigger than a pack of smokes. It should fit any tool bag, toolbox, your back pocket, or even the luggage the ol' lady carries around.

Well, I've run off at the mouth long enough about this spare plug holder; now I've got to go talk Spider into giving me the rest of the week off so I can put my mind in shape for next month's tech tip.

Later. . . —Wrench


45"
74"
KIETH

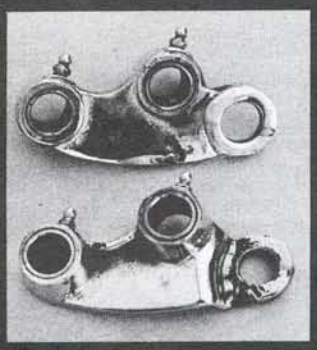
Here's how to be sure if it's a 45 or 74 springer

There are several minor differences between the 45 and the 74 springers — such as the rockers, rocker studs, size of holes for the rocker studs at the bottom of the fork legs, and the size of the neck.

The first, and most definite, way to distinguish one from the other is to check out the neck. The 74 neck is the larger, measuring 1" in diameter. The 45 measures 7/8".

A 45 springer will "bolt" right on to a Sportster frame, using all the stock 45 springer hardware such as crown nut, triple clamp, and top nut — the stock Sportster cups, balls, and races may be used. The Sportster races, however, are slightly different from the 45 races, and it would be advisable to use the 45s if possible. (Trying to use a 74 springer on a Sportster is a hassle.)

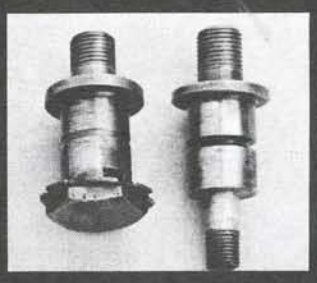
Pick up on the accompanying photos and store the info back in your head somewhere. Next time you see a springer at a swap meet or whatever, you'll know what you're buying and whether you can use it.



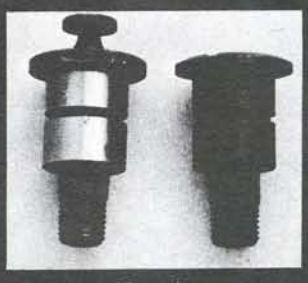
74 rocker.



45 rocker.



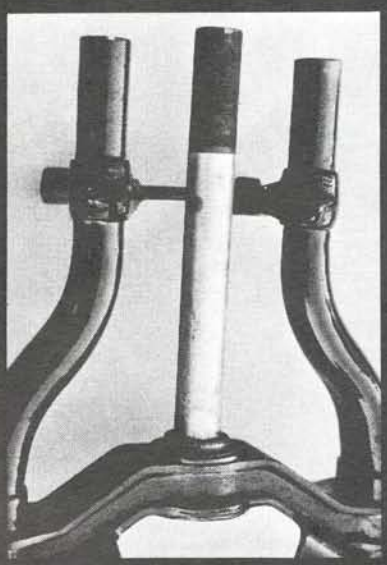
74 rocker studs.



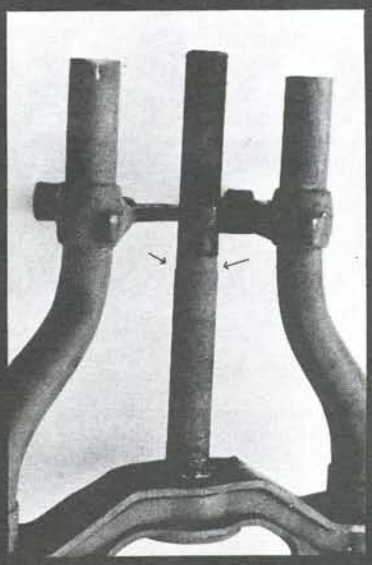
45 studs.



Fork leg hole is 1" dia. on seventy-four. 7/8" on 45.



74 neck is 1" dia.



45 neck is 7/8" dia. Note step.

Holdin' Your Oil



Anyone who runs a Hydra-glide front end, especially an extended one, knows the frantic hassles of trying to keep oil in the damn things. Everything's fine for a few miles after replacing the seals and boots, but then you start to see that familiar oily substance everywhere on your forks except inside the sliders.

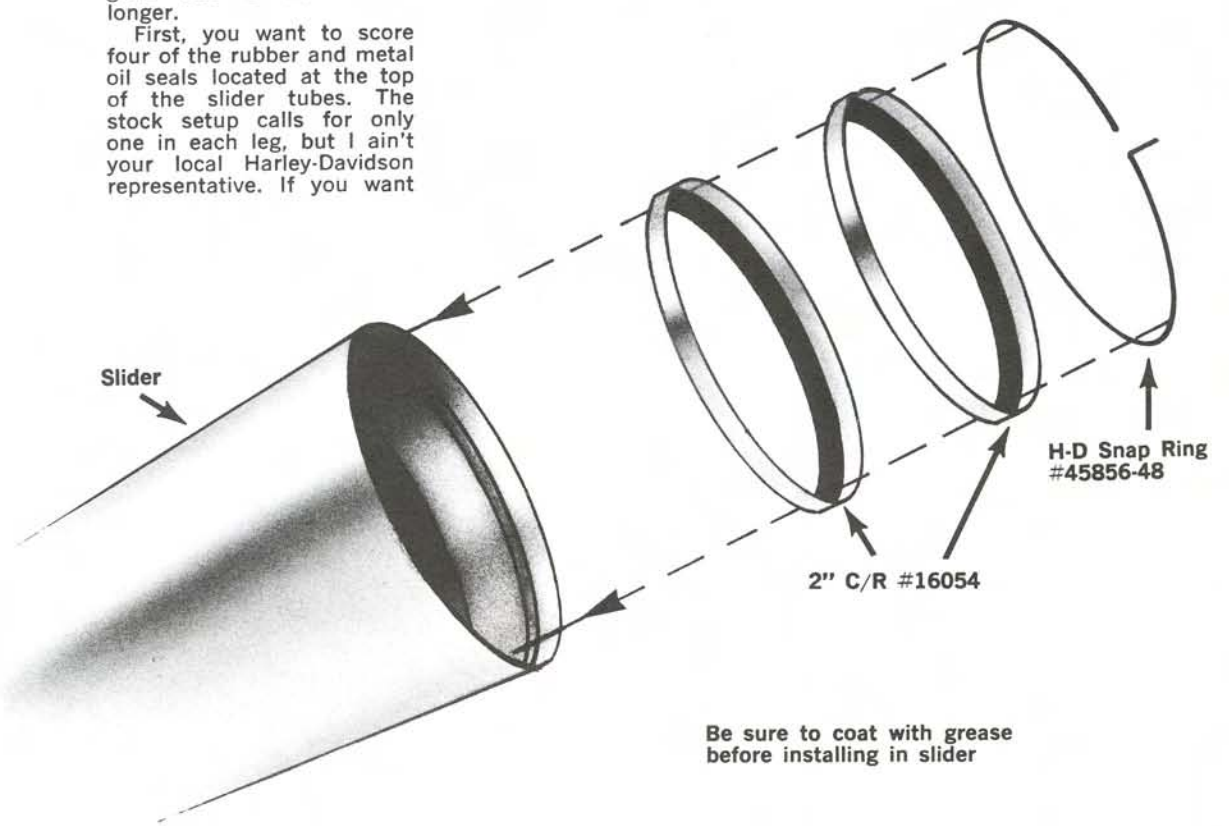
This cure will by no means fix the little buggers forever, but it will keep you soakin' up the bumps about four times as long as the stock setup allows. The oil kept inside your forks will make for a much more comfortable long-distance machine and will also make your wide glide last a helluva lot longer.

First, you want to score four of the rubber and metal oil seals located at the top of the slider tubes. The stock setup calls for only one in each leg, but I ain't your local Harley-Davidson representative. If you want to save some cash, the Harley seals are made by Chicago Rawhide, and the C/R number is 16054. At a bearing and seal house, these little fellas sell for about two clams apiece. Harley-Davidson sells theirs for $3.10.

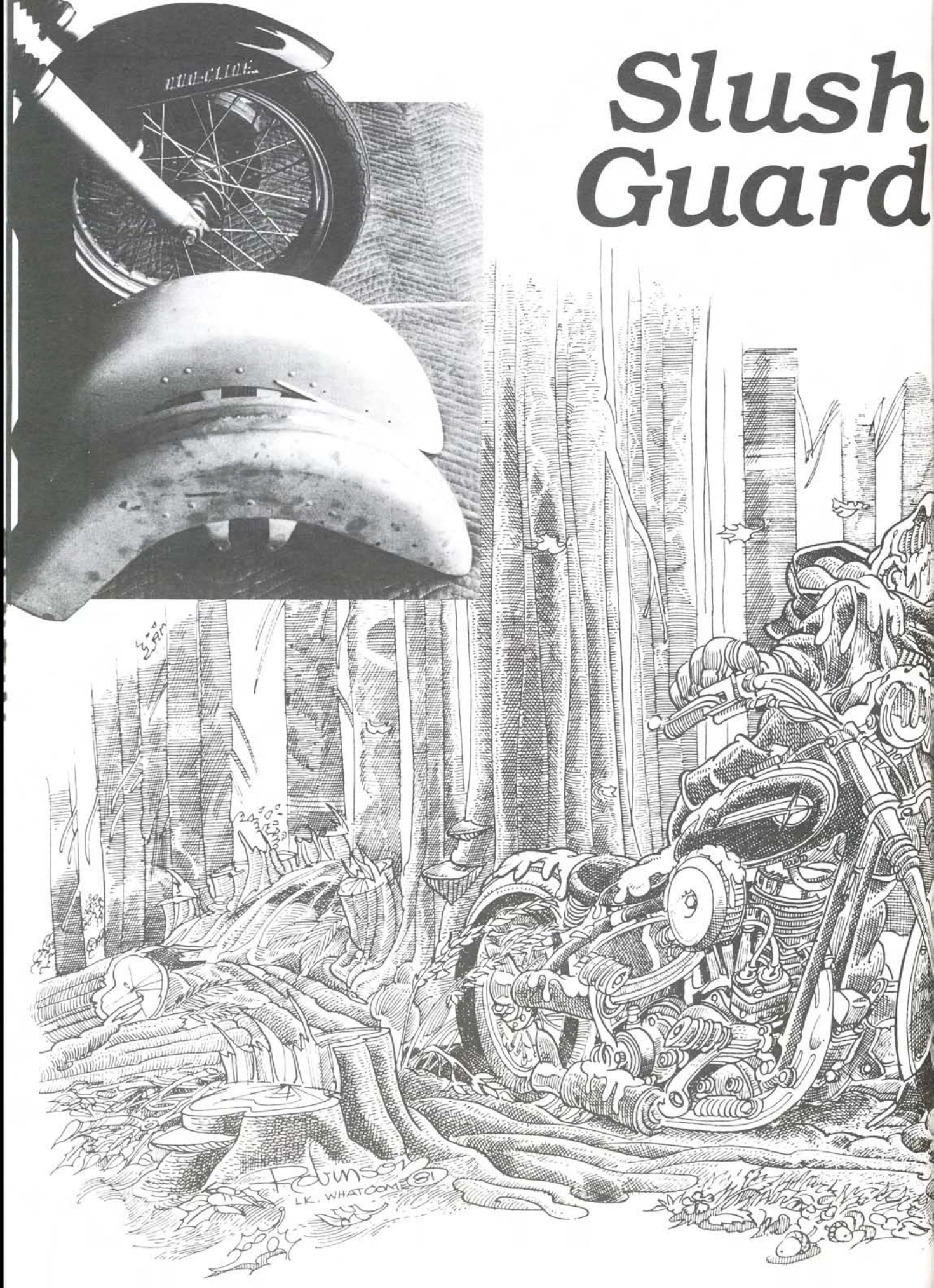
Now that you've picked up seals, take your sliders and clean them up a little. Now the stock seal setup uses a seal, a felt wiper, a retainer for the felt, and a snap ring at the top. What we're gonna do is eliminate the felt wiper and its retainer. In its place we're gonna tamp another seal (#16054) piggyback style. Then we pop the snap-ring into place, just to finish up the job a little.

Remember, before you put your seal in, rub some grease on the outside of the seal and some on the inside of the slider. Then, when you go to put your tubes in, coat the rubber sealing surface with some good grease or heavy oil. To top it off, throw a set of slider boots on and you'll be ready for a lot of comfortable, carefree miles. It rides and it glides — right? ■

By Tim Kast



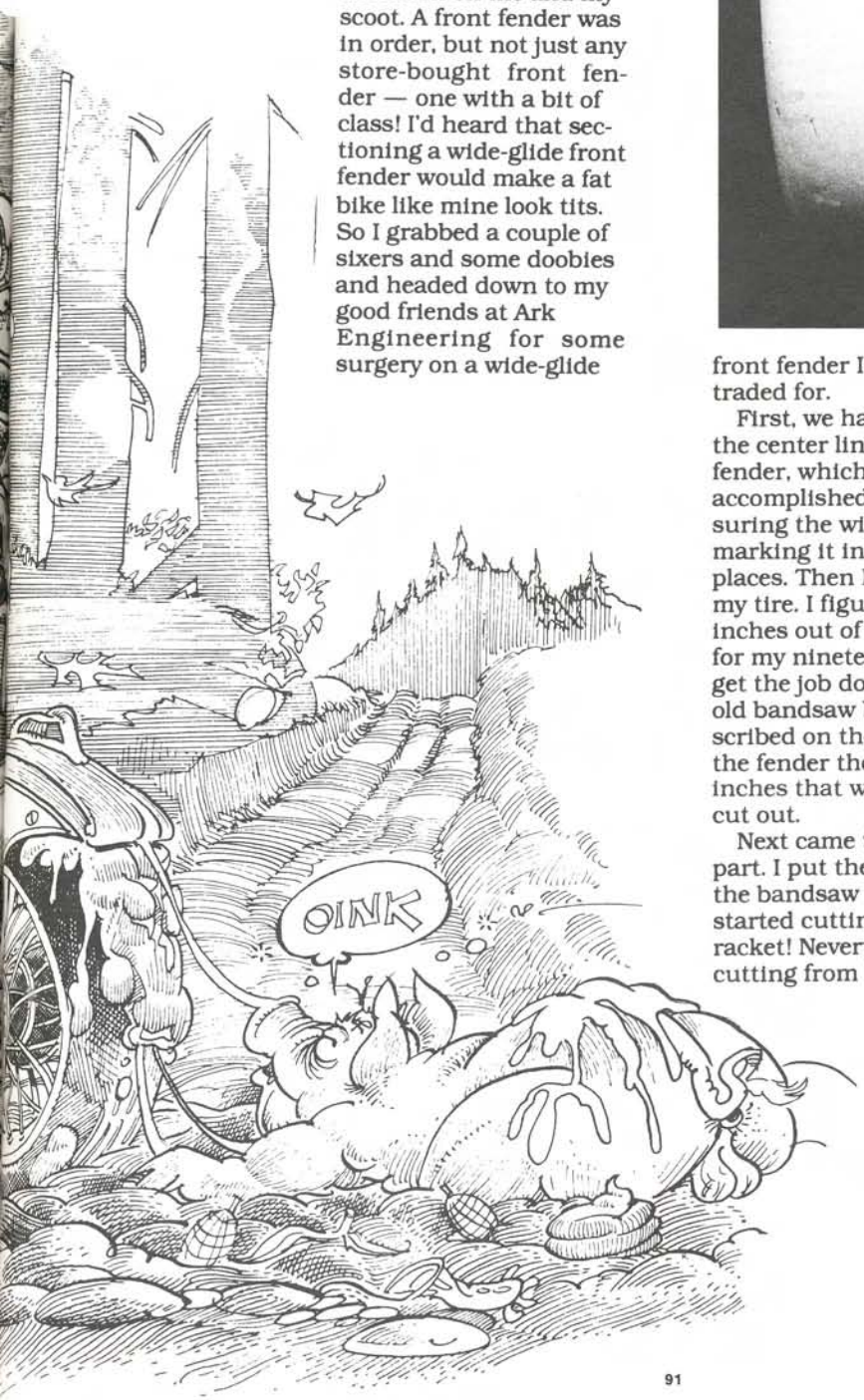
Slush Guard

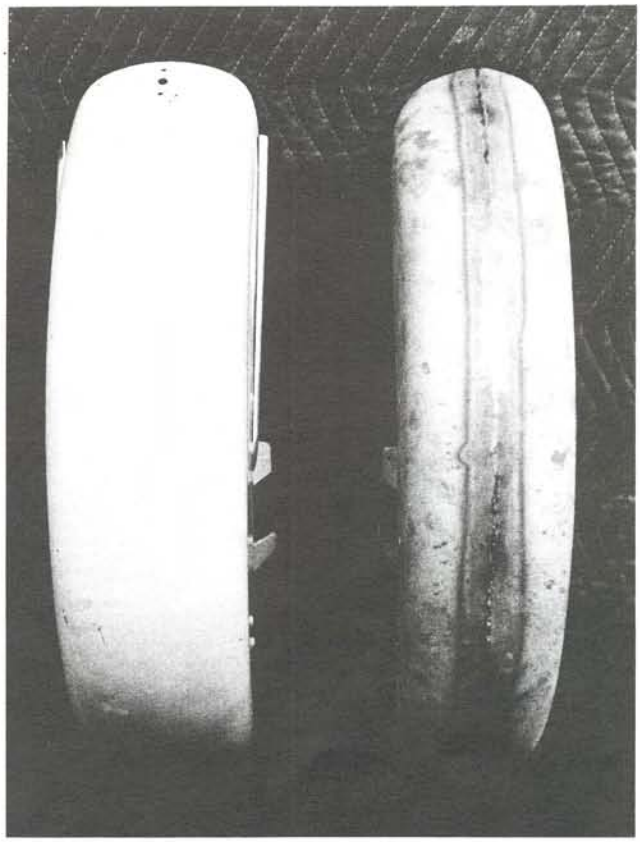


Fuck the rain;
fuck the snow;
I'm going riding!

I was sitting over at my bros' house, listening to their stories about what a neat summer it had been: all the sun rays, hard bellies, beer, adventures, and such. You know how it goes. It's sorta like "Can you top this?" Well, the more bullshit that they slung around, the more I wanted to get in the wind. You see, I had the misfortune to have spent the entire summer with a leg cast up to my ass. And other than riding in a pickup truck on the runs a few times, I spent the biggest part of the summer in front of the boob tube, sucking on some suds and getting fatter. It's totally screwed to watch your brothers and sisters taking off on a run for a weekend of fun.

The only problem I could foresee was keeping the slush off me and my scoot. A front fender was in order, but not just any store-bought front fender — one with a bit of class! I'd heard that sectioning a wide-glide front fender would make a fat bike like mine look tits. So I grabbed a couple of sixers and some doobies and headed down to my good friends at Ark Engineering for some surgery on a wide-glide front fender I'd traded for.





First, we had to find the center line of the fender, which was accomplished by measuring the width and marking it in several places. Then I measured my tire. I figured two inches out of the center for my nineteen would get the job done. With an old bandsaw blade, I scribed on the inside of the fender the two inches that were to be cut out.

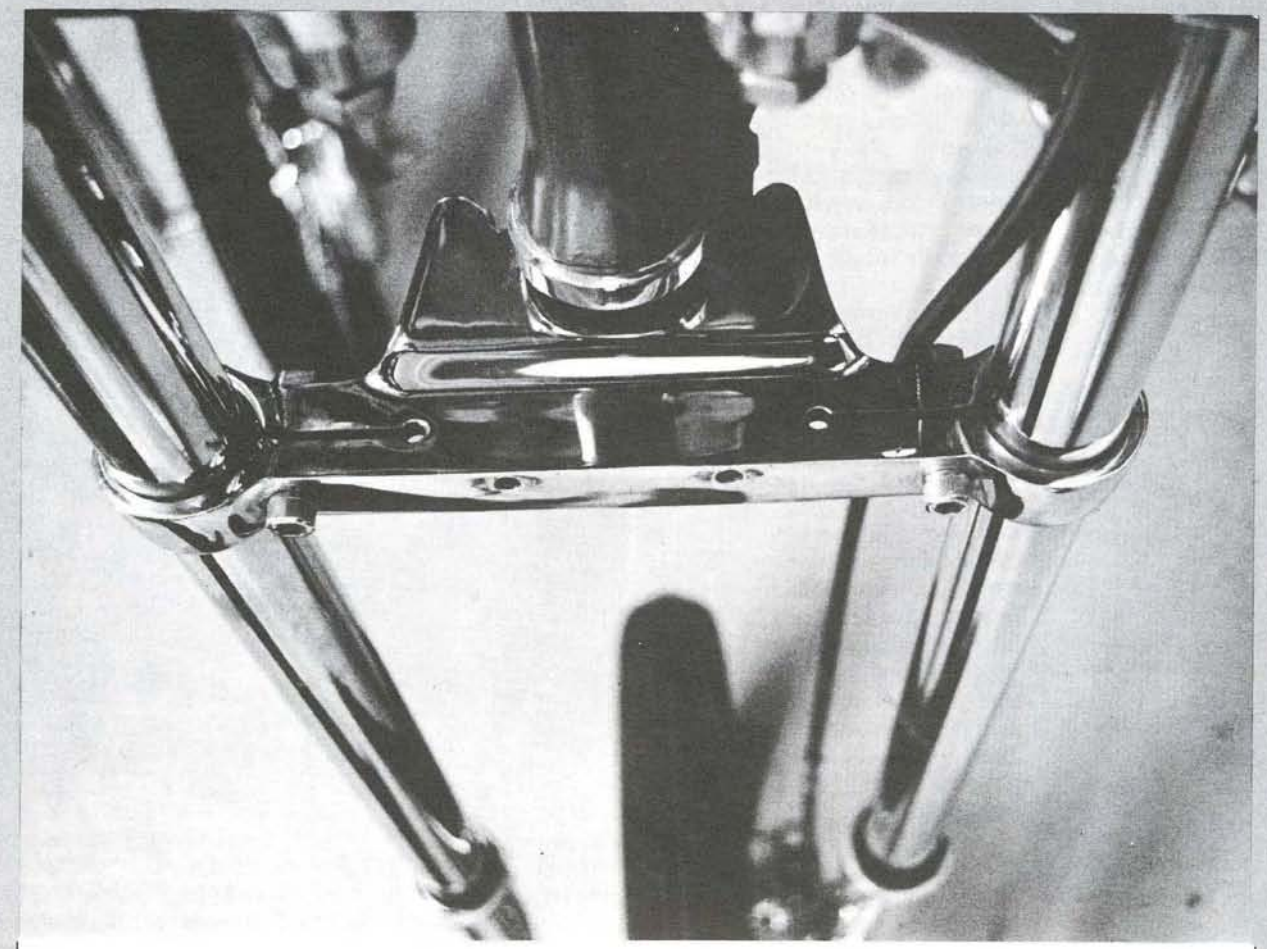
Next came the trick part. I put the fender on the bandsaw table and started cutting it. What a racket! Nevertheless, by cutting from both ends of the fender, then taking a few snips with a tin shear, I completed that part of the job. Then Randy tack-welded the two halves together in several places on the inside before flipping the fender over and welding it from one end to the other.

If you have the patience, the same thing can be accomplished with a regular gas welding outfit and a saber saw. It just won't come out as neat. But remember that old saying: "Bondo hides all sins."

I took the fender home, beat down the rough areas, and bondoed the shit out of it. Then I took it to another friend, who painted it. I also found some old Harley emblems to put on it. Finally, it was out on the road.

Hey, guess what. I've fucked up the other leg now. I guess I was having too much fun.

—Knarly



Inverted Lower Triple Clamp

Quite often the difference between building a nice-looking bike and building an out-of-sight chopper is simply a matter of "little things" and details—those small tricks in building that add little touches of polish and finish to a bike. One of these tricks is reversing the lower triple clamp.

Basically it is simply a matter of grinding the welding off the bottom where the neck stem goes through, pressing the neck stem out, and then pressing it back in and rewelding it from the other side. Along with this you should do something about relocating the fork stops below the frame crown.

Why go to all this trouble? If you've ever had a pair of glide clamps chromed you will no doubt remember how beautiful the smooth bottom of the lower clamp looked, and how lousy the top looked because there was almost no way to polish the inside of the recess in it or get chrome to flow into it. In other words, the only way to see the good-looking side of the lower clamp was to lie on the ground. The only time other people saw it was when you were doing big wheelies.

One other little thing the inverted lower clamp does for the looks of your scooter is to move the clamps about two inches farther apart, and when you are running long legs, like 14 inches over stock and up, this eliminates the "bunched" appearance that wide glides sometimes get. Just one of those little things, but one that makes a big difference in how "complete" your scooter looks. ■





Why You Need 21 Inches

The 21" front wheel is fairly well accepted as being the normal size used on a chopper. Although 16s, 17s, 18s, and 19s have become more popular in the past couple of years, the 21 is still without a doubt the most commonly used size. The increasing popularity of the smaller sizes, especially the 17", can be credited to the fact that a large number of chopper suppliers have been selling a cheaply made 17" imported spool wheel at a very low price (most of them belong in the junk pile).

There are many good reasons for running the 21 up front. Originally, the idea was to be able to run a skinny front wheel and tire and still have enough ground clearance to turn corners. This, of course, was before the advent of extended front ends—and the 3.00 x 21 tire is almost exactly the same diameter as a 5.00 x 16. So what you ended up with was a chopper that sat level but had a cooler looking front end.

Needless to say, with today's 6" to 20" over stock front ends, ground clearance isn't a problem, but there are other features of a 21 that are a definite advantage. The most important of these is the axle height; again, since the 21 and the 16 are of the same overall diameter, the axle will be the same distance from the ground. With a smaller front wheel, the axle drops closer to the ground and the weight of the bike has more of a tendency to ride over the top of the wheel when you're trying to stop or turn. In other words, endos and highsiding. Not that either of these will ever happen; it's just that the tendency and feeling are more and more noticeable in the handling as the front axle drops lower in relation to the rear axle.

Something that is likely to happen is "fold under." (You probably never heard of fold under—and for good reason: I just made it up. Endos and highside are common terms in racing for two things that happen quite often; fold under is something created by small front wheels and is not seen too often in racing, simply because small wheels aren't used.) Fold under occurs when some ass in a white '60 Falcon pulls out in front of you when you're puttin' down the road without a care in the world—you hit the brakes, lean the bike to the left and lay it down in a slide—the nosepicker goes on his way, and you want to bring it back up so you don't continue to slide into oncoming traffic in the next lane. Well, here is where you learn about fold under: the smaller the front wheel, the harder it will be to pull it back up off the fork stop, and if you're running a skinny 17 you might as well forget it. Here's something to think about: when you're sliding to the right with your wheel locked to the left, and you're leaned over so far that the portion of your front wheel touching the ground is over halfway past the center of the axle, **your front wheel will be running backwards.** If you don't believe it, grab your kid's Stingray bike and try it. There are other factors involved also, but I think you get the point.

Other, less important, features of a 21 include increased mileage — there's more of it, so it goes farther. Because it is larger in diameter, it turns fewer revolutions to go the same distance, so your wheel bearings last longer. Ride is improved, because of the more gradual curvature of the larger diameter; in other words, it will meet and roll gently over the same bump in the road that a smaller wheel would slam into— it will also roll over the hole in the road that the smaller will fall into. This will hold true no matter how big or small the hole or bump may be: the 21 will ride better, comparatively speaking.

If you really dig the looks of a small wheel and there's no way you're going to be happy without one—well, shit, brother, don't worry about it, run one; but maybe you should consider an 18 or 19 rather than a 16. They all work. You may ride for years and never have any problem (as long as you get a good quality wheel). On the other hand, how much difference in looks is there between a 2.75 x 18 and a 2.50 x 17? Not much, right? And the 18 seems to be the breaking point between good and poor handling. A lot depends on what kind of rider you happen to be. I'm a crazy screw-off, hot-rod, balls-out jammer, and no matter how often I scare the shit out of myself and swear off doing the things that get me in trouble, I know it will be all forgotten every time I throw a leg over my Hog. So I feel that I've got to have everything possible going for me to get me out of tight spots.

If you're the type that just takes a slow putt through the park on Sunday afternoon and you don't get hung up looking at all those big boobs and asses instead of watching where you're going, you could probably get by with a 12" wheel.

—Joe Teresi

How far should you go your first time?



How far can I extend my front end before my bike handles bad? How much rake should I put on it? These are probably the two questions most often asked by a guy starting to get a chopper together, and both questions fall into the same category as "How high is up?" A better way of putting it would be: "What length and rake will make my bike handle better than stock?"

That's right, brother. Done right, your bike should handle better than stock when being used for the purpose for which you're building it—which is usually highway jammin'. Now, if you're planning on running your chopper in a moto-cross, your head's in your ass anyway, so just shine it on. The result would be like saying a Rolls Royce didn't handle or ride worth a damn just because a Porsche shut it down through a slalom course. Whenever you build something for a specific purpose, it has to suffer a little somewhere else, and this holds true for long forks. Generally speaking, the longer you go, and the more degrees of rake you put in your frame, the better your bike will handle at highway speed in a straight line; you suffer slightly at low speed and through tight corners, as does a Rolls or a Cadillac. (The quality of the fork you are using is very important; if the construction of the fork allows it to flex around like a piece of wet spaghetti, you're going to have handling problems, no matter what.)

There are other things to consider along with the handling characteristics, things such as size of wheels, tires, weight, handlebar leverage, and ground clearance. These, in turn, should be decided upon with weight, height, strength, and favored riding position of the owner in mind. Remember that you're not going racing; you're goin' puttin' to enjoy yourself, and you can do this best if you're comfortable.

There is always, of course, Denny Dumfuk, who isn't happy unless he's the most, the hairiest, the biggest, highest, etc. He's the guy who got apehangers outlawed for us. What can I say? You can overdo anything. But let's take a look at the positive side. Take, for example, a stock full-dress '52 Hog and put it up against a chopped version with a 16 on the rear, 8-inch-over narrow springer up front with a 3.00 x 21 Avon. I'll bet a $100 bill against a week's use of your ol' lady that the chop will crap all over the dresser on a tight mountain road. Why? Light weight; ground clearance; firmer, more responsive fork; and better weight distribution. True, an 8-inch fork isn't very long by today's standards, but I would guesstimate that you could go 14 inches with a ¾-inch rake before you went so far as to lose ground to the stocker. Even 16, 18, and 20 over, with up to 1¾ rake is believable if it's set up right and all factors are given careful consideration.

On a recent weekend I was down at the river and overheard a conversation between a brother with a righteous knuckle and a Racer McJackoff type. After what seemed like an hour of bullshit out of the racer dude on the many advantages of his Kawasaki III over the Hog, the brother showed his cool by saying, "Yeah, man, but mine has soul..."

By Super Hog

Never Seize

No, this shit don't go in the oil tank instead of oil. If you ever had to wrench on your scooter and had the unpleasant surprise of removing a bolt or screw and finding that the internal threads came out with the bolt, then this stuff is for you. Never seize is a silvery goo that usually comes in a 1-lb. can, much like your conventional axle grease. But it doesn't harden up, it can't be washed off by water, and it's not affected by heat. Sounds too good to be true? Well, it isn't. Just dab a little never seize on things, like timing cover screws, tappet block screws, trans top screws—even a little on the axle and on the inside of wheel spacers.

Never seize is the hot tip for any steel bolt that threads into aluminum. It resists rust and corrosion on any metal surface. By now, you're probably thinking that if never seize does all this, it will let the bolts come loose after a lotta miles of riding. No way. If, when you put your sled up, you make sure everything is torqued right, it won't come loose. What this stuff does is coat the metal of the bolt, or whatever, so that rust and/or corrosion won't form and weld the two metals together.

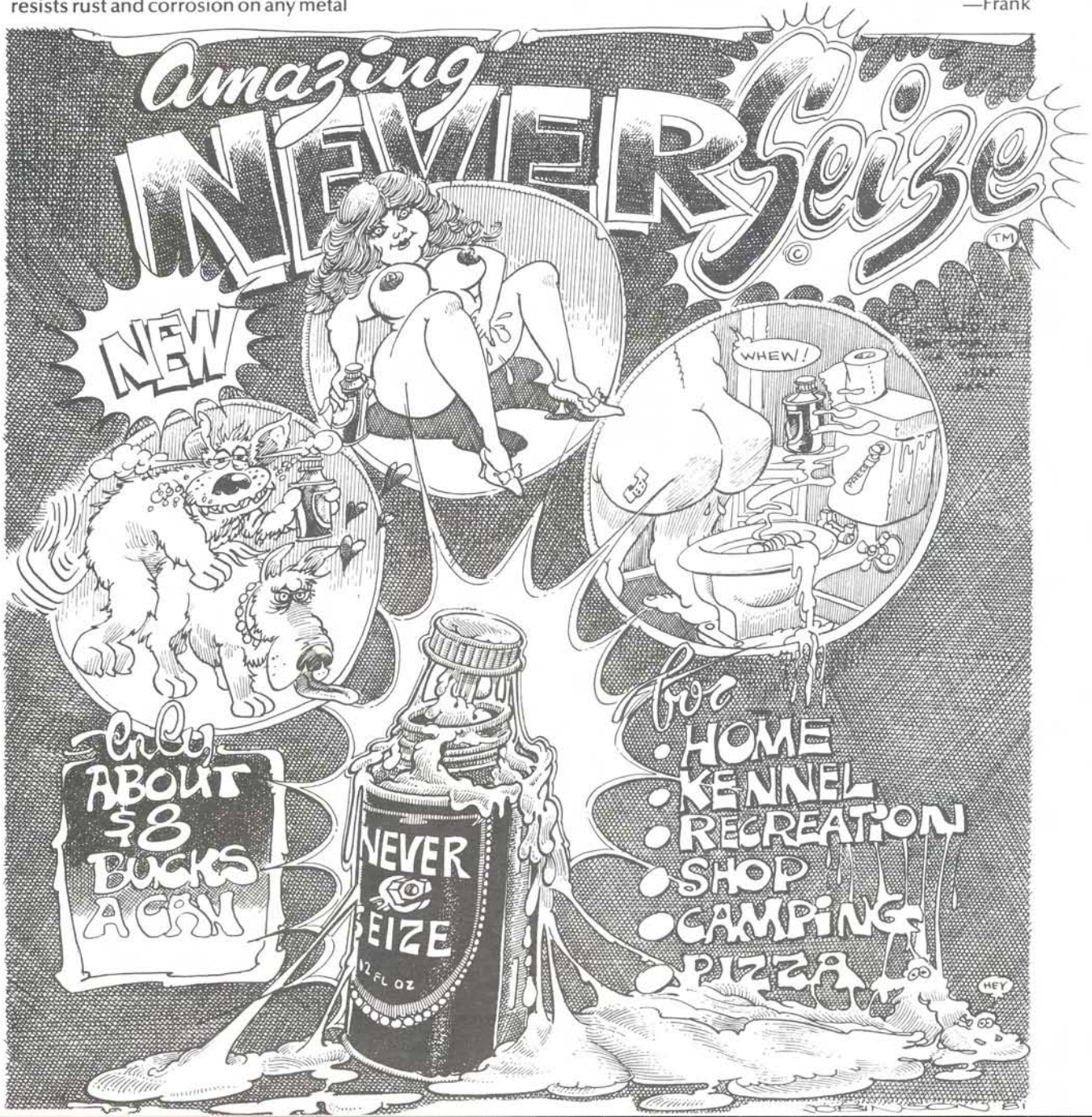


We're not trying to tell you this is a substitute for Loctite, 'cause it's not.

A can of never seize costs between eight and nine bucks for a 1-lb. can, and should last ya about a year, unless you're into a lotta teardowns. It can be bought in most automobile parts stores or plumbing supply houses.

We're not claiming this will end all of your maintenance worries, but it will sure help in keeping your downtime to a minimum.

—Frank





It's a Frame Up!

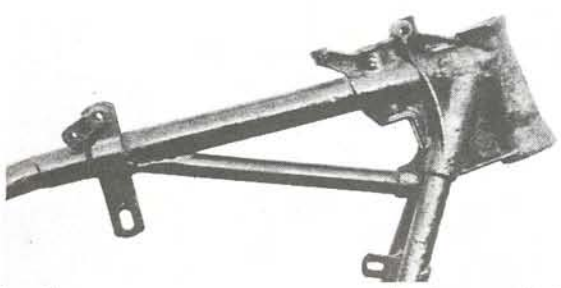
Quite often a biker will, when he starts building, have to spend a lot of time and effort looking for a rigid frame for his scooter. It may be because he has a swingarm that he wants to pull the engine and tranny out of, or that he wants to build a late shovelhead-to-rigid chopper, or simply because he is starting off with just a pile of parts, including an engine.

Locating a rigid frame isn't that hard, so he buys one, takes it home, goes through the long and involved process of molding, painting, etc., and then, too late, finds out that he has a knucklehead frame and that the rear jug of his panhead engine just won't fit into the frame. The language at this point usually isn't something you would want your mother to hear.

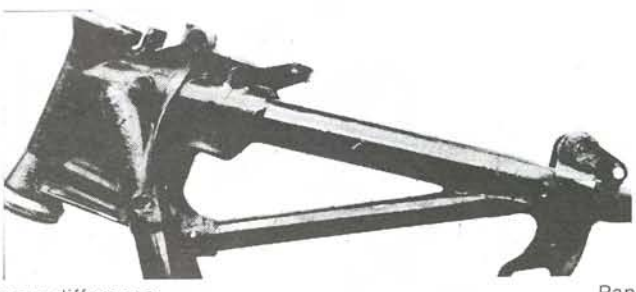
It is possible to fit a panhead engine into a knucklehead frame, but it takes some cutting, grinding, welding, filing and the use of a big hammer. On another day we'll have to look at just how it can be done. On the other hand, you can slip a knuckle engine into a pan frame with only minor changes, if that happens to be what you are planning on building. If it's a panhead you're building, though the hot setup is to make sure the frame you are going to buy is a panhead to start with, so that you won't need to do all that surgery.

There are several differences between the pan and knuckle frames, but most of them are rather subtle and hard to spot. Some are "sometimes" differences, like the straight front downtubes. The knuckles have straight tubes, while most of the rigid pans have "bowleg" tubes. However, '57 pan frames were also straightbars. The one sure way to tell the difference is the top motormount. A look at the pictures will show that the top motormount on a knuckle is a straight-sided rectangular tab, while the top mount on a panhead is a sort of triangular thing. If the top mount is missing, or looks like it might have been changed for one reason or another, a final check involves the front tubes. If it is a straightbar and there is a lock built into the neck, it's a pan. If it's a straightbar and there's no lock, it's a knuckle. If the neck's been molded and you can't tell, you've got troubles.

by Joe Teresi

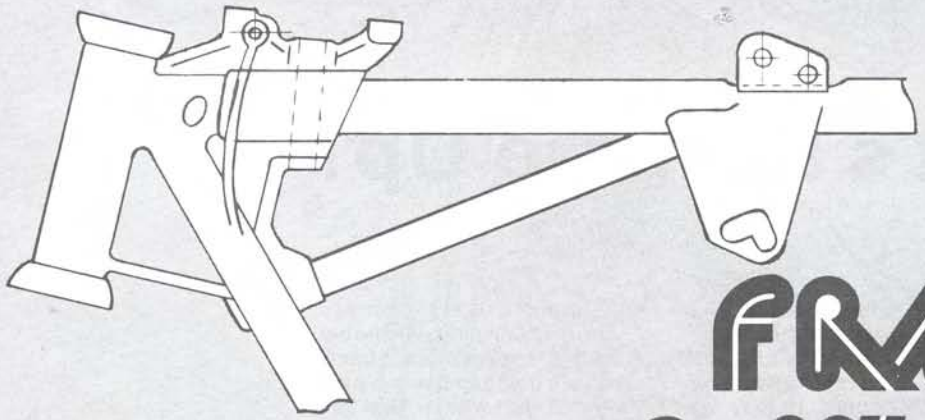


Knuckle



Pan

Engine mounts are primary difference.



FRAME SAVERS

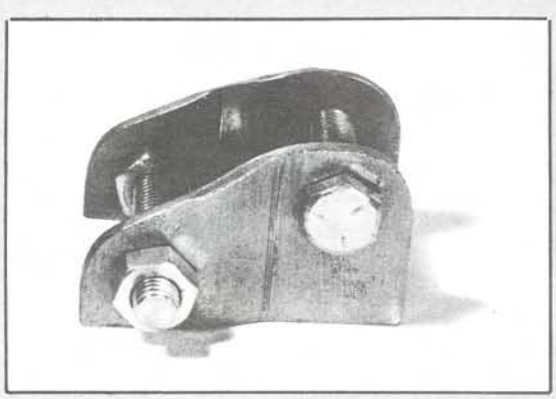
Before you sell three slightly modified stock, rigid frames for one that has all the tabs still intact—wait. Two bros in Colorado, Dale Barnett and Jim Keller, have come up with a couple of parts to save those hacked or shaved frames.

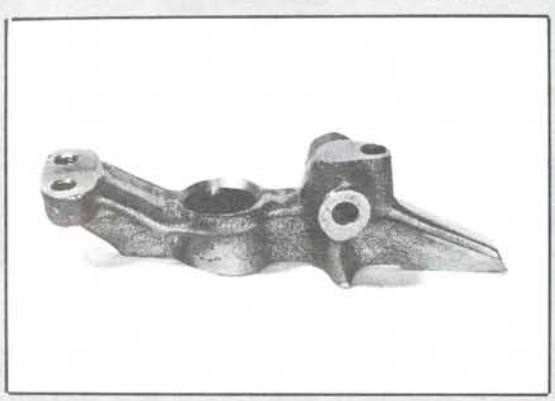
Even if you have a custom frame and want like hell to have the nostalgia appearance through the use of fat tanks and the old style dash, they have it covered. These dudes remanufactured two of the three fatbob mounting tabs and sell them in kit form for $19.95, and they come ready to weld in place. We don't know what their thinking is on the third tab on the front down tubes, but with some strap and a torch it could easily be replaced. These cats went so far as to draw and print complete instructions for the placement of each bracket. With the tabs in place, everything that once attached to the stock fatbob mounts can again be installed, including the stock seat bracket.

Okay, before you reach for the phone to chew us out for not printing the vital info, here it is: Mill Street Products, P.O. Box 21901, Denver, Colorado 80221. Phone: (303) 534-4136. I'm hoping I can snatch the set Dale and Jim sent us. Then I can patch together the cradle frame I've had stored for the last three years—but I'll probably have to fight Snake and Renegade.

One more thing though. Some of you skeptical red freaks may think this article is a hype for these bros' product. Well, for one thing, fuck ya if you don't like it. It's their first attempt to put a part on the market and we think it's a damn good idea. But then again, if we ever print anything about a product and it just ain't so, let us know. As you know, we're not bashful. We'll either make it right or point out where the smell is comin' from.

—Weed





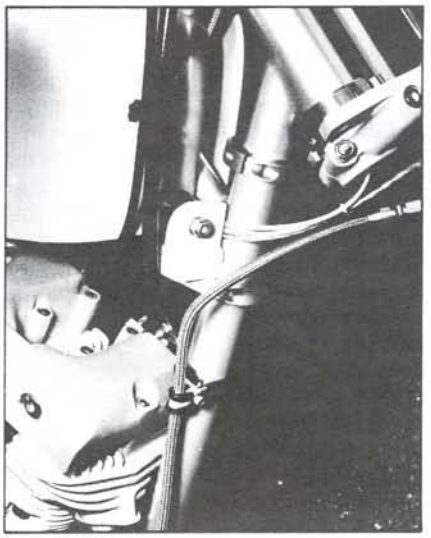
Frame Clamps—from Freak to Far-out

There are a lotta ways to attach things to your scoot's frame—and most of 'em look worse than a vulture's hangnail. One of the sorriest sights you'll ever lay eyeballs on is a sled that some bro has busted his sweat glands over, buildin' it clean and solid, only to blow it at the eleventh hour in a blizzard of black tape, bungie cords, muffler clamps, and bailing wire.

If you're a serious plan-ahead type, you can weld tabs on the frame where you know you're gonna need 'em to attach your exhaust pipes, footpegs, fenders, or whatever. But there are a coupla problems to this route. First, at some point durin' the assembly, ya end up needin' a bracket where there ain't one. Second, a lotta weldin' here and there for tabs doesn't exactly do wonders for the grain structure, the ultimate strength, and other technical characteristics of the metal in those areas. If you're reworking a stock frame, don't go bananas hackin' off the brackets—particularly if they're not highly visible anyway. You might just end up usin' 'em. And, try to attach new ones with high-strength, low-temp brazing instead of welding—some brazed types are just as strong as welded ones, and because they work at a lower temperature they hassle the original frame metal less.

Thanks to the good ol' military-industrial complex, there are a variety of clamp-on frame brackets that can also help ya hang things off your set of wheels without makin' it look like a hang glider. These doohickeys range all the way from metal strapping that holds up cold water pipes (and rat bike exhaust pipes!) to special designed-for-the-job shit that will tie up a whole machine shop for a week just gettin' it made.

For light-duty work like juice brake lines, oil pipes, or wiring, one of the best alternatives can be copped easily at many surplus, aircraft, or industrial supply houses (particularly those specializing in hydraulic components).



Usually called Adel clamps, they are available in a wide range of sizes (1) and consist of an aluminum band with a rubber cover—not too bad for protecting your paint. Once it's on the frame, you can attach the cable or line with a second Adel, all held with one cap screw and nut. For high-temperature areas, Adels are sometimes available with a heat-resistant rubber (Viton). They're clean and simple, but not meant for high temps or a lotta weight.

Stuff your nose in some accessory catalogs and you'll also see a whole passel of cable routers, wire looms, and the like. Two that come to this worn-out mind are Jammer's clutch cable stand-off and an aluminum control cable mount from Cycle Fab (2).

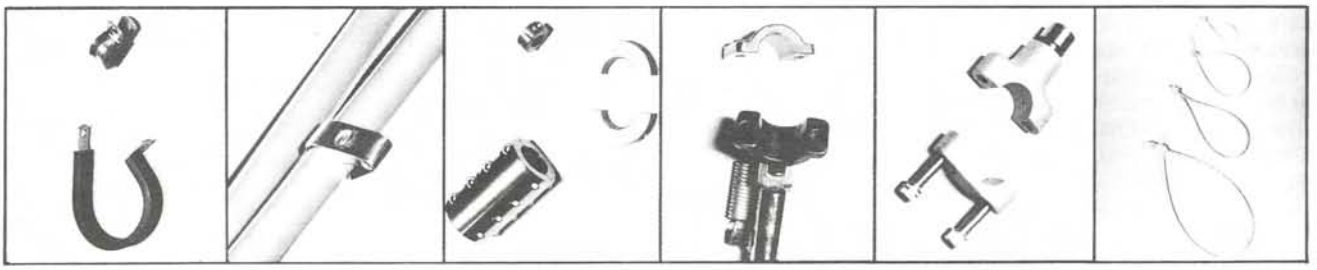
Weightier items like gas tanks, gorilla bags, and girlie bars need somethin' a taste stronger. Another easily purchased clamp that does the job like a bandit on Wall Street is the clamping-type shaft collar. This is commonly found on industrial machinery, and is usually in good supply at most bearing supply houses. Unlike the normal shaft collar that is held with a keyway or setscrew, this type actually squeezes down around the entire circumference of the shaft (or in our case, the frame tube) for a much stronger, more uniform connection. Clamping collars are normally available in one-piece, two-piece, and even multiple widths, from under 1/2-inch diameter to over two-inch (3). Ya can get 'em in a choice of cold rolled steel, stainless, and even high-strength aluminum for weight-reduction freaks. Sometimes the bros at the bearing counter won't know what you're looking for until you tell 'em a brand name, so ask for Ruland, Clamptite, Maxwell, or Macit, among others.

The bodies of these beauties are thick enough for you to file a flat on one side and then drill and tap them from an attaching point. A mounting tab can also be attached where the collar halves join, if the ends are filed or ground back to compensate for the thickness of the tab. Shaft collars can be easily moved and adjusted while you're in the dial-in stage, and they eliminate welded-in mounting sleeves in the frame for bolts or studs.

A couple final suggestions before I go off ta soak my whiskers in some cold suds—or a warm bush. Some accessories like handlebar master cylinders, universal kickstands (4), or short handlebar risers come with a clamp integral with the body of the piece. If you score these for low bucks at a swap meet, you can sometimes ravage 'em and use just the clamping section for other purposes (5); or, mount the whole ball of wax on the frame if it's still good and your frame tubes are the right size (7/8 inch or 1 inch).

And, although I don't personally cotton to Ty-wraps, Snap-tys, and the like, for low-temperature spots they definitely do the job and are available in many more sizes that ya might think (6) from electronics, industrial, and hardware supply outfits. Jes' don't try to hold up your exhaust pipes or tie down your motor mounts with 'em—right?

—mystery man



Don't Throw It Away!

Hokay, troops, did you know that there are all kindsa tools, belt buckles, and even custom gear that can be made from old, worn-out stuff? It doesn't have to be a bike part to be useful and original.

Just think, there's probably a zillion uses for a single item like a hacksaw blade. Here's a for-instance: Take a broken piece of the blade three inches to six inches in length, strut over to the grinder, and whizz away at the blade until you got something that sorta resembles a stretched guitar pick or a fat fingernail file. Ya got the picture? Take an extra minute and buff off any rough edges. Kinda neat, huh? Oh yeah, what's it do? I almost forgot: It's the niftiest, slickest little O-ring popper-offer you ever laid a digit on. Take your Sportster tappet-guide blocks. You know the little skinny O-rings on the underneath end? Slippery little buggers, ain't they? Use your little hacksaw blade tool and zammo! Them li'l suckers almost jump right offa there! Just another little goodie to hang near the tool rack. Oh yeah, the little hole in the end makes it handy to hang on a nail. Smooth, eh?

If you live in an apartment or rent a house, you probably run through a regular rap with the landlord about keeping your sled in the living room. Compound that if the joint's got carpet. Easy. Just take an old sheet and spread it down on the floor to keep the drips from gettin' real serious. If you got a leaker, simply add another layer of sheet or use an old blanket (for extra absorption). The sheet helps in another way too, because when you're bangin' wrenches tryin' to keep her runnin', the white sheets reflect light, givin' ya a better view of what yer doin'. Besides, ya get to look like one of them spiffy top-drawer, eat-off-the-floor technocrats. Just might impress your landlord enough to make him give ya a job in his Harley-Davidson shop. Right.

And then there was Uncle Woody, who bought a full dresser a bit on the gaudy side. He took all them fancy little chrome rails and made Aunt Sophie the damndest set of jewelry racks to hang all her "good stuff" on. Took all the big ones and made towel racks. Not satisfied with that small junk-wizard's feat, he took the tour pack off and made ol' Soph' a spiffy bread box. Grabbed the mudflaps for his old pickup. Finally, when the dust cleared, everything the family had was graced with a little of that dresser's leftovers, and Uncle Woody had a cleaned-up stocker, just like he wanted.

I guess it's this bone-breakin' semi-Depression that gets everybody to thinkin' of ways to save dough. Cripes, ya gotta try! It's just learnin' to cope with long wants and short cash. I know there's a balance point in there somewhere.

What's that ya say? Batteries? Well, yeah, I suppose I could do a little battery tip for you bros. Example: If your battery keeps gettin' weaker even though you've always tried to keep the blighter healthy and wet, it could be losin' its charge because of sediment or weak electrolyte in the cells. Assumin' you've got the little fella out of the battery box, turn the battery over on the ground (away from the ol' lady's eggplant harvest) and let it drain completely. Score a plastic jug of distilled water. Fill the battery with the distilled water and empty it again. Flush it again. Allow it to drain thoroughly, and then carefully refill it with fresh electrolyte. Leave the caps off for a spell while you're charging it on a low-amp trickle charger. Use a small battery hydrometer to tell you whether the operation was a success. Every now and then this little trick can save that aging battery for an extra term. Take part of the dough that ya wuz gonna use for that new battery and buy us some Jack Black; take the rest and buy yer ol' lady that snappy halter top she's been eyein'.

This next handy little tip is a real money-saver. I went lookin' for a quality, aircraft-grade hose clamp for oil and fuel lines. I had busted a zillion of those little pencil hose clamps that don't chew up an inch of hose every time ya torque 'em down. Naturally, I started lookin' at

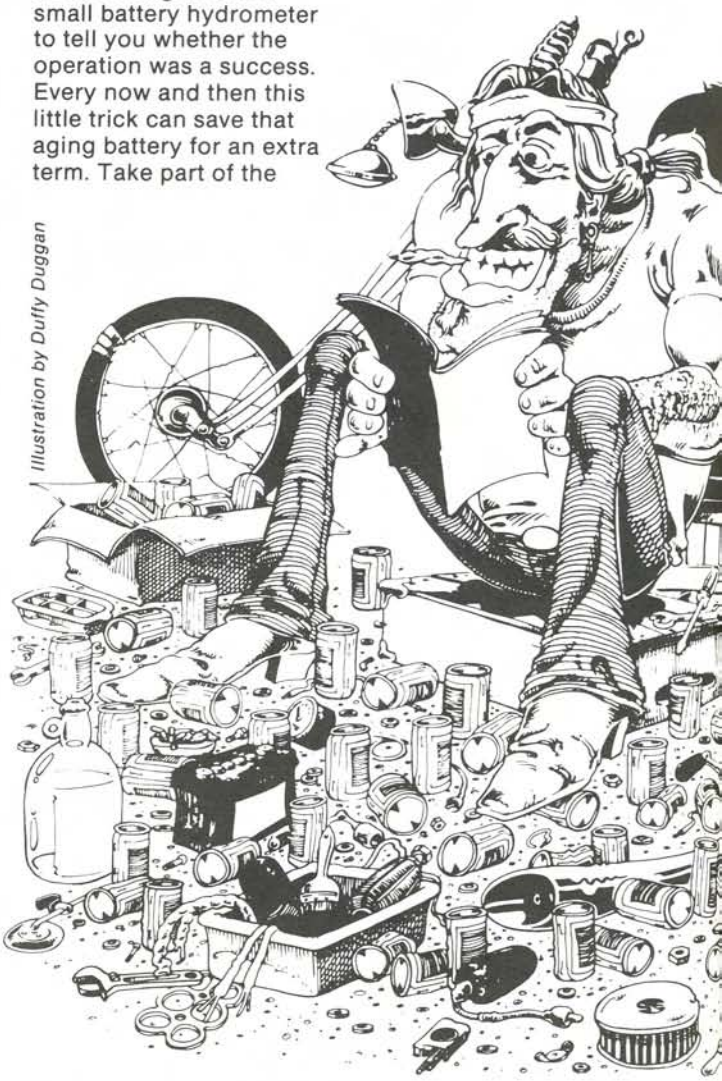


Illustration by Duffy Duggan

the airport. After walkin' all over the freakin' place, I finally rapped with one of the airplane wrenches. "Hose clamps?" he says. "We don't use hose clamps on low-pressure lines. We just put a turn of wire around 'em and let 'em go." So I poked my snoot into the cowl, and this is what he laid out:

Take about a foot of stainless steel wire, stainless steel safety wire, or steel or cast-iron stuff — often referred to as stovepipe wire or mechanic's wire. It's best to use the stainless if you can get it (it won't rust), but the mechanic's wire does the job nicely. Place your oil line in the middle and very snugly wrap two turns around the hose; it's best to keep constant tension on the wire as you wrap to help the wire coil in neat, tight turns. You can use three turns or more if you have forearms like Popeye; but remember, two will do the job and you don't have to pull so hard

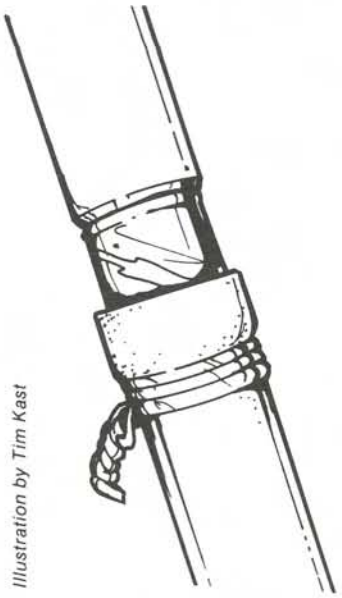


Illustration by Tim Kast

to get the wire to snug down. Use tight, small coils, then twist the wire together for half an inch or more. Give the whole twisted, braided end a slight turn or so with a pair of pliers to cinch everything down, and cut off the excess braid with a pair of dykes. Leave 1/4" to 3/8" of braid to hold it all together, and fold the remaining end down flush with the oil line. Now you have a good, clean, tight joint and, best of all, ya didn't have to shell out another fiver for more of them freakin' little pencil clamps. This idea has been around for a while, and is widely used on race bikes, race cars and, as I said before, airplanes. It's inexpensive, easy to work, and easy to replace if you're out on the road. This works with oil line (black neoprene), so don't be callin' up the rag an' sayin' the trick won't work. If you *do* have a leaker, don't panic; we can fix that too. A good, tight connection is sometimes not as easy as it sounds. Simply pull your oil line off the fitting and look at the fitting to make sure it's the right size for the hose. Does it fit tight? Clean about an inch *inside* the oil line with a rag dipped lightly in enamel reducer and wipe the fitting likewise. Then take a good grade of pliable sealant — the absolute best I've ever used is Loctite brand teflon pipe sealant, also sold by Harley — and smear it on the outside of the hose nipple. Slide the hose back onto the fitting, tie off a wire clamp, and just *dare* that sucker to leak!



The list is endless. It's part of the spirit of the biker, and what with these inflationary times, it often tips the scales between stayin' broke and gettin' by. Get this: Radio wanted to hang some freebie fluorescent light fixtures in his workshop for some nocturnal wrenchin'. He didn't have any wire-link chain to suspend the lights on, so what's he do? He wanders over to a pile of junk an' pulls out a bunch of worn-out drive chains. They're adjustable, cheap, available, and even give the barn that rustic, scooter-trash look. Spiffy, huh? It's the American spirit and the biker spirit all rolled up into one; an' who could be more American than we are? Don't it make ya proud?

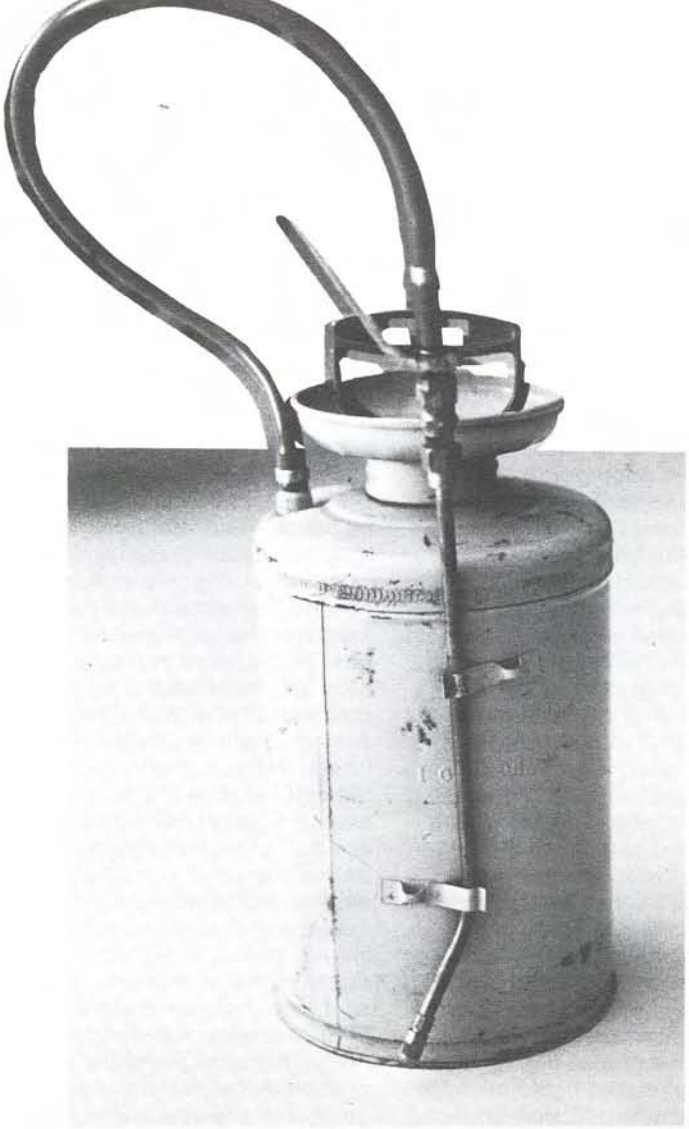
One more thing, and then I'll quit bendin' your ear. It seems Joe Mama was in the local burger 'n' puke gettin' some chow. He orders up his stuff and carts the tray to a quiet booth near the back. "Rats!" he says. "Forgot the napkins." So he ups and jogs to the counter an' books back to his booth. Well, he gets back to his chow, and some old man with a shopping bag is sittin' in *his* place eatin' *his* grub. Claims it's his! Well, Joe gets all bulled up an' seriously considers thumpin' the old dude, but then he thinks of all the ruckus afterwards. Newspaper headlines: *Biker Assaults Old Invalid!* So he just starts hollerin' at the guy! It turns out the old wino ain't no milktoast, an' he hollers back! So there they are, hollerin' an' caterwaulin'. By this time Joe Mama is really tryin' to keep from zappin' the old fart. The beanery manager runs up, askin' what the commotion is all about. Joe and Methuselah give fifteen different versions at top volume. The bistro manager backs up. Try again. He tells Joe that he don't care who's right; he wants no caterwaulin' in his grease dive. He takes Joe up front and makes out a duplicate order to shut the whole mess up. Fine. Joe beats it back to his former booth, and the crazy old coot has up and gone. Joe sits down. He notices that the old guy has left his shopping bag and bindle. He waits around a few minutes after finishing up. Still, no old dude. Joe tucks the shopping bag up under his jacket and scurries out. Figures he's made out like a masked man.

Well, that about wraps this little seminar up. I hope ya maybe picked up a little sumpin' from it, maybe even a laugh or two. The bag? What was in the shopping bag that Joe Mama lifted? Sorry, it about slipped my mind. You really wanna know? Quit stalling? I guess you guys *do* wanna know. Well, it was just some more o' that bullshit I been feedin' ya.

Later. Gotta run.

—Tim Kast

Easy Elbow Grease Eliminator





I ain't sayin' cleanliness is next to godliness, but an accumulation of scooter crud can eventually rot wires, clog cooling fins, and obscure oil leaks — to say nothing of the unwelcome decoration it'll put on the back of your ol' lady's halter top.

So once in a while, even in a rat bike's life, comes time for a good cleaning. There are a lotta ways to get the sleaze off your sled and headed down the drain — from Simichrome to soap and water to high-pressure steam. But most of them require a heavy application of elbow grease as well, if you know what I mean.

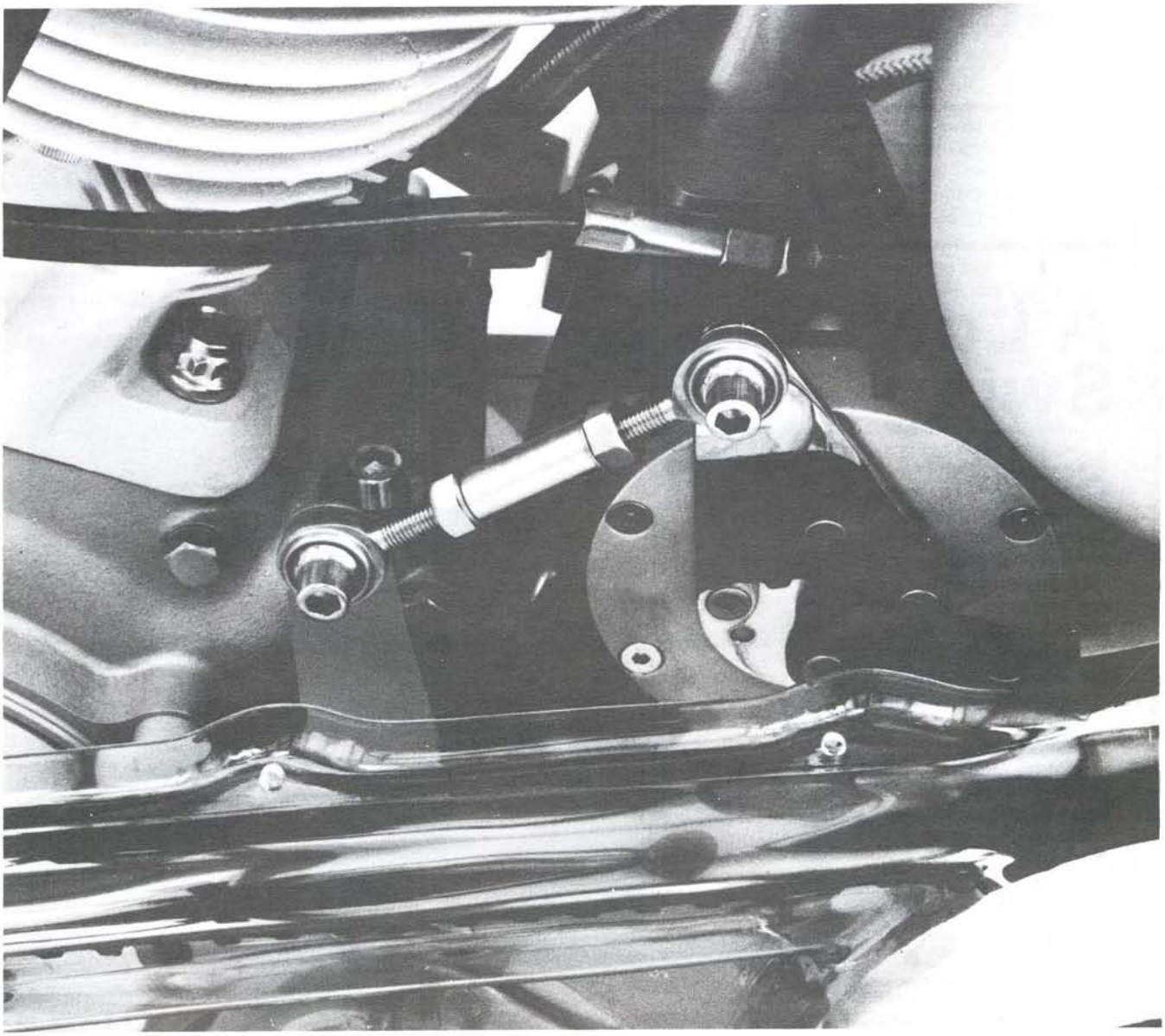
While tryin' to score a check-out cutie at the local discount store, however, I came across a cleaning device that uses pressure in place of horrendous sweat-gland activity.

This gizmo (see photo one) is called a garden or fruit sprayer. It's normally used by surburban citizen types to kill weeds with herbicide, douse bugs in insecticide, or squirt rugrats tearin' up the garden on mini bikes. The contraption works in a fairly simple way. You just pour whatever fluid you want to spray into the tank and close it up by screwing the handle back on. Then, to build up some pressure inside, you grab that same handle and pump your brains out for a few seconds. Now you've got a pressurized tank that's capable of squirtin' — with considerable force — whatever's inside. Load it up with a solvent or liquid soap and you'll go through a crud-encrusted mill, slime-coated forks, or a filthy rear wheel faster than the White Tornado.

For a sled with a lotta bead-blasted or aluminum metal-sprayed parts, a low-penetration solvent like kerosene or Prepsol (see photo two) is very effective and won't harm the paint on frame or gas tank like stronger stuff. (Solvents get expensive in quantity, so I usually catch the run-off in a big automotive drip tray, strain it, let the swill sink to the bottom, and reuse it.) Good results can also be had with hot water and Tide (or a household cleaner like 409 or Fantastik) if the putt to be purified is mostly paint and chrome.

These sprayin' jobs usually have an adjustable nozzle so you can vary the stream from a wide fan for big surfaces to a needle-thin point for crevices. They come in sizes from two to five gallons. And you can probably get your mitts on one at a sale for under twenty bucks. At that, maybe you oughta get a second one to butter up steaks, popcorn — or your ol' lady when she's in the mood for somethin' kinky and close!

—Mystery Man



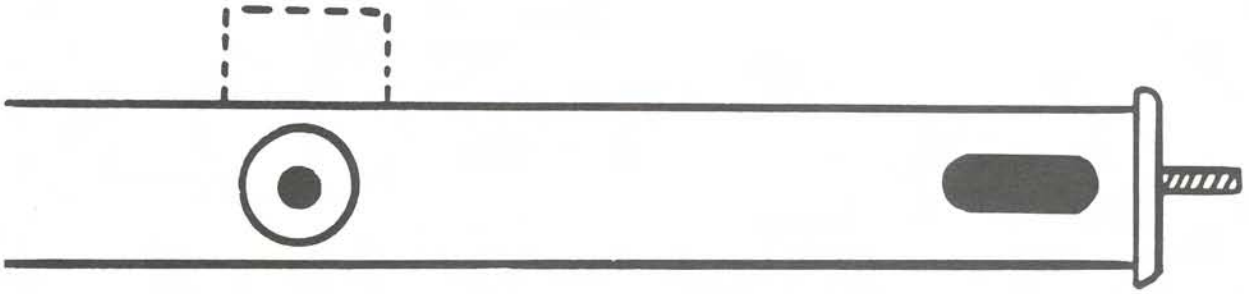
Barin' The Shift Drum

The great-grandaddy of today's scoots — the bob job — was born when bros comin' home after World War II began choppin' off unnecessary parts from big twins, producin' sleds that looked less gussied-up, and went faster to boot. This trip continued as aircraft materials and other high-technology stuff became available, allowin' bike builders to substitute parts that were not only lighter but stronger. Today, a lotta sleds are a combination of these two schools of thought, and most major modifications are well known from New Hampshire to Nevada — many are even incorporated in some factory "specials."

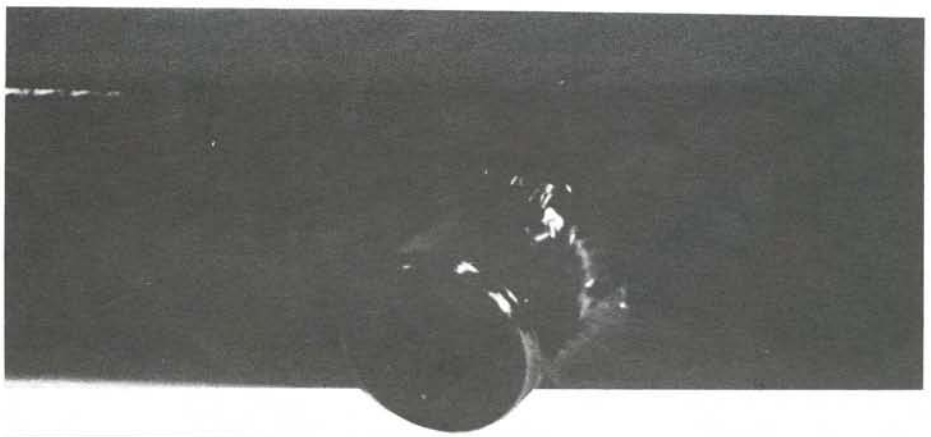
One small, new trip I stumbled across recently is the exposed shiftin' drum pictured here. It looks like a custom-machined part, but actually it's the standard drum. The trick is that the thin sheet-metal cover has been removed, the aluminum outer drum casting has been bead blasted, and the countersunk retaining screws are chromed. The only real modification is that thin 3/16-inch washers are used in place of the drum cover — so when the bracket (here attached to the shift linkage with a rod end) is bolted on, it is spaced away from the drum as it was originally.

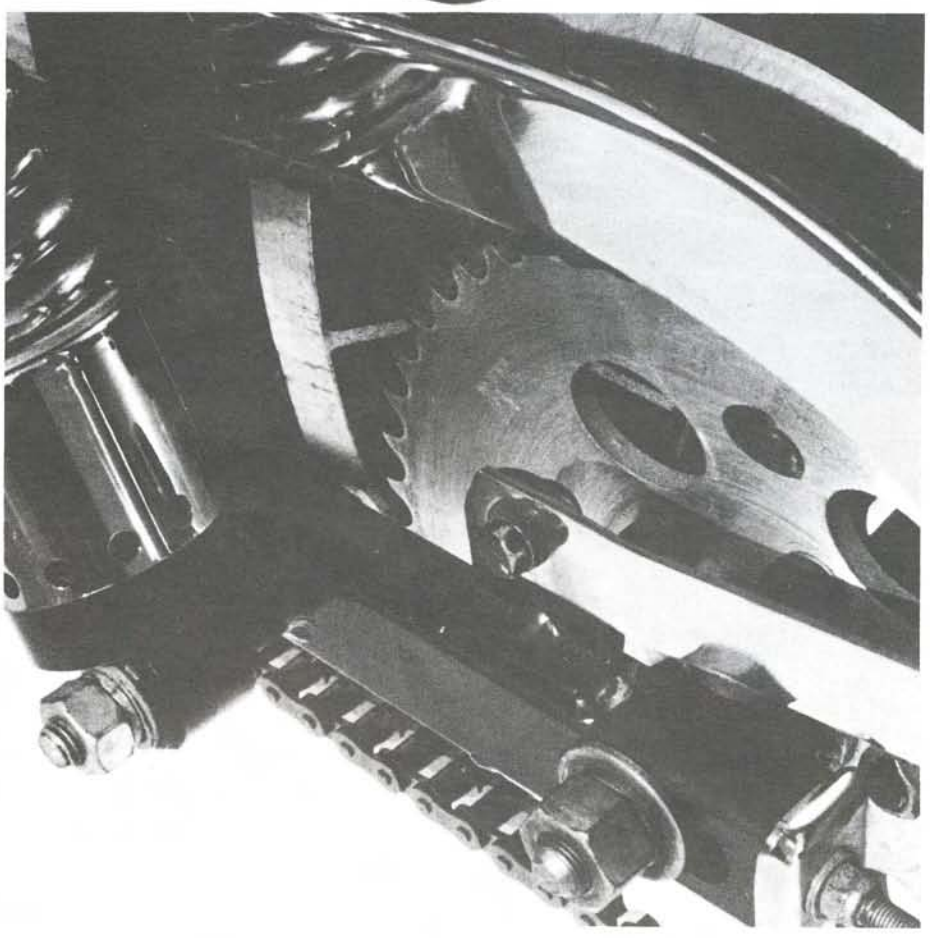
The drum cover provides some water and dust protection, but the bro who runs this modification keeps the drum itself well packed wth heavy grease to contend with muddy roads. Barin' the shift drum adds an additional detail to scoots with a technical look and saves a coupla ounces in the deal by doin' away with the cover.

— Mystery Man



A Low Swing





Swingarm frames have a tendency to look as if the rear end of the frame is higher than the front, unless you, your ol' lady, and most of the dogs on the street are all aboard. So here's a quick tip on how to drop that rear end slightly and clean up the appearance of those late-model swingarms.

First off, the block: the shock mount must be carefully removed with a hacksaw and file or a torch, then a steady hand and a file or grinder to clean the remaining surface of the arm. Then, 7-3/8 inches from the rear of the swingarm, drill squarely a 7/8-inch hole. Cut a piece of round 1018 mild steel stock, 7/8 inch in diameter and 1-3/4 inches long. Drill it out with a 1/2-inch drill.

Tap it into the swingarm leg so that it's flush with the inside edge and weld it on both sides. Shit, that's all there is to it. Do it to both shock mounts on the swingarm, and your putt will be 1-1/2 to 2 inches lower and the swingarm will look cleaner.

It's a breeze once you've taken off your swingarm.

—K. Ball

Genuine H-D Motorcycle Jack

In 1958, when the H-D factory introduced the swingarm frame, they encountered a small problem. How the hell do ya get the rear wheel off to fix a flat, inspect the brake linings, or adjust the rear chain? A rear ride-off stand like the one used on the rigid-frame models wouldn't work, so the engineers in the accessories department came up with a portable jack stand. Now I know what you're thinking. Where can ya strap a jack on your scooter without making it look like you're carrying a Snap-On rollaround?

The factory designed the jack in two pieces, so that it would fit in the stock teardrop toolbox. The bottom part of the jack is a round metal disc called the base plate, and is stamped out of heavy-gauge steel plate. The center of the base plate is dished so the screw part of the jack can rotate while lifting the bike. The screw part of the jack is made up of a heavy-gauge steel tube that is rounded off at the bottom in order to fit the dished part of the base plate. The top of the tube has a threaded nut welded to it that is the same size as the rear axle. A threaded rod with a smooth dowel and a curved piece of steel threads into the metal tube.

On the swingarm frame the lower rear crossmember extends out past the right frame rail about one inch. This part of the crossmember that sticks out has a half-inch hole drilled through it from the top to the bottom. I had never been able to figure out what its purpose was until I came across this jack. The jack's dowel pin fits in the hole in the frame member, and the curved piece of steel keeps the dowel from turning while you're jacking up the scooter.



The proper way to use the motorcycle jack stand, part number 95825-58, and I quote from the original instruction sheet provided, is "to raise rear end of motorcycle, place shaft end of stand in hole provided in frame crosstube. With large end of stand in place in center of base plate and motorcycle resting on jiffy stand, raise motorcycle using tool kit wrench on hex portion of stand." The instruction sheet also tells how to raise the front wheel of your scooter by using a suitable support under the front of the frame while the bike is on the jack stand.

John, of John's Harley Salvage in Owings Mills, Maryland, lent me the jack you see in the photos. A stock swingarm frame that still had the crossmember intact was harder to get hold of than a greased fork tube. In later years the factory did away with the extended frame crossmember when the accessory bolt on the center stand was made available. I don't know how many of these jack stands were made by the factory, but it couldn't have been very many, 'cause it's easier to score a gram of go-fast in Mongolia than to pick up one of these back savers from your local H-D dealer.

— Wrench





Cheap-ass Ring Compressor

I was puttin' jugs 'n' pistons back on my big twin the other day, and it looked like all the right tools were at hand — needlenose pliers, oil squirt can, and a new high-rent piston ring compressor. Well, this dude that squeezes down the end gaps, so you can slide the cylinder on, worked halfway decent going on. But once I had the piston up inside the bore of the barrel, I made a cranium-crinkling discovery. There was no way to get the mutha off! Usually you can undo the compressor completely, open it up, and remove it from the rod that it's circled around. But not this one—the spring bands were riveted at both ends. Would you believe I finally had to take tin snips and cut the turkey off?

Well, I remembered that when I was young and smarter, a coupla greasy ol' hose clamps would do the job as a compressor. So I used the tried-and-true method on cylinder #2 and it took about one-quarter of the time. If you oil the clamp up well, and position it carefully over the rings, it slides easier than the high-dollar version because there's actually less area contacting the piston. Sometimes the ring land area will be wide enough to necessitate two clamps per piston or a wide band of brass shim stock to cover and compress the rings, but that's unusual.

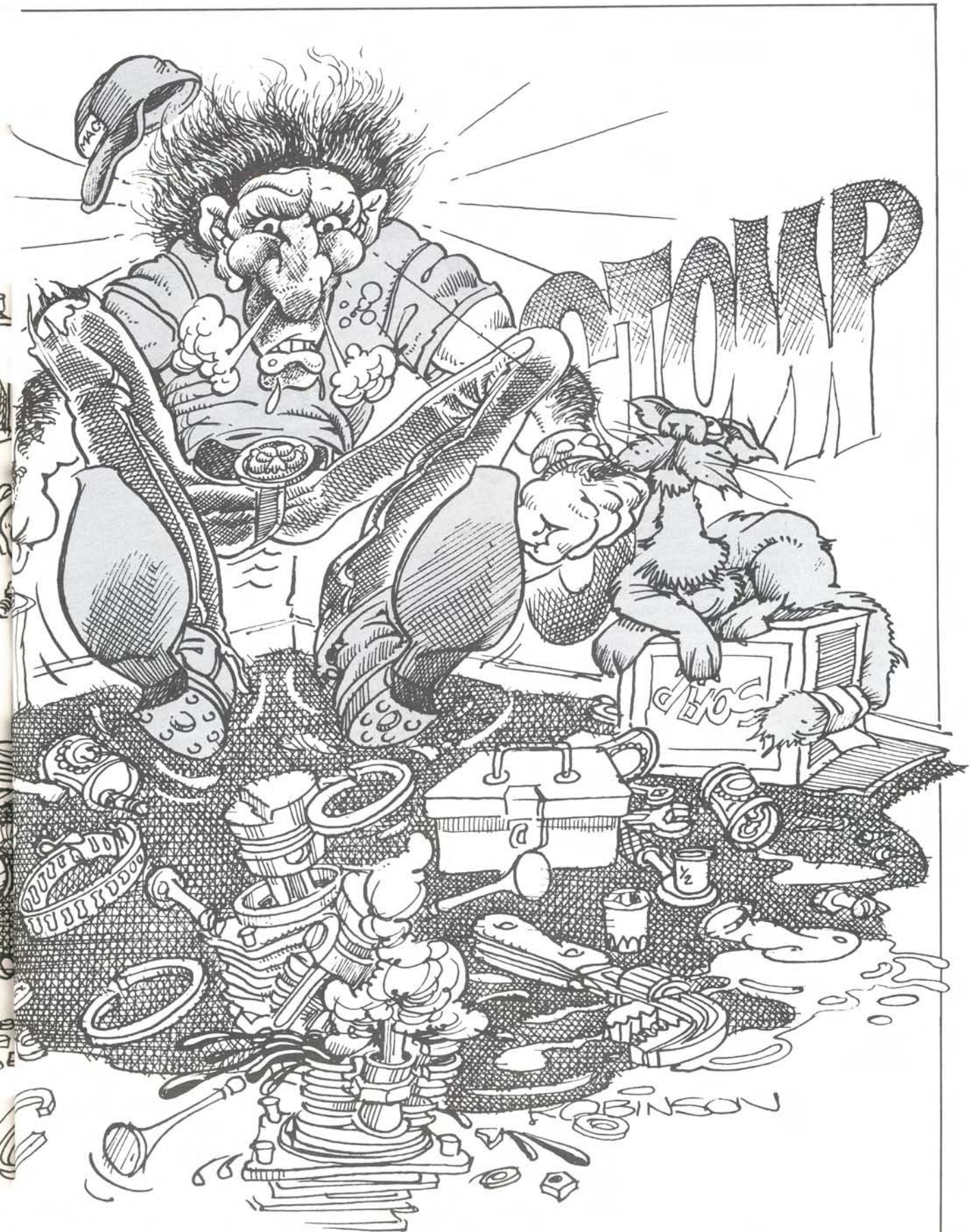
For your own engine, buy clamps that have enough adjustment range to fit over the rings when they are loose. Also check that there are no burrs on the inside to mung up the piston surface when you're using 'em. Ones with the quick release as pictured are best, since you can merely pull outwards on the adjustment screw when you're done and the band will immediately release for quick removal.

'Course you can make like Howard Hughes and spring for an official high-roller ring compressor. Just make sure it's the detachable type! In automotive work, the piston is pushed **down through** the compressor ('cause door-slammers have two-piece rods and non-separable cylinders), so no undoing of the compressor is necessary.

—Ol' Coot





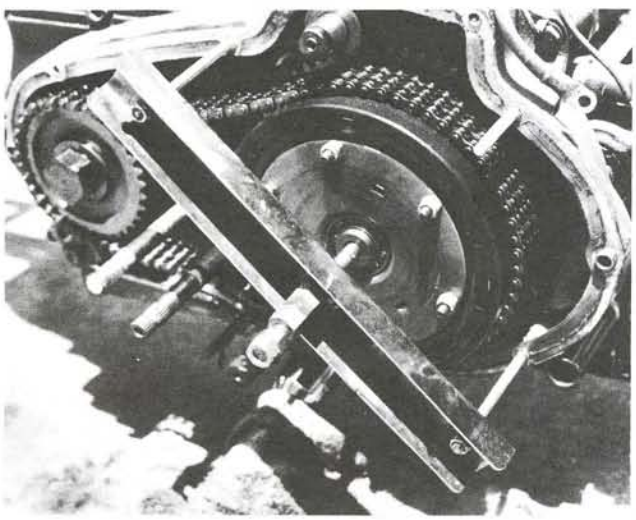

MAG
CHOMP
DOG
½
ROBINSON



Sportster Clutch Spring Compressor

If you are a Sportster owner with a 1971 or later Sporty, you might get behind this tech tip. What is it? Well, it's a clutch spring compressor for late-model Sportster clutches.

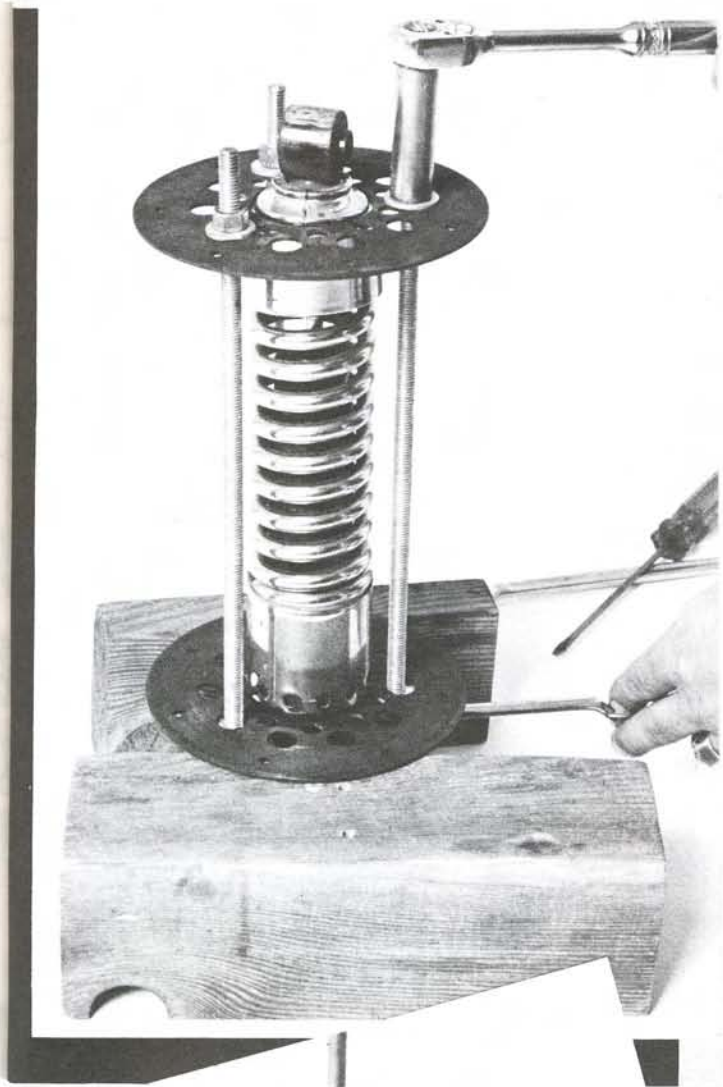
It was constructed by D.C. Jack out of junk lying around the garage, and beats hell out of going into contortions while trying to put the pressure plate back on the clutch, not to mention removing the same plate. With this deal you can twist that last nut off without catching the balls or kneecap and losing the clutch spring. As I said, this clutch-spring compressor was made out of junk. The metal channel was taken from an old dresser luggage rack, and the two end bolts were made from 4-inch-long ¼-20 all-thread. Both bolts are double-nutted on top to secure the tool to the engine cases. The bolt in the middle that pushes on the pressure plate itself is a piece of ⅜-16 all-thread about 4½ inches long. Jack used a piece of ⅝-inch hex stock and drilled and tapped it ⅜-16. He then welded the hex stock to the channel.

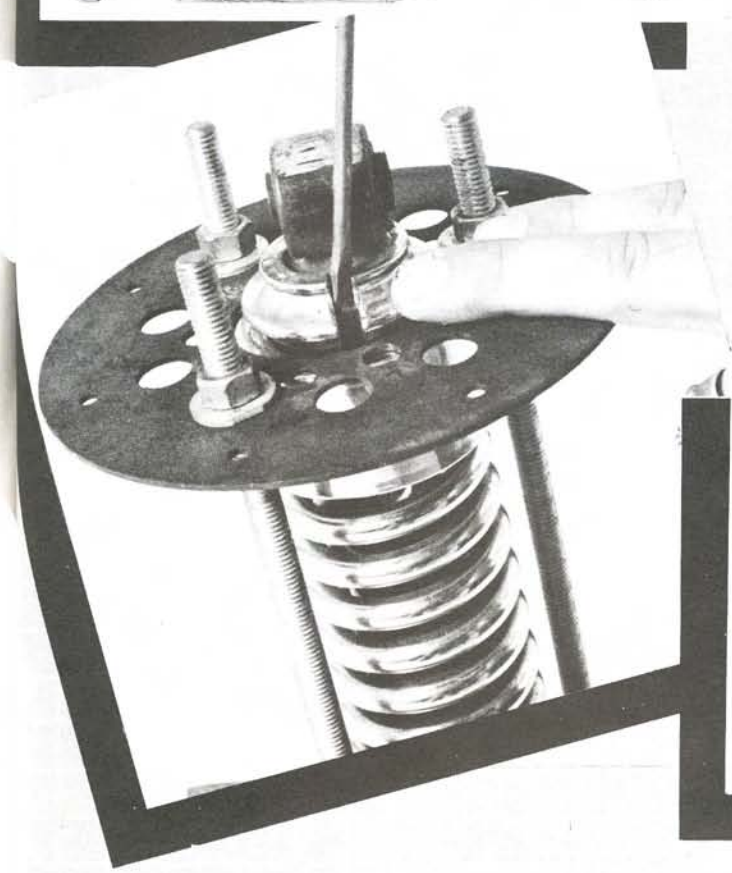


If you undertake this project, the easiest way would be to drill the ¼-inch end holes first to make sure things line up right. Drill a ¼-inch hole in one end of the channel, then stick a bolt through the hole and thread it partway into the engine case. Line up the channel with the other case bolt hole, making sure the channel is centered over the pressure plate bearing. When you get the channel lined up, mark and drill the other ¼-inch hole. Okay, now thread both ¼-inch bolts in the engine case part way and mark the channel for the ⅜-inch push-bolt hole. After drilling the ⅜ hole in the channel, carefully weld or braze the hex stock to the channel and you're ready to go jerk any late-model Sportster clutch that your heart desires. That is, provided the owner doesn't mind.

When you go to use your new clutch spring compressor, make sure that the two ¼-inch bolts thread into the engine case at least ½ to ¾ of an inch. You don't want the threads to pull out of the engine case when you tighten up on the ⅜ push-bolt to compress the clutch spring. One more thing: if you don't want to amputate part of a cherry luggage rack, you can always use a piece of flat steel bar about ⅜-inch thick. All the hole locations stay the same, and if you're into buffing up your toolbox, you can even have the mutha chrome-plated.

— Wrench





Don't Be Shocked

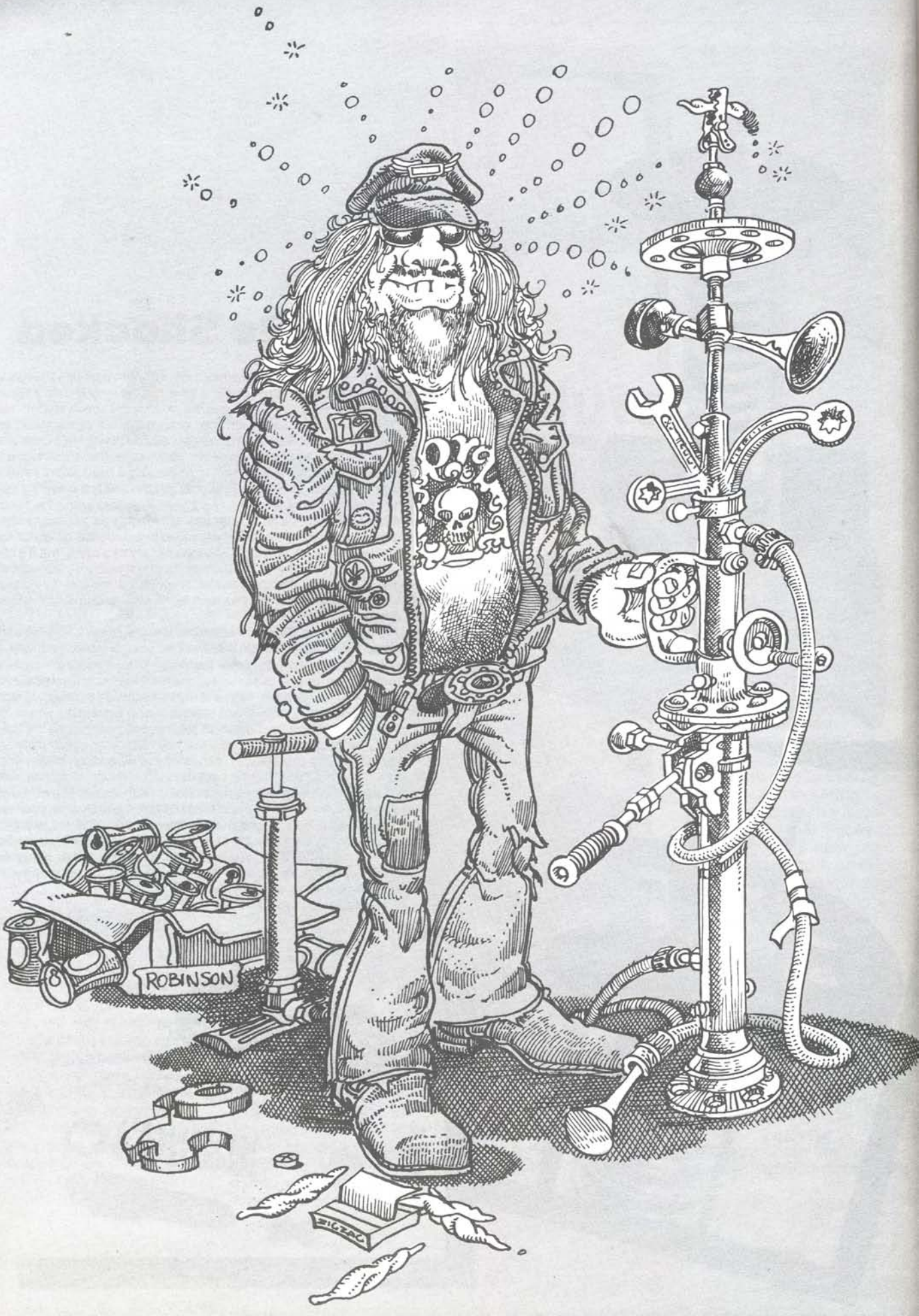
One of our bros, James Dudley, sent this here tech tip in. It was so damn simple it made me forget where I was — and before I knew what was happening, my grip relaxed on the only roach still left from last night. Weed snuck up on me, snapped it out of my hand, an' sucked it down until it was just another blister on his lip. He's been after me to dismantle the shocks on this new swingarm frame that found its way into his garage. Now, I don't mind helping a bro out, but inhaling the last roach in existence is as bad as guzzlin' the last brew. To top it off, I'm not that crazy about having a spring retainer embedded in my front teeth. But after one look at this tip, which was carefully hidden under twelve manuals and forty back issues, I looked at Weed and said, "Hey, man, no problem. I'll take your shocks apart, but it'll cost you a couple of doobies." I could see his grin coming. He thought my fondness for herb had overruled what was left of my common sense. He'll be hot when he sees this tech tip. It makes dismantlin' shocks a breeze.

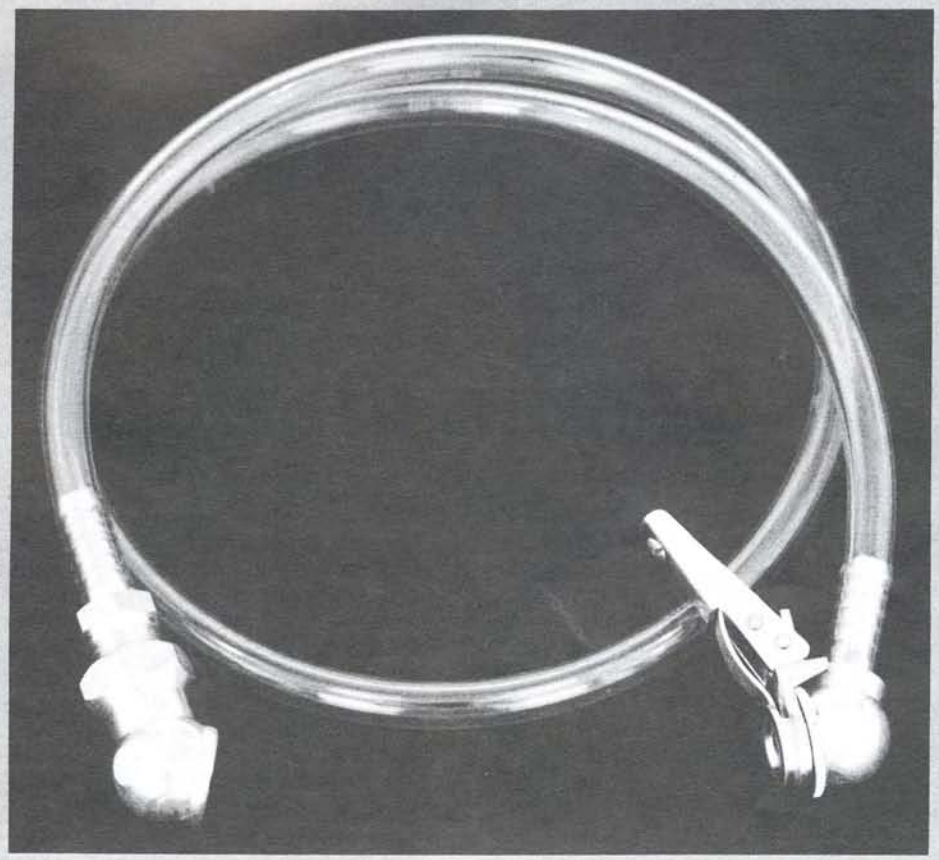
This homemade shock disassembly tool is half done after you find those old H-D clutch plates in the bottom of your junk box. Then find (or cop at a hardware store) three pieces of 3/8-in. threaded bar about thirteen inches long, and six nuts and washers. Place the shock in the middle of one clutch plate; then slip the three pieces of threaded stock in the plate, keeping the threads spaced evenly around the shock. Put a washer and nut on the bottom of the threaded bar just so the nut is flush with the bottom of the rod. Now take the other clutch plate and place it on the top of the shock, centering the top spring retainer in the middle of the hole and making sure the studs come through the same holes as they went through in the bottom clutch plates. Slip on the top washers and nuts; then tighten the nuts down evenly until you have compressed the spring past the spring retainers. After removing the spring retainers, back the top nuts off evenly until there is no tension on the spring. Shit, there wasn't nothin' to it, right? Just remember when you put this mess back together that the spring retainer fits completely in the top of the spring cover.

Now, where's Weed with the weed?

— Wrench




ROBINSON



A TOOL WE ALL CAN USE

This spare tire came from Steve Worrell in Michigan. It consists of two tire nozzles like the ones used in gas stations, one that locks in case ya can't use both hands, a couple of hose fittings, and a piece of hose three or four feet long.

Now if ya haven't figured the damn thing out, it enables ya to cop a little air outta yer bro's bike or a parked car after you've fixed a flat, or to keep that slow leak from goin' flat. Steve said ya can ooze about ten pounds of mist outta a bro's tire without harmin' his rubber.

At last, a solution to the hassle of fixin' yer own tire an' then huntin' up someplace to replace the air. Thanks, bro.

—Weed

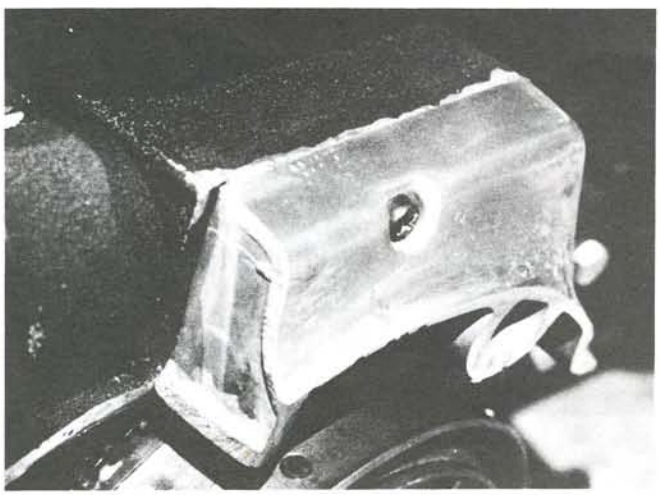


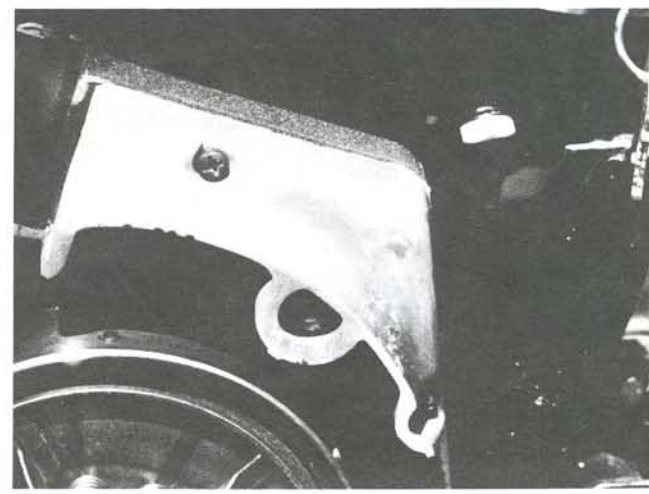
Bendix Viewer

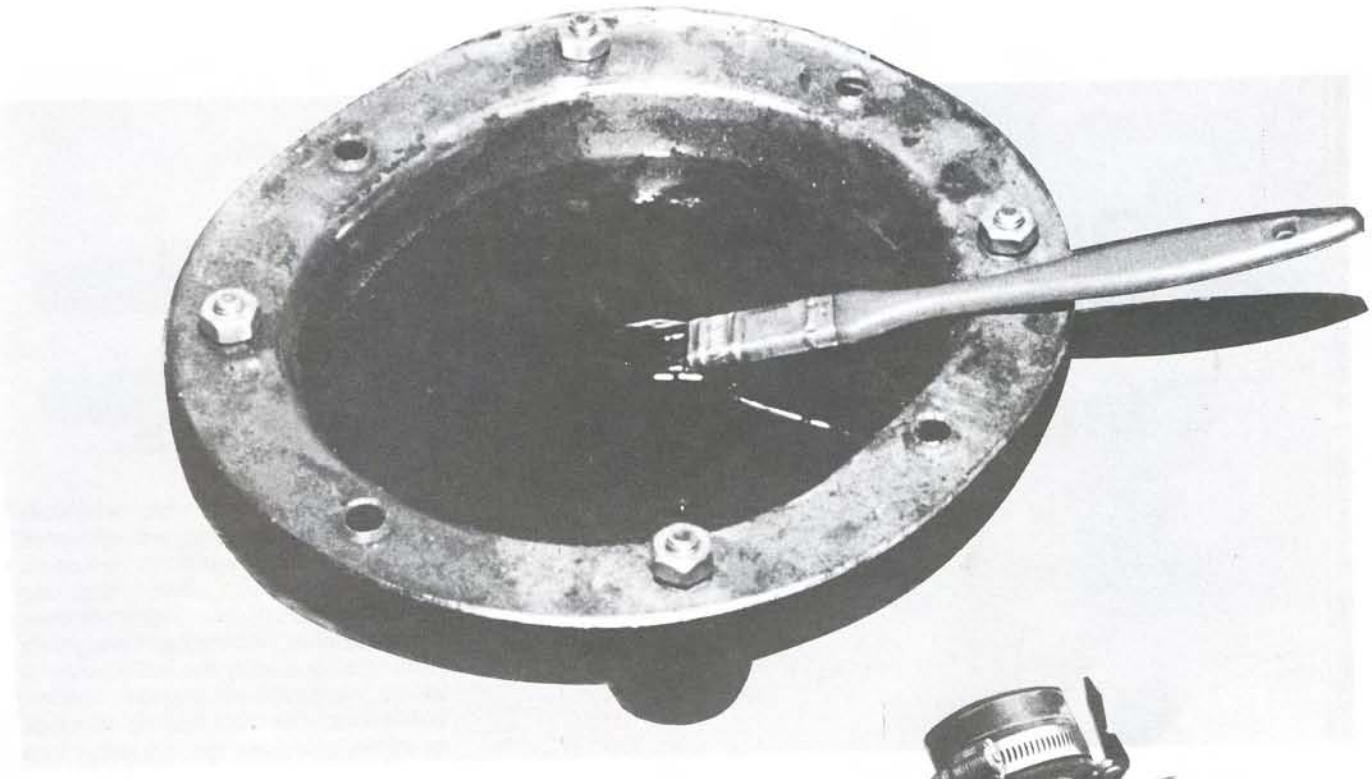
This tech tip is not for everyone. It's one I felt the bros with the magic button would appreciate. If you've ever suspected that something isn't happening inside the primary of your Sportster or Big Twin according to the manual and that a visual inspection is necessary, then this starter pinion shaft bearing support should come in handy. For short, we'll call it a bearing support. It allows you to watch the operation of the electric starter when the button is pushed. You will be able to check the engagement of your Bendix on the clutch ring gear, check the stroke of the solenoid plunger to see whether it moves smoothly inside the solenoid, and check to see if the Bendix fork is bent or cracked.

Some people may have a problem in finding a primary cover that is too screwed up to run on a scooter, but is still good enough to cut up and use in making one of these bearing supports. When you get your hands on a cover, make sure it will fit your bike. Then cut away the bearing support, leaving a mounting-screw hole on either side. Now cut a section off the front of the bearing support, so it looks something like the one in the photos. Be sure to leave the shoulder that the needle bearing rests against. That's it. You're done, unless you want to dress up the edges and put in a new needle bearing. I used one of those carbide saw blades that fit on a hacksaw frame to cut out the bearing support. To put the bearing support on your scooter, you will have to remove the primary cover — but I guess that's kinda obvious. Use the two screws that came out of the top of the primary cover to hold the bearing support to the inner primary cover. Don't worry about a gasket, but you must have the brass thrust washer on the starter pinion shaft to keep the Bendix gear from banging on the back of the clutch hub. Even if there is nothing wrong with your electric starter, you may want to try this bearing support just to get a better idea of how your starter works. One more thing while I'm thinking about it: Watch your hair while peering into the primary. Don't get it caught in the chain or belt, 'cause it hurts like hell.

—Wrench



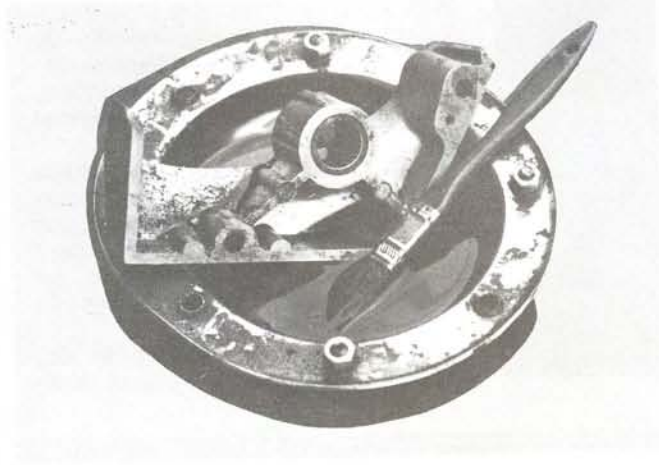




Derby Cover Cleaning Tray



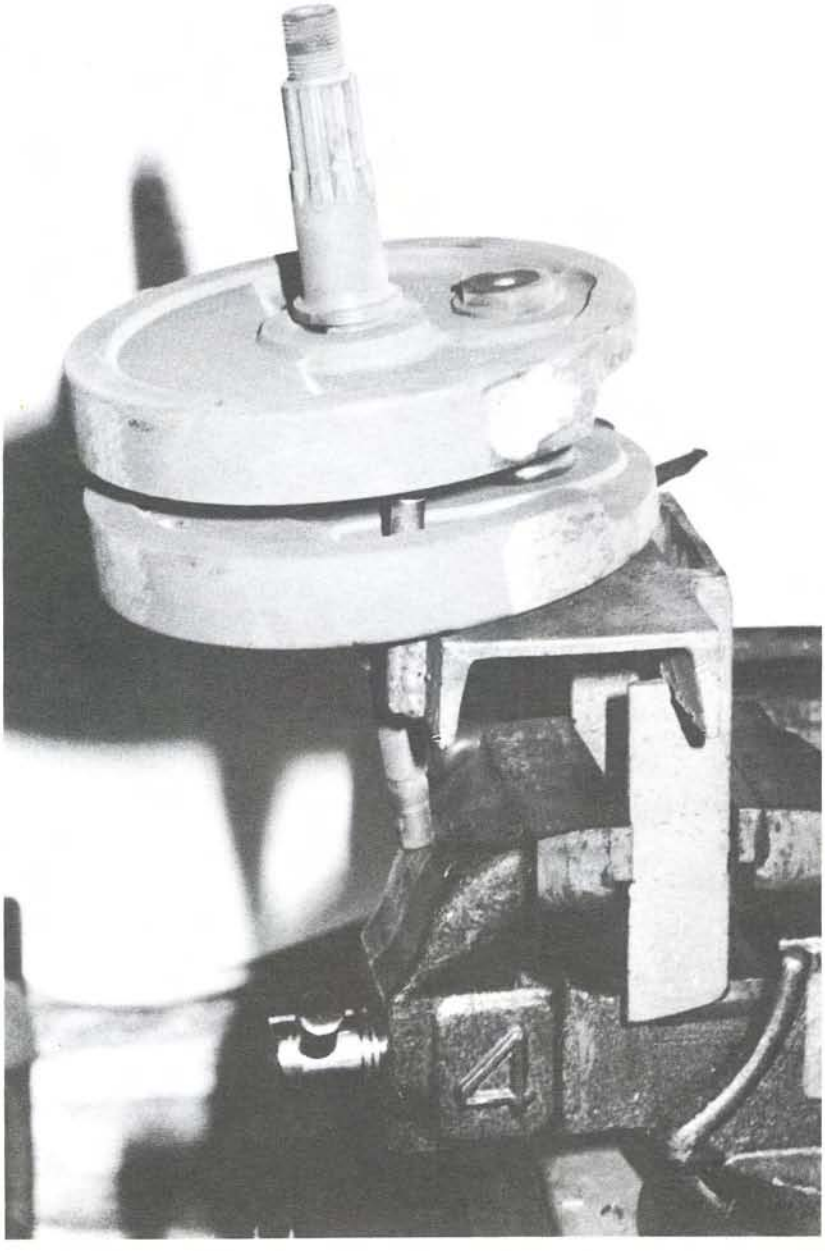
This small-parts cleaner was found on one of my partner's benches. It took a total of five minutes to whip up, with three of those minutes spent looking for the hardware to hold it all together. The derby cover is left over from a three-day binge on a wet country lane, and the four rubber mounts came from different projects in past years. Earlier versions of this cleaner sported just a derby cover balanced on the bench. It lasted about ten minutes, or just long enough to have a carb body tip it over, soaking a fresh pack of smokes. The rubber mounts, which the factory uses to mount oil tanks, battery boxes, and regulators, are used here as stabilizers.



Now, I can imagine that some people out there may question the sense behind this bench-top fingerbowl; but if you want to clean a carb or an oil pump, this is just the right size. There's no worry about dropping your only main jet or the last oil-pump keyway into the solvent tank and having to grope around in solvent up to your armpit, only to find the missing part sunk into a couple inches of metal filings, used gaskets, and gritty silt. Besides, the solvent in this belly-up derby cover can be kept cleaner for the final cleaning of an oil-pump body, shafts, and gears before final assembly.

Okay, for those bros among us who cannot bear to be without one of these little gems and have an abundance of cash, these parts can be purchased directly from your local H-D dealer. You will need one derby cover, part number 60555-36, and four rubber mounts, part number 62563-65. Remember, most solvents are flammable, even in small quantities, so watch your smokes. No one needs to burn his nose out *this* way. —Wrench

On Breaking Down, Truing Flywheels, and Replacing Cam Bushings and Bearings.



Andy Hanson, a bro who has honed, ground, ported, and trued through many mills, turned us on to this vise-saving device. Breaking down flywheels that have been torqued in excess of 220 pounds can really be a bitch. It's not exactly the job where you ask your bro to give you a hand — "Hey, pal, will ya hold this for me?" He could grunt and strain and grapple with it for a week and the wheels would be as tight as ever.

After lunching a couple of vises and coming mighty close to bending a rod or two, Andy dusted off his stick welder. With some plate, rod, and channel steel, he proceeded to build a lower-end tool to hold the flywheels in place while a long breaker bar with a socket loosened the nuts holding the crankpin and shafts.

The dual bracket is constructed of a one-foot section of six-inch channel. The chunk bit out of the channel extends approximately two inches in from the pins that hold the flywheels in place. The dished area allows the sprocket shaft to extend below the channel while the opposite end of the crankpin is being loosened. Once the pins are welded in place, they must measure as follows to accept various flywheels: Harley-Davidson 74 wheels, 3 15/16 inches center to center; early S&S wheels, 4 3/16 inches; late S&S wheels, 5 25/32 inches.

The bracket welded beneath the channel and clamped into the vise consists of two sections, approximately six inches long, of 1/4-inch plate welded together for strength.

Andy's one of those racy bros who has S&S flywheels lyin' around his garage gettin' rusty — while we sweat and scrounge just to make a down payment on one S&S rod bearing. The set pictured on the solo stand has seen 276 mph — not too shabby.

A great deal of the truing job can also be accomplished on these stands. While



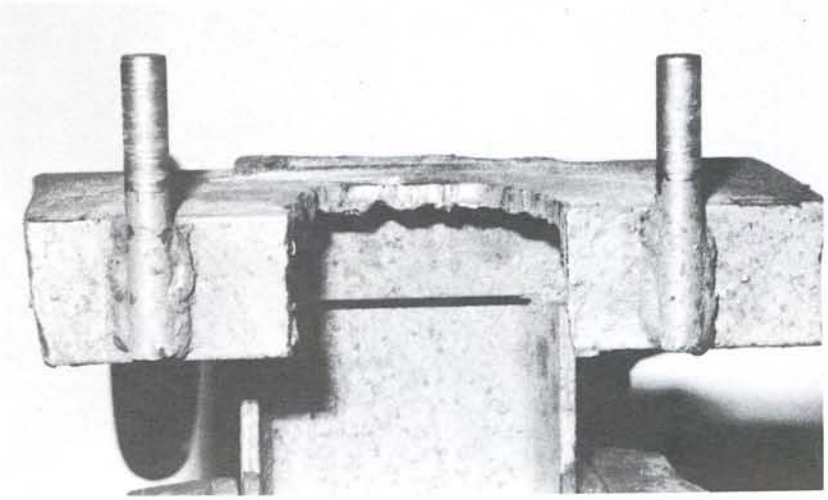
assembling the lower end, tighten and torque the keyed end of the crankpin first (200 lbs.; sprocket shafts for '72 bikes and later, 400 lbs.), then flop the wheels over and place the top wheels on the crankpin with the rods and bearings in place. Just snug the top nut down on the wheel. With the wheels placed on the tool with the crankpin nut to the inside of the bench, place a straightedge against the left side of the wheels as you face them. Hold it up against the bottom wheel and align the top one so that it's approximately 1/16 inch away from the straightedge. Once the wheels are tightened, the straightedge should line up with both wheels. If it doesn't line up, smack the wheels into line with a brass hammer. If you use this method, the wheels should be approximately 90% true before they are placed in a truing stand.

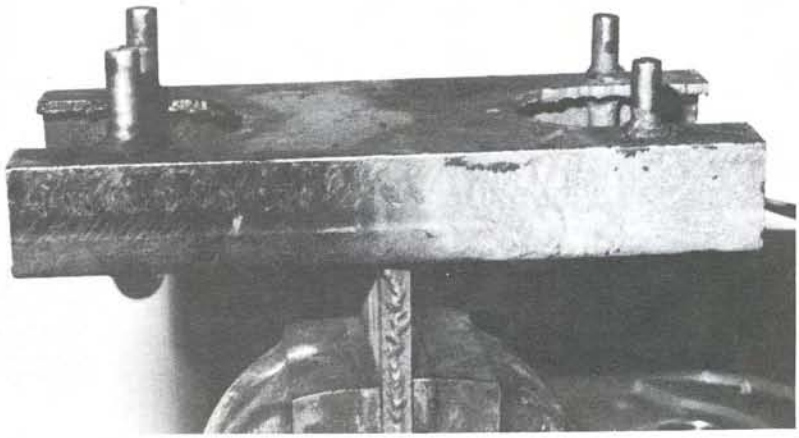
The two steel dildos you see (shown inserted into cam bearings) were designed by Andy to remove and replace cam bushings (1957 and earlier Sportsters and 74s) and bearings. The bushings and bearings are driven out from the crankcase side and replaced from the cam side. The dimensions for the 74 punch are .800 inches diameter for .633 inches, then .965 diameter for 2.140 inches. The shaft began as a section of 1-inch round, mild steel, and the second step was designed and sized in such a way as to let the punch slip through the cases after the bearing falls out, without marring the bearing surface in the case.

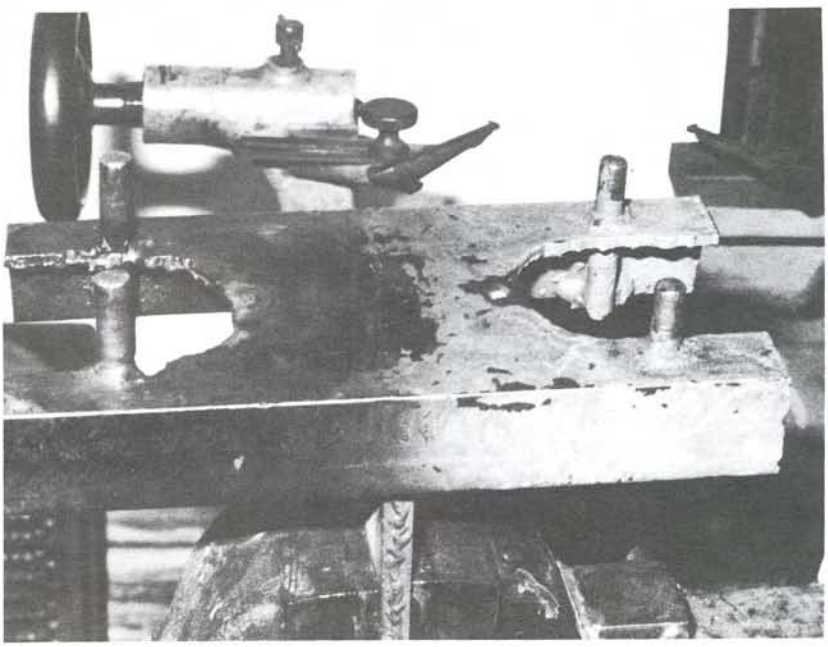
The Sportster cam bearing punch dimensions are .675 diameter for .575 inches, then .815 diameter for one inch. The additional step is not necessary.

If you're a wrench, we hope these tools help you. If you're just learning the trade, they'll make it easier. And if you're riding — ride safe.

—Weed








BOO
ROBINSON

Why Not Do It Right?

"Well, it may not look like much, but I done it all myself, and I didn't use none of them ready-made parts . . ." So says Jay Assrack, standing next to his oil-dripping primer and rust . . . chopper? "Yep, I bet I ain't got more'n a thousand bucks in the whole thing, includin' the Honda engine and the Harley 45 frame. Picked up that Horex front end for ten bucks at the swap meet, and it only cost me a hunert an' a half to rebuild and straighten it. . . ."

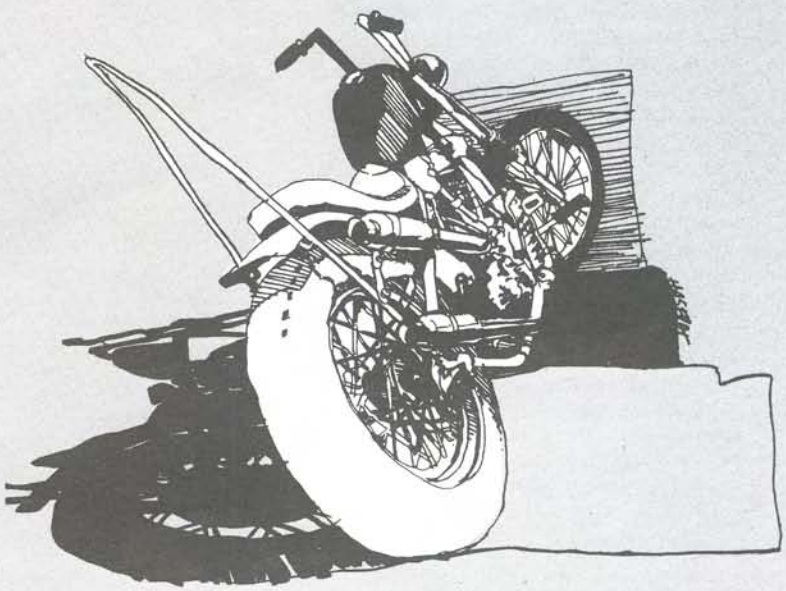
As he pulls away from the curb, belching oil smoke, missing shifts, and with one muffler dragging the ground, you have to say to yourself, "What makes an ass like that tick?" His mother must have started him on hash and reds when he was two years old, for him to wind up with a mind like that.

The day of "I did it all myself" is gone, and it's a good thing, too. I know. I was into it back in the days when you had to do everything yourself because you couldn't buy anything you needed. You spent more time building and repairing than you did jammin'. It was so bad that you could walk up to a group of ten bikers and hit them with "Hey, you turds, let's put it in the wind and head for Elsinore," only to find out that six of them were torn down for one reason or another. Then, two of the four who did go would break down on the way. Those may have been th "good ol' days," but I'm glad they're gone. Today you can get some of the guys and their ol' ladies together and party at the drop of a hat—and you don't have to spend half the weekend alongside the road with a roll of baling wire in one hand and a pair of pliers in the other.

It's true that a big part of owning a chopper is building it, and the fact that it's your own creation, one of a kind, the way you like it. Ready-made parts haven't done anything to change this; as a matter of fact, I think they've done a lot to help originality. All the nitty-gritty parts you need to get your scoot together are available, usually already chromed, which means you can devote your attention to making your chop different in other areas. You have a large selection of forks, handlebars, gas tanks, seats, sissy bars, fenders, and so on and so on, to choose from, and the custom painters are getting better and freakier all the time. It is actually harder to find two similar-looking choppers today than it was ten years ago.

Building a chop today is like decorating your home: There are plenty of items to choose from, but it still takes good taste and talent to get them all together in a package that looks good. One builder can spend just as much money on parts as his buddy does but still have an eyesore because he didn't think out what he was going to do, or got sloppy when he assembled it, or possibly has just plain bad taste. You have to really think out what you're going to do. Look through catalogs. Study feature bikes in magazines. Mock up your bike, using the frame, garbage can covers for wheels, a broom handle for fork angle and length, etc. Then stand back and look at it through squinted eyes and try to visualize how it's going to look overall when you're through. Next, decide what colors to use, and what to chrome—too much chrome, and your bike'll look like a mirror. Chrome has to have color around it to reflect, or you really lose. If your bike is going to be dark red or blue, you should probably paint your engine and trans light or natural vaporhone base with lots of chrome. If you're going a lighter color overall, black wrinkle paint with less chrome might be the trick setup.

Just as there are good and bad interior decorators, there are good and bad chopper designers, and remember that what you end up with will be your own creation. If you're thinking about building a chop, don't let Jay Assrack get you off on the wrong foot by convincing you that you have to do it all to be original. You don't! And you'll be out jammin' and partyin' on a better-looking bike than he'll ever have—while he's home trying to figure out why his doesn't run.



By Super Hog

Compensator Crank

For when the mill ain't attached

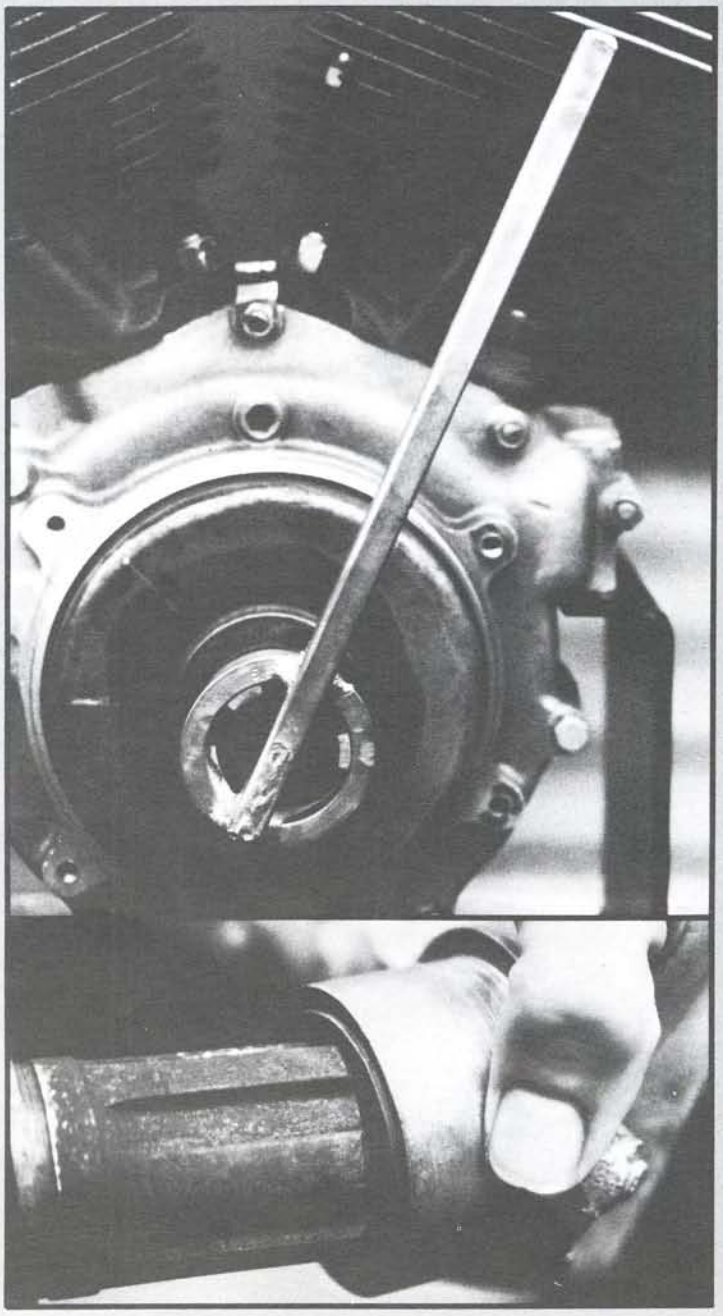
The other day I stopped by to check out what was happening with one of my partners at the bike shop where he puts in his time. Mario, my bro, has been turning wrenches on all makes of scooters for the last half decade. So, any time I'm holding up his workbench, my bloodshots usually land on some new antique he's discovered or the latest in handmade knuckle-savers. Most of the time I have stumbled across them before, but being in no condition to pay attention, I just let 'em slide. But not this time — got to keep in mind that I got a lotta people dependin' on me for this weird shit.

Mario whipped this little gem together in a matter of a couple o' heartbeats, when he had to adjust the timing and valves on a late-model 74 motor sitting on the bench, bolted to an engine stand. Digging around in the used-parts stash box, he came up with the inside piece of a compensating sprocket that someone had shitcanned in favor of a belt drive unit. After he welded a piece of scrap square stock to the flat side of the sprocket piece, it was all downhill. Then a quick trip to the glassbeader and his engine handle even looked like it was meant to be.

The same sorta wrench diddy can come to life for earlier mills. A handle welded to an early (must be wasted) engine sprocket will work once it's slipped over the key and the engine nut is screwed into place. Check it out — the same idea could be applied to almost any mill.

I can't say this new discovery will revolutionize H-D engine building, but it sure beats hell out of a pipe wrench on the sprocket shaft.

— Wrench



SOCKIN' DOWN SOCKET HEADS

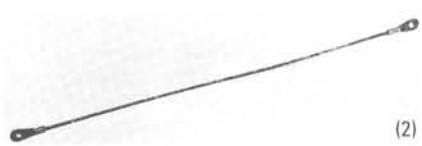
First the bad news—although socket-head cap screws look great, in a lotta cases they're a real bear to tighten down properly. I mean, didja ever try to torque up socket-style cylinder-head bolts on yer shovelhead with a four-inch allen wrench? Or with waterpump pliers on the *end* of a four-inch allen wrench? Man, there has gotta be a more pleasurable way ta turn knuckles into spaghetti sauce and fingers into the blues magoos. But there's hope. After some serious nose pickin', head scratchin', and a rap inna mouth from the editor, I found a way!

First, check out the bolts or screws in question to determine the size of the internal socket in their head. Next, go down to your friendly local hardware store, auto parts operation, tool supplier, Sears, J.C. Penney, or whatever. Get a set of allen wrenches (1)—sometimes called socket keys. Or buy the individual size to fit the fastener back home. They should be the heat-treated, hardened type. You can check this by running a metal file across them. It shouldn't make a dent.

Next, cop a tungsten-carbide rod saw. This is a round section saw blade (2) that fits into any standard hacksaw and will cut practically anything—including that hardened allen wrench



(1)



(2)

that just told your file to shove it. These rod saws are common hardware items. You can also get 'em by mail from places like Brookstone Tool.

Now, truck this stash home and down the rickety stairs to the workshop. Select the allen wrench that fits into the bolts in question and put it into a vise. Using the rod saw, cut off a section (3) long enough to fit full depth into the socket-head fastener, and still project out far enough (about one-half inch) so the end of a wrench can be brought to bear on the whole shootin' match (4). What kinda wrench? Okay, here's the payoff to all this nonsense. Once you have made this li'l adapter (don't forget to deburr it after sawing), you can now tighten those offending screws, bolts, or anything with a socket head in that size, with just a box wrench.

For best results, get a twelve-point, extra-long box wrench that contacts the flanks of the hex adapter rather than the corners (5). Two types





(3)



(4)



(5)

that come to this bleary brain are Snap-On's XDH line of wrenches, or the Bonney "Loc-rite" series. The twelve-point design is useful in places where the swing room for the wrench is limited, allowin' ya to catch the next flat of the hex without crunchin' knuckles. As you can see in the lead photo, using the box wrench on that hex shank you made, it's a lot easier to tighten even hard-to-reach socket-type head bolts.

—Mystery Man

Keihin Idle Adjustment

Have you ever had to adjust the idle on your scooter and found that there seemed to be no way to get your fingers, much less a screwdriver, behind the aircleaner and under the fatbobs to make the adjustment? Any bro who's running a late-model Keihin carb on his scooter with fatbobs has probably cussed more than Milwaukee for this little oversight. But Balls, a brother from Tacoma, Washington, turned us on to a hot tip to make idle adjustment as easy as twisting the throttle.

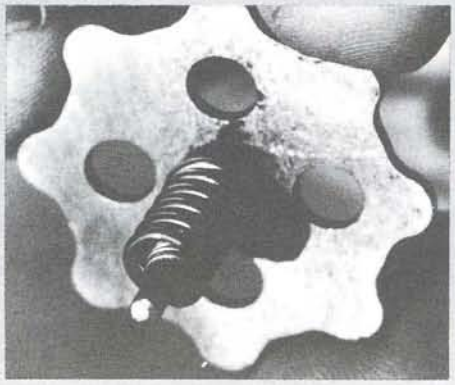
The only part ya gotta hunt up to make the changeover is the low-speed needle from a Tillotson carb. Ya can't miss it—there's a little wheel on the top of the needle. Now, shitcan the stock idle adjustment screw, clip one full turn off the stock idle adjustment spring. On the bottom of the low-speed needle that you removed from the Tillotson, there is a tapered tip. Cut this tip off so the bottom is flat , put the clipped spring back on over the needle, and screw the new idle adjustment screw in place. Readjust your idle and ya got it.

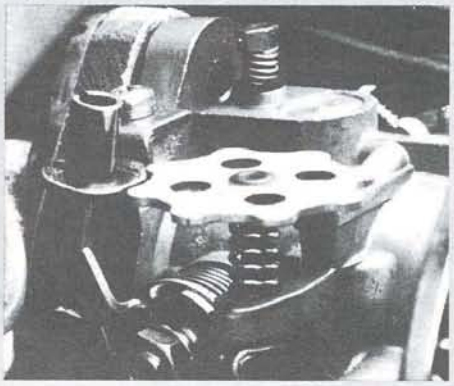
It should be a lot easier to set up the idle for those cold morning warmups. Holding the throttle for three or four minutes in the cold is hard work.

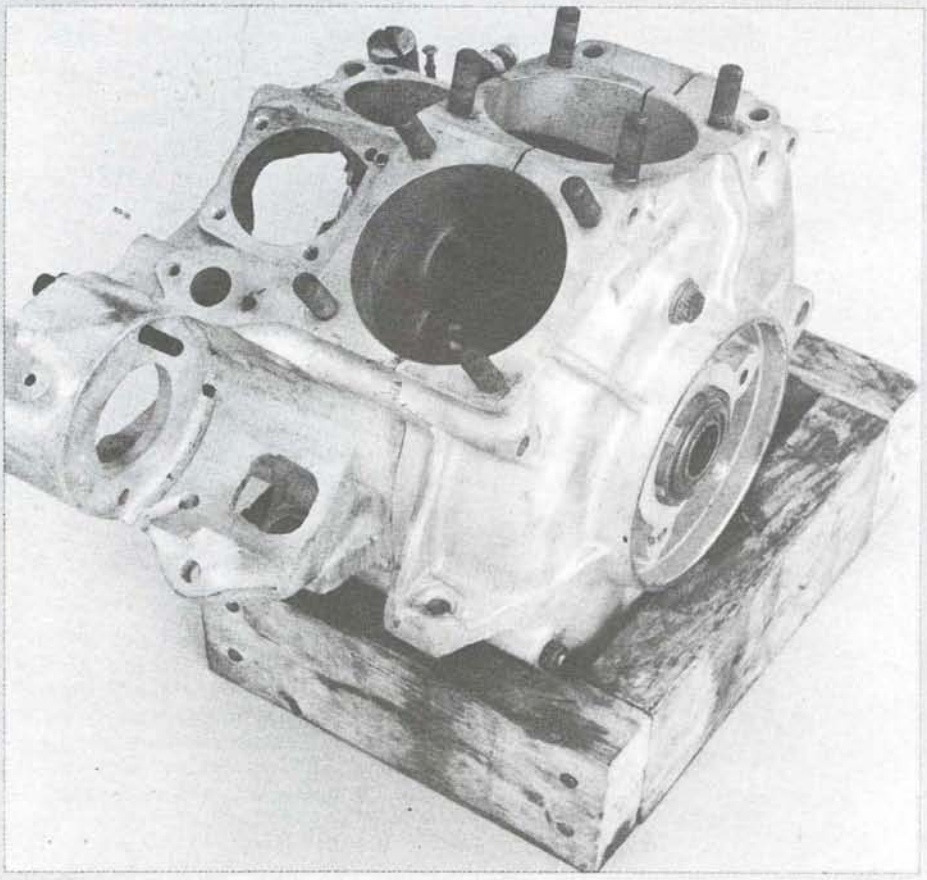
—Wrench











Engine Box

Here is a handy little item for the bucks-down bros who might need a prop for a big-twin motor when it's not occupying the space beneath the gas tanks. Ya don't have to be an engineering whiz to figure this one out. In fact, the whole operation takes less than five minutes, unless you're severely handicapped by an overdose of last night's good times. Hell, it'll take ya longer to read about it than to make it.

All ya need to whip up this answer to anything is a 2x4 piece of wood (about four feet should do fine), eight 16-penny nails, a woodsaw, and one of your finest hammers. (Getting that shit together was the hard part.) Cut the 2x4 into four pieces, each nine inches long. Lay the four pieces on the skinny side, so that they look like the photo and nail them together.

You now have a wooden square that will hold up a set of cases or a tranny or even keep the door propped open in the summer—if it comes this year. Having accomplished a major mechanical feat, take the rest of the day off on me.

—Wrench

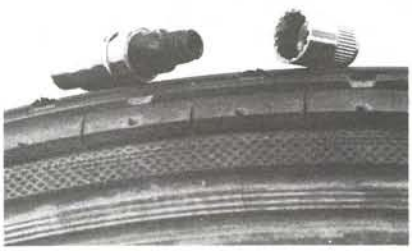


COUPLE O' ITEMS

One can be purchased; the other can be made with a soldering iron. They're both handy.

The tire pressure gauge seconds as a valve stem cap. It's a bitch trying to find a gas station that has working gauges, so even if this little item isn't the most accurate measuring device, it will give you a ballpark reading and may save some unnecessary wear on your tires.

The other doodad can be constructed with a piece of copper tubing, a roach clip, a yard of 14, 16, or 18 gauge wire, a soldering iron, solder, a bulb, and a paperclip. 'Course, that ain't sayin' what the damn thing is, but to cut short the suspense, I'll tell ya that it's a cylinder light—or a light that can be used to illuminate any dark area on your bike. With the roach clip connected to a hot battery lead and the base of the bulb connected to the tubing (which also works as a probe handle), the bulb will light up any time the tubing touches a metal part on the bike. This one was specifically designed to be inserted through the spark plug hole. When the tubing touches the rim of the hole, the operator can view the top of the piston and cylinder walls for evidence of excessive heat, abnormal carbon deposits, or striations. But the light also comes in handy when you need to find a dropped screw between the engine and the tranny. It would work as an emergency light on the road too.





Construction takes maybe five minutes if you have the parts. I cut a piece of copper tubing about a foot long and ran some 16 gauge wire through it. With the wire stripped, I soldered it to the tip of the bulb (use a dash or high/low beam bulb). Then I connected the tubing to the bulb base with a one-inch segment of paperclip (you can use a couple of lengths of paperclip, if you want it stronger). I completed the project with a roach/alligator clip fastened to the end of the wire. Finished, I could view the guts of the engine with ease. Almost wish I hadn't—now I gotta replace a piston.

—Weed

LEAK SAVERS

Title sounds gross, huh? Well, anyway, we have two items here. One was a bro's inspiration for preventing exhaust leaks on shovels. The other was designed to pump air back into a leaking tire.

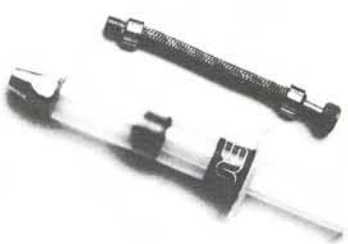
I'll tell ya about 'em in a minute, but first I'd like to point something out. This column was slapped onto a page for one purpose, to help out brothers and their putts—not to hype any product. If a product such as this mini-pump shows up in a column, it doesn't mean we think you should sink a claw into your pay for it. We just think it may be a good idea. It's not a promo for the company or the product. If you can make the same item out of pipe and hose clamps, more power to ya.

All right, the pump is here 'cause I've had flats out in the middle of nowhere that I could fix. But I repaired the tire and there wasn't **no** air around to replace what had leaked out. This pump is five inches long. Supposedly, it's capable of producing 150 psi with a volume of 1.5 cubic inches per stroke. And supposedly it has a check ball so the air going in can't back out. It's a great idea, but who knows whether the product's worth a shit or not? It costs $6.95 and the company is S&W Engineered Products, 2617 W. Woodland Drive, Anaheim, Calif. 92801, if you're interested.

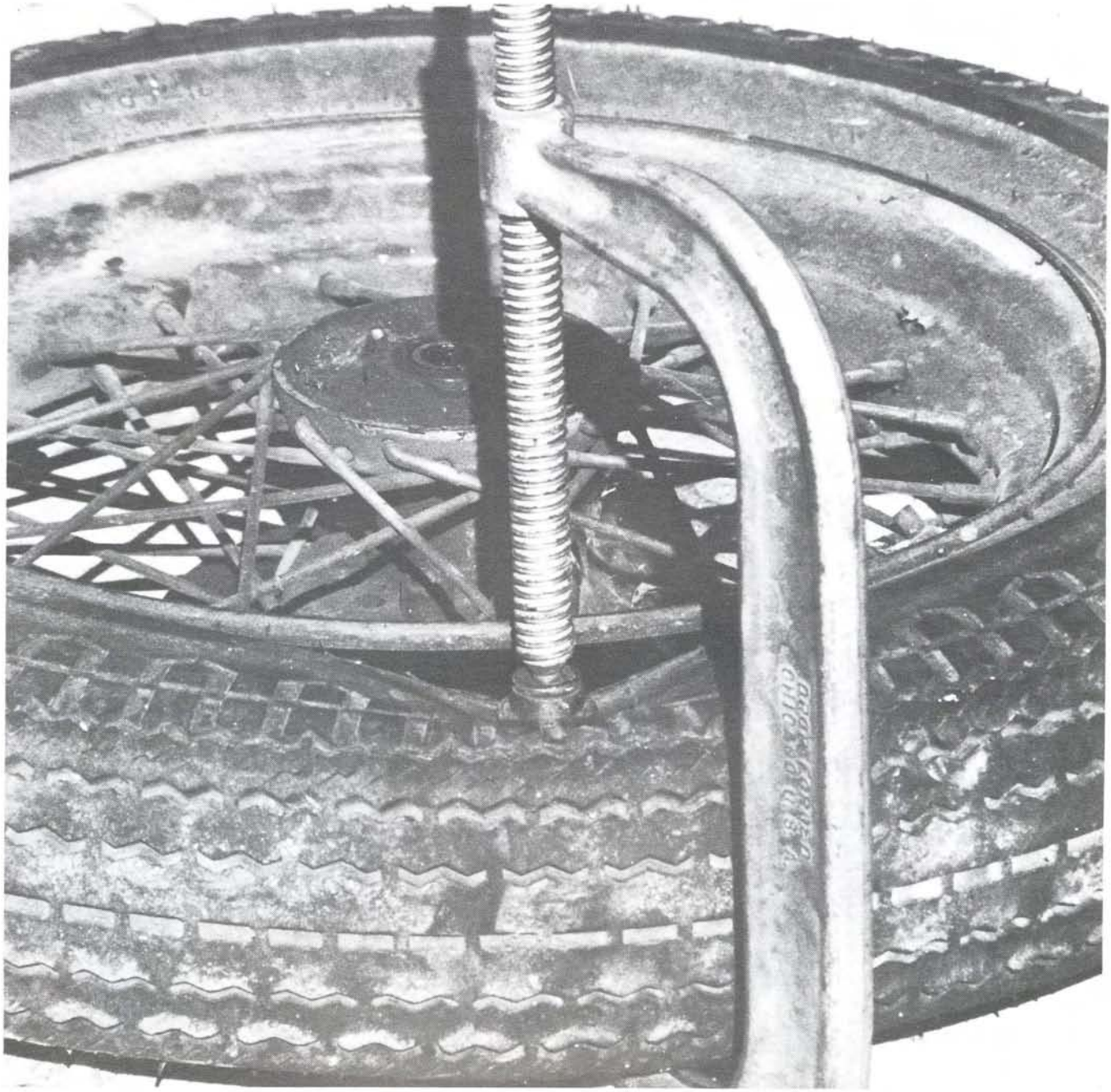
The other gem is a modified Honda part for your shovel. It came from Z-RO in Yuma. It's for leaky shovelhead exhaust manifolds, and Z-RO recommends that you shitcan your fiber gaskets and replace them with Honda part #18291283-010 (if ya can get yer ol' lady to go get it). The part must be peened slightly to fit properly, but Z-RO says it'll do the job.

—Weed









Breaking Rubber

Having a hard time breaking down the old 500x16? Tired of driving a one-ton truck over the rim, trying to break the bead, only to bend your wheel into a pretzel? Well, Pollack Mike has come up with one of those sitting-in-front-of-us-the-whole-time tech tips. All it takes is two C-clamps; eight-inch clamps did the trick for me. If you don't already own a couple of C-clamps, one of your partners probably does. After I borrowed a couple, I was checking around for a good test to try on these clamps and I flashed on the wheel that came with an early forties sidecar that had been rescued from the rear of the barn. The tire looked to be original; in fact, there was no telling where the tire started and the rim stopped. Playing it safe, I put both of the C-clamps together up against the rim. I then tightened the clamps at the same time until the bead popped. It was all downhill after that. But remember, when putting a new tire on the front, back or side, it's a good idea to take it easy the first 50 miles or so to let the tire seat itself on the rim before you start burning the tread off.

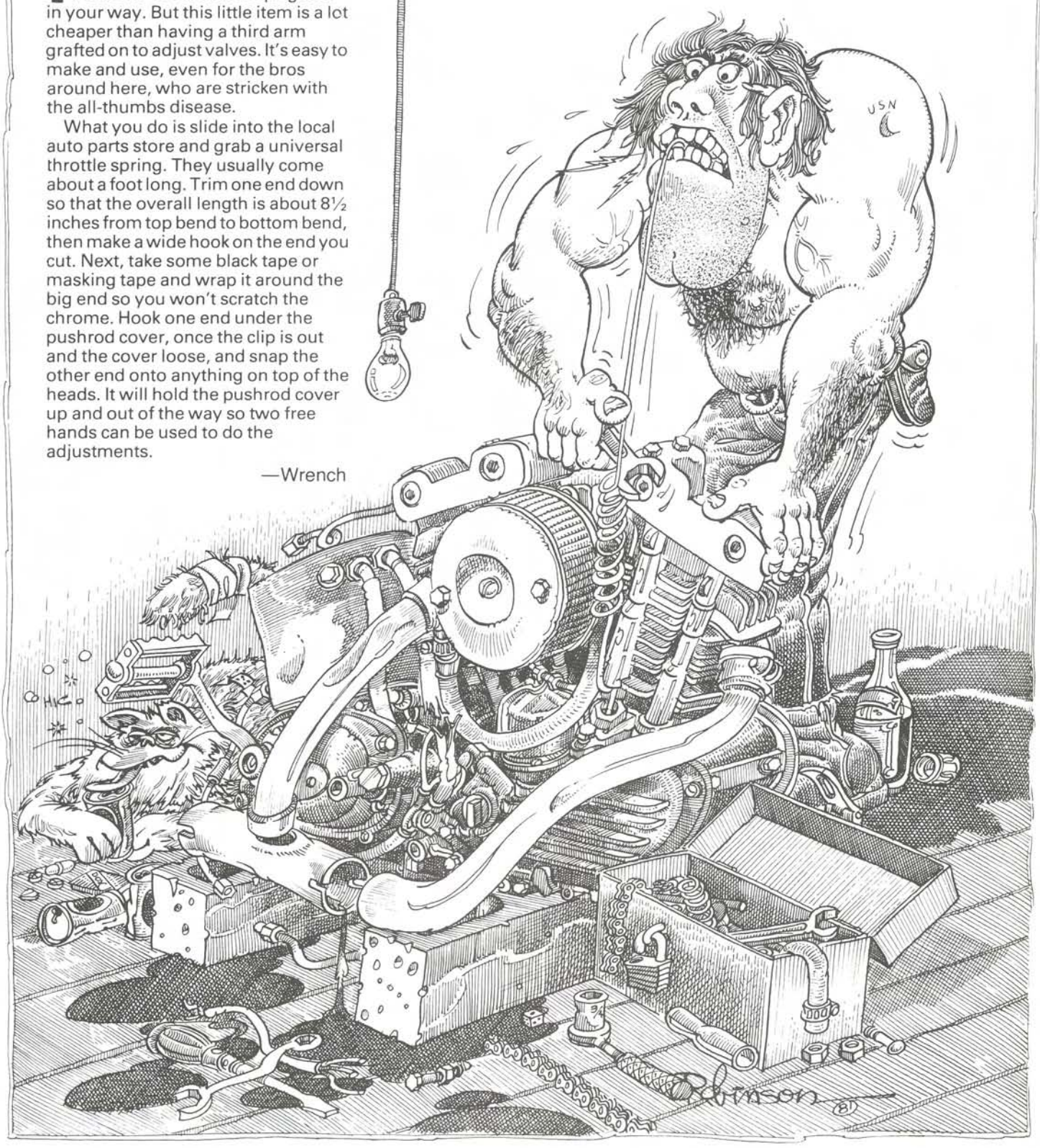
— Wrench

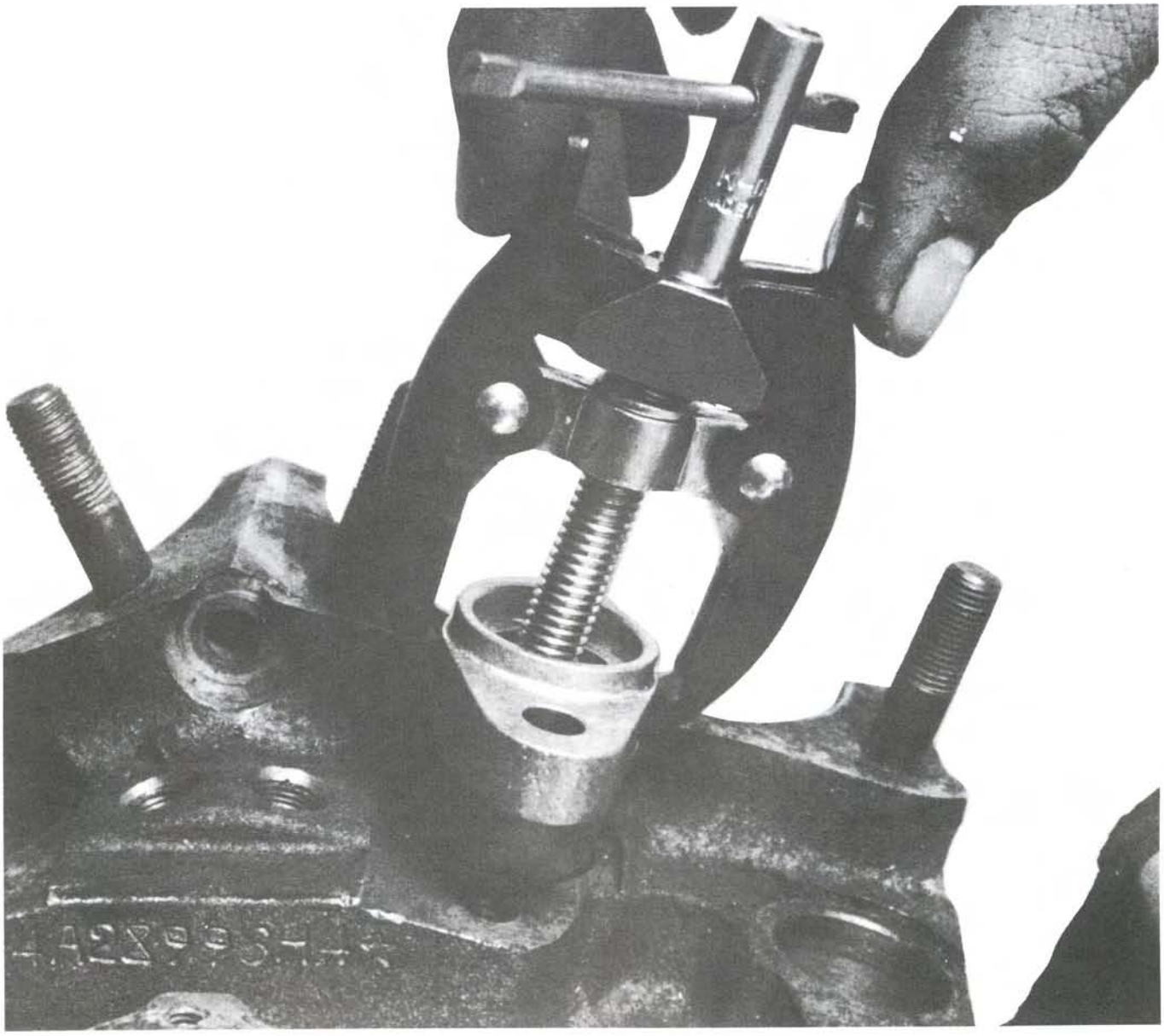
Valve Adjusting Spring

It's always a problem adjusting big V-twin valves. Ya got two wrenches, a slippery pushrod, and a chrome cover that keeps gettin' in your way. But this little item is a lot cheaper than having a third arm grafted on to adjust valves. It's easy to make and use, even for the bros around here, who are stricken with the all-thumbs disease.

What you do is slide into the local auto parts store and grab a universal throttle spring. They usually come about a foot long. Trim one end down so that the overall length is about 8½ inches from top bend to bottom bend, then make a wide hook on the end you cut. Next, take some black tape or masking tape and wrap it around the big end so you won't scratch the chrome. Hook one end under the pushrod cover, once the clip is out and the cover loose, and snap the other end onto anything on top of the heads. It will hold the pushrod cover up and out of the way so two free hands can be used to do the adjustments.

—Wrench





Pulling Tappet Blocks

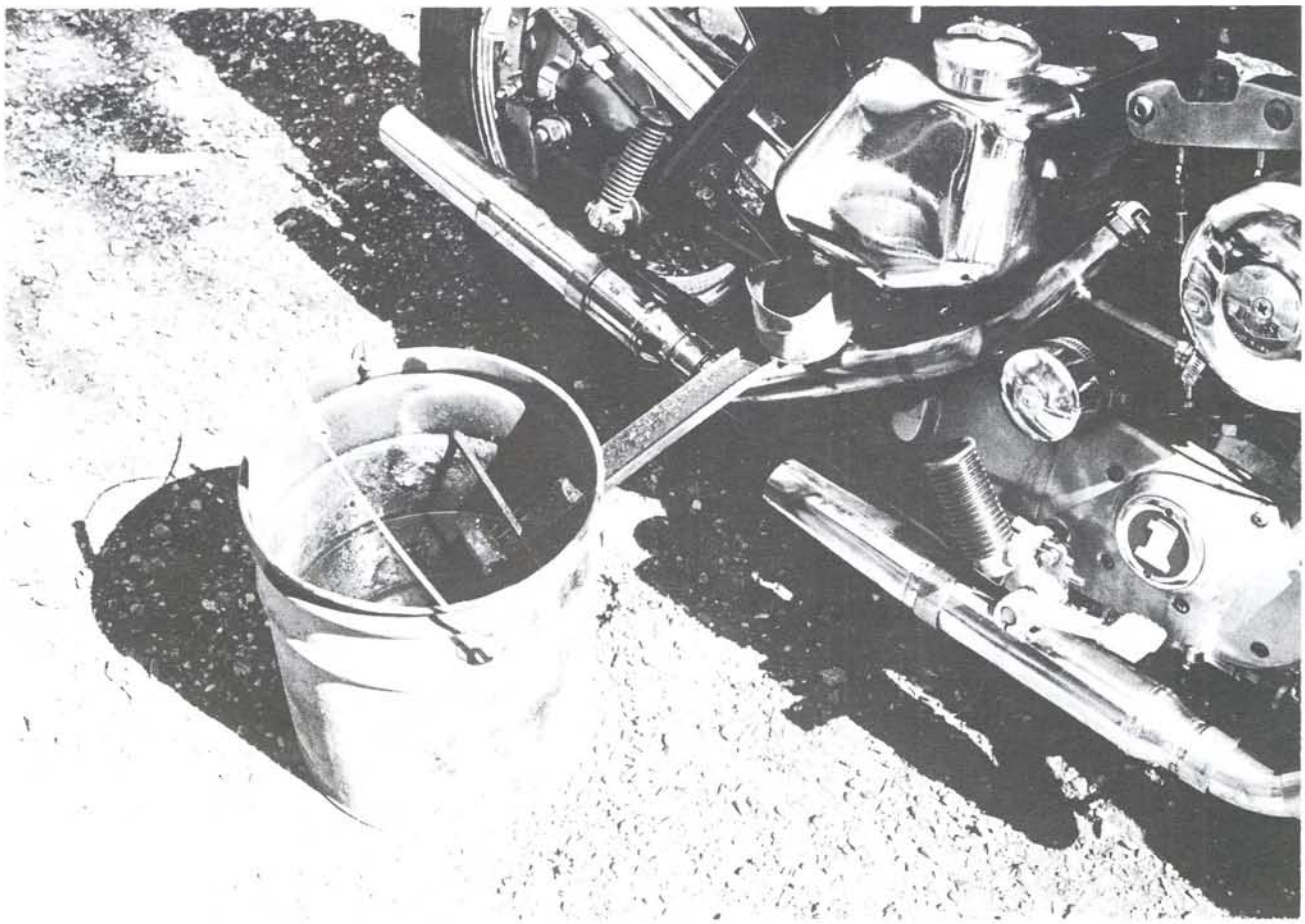
Sporty owners who do their own engine work can appreciate this low-buck, dual-purpose tool. What is it? It's a Sportster tappet-block puller disguised as a Pep Boys battery-terminal puller.

In order to remove the tappet blocks from the lower end, remember, it is easier to wrench off the heads and barrels first, leaving the timing cover and cams in place. On the sides of the tappet blocks there are grooves machined for the H-D puller. These are the same grooves you use with the battery-terminal puller. Make sure the jaws of the puller catch in the grooves on the tappet block. Center the threaded shaft of the puller on the tappet where the pushrod would go, then turn the puller handle clockwise. Now the tappet blocks won't jump out. Take your time and remember that the tappet blocks are a press fit in the engine cases. Another use for the battery puller is to remove generator drive gears.

Once a tool like this has found its way into your toolbox, new uses will smack you in the face at least once a week — so you can be pretty sure of getting your money's worth.

Battery-terminal pullers can be had for four or five bucks at most auto parts stores. The one that appears in the photo was donated by a few bros who turned in the mountain of recyclable brew cans that held up my shopping-cart workbench. Now, if they had returnable Jack bottles, I'd be slicin' the wind on a new Wide Glide.

—Wrench



Oil Drain Bucket



Remember the last time ya changed the oil in yer pearlescent, metalflake scooter with its fifty coats of hand-rubbed lacquer? Remember how you tried to get the jagged edges of the ol' funnel under your show-chromed oil can without letting them touch the 14-kt.-gold-plated tranny cover? Remember scratching the four-bill, lustrous paint job on the frame when you tried to balance the funnel so the bastard would stay there? Remember the sweat beading your forehead 'cause you couldn't get a wrench on the drain plug — so you tried an old exhaust pipe?

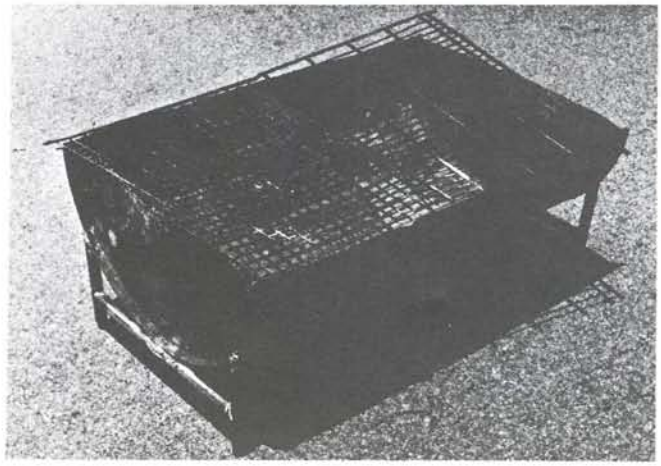
It worked great, except that you had to kneel uncomfortably there and hold it while the oil ran all over your boot and the floor of your dad's garage. Remember losing all patience and removing the pipe before you set your scoot up straight, allowing the remainder of that old, dark, burnt, grimy oil to run all over your gold-plated tranny and fifty coats of pearlescent, metallic, hand-rubbed lacquer, permanently discoloring it while you punched forty holes in the garage walls?

Well, a coupla years back, a bro of mine gave this beaut of an oil bucket to oily ol' me for Santa's Day — or was it a birthday? Whatever. I'm not gonna describe the precision workmanship that was injected into this close-tolerance project. It's obvious from the tuna can brazed at the end of the drain rail. But you too can take a five-gallon bucket, knock a hole in the side, and fashion a rail that can be adjusted under any drain plug to lead the old oil away from the pretty bike and into the storage bucket.

It works.

—K. Ball

Run Drum



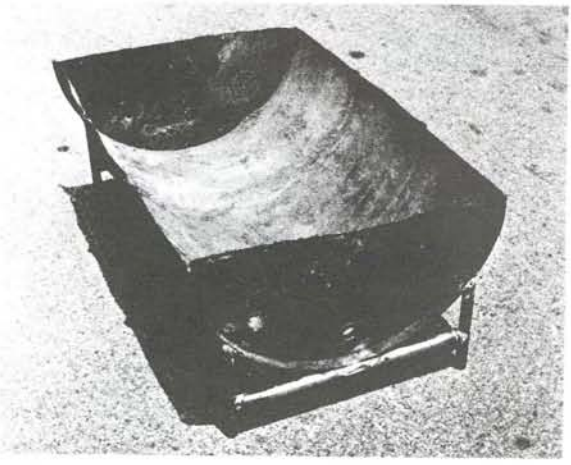
This month's tech feature has absolutely nothing to do with your motorcycle. Now isn't that just too fucking bad? But then again, think back to the last run you went on. Remember the dusty campsite with no cement barbecue pits, no rocks, no shovel in the back-up truck, and a juicy stack of beautifully cut steaks in the portable freezer?

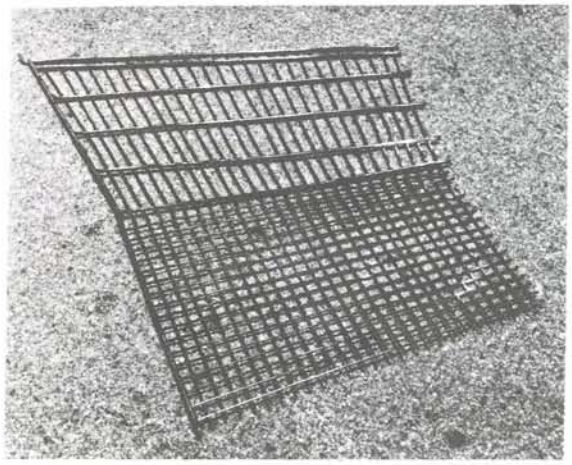
Even if you could build a fire, what in all the squirrel's forest are ya gonna use for a grill? The chrome mesh mounted securely on the front of your bro's pickup? Nobody likes to see good meat go to waste. And having a hell of a monstrous appetite myself, I volunteered to whip up something three days before the last run.

The day before the run a bro casually reminded me about the barbecue pit. Half an hour later it came to me while I was starin' at this ol' rusty 50-gallon drum lying in my back yard. First, I decided I'd cut it in half while it stood there. So I sliced it down the middle, slapped a couple of legs to it, and it began to take shape.

The grill was the next challenge. Knowing I didn't want to poison my bros by using galvanized steel, I looked for something chrome. Lo and behold, I came upon an old shopping cart at a garage sale. After purchasing it, I quickly cut and welded certain segments of the cart together to form the grill.

Completed, the grill and pit were light and portable enough to fit in the trunk of a car following the pack. The contraption was the success of the run. It even held a sizable bonfire when the ol' ladies weren't cooking. Only one bummer—somebody forgot the steaks. —T-bone

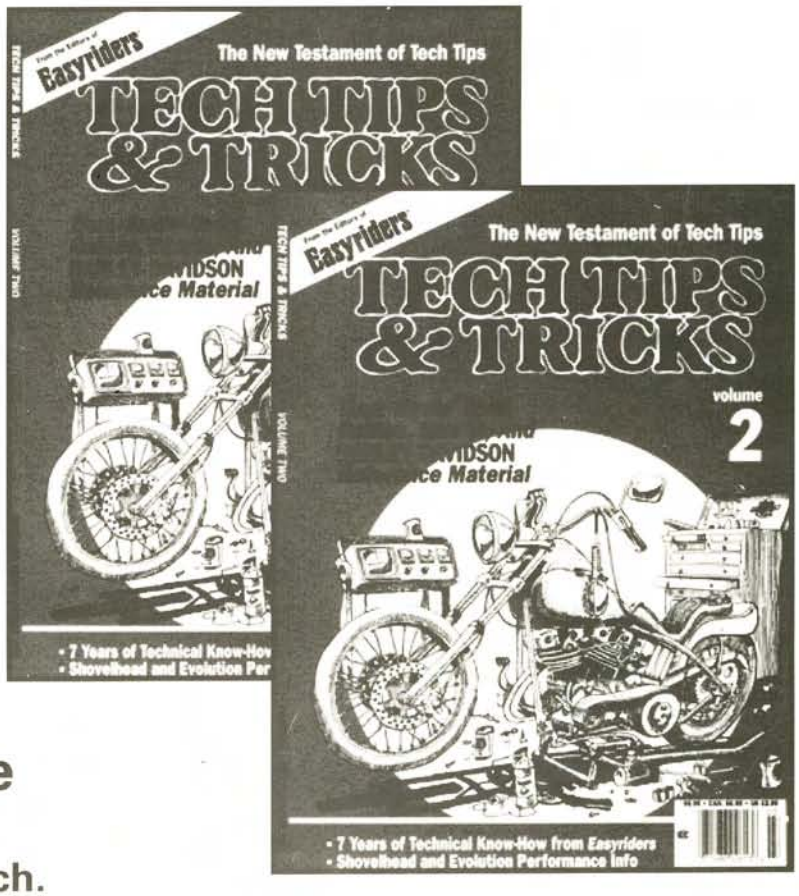




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