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# **HOT BIKE**

PDC



**TESTS: YAMAHA IT400E,  
KAWASAKI KZ 750,  
MOTO MORINI  
3 1/2 SPORT, And  
SUZUKI'S DIRT  
SCAMP FUN BIKES**

MARCH 1978  
VOLUME 2, NO. 3

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**TRACK TESTING A FOUR-VALVE  
JAWA SPEEDWAY BIKE  
ALCOHOL For Racing Applications**

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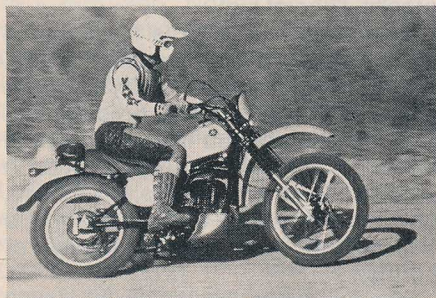
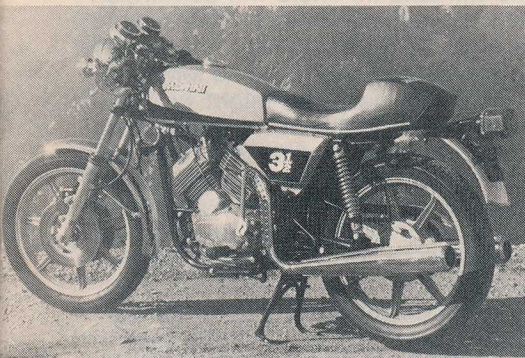


# HOT BIKE

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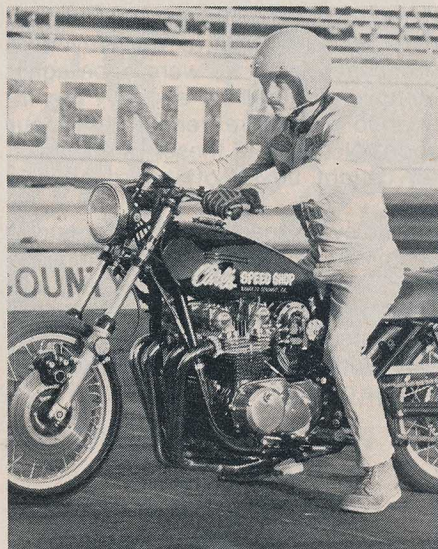
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*On the Cover:* Yamaha's IT400 was plenty of fun riding through the hills of Malibu. Extachrome by Mike Griffin. The Kawasaki KZ750 was photographed by Dain Gingerelli.

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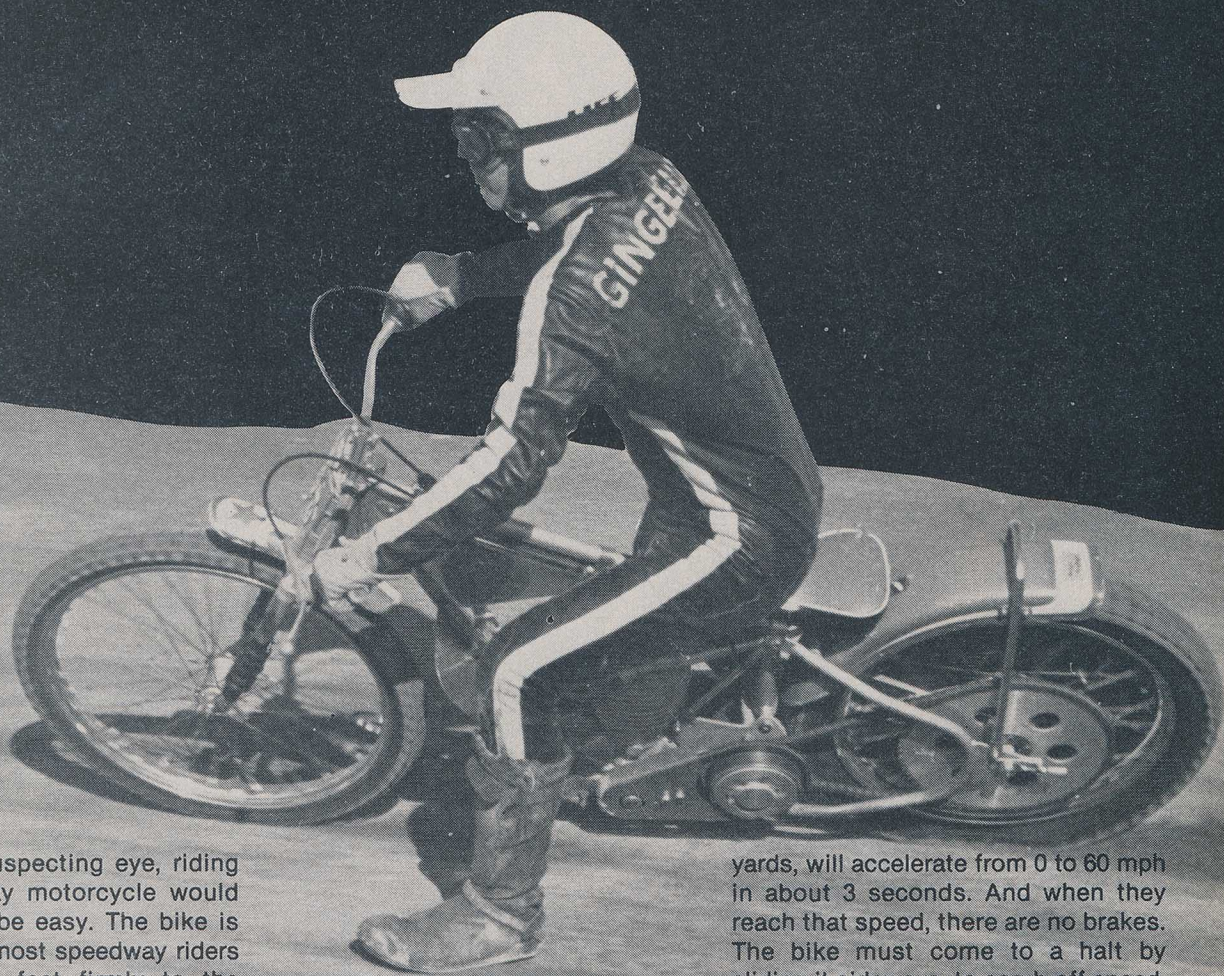


# track testing a SPEEDWAY RACER

“And On the Pole! Dangerous Dain Ginnngerelli!”\*

\*You can't hear or see him, but that was Larry Huffman announcing me for the scratch main

by Dain Gingerelli



**T**o the unsuspecting eye, riding a speedway motorcycle would appear to be easy. The bike is relatively small, most speedway riders can touch both feet firmly to the ground at all times. Its single cylinder motor, although at times deafly loud, doesn't appear awesome as compared to say, a four cylinder TZ750 road race motor. And the frail, almost genteel lines of the machine make it appear more as a bicycle than a motorcycle.

But all that is to the unsuspecting eye. To the knowledgeable enthusiast, one who understands the art and science of speedway racing, there is nothing but respect for the bike. Consider that most speedway race bikes, geared for the short tracks in America measuring about 300-plus

yards, will accelerate from 0 to 60 mph in about 3 seconds. And when they reach that speed, there are no brakes. The bike must come to a halt by sliding it sideways, to scrub off speed, or plow head-on into the object in its path, as which case speed is scrubbed off rather quickly.

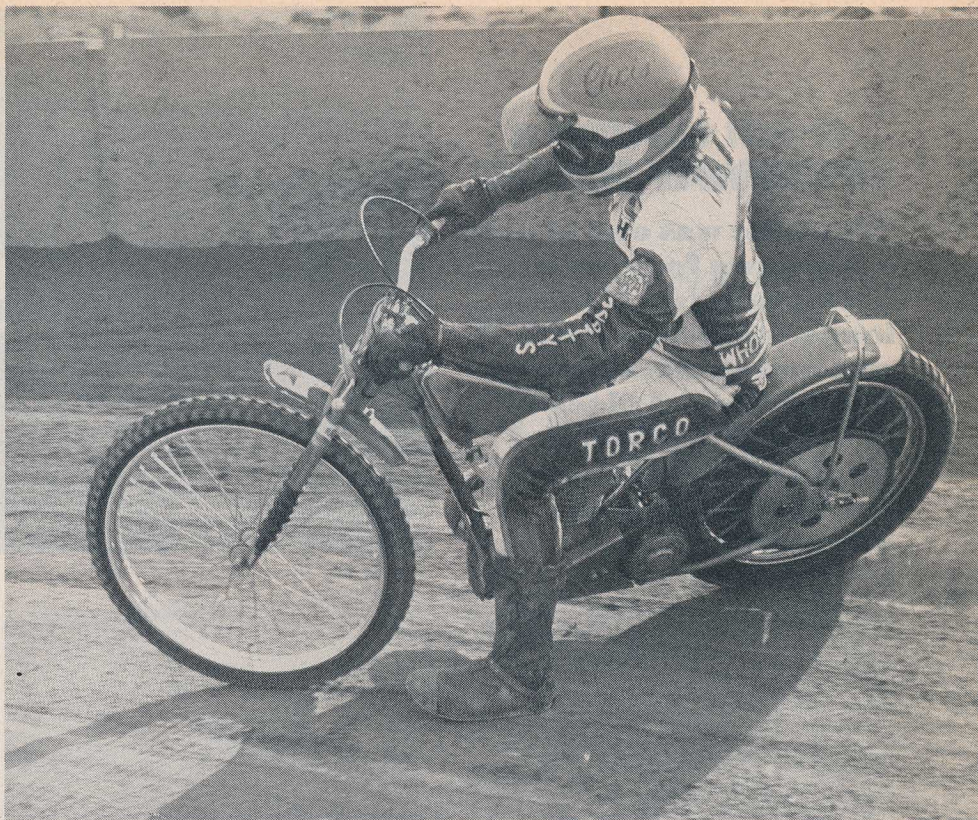
The fantastic acceleration is attributed to several factors. First, the machine ready to race, weighs at or about 182 pounds. This helps keep the power to weight ratio very low,



Having a go at it after I set a new track record for SLOW, Chris Haines got the bike sideways, and showed me what I was doing wrong. Experienced riders hardly ever shut off.

as the 500cc engine generally can produce over 50 horsepower; a good running four-valve Jawa will produce upwards of 55-60. Taking those figures, power to weight is roughly one horsepower for every three pounds. A very impressive figure in any kind of racing. Of course final drive gear ratios will vary with the number of teeth used for the given track, but it is not uncommon for a bike to be fitted with a 3.75:1 ratio. Rear tire size varies also, and may range from the common 19-inch tire that is standard in Europe, to the new 22-inch that seems best suited to tracks with good traction, and is popular in America.

As if this isn't enough, speedway motorcycle engines burn methanol, and have compression ratios well



photography: Chris Haines and Dangerous Dain Gimmerrell

over 10:1. You can begin to understand that there is a lot more to riding one of these bikes than just releasing the clutch, and setting her sideways. You've got to know how much throttle to give it, and when and how much to lay it sideways. Tricky, indeed, but even more so when you have three other guys diving into that first corner side-by-side. Over two hundred screaming horsepower pushing and shoving to be first!

I had an opportunity to saddle one

of these bikes for a little test ride. The bike was one of only a few Jawa four-valvers in the country. It belonged to Bruce Penhall, and had been ridden by him only a few short weeks prior to second place at the United States Nationals. He then upped the gearing, and took it to Ascot, where he was just a nat's whisker shy of Kenny Roberts' track record set last October on his Yamaha 750. I would be, quite frankly, riding one of the best bikes in the country.

Jawa has always been at the forefront of speedway design and technology. When the sport was revived in America about ten years ago, most riders were on Jawas or JAPs. As the sport evolved into a big money operation for many riders, technology moved forward, and pretty soon there were more than just these two names competing on the tracks of America and the world. This led Jawa to update their old two-valve design to a four-valve conversion, and finally to this new motor that sports two overhead cams and its own four-valve head.

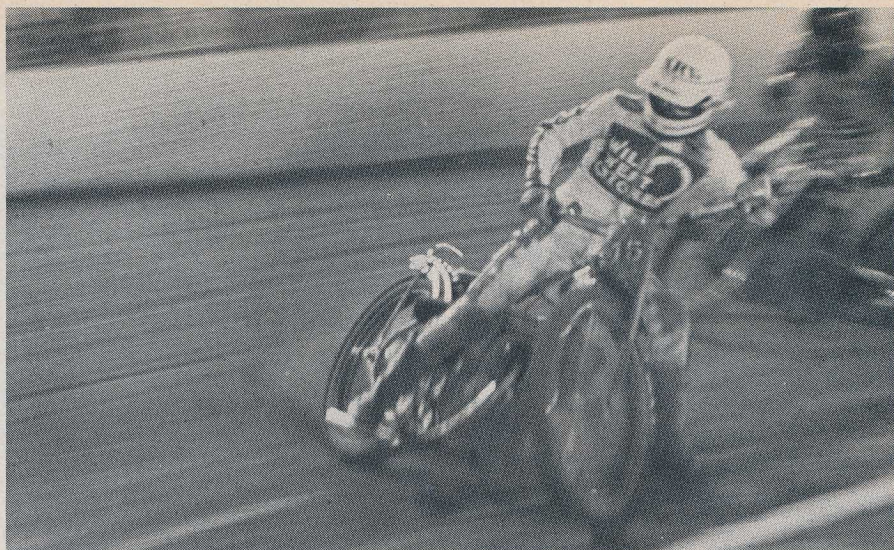
Bore and stroke measure 88mm x 81mm (3.464 in. x 3.189 in.) Talk about a thumper! Total displacement is 492cc. Compression ratio is set at 13.5:1 at the factory. Carburetion is via a single 38mm Amal.

Two interesting features about speedway engines are 1) there is only one gear for the engine, as it has direct drive from the clutch to the rear sprocket, and 2) lubrication is through a total loss system. The clutch is a dry multi-plate, type, and is located on the left side of the engine. The rider has only two choices, pull the clutch lever in for neutral, or leave the clutch disengaged, at which the engine will spin the rear tire. There is no second gear. Because of this design, there is little power lost through a transmission, weight is kept to a minimum, and the rider must be



## track testing a SPEEDWAY RACER

**“The bike was one of only a few Jawa four-valvers in the country. It belonged to Bruce Penhall, and had been ridden by him to second place at the U.S. Nationals. I would be riding one of the best bikes in the country.”**



very selective as to when he lines up on the line for the start of the race. If he stages too early, he has to either risk overheating his clutch, or he sets the bike on the right foot peg/side stand, allowing the rear tire to lift off the ground and spin freely. By doing this, he saves the clutch, but also risks losing his concentration waiting for the other riders to stage.

The total loss lubrication system is just what it says. The oil is stored in a .5-liter tank, and is pumped to the engine head via a mechanical pump. From here the oil is drained to the lower end, where it spills out through

a small slit on the underside of the engine. This sounds very messy and rudimentary by normal design standards, but it is for a reason. First, it again helps keep the overall weight and design of the engine light and simple. And since the racing lasts only four laps, there is no real need to recycle the oil. Half a quart will go a long way. This system also insures the top end of the motor, which is pitched sideways half the time it is raced, a supply of clean, fresh oil. The tank is located within the frame tubes. Jawa recommends Castrol R 40 weight, but Penhall's

bike uses Bel-Ray Four-Cycle Racing Oil.

The fuel tank, a small metal container situated just atop the engine, holds two liters of fuel, in our case, straight methanol. You can read more about this alcohol fuel elsewhere in this issue. This is the accepted fuel for all FIM speedway racing, and so was adopted by the AMA and Speedway Racing Association for use in speedway racing in America. In the past, nitro was allowed, but no more.

The frame of a speedway bike is quite unique. There is absolutely no suspension in the rear, save the rider's butt, which is on the saddle maybe a fourth of the race. The rest of the time he is busy standing on the right foot peg, and dragging his left foot on the track for stability.

The front forks are a little closer to normal motorcycle design. Travel consists of about 50 millimeters. That works out to about 2½ inches of travel. Not much, and the rider hardly feels it. Steering angle varies with each rider, as some reduce it even more than what is supplied from the factory. The style needed for speedway racing, the steering angle is typically very little so the bike can be pitched into a slide with little difficulty. Steering, then, is very quick.

The particular bike I was to ride had a slightly altered frame, to suit Penhall's riding style. The front tire would be the normal 23-inch diameter type. The rear was a 22-incher. The 22-inch tire replaces the standard 19-inch as comes from Jawa. Most riders favor the 22-inch for better traction. As the track surface may deteriorate, and become slick, a 19 is put back on, with a universal tread tire that has been cut according to the wishes of



the rider, much like Class C half-mile riders do.

Bruce would not be able to make this little test session/speedway debut by me, as he had other commitments. His tuner Chris Haines would assist me. Haines has ridden speedway too, but this past year parked his bike to help Penhall. Their year was very profitable, as witnessed by their fine showings throughout the year, including qualifying to represent the United States at the Inter-Continental Round for the World Finals, and second at the U.S. Nationals last October. Haines kept the bikes in perfect running order all year, and both bikes were spotless at each race. Today would be no exception. My bike was clean and ready. All we had to do was take it to the test track, and fire her up.

The track is owned by Penhall and Dennis Sigalos. Since the race season had just finished, the track wasn't in the best of condition. Haines and I groomed it, then watered it down, taking about one and a half hours to do. This is absolutely necessary, as poor track conditions will make riding almost impossible. As it was, the first turn had several ruts, making an outside line mandatory. The second turn (or turn three and four) had a bad entry, but an excellent exit. This proved to be a good thing for the test, as I would have a chance to experience several conditions at one time.

Chris checked me out on the bike, showing me the kill button on the left handlebar, and informed me on how to use the clutch. Then he gave me a brief lesson on how to enter, slide through, then exit a corner. I would be on my own from there on.

Starting the engine requires a second person to push start. There is no kick or electric starter on this bike. Chris pushed me, and I let the clutch out, without pulling the throttle. As the motor came to life, I then gave it a little fuel and once it got going, let it motor around the track for warm-up, gingerly touching the throttle so as not to load the plug. I must admit, I had apprehensions as to how powerful the engine would be even on fire up. I could only imagine myself giving it too much fuel,

and taking off, front wheel in the air, Chris laughing and cringing as I fought to get things right. It didn't happen that way, thank you.

The first couple of laps were taken pretty easy. I wanted to get the feel of the bike, how much throttle to give it, and try and accustom myself to having no brakes. Shakey proposition, I told myself, but what the heck. That wall wasn't too sturdy, after all Chris and

and just rode with the left foot dragging on the ground. After all I didn't have to shift any gears, right?

After three laps, I mustered up some courage to wick the throttle some more. This would be done *exiting* the corner, where the crash wall ends. I tried to make myself feel like Bruce Penhall, left foot pointed outward, most of the weight on the outside heel and little toe. My right leg was straightened out,



Bruce were the ones that put it up!

You will also note that I am wearing an old pair of black leathers. These were the ones I learned how to road race on, and so decided I would become a speedway star using the same pair. (Actually, I had a road race coming up the following weekend, and didn't want to destroy my nice brown and white ones. Pessimism grew deep within me . . . I didn't tell Chris, however.)

It felt awkward at first. My right foot was firmly planted on the right foot peg/side stand, but my left foot, steel shoe and all, seemed lost. The left peg on the bike is about as useful as a Cricket lighter in a four alarm fire. It is small, and tucked out of the way, in the event the rider tosses the bike way over — which happens. But not today. I finally made it easy on myself,

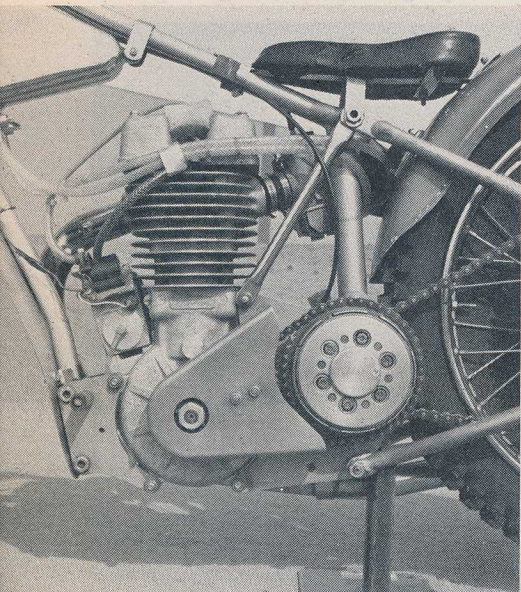
trying to remove as much weight from the peg (and subsequently the rear wheel) as possible. Elbows out, throttle hand positioned so I could roll the grip back towards me without disturbing my stance, then one, and two, and one, and two. Like a ballerina. And the grace and beauty of a court gesture. I wicked the throttle, and to my amazement the rear tire began to come around. I let off too soon (a good rider *never* lets off the throttle, or he loses races) and the bike felt as if it would high side. That right there told me a lot about how to ride the bike. It is much like a road racer with slicks. The harder you ride it, the easier it is.

I came in after that lap, gasping for breath. Not because it scared the beeggeezuz out of me, but because it required so much from me physically.



## track testing a SPEEDWAY RACER

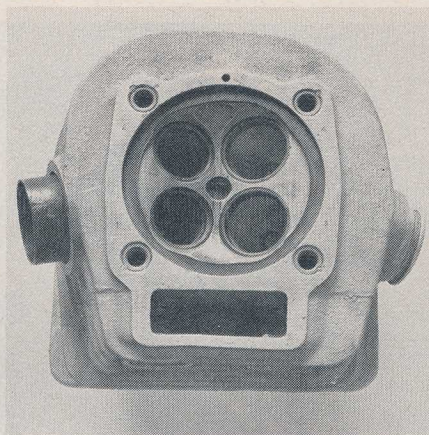
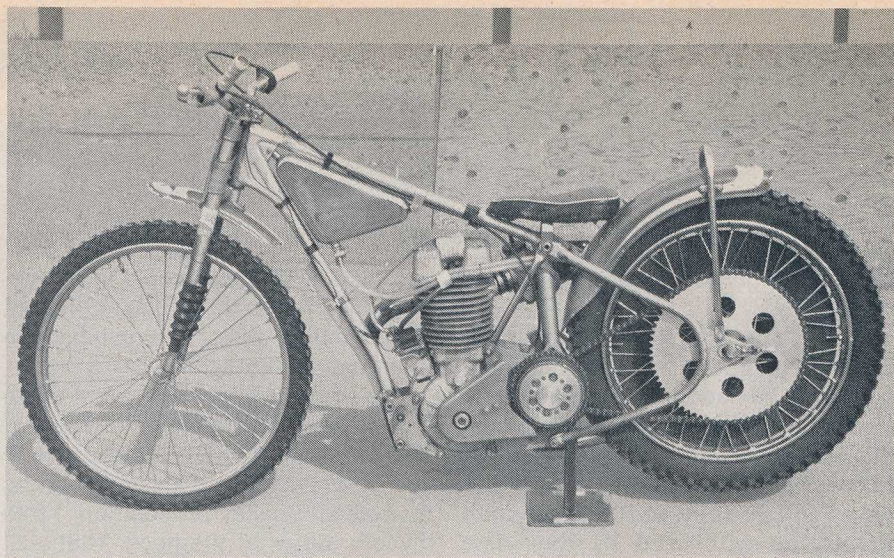
**“Bore and stroke measure 88mm x 81mm (3.464 in. x 3.189 in.) Talk about a thumper! Total displacement is 492cc. Compression ratio is set at 13.5:1 at the factory.”**



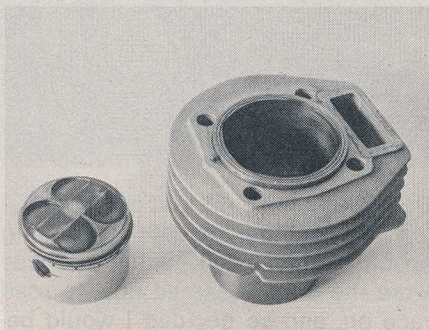
Chris mentioned that I would be using muscles I had never used before, and he was right. I try and keep myself in pretty good shape but after four laps, I was tired and sweating profusely from head to toe. On top of that, the sun had come out, and we were just entering a Santa Ana conditions, where the desert winds blow in, bringing with them unwanted heat.

Chris checked the oil and fuel, gave the bike a quick once over, then told me what I was doing wrong. I like those positive attitudes, makes me feel like I was at least doing something. Better put than “what I wasn’t doing right.” We fired her up, and I went out for some more laps.

The second time was more profitable. The chalk talk we had helped. I became more brave with the throttle, and found myself crossed up (I felt like I was crossed up, but Chris gave a negative swing with his head when I asked him afterward . . . tuners, what



ABOVE — Jawa’s latest addition to a long line of successful designs is the four valver. Combustion chamber is of hemispherical design.



ABOVE — Cam drive for the DOHC engine is to the side of the cylinder, via chain. Note valve pockets in piston dome.

do they know?!) at the apex of the corner, and coming out pretty strong.

Again, I lasted four or five laps, then brought it in. This speedway superstar bit was beginning to sound and feel like work. I was also fatiguing early, or so I thought. Chris explained that most speedway racers that really charge hard in a four lap race — Bast, Penhall, and the like — come in sweating, and feeling tired. Not that they are worn out, but one can tell that they have

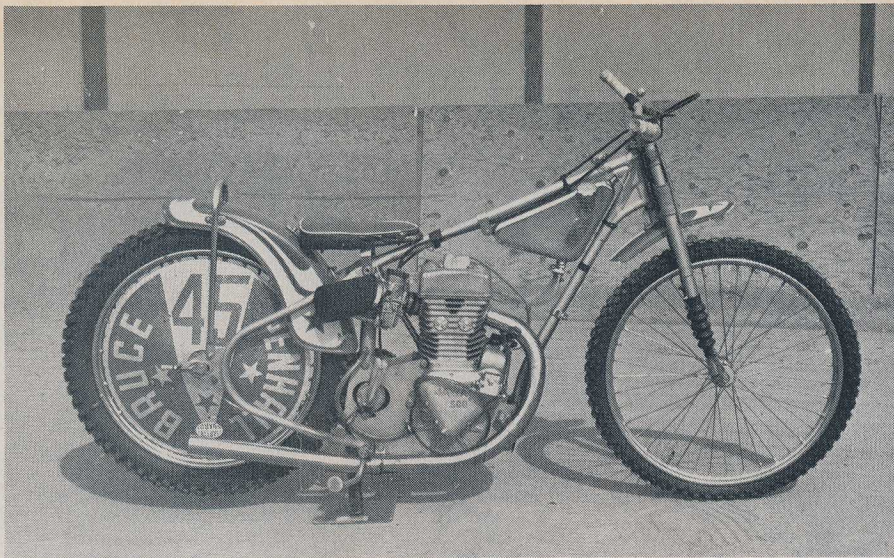
physically had a good workout. On a night like the Nationals, every rider must compete in five four-lap events. One hundred percent for twenty laps total, I can now imagine what they go through.

We had watered the entry into the second turn too much, and it was a little slippery. I found out once, and the front end almost washed out on me. I was a little proud of my reaction, I gave it some throttle and the rear end came around just as expected. Nice save, kid.

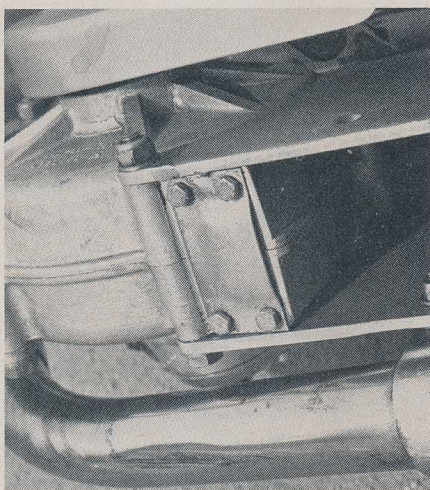
By now I was beginning to get the hang of it. I was going kinda slow, rather than miserably slow, and I was sliding it a little sideways, rather than maybe sideways. The most difficult thing I found was keeping the left foot planted forward, with most of my weight there, and the right foot perfectly straight, to help reduce the weight on it. That, in a nutshell, is the whole secret to riding one of these bikes. From there on, it is a matter of fine tuning the body and reactions, soon to develop your own particular style.

Toward the end of the session, I felt a rush of bravado, and juiced it coming out of the last turn, which had the best surface. I was amazed at the brute power the engine actually developed. I wasn’t pushing it anywhere near its 7000 rpm power peak, and still that turn one wall came up awfully quick. Once the motor got away from me, entering turn two on the back straight, and I thought I would have to lay it down. Entering a turn, I found out the scary way, is a difficult thing to be sure. The good riders go into it full bore, then shut down enough to swing the rear wheel around, then back on the gas. Depending on the track surface, they find a point just past the





**“Most speedway race bikes, geared for the short tracks in America measuring about 300-plus yards, will accelerate from 0-60 in about 3 seconds. And when they reach that speed, there are no brakes.”**



All speedway engines have total loss lubrication system, which empties beneath engine sump.

middle of the turn, square off the corner, then point the front end towards the outer wall on the straight. That way they have made the turn more into a straight section of the track — a fundamental rule of any kind of closed circuit racing. I elected to pass on the fast entry, my reactions and experience on the bike wasn't up to it. I would hate to wad up this \$5000 piece of machinery, just for the sake of seeing if I could do it or not.

By now I was becoming pretty tired. So Chris pointed me to the end of the track, and told me to try some quick starts. We went to the far end of the track for obvious reasons. If the 55 horsepower should decide to get up to a full gallop, I would have maximum length of track to whoa them down. I was told to just shut down on the throttle if the front end got too high. *Too high?* I was going to make sure it never left the ground!

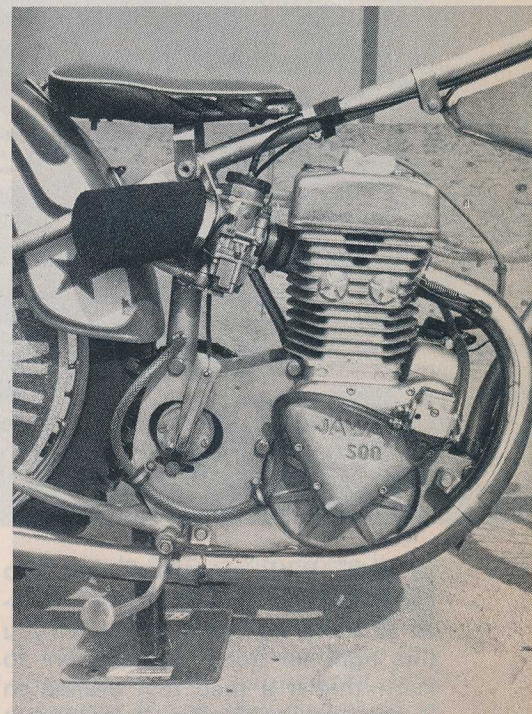
The rear tire was not the least bit hesitant about spinning. I could dig a

trench about ten feet long and three inches deep with very little effort. And, dear friends, I made sure the front end stayed firmly on the dirt. Chris said that guys like Penhall and Bast never shut down on the throttle when starting. It is full gas, and if the front end gets too high, the clutch is feathered, to help bring things back under control. Sounds strange, and totally opposite what typical human reactions tell you to do.

By now I was pretty worn out. I felt myself making some mistakes, so pulled in and asked Chris to take it around, just to get a quick comparison as to what the bike should really do. Although he hadn't raced competitively in over a year, he hopped on and gassed it. The motor didn't sound the same as when I was riding it — it was much louder. 7000 rpm sounds much meaner than 5000. He did several laps, and threw up some nice rooster tails all the way around the turns.

When he got off, we talked some more about the difficulty in riding it. He thought back to the first time he rode his bike. He had just come out from the east coast, deciding to establish himself in Southern California to race speedway. After the first day on the bike, he had fallen down an unforgiving number of times, and was so tired he couldn't even lift the bike into his van. The first two weeks, he confessed, were the roughest.

He also noted that there are no real over night success riders in speedway. Those that jump into stardom on the Division I level have actually practiced and practiced on private tracks, or out on a flat dry lake in the desert. Even Penhall, who had a meteoric rise through Division II and into I continued to practice on his own track, making



sure he got all the fine points to learn in this type of racing. It's a tough business, and any rider that is serious about winning had better devote all his time and energy to the sport. Many young men think it is all glamor and party life. Those that take that approach may win once or twice, but are never consistent. As with any winner, it is the one that directs all his energy to the sport that comes out on top, or at least has a decent shot at it.

As we loaded the bike into the van, the Santa Ana winds began to settle down, then the sky turned an overcast grey. Clouds began to form, and the air cooled down drastically. It was as though Thor himself had witnessed me on my first run of a speedway bike, and warned me to carry it no further. He got no argument from me.