THE SCOOTER with POWER & PEDAL

HOW TO SPEED-TUNE YOUR SCOOTER



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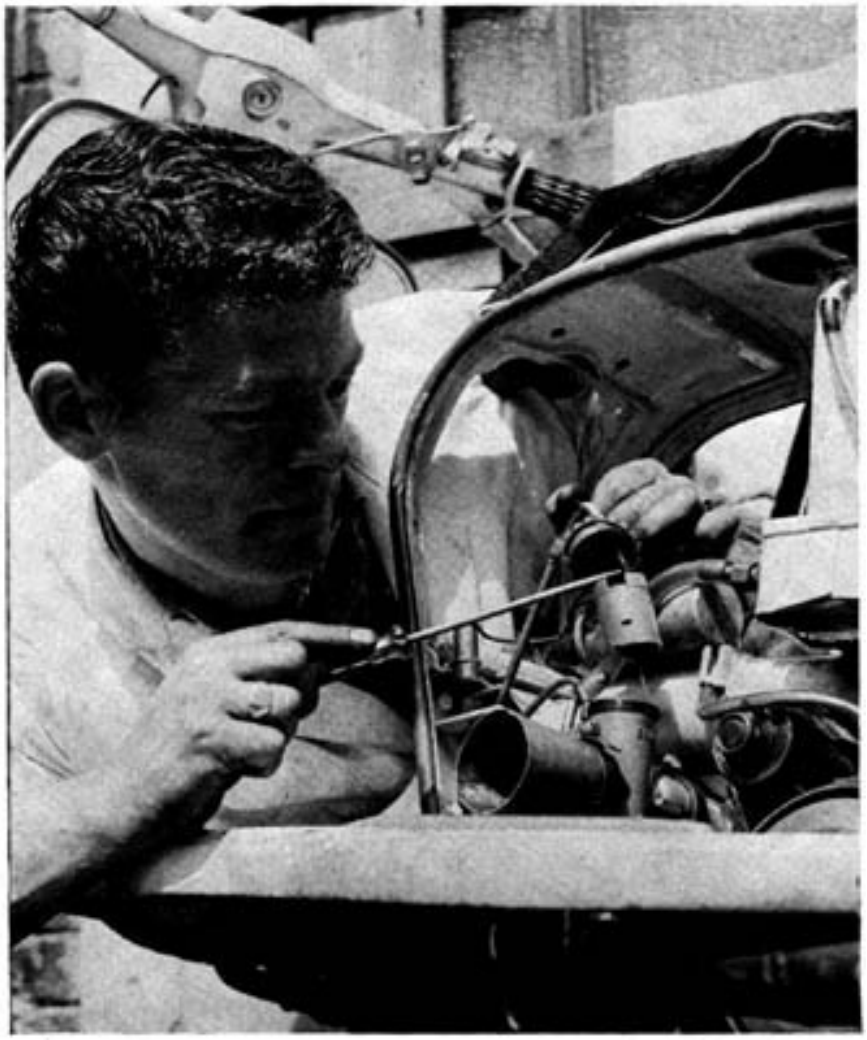
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SPEED - TUNE YOUR SCOOTER

First in a new series of speed-up articles aimed at boosting both speed and acceleration

SO you want to turn your scooter into a little bomb, do you? Fed up with being run into the kerb by thundering lorries and chased by maniac motorists, you are in search of more power –and you know you can get it.

The first thing to remember is that speed costs you money says Don Noys of London, S.E.19., who gave us our tips. You may have to spend £5 for the first extra 5 m.p.h., but the next 5 m.p.h. may cost £20.

Next step is to ensure that the machine is basically sound mechanically. Proceed as for a decoke and you will then be able to examine the big ends, main bearings, small-end bush, barrel, piston and cylinder head. Whilst doing this, check the oil seal between crank-case and gear box (this involves further stripping down of course), for a faulty oil seal is one of the chief causes of loss of oil on many two-strokes.

Cycle parts like steering, tyres, suspension and brakes must be checked before you can begin to tweak the unit for improved output. More 'go' always calls for more 'stop' and a brake overhaul is vital. Also check that your insurance does not ban any tuning-up.

Piston touching risks

Stage one tuning of any orthodox scooter involves increasing the compression ratio. Sometimes this can be done simply by removing the cylinder head gasket, but great care must be taken to ensure that there is no danger of the piston clouting the head as it operates. If it does, then the cylinder head must be relieved around the outer periphery to prevent this. Again, this is a simple job, but it must be done accurately.

The ratio can be even further increased by reducing the head face itself. This is achieved accurately by use of a surface plate. An old mirror and fine grinding paste is just as good provided care is taken to keep the action level.

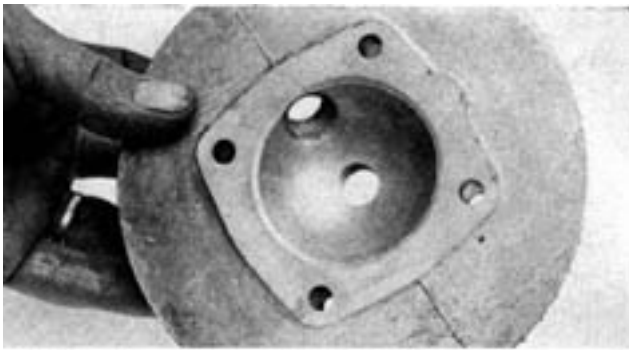
This is about as far as you can go with modifying of the cylinder head at home. Further output can be gained by fitting a special high-compression head, complete with central spark plug, which ensures central burning of the mixture and cleaner combustion, and sporting units like these are readily available. Do not tamper with the finning of the head or barrel, and on no account impair the cooling system by removing flywheel finning.

On the cylinder barrel, the ports are of paramount importance. All must be clean and smooth, with any casting lips or imperfections removed. Do this

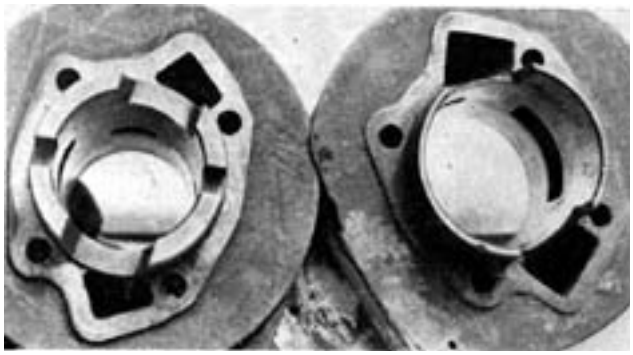
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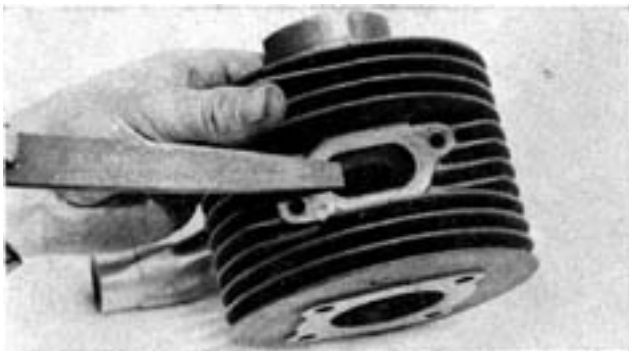
To skim down cylinder head, use an old mirror or piece of plate glass and fine carborundum paste.



Outside edge of hemisphere must be cut away well to stop piston hitting. Note new centre plug hole.



Standard and modified barrels, showing how the transfer ports have been carefully cut out bigger.



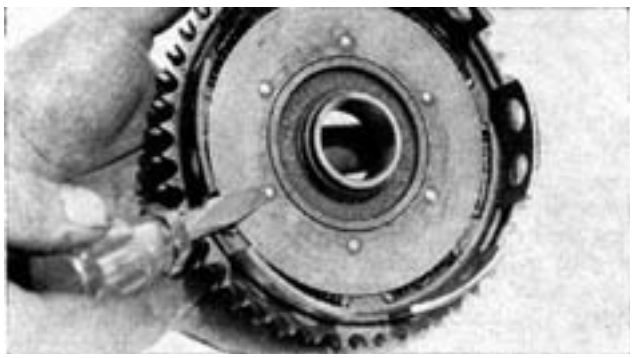
Gas flow through the inlet and exhaust ports can be helped by filing away smooth any rough edges.



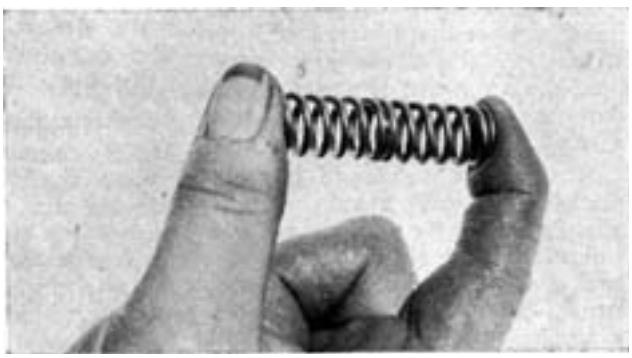
The 'window' in the piston is cut out more to lessen drag and also to advance the port timings.



Induction manifold gasket is cut back to stop it squeezing and obstructing port when it's bolted up.



Clutch housing rivets must be checked for any looseness as rigid assembly is vital for speed.



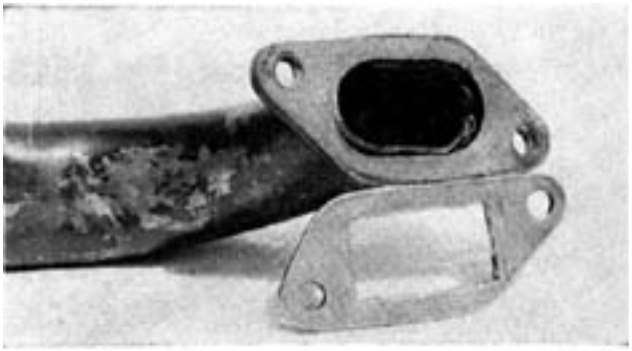
Test clutch springs by putting old and new together and squeezing to see which of them moves most.



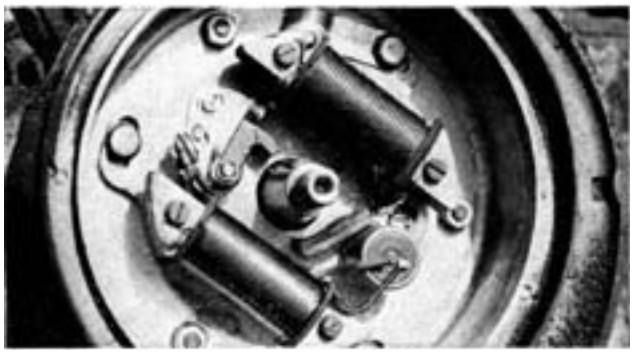
Crankshaft balance holes con be filled to bump up the primary compression—an experts job, however.



Check carb slide and make sure needle is not bent. The needle position can be experimentally raised.



Modified exhaust gasket is shown here with exit tube before it is filled to mate cylinder flange.



Ignition timing advance is vital. Elongated slots in breaker plate allow you to shift points further on.

carefully with fine files and emery cloth. Opening of the ports is really a specialist job and should not be attempted without advice. However, on the Lambretta for instance, it is possible to open up the transfer ports, making them flush to the barrel walls, by filing away the protuding spigot. Don't try to open up the inlet port too much; simply match it to the piston and the induction manifold. In addition, make allowance for the squashing of the new induction manifold gasket, by cutting away the inner opening of the gasket with a razor blade.

File it square

On the exhaust port, where this is oval as standard, you can file all four corners to right angles, at the same time ensuring that this matches the piston. On finishing, make sure that you chamfer off all the inside edges of the ports to prevent any trapping of the piston rings when the engine is operating. It goes without saying that for all this work a selection of good quality, sharp files, medium and fine-toothed, are absolutely necessary. On the piston, it is vital to make sure that there is no excessive burning or ovality, and that the ring gaps arc no wider than about 7 thou. as a maximum. Better if they are around 5 thou. Anything more than 7 thou. and new rings must be fitted. The piston itself must not have more than 10 thou. clearance between piston skirt and cylinder barrel wall. If it is in excess of this and a rebore becomes necessary, ensure that the reboring specialist knows that the machine is to be used for high speed work. For the standard bore should be between 4 and 7 thou tolerance whereas if increased performance is in mind, greater tolerance is allowed.

In other words, the barrel will be machined out to provide a looser fit for the standard piston. Cost of a rebore, including new piston and rings to match, is 65s. 0d.

Final home tuning hint on the piston; carefully cut away the bottom sections of the transfer port windows, and then use a fine file, blue-back emery cloth and then metal polish to ensure a really smooth finish. This will lighten the piston and reduce operating drag.

With this degree of tuning, the bottom end will stand up well to the power increase, provided it is sound in the first place. So leave the bottom end well alone and do not attempt to increase crankcase compression by filling the crankshaft webs with ducal blocks.

Highly specialised

If you perhaps intend to go on to second stage tuning though, scooter tune specialists like Don Noys provide an over-the-counter crankshaft, complete with ducal blocks inserted into the webs. This is highly specialised and involves splitting the crankshaft halves, and re-balancing. Cost of this modified unit is £1.15.0. for the Lambretta.

Having gained extra power, it now has to be transmitted to the rear wheel and the weakest link en-route is the clutch. This must be in perfect condition, otherwise there is risk of clutch slip or breakage. If in doubt, strip the clutch for inspection, paying special

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Speed Tune Your Scooter

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attention to the fixed plate rivets, the plates themselves for wear or glazing, and the clutch retaining springs. Hold a new spring and one of the existing set between your fingers and press hard. If the old one closes its coils more than the new it is obviously weaker and the whole set of five must be renewed.

So much then for the basic power and transmission units. We now come to the all important carburettor. With the greater power development, more fuel will be needed. Just how much more can only be assessed by trial and error testing with differing main jets and needle settings. Each machine has different characteristics. Generally though, it will be found that an increase of ten sizes of main jet (from the basic number 78 up to 90 or even beyond), will be about right.

This check on mixture can only be carried out on the road, and must be done later with a close watch on the spark plug.

Needle setting can often be raised from the middle notch to the next in line or maybe even two positions. Remember to move it in the right direction (up or down according to the carburettor model), the object being to raise it away from the atomiser. Make a close check on the carb. slide too. There must be no wear, or signs of scoring. If there is, then renew the slide.

Keep air cleaner

On no account attempt to dispense with the air cleaner; it will make the mixture weak, carburettor setting almost impossible and cause overheating of the engine.

Ignition is the subject that has many scooter owners foxed. But it is vital to advance the ignition having altered the port timings in the cylinder barrel. Usually 1 degree of advance is sufficient with Stage One tuning.

Do this by removing the flywheel and advancing the stator plate either forward or backward according to the model. Most machines will have a full description of this operation in the hand-book. You will almost certainly need a few special tools to do this, particularly a flywheel extractor. A standard tool costs about 10s 0d. Points setting remains constant whatever the degree of tuning, i.e. same as that recommended in the handbook. A harder plug will probably be needed, too.

The silencer itself is very important with any two-stroke machine and provided it is in good condition it is as well to leave alone. Never, in any case, completely remove the baffles which will destroy the back pressure so vital to performance.

However, if the standard unit seems unsatisfactory—test by holding a hand over the outlet pipe and revving the engine; if efficient gases will pulsate strongly enough to thrust your hand away—try fitting one of the proprietory units which allows for increased expansion of the gases.

Don't be tempted to knock some of the old baffles out of existing silencer, as this will only make the machine extra noisy—and will probably make the engine run worse than it did before. Remember, more power does not mean more noise.

In June, Robert Currie sets out from Cheltenham to journey the world an a Vespa SS–a journey which will take him over 25,000 land miles.

The tyres he's chosen are Michelin ACS



This is what he says about them: *"I've found Michelin tyres last longer. I get 15,000 to 20,000 miles from one set in comparison with the average 10,000 I used to get with other brands."*



About the traveller. Robert Currie is 23. He is a member of the Cheltenham Vespa Club and since joining in 1958 has collected 25 cups and trophies including four firsts for national rally events. In 1961 he won the Isle of Man 12-hour trial, and in the same year scored two firsts in the International Rally held at Cheltenham in which nearly 4,000 British and Continental riders competed. The route planned for his world trip takes him through America, Canada, Mexico, New Zealand and Australia. His return trip covers India, Iran, Pakistan, the Middle East and Turkey.

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