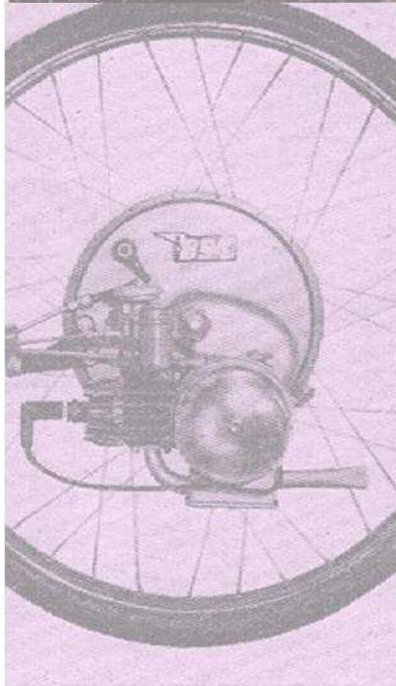


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## "THE TRADER" REPAIRERS' SUPPLEMENT-19

# MORE ABOUT MOTORISED CYCLES

**I**N this, our second servicing supplement on motorised cycles, we deal with the Cyc-Auto unit, and with individual features of Excelsior, James, and Raynal machines. Since the compilation of this article many new makes have made their debut at the show. Obviously it is not possible to include them until road and workshop experiences have been gained.

The extension of these notes on motorised cycles into two supplements must by no means be taken as an indication that servicing is apt to be extensive or in any way difficult. Our enquiries of motorised cycle dealer specialists reveal that with a little running attention given in the early stages, servicing other than of an infrequent and elementary nature scarcely arises.

The cycle parts, too, give little trouble, but for the benefit of mechanics who are mainly motor cycle minded, we give one or two hints on general cycle practice. No attempt is made to divide these to apply to individual makes, as the similarity is sufficient to render this redundant.

Much satisfaction has been expressed with the Villiers lighting and ignition set. We dealt with the Villiers engine in our issue of October 21st.

### THE CYC-AUTO UNIT

This has a vertical cylinder with flywheel magneto at forward end, while rear end of drive shaft is slotted to take a flat steel driving strip of which the other end engages in a slot in a worm shaft. The underslung worm drives a worm wheel which rides free on the bottom bracket axle on a bush. There are two locating pegs, one chisel-point, the other blunt ended, with a stirrup shaped spring clip connecting each. The "power chain" sprocket takes up the drive when the pedal spindle is tapped over with the foot, to bring into engagement mitred dogs on the sprocket with mitred slots on the worm wheel centre. The worm shaft itself terminates in a caged thrust race in a housing covered by a cap screwed into the bracket shell cover. Study of the sectional illustration will make the assembly clear.

### DISMANTLING

Remove petrol pipes and carburettor. Remove sparking plug and release valve. Take off exhaust pipe. Loosen the clamp bolt through the bottom bracket, and remove the bolt through the cylinder head and frame lug. Pull engine forward along tube (if necessary, levering from behind expansion chamber) and out of frame.

### CYLINDER REMOVAL

Remove the expansion chamber by undoing the lock ring on the support tube and the screw plug. Prise off. Engine may now be held between soft jaws in a vice. Remove cylinder base nuts, and see that piston is at bottom dead centre. Then be careful when drawing off the cylinder not to allow the cylinder to turn, as otherwise one of the ring ends may foul a port.

For general instructions on decar-

bonising follow our notes in supplement dated October 21st.

Before fitting new rings to the piston place them dead square just inside the cylinder and see that the gap is between .006in. and .008in. If less, a small section should be carefully filed from the ends of the ring to allow it to close further. Any old ring showing a gap of more than  $\frac{1}{32}$ in. should be replaced.

When decarbonising, do not forget to clean out the exhaust pipe and the expansion chamber. An old dodge, of course, to remove encrusted carbon from the pipe, if a flue brush fails, is to heat it well and then tap the outside, although this naturally ruins the enamel.

### THE RELEASE VALVE

This must be gas-tight. The essentials are a good clean seating, correct adjustment of control lever and wire,

A further section on motorised cycles with details of the Cyc-Auto engine and with reference to general maintenance

and finally to screw well home on to a sound copper washer. If the valve and seating are badly fitted they should be "ground-in" with a little valve-grinding paste. For the information of the purely cycle-minded, this is done by applying the paste to the seating, then rotating the valve against it by way of a screwdriver in half-turns, until the surfaces are good. Then swill thoroughly with paraffin. If return spring has become softened through heat, fit new. The control wire is threaded under a clamp plate to the required adjustment and the plate is then tightened down with a set screw.

### ENGINE BEARINGS

The following is of course elementary to motor cycle traders. Normally main bearings (to crankshaft) should not require renewal except after very big mileage. To test, after removal of cylinder and piston, hold engine in vice. Grip the shaft and try to force up and down to detect any vertical play. A slight amount of "end" play is essential and must not be confused with this. Similarly the big-end bearing can be so tested by pulling on the connecting rod when the engine is at top of stroke. Do not confuse with side movement, of which a slight amount should be perceptible.

The "little" end bush at the top of the connecting rod is a parallel fit and can be pushed or pressed out from either side after removing the gudgeon pin. If it is obdurate, take one bush slightly smaller in external diameter than the one to be removed, and another with an inside diameter bigger than the existing bush's external diameter. Place these one on either side of the "little end" bush. Run a bolt through the three. Screw on to it a large nut with washer. Screw up the nut and the bush will be forced out by the travel of the small one into the larger on the other side. A similar type of operation, it will be seen, can be used to fit the replacement bush.

As to other work on bearings, this is self-evident to motor cycle mechanics, but such work, and also that of renewing big-end bearings, is best put out by the purely cycle repairer, unless possessed of the necessary versatility and equipment. Its full detailing to the



## MORE ABOUT MOTORISED CYCLES—continued

entirely uninitiated is a matter scarcely within the immediate purview of this article. Neither are such operations called for to much extent in actual practice.

### TRANSMISSION

Adjustment most frequently called for is to take up play due to wear. Remove one of the bottom bracket lock rings and take out shim behind it. If play is excessive and removal of shims *both* sides fails to cure, pack behind the inner race with suitable smaller diameter shims. In some earlier models ball cages are not fitted to bottom bracket bearings. Sudden seizure may be due to disintegration of a bearing and the jamming of the balls in the drive. In this case strip down, renew all damaged parts.

### DISMANTLING BOTTOM BRACKET

Remove chain guards, chains, left-hand cotter pin and crank, power chain sprocket, thrust washer, three bottom bracket cover screws and dipstick (if fitted). Lay model on left side on large sheet of paper. Give a sharp tap with hammer and screwdriver to remove bottom bracket cover. Withdraw worm wheel and worm centre. Ball cages are marked with a star. This side, on reassembly, should face toward the worm wheel. Note that in uncaged models the correct number of balls should be checked up, i.e., 20 on each side.

### REASSEMBLING BOTTOM BRACKET

Stand model up. Clean bearing cups. Pack 20 balls into each cup or cage, using thick vaseline or grease. Fit cover. The adjustment for wear and correct alignment is by means of the adjustable screwed cup on the left-hand side of the bracket. The check-up can only be made by removing the engine entirely and introducing a screwdriver to ascertain the position of the slot in the front end of the worm shaft. After any adjustments to the bottom bracket note that the assembly should rotate freely. Test by turning the worm wheel centre, introducing the power sprocket to do so.

In service occasionally flush out the assembly with spindle oil. There is a drain plug.

### LIGHTING AND IGNITION (GENERAL)

It is hoped to deal fully with various electrical systems in a later series. Method of dismantling and reassembling the Villiers flywheel magneto, together with an outline of its

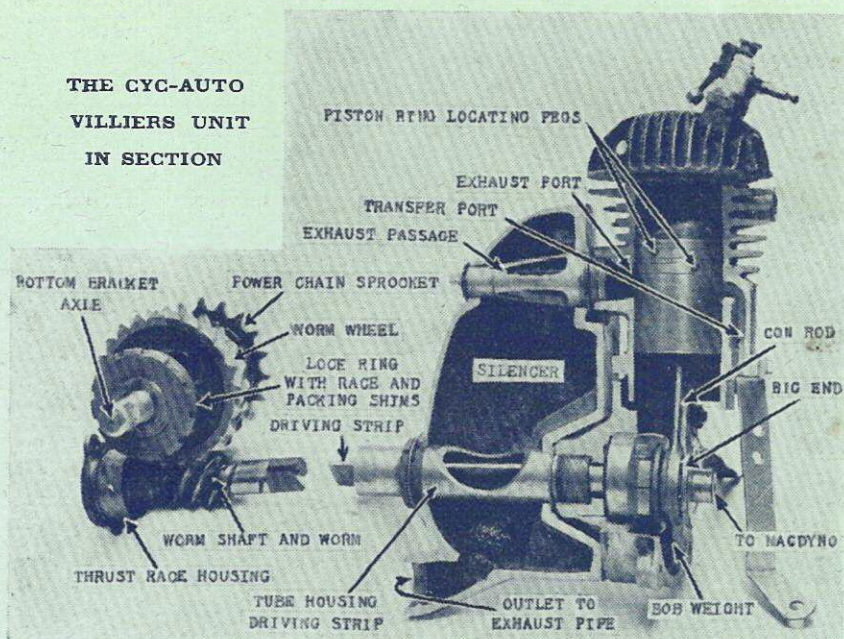
principles, was given in our supplement of October 21st. The illustration on page 3 shows clearly the disposition of its parts. Note the poleshoes, across which a piece of iron, e.g., a spanner, must be placed when dismantling, to avoid demagnetisation. Partial demagnetisation may also occur if the flywheel is dropped.

In actual service the component calls for little beyond superficial attention.

A rare, but somewhat puzzling, "shortage of sparks" may be traced to a faulty pick-up spring. At magneto end of high-tension cable there is a terminal located by a spring clip.

On *Excelsiors* it will be observed that two small steel plates carry the engine at back and front. Each has an upper and a lower bolt. Removal is easiest if the *top front bolt* and the *lower rear bolt* are those selected for removal. The top rear bolt is apt to present a little difficulty by reason of its fouling the crank and chainwheel assembly. Therefore loosen the nut on the opposite end of this bolt and take away the chainguard. This gives access to the lower bolt, which can then be drawn out on the same side.

The *James* mounting embodies two



Remove terminal, and a small pick-up spring will be revealed inside. This spring should be quite straight, and should make proper connection with the small contact point on the coil, immediately beneath it.

The direct lighting system is essentially simple. It consists of one cable taken from the back of the armature plate direct to headlamp and thence to tail lamp (wired in series) and earth. Connection at magneto end is usually by way of a split terminal.

It will be appreciated that the system being in series, failure of one bulb occasions failure of the other. Another source to which this trouble is often traced is the snapping off of the earth clip. Therefore always check for this in remedying such failures.

## CYCLE PARTS

### ENGINE MOUNTINGS

On most makes engine removal is self-evident. First, of course, disconnect petrol pipe, clutch wire, and other obvious connections.

bolts only, securing the engine direct to the bracket. There is no need to disturb the bracket. Draw the two bolts, and lift off engine complete with exhaust pipe.

The *Raynal* engine mounting is also two-point and is obvious after disconnecting usual connections. Remove chainguard for the purpose of easy access.

### JAMES

Bottom bracket has ball-bearing axle with usual cup and cone assembly. Chain adjustment is by way of the usual type of adjuster on the rear fork ends. This adjusts power chain tension, while the jockey sprocket is set to correct the pedal chain.

Note that to facilitate rear wheel removal the back mudguard stay is secured to the guard by a fly-nut. Release this, and slacken nuts at other extremities, when stay can be swung up out of the way. Saddle is adjustable up and down, forward and back. Freewheel is of double row heavy carrier type. Note this for replacement purposes.



**MORE ABOUT MOTORISED CYCLES—continued**

**RAYNAL**

Two individual points are the spring fork and the rear brake actuation. Front shock-absorbers are of simple friction-lined pattern. Adjustment for play after bedding down can be taken up by loosening lock nut on near side of fork (R.H. thread), and then tightening the fork bolt from the off-side, subsequently locking up again. Do not forget that there is grease gun lubrication to the fork bolt. To dismantle, it is simply necessary to withdraw the bolt and the fork can be pulled out forwards and downwards complete with the spring, and away from the steering head base. Thereafter, renewal of shock-absorber linings or replacement of spring are self-evident.

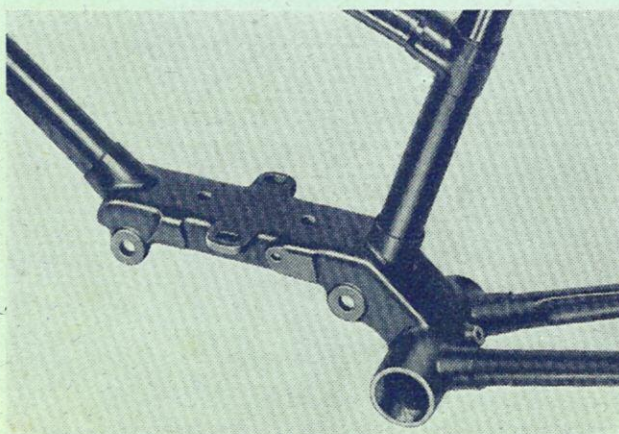
The rear brake is simply actuated by a catch plate on the left-hand crank which engages the brake rod on a back-peddalling motion. To adjust brake it is easiest to place the machine on the stand with clutch withdrawn, rotate rear wheel and take up adjustment at end of rod until shoes just begin to rub. Then slack off adjusting nut two or three full turns for necessary clearance.

Chain adjustment is obvious, by rear fork end adjusters, and a plate-mounted jockey.

**EXCELSIOR**

Bottom bracket is plain bearing and has an eccentric to deal with pedal chain adjustment, for which a Cee spanner is provided. Slack off pinch bolt just below and behind bracket, turn eccentric (near side of machine) to required degree. Fork end adjusters are provided to take care of the power chain.

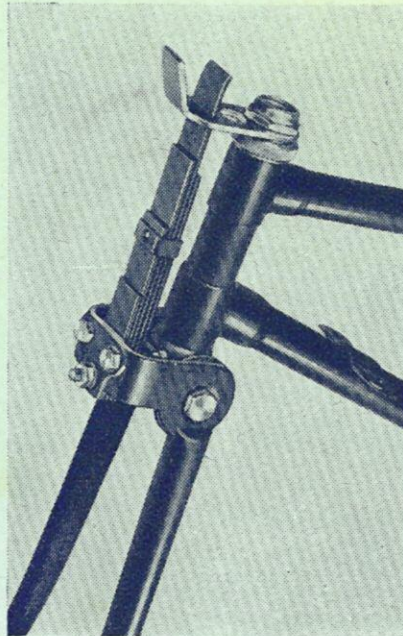
Clutch.—See that about  $\frac{1}{8}$  in. play is maintained in clutch-operating lever on bar. Do not forget a spot of oil between clutch-operating pin and clutch push-rod end.



**RAYNAL ENGINE MOUNTINGS and base support for tank**

**GENERAL SERVICING**

It is as well to detail here some idea of the equipment that may be needed in order to service most makes of



**The Raynal spring fork**

motorised cycles, and traders can rest assured that very little beyond the normal run is required. In point of fact, any cycle dealer with a normally well-equipped workshop can confidently undertake what is needful on the motorised cycle.

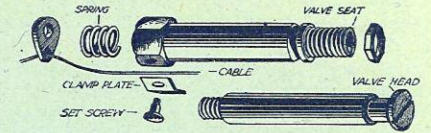
**A USEFUL BENCH**

It is as well at the outset to provide oneself with a workbench

especially for handling these little jobs. Such a bench can be a very simple affair, constructed from any timber which may be handy or which can be bought cheaply. It should, of course, be long enough to take the machine, and height depends on the operator. A useful point to bear in mind is to make the legs long enough to

enable the engine itself to be at a useful working height without entailing the need for stooping over the job. A ready accessibility saves much time, temper, and money, and enables an awkward job to be much simplified.

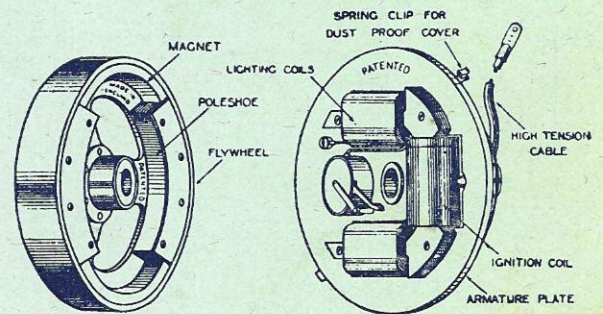
To each end of the bench secure parallel strips of wood to hold the machine upright by the wheels, and also provide yourself with a block to go beneath the bottom bracket.



**Showing parts of the release valve on a normal two-stroke engine**

Having thus obtained a useful platform upon which the model can be maintained in an upright position, the next thing to consider is that the presence of an engine calls for the handling of many more small components than are encountered in servicing a pedal cycle.

It is advisable, therefore, to secure to the sides of the bench, one at each end and on each side, four small wooden boxes, or even old disused tins, into which the parts dismantled can be



**Parts of the Villiers flywheel set. See notes on facing page**

dropped. In this way there is little fear of misplacing or losing an essential component.

Further, if four such boxes are used, the parts, as they are dismantled, are kept in some sort of order, and are very readily reached when the work of building up again is undertaken.

One trader of our acquaintance even elaborates upon this idea so far as to provide a ramp at the end of the bench, up which the machine can be wheeled, but such a fitting is more luxurious than necessary.

Special tools are scarcely called for. A tubular distance piece for assembling Villiers' clutches, and a Villiers "Hammer-tight" spanner, together with a pair of liners to the vice-jaws (for holding pistons, crankcases, and so forth) are about all that are called



**MORE ABOUT MOTORISED CYCLES—continued**

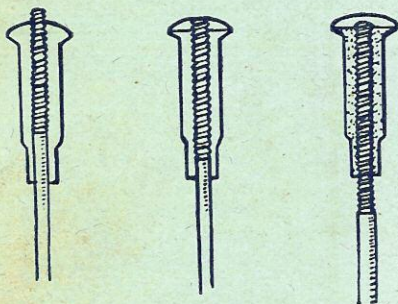
for over and above the usual cycle workshop outfit.

**WHEELS**

One of the most common complaints encountered is that of rear wheel spoke breakage. In most cases a new spoke can be fitted without removing the wheel. The thread must be filed down to the same length as the old one. Curl the spoke into a large Cee shape while threading over the others and see that the nipple is kept hard up against the rim, not letting it pull back against spoke tension while tightening up.

Our supplement No. 2 of January 28th gives details for fitting spokes and truing rims.

In spoke replacement the essentials are to see that the thread length is correct, flush at top with head of nipple, and short enough to allow a small portion of the full diameter to lie inside the bottom end of the nipple, where the nipple thread is cleared away to take it.



The centre illustration depicts the correct setting of a spoke in the nipple. Note the flush fit of the thread, and the full diameter entering the base

The neck of the spoke should also be a snug fit. If the neck is too long, flexing will frequently give rise to breakage.

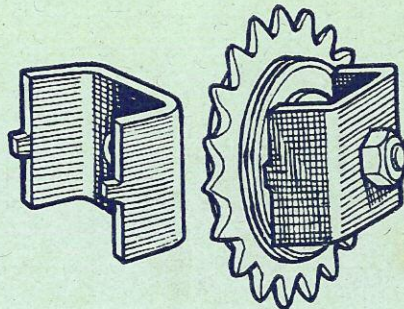
If the rim has become dented do not try to hammer out. Use a form of screw-pressure. Useful equipment consists of two hardwood blocks, one with a concave arc radiused to slightly less than that of the outside of the rim, the other convex to fit the inner surface. Cramping in a vice between two such blocks will usually take out dents, and if the rim spreads a little it can be rectified by gentle side pressure between soft jaws.

In addition to notes in Supplement 2, January 28th, full instructions on wheel building will be found in Supplement 4, February 25th, in the "Costed Cycle Repairs" series.

Note.—In all cases of wheel trouble, check the cone adjustments on the machine. Root cause can often be so discovered.

**REMOVING THE FREE-WHEEL**

A piece of steel 2in. by 3/8in. thick should be bent to channel section, and drilled centrally to pass the spindle. On each end cut dogs to fit the slots in the free-wheel housing. Tighten the spindle nut while the tool is held in a vice and the wheel is rotated anti-clockwise. Special tools of this character are marketed by Cyclo, Lake and Elliott, Ltd., Constrictor, Brown Bros. and T. D. Cross.



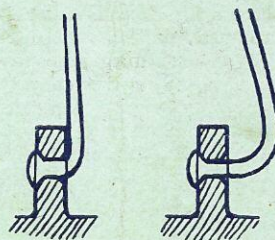
A useful tool can be easily constructed to remove free-wheels

**BOTTOM BRACKETS**

Space precludes detailing tools and methods employed in work on bottom brackets, cranks, etc. The reader is referred to Supplement 6, March 25th, wherein will be found a comprehensive and informative survey, applicable equally to the motorised cycle.

**BRAKES**

The final section of Supplement 8, April 22nd, is an excellent guide to hub brake servicing, and can be taken to read "as for motorised cycles also." Our illustration shows how, when relining, the lining must be a tight



Showing how it is essential to secure a good fit at the neck end of the spoke to avoid flexing

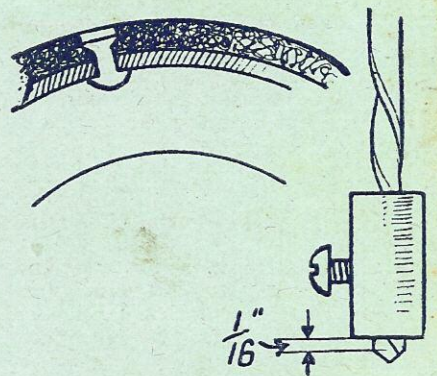
snug fit against the shoe, how the rivets penetrate the lining almost halfway and are possessed of a substantial head clenched well over. Several firms supply small countersinking tools for rivets, which ensure correct depth of penetration. A careful perusal of the Supplement will prove of immense benefit to those to whom cycle brake

servicing is not entirely familiar, and gives details of many inexpensive and useful pieces of equipment.

**AVOIDING TROUBLE**

The first two or three hundred miles is the crucial period in the existence of a motorised bicycle. Try impressing upon customers the need for bringing the machine in to be looked over after, say, the first 250, and the first 500 miles, so many minor sources of complaint can be eradicated. The inauguration of such a scheme costs practically nothing, it ensures customer-satisfaction, and enables the trader to retain the goodwill of the purchaser, and so extend his business by recommendation.

Traders will be doing the movement a particular service by impressing upon new owners the need for careful handling during the running-in period. Most of the complaints which come to our ears are caused initially by injudicious usage in the first stages of the life of the machine.



How the lining should fit the shoe. Note depth of rivet and turnover. An adjustable counter-sinking drill is on the right

On such routine service check-ups as we have indicated there is not a lot to be done, but the following points are worth watching.

Check the carburation. It is possibly a little on the rich side, and is better so until the engine has settled down. Smoking at the exhaust and a tendency to "four-stroke" are indications that the mixture could be weakened to give slightly better performance and consumption.

Clean the plug points and check electrical connections, see that the petrol supply system is clear, and swill out the carburettor float chamber. See that the needle seats cleanly. Examine, and if necessary adjust, the chains, check rear-wheel bearings to see that play has not developed. Adjust brakes. Go over all nuts and tighten up. If these, and other obvious little attentions are given at the outset, the trader should find subsequent servicing a slight matter.