"THE TRADER" REPAIRERS' SUPPLEMENT—16

THE CYCLO DERAILLEUR

Fitting, adjusting and overhauling instructions for one of the most popular variable gears

ORIGINATING in France, the derailleur gear has attained a high degree of popularity throughout the world amongst the sporting fraternity, since the ratios and their spacing can readily be varied by changing one or more of the cogs on the triple free wheel.

One of the most popular of these gears is the Cyclo, which is manufactured in Birmingham by Louis Camillis and is fitted as a standard item of the equipment of many high-grade lightweights and tandems.

It is the purpose of these notes to describe the various adjustments which may be required, to outline the methods of repairing the various parts, and to deal with the correct way to fit the Cyclo to an existing machine.

FITTING INSTRUCTIONS

THE HUB

Although the practice is not recommended by the makers, it is quite possible to fit a Cyclo to an existing hub. If this procedure is adopted a special long spindle with long cones and packing pieces is required, and this can be obtained from Messrs. Cyclo.

Remove the old free wheel—a Cyclo free-wheel remover is invaluable here, and its use is described under "Free Wheel Removal"—and also remove the spindle. Fit the long spindle and adjust the cones, when the width over cones and packing pieces should be 4½in.

It will now be necessary to retrue the wheel, since the rim must be central *between the cones and not between flanges*.

Next screw on the triple-cog free wheel, using a chain wrench on the low-gear cog to tighten it. Spread the chain stay ends *equally* to 4½in. between the inside faces of the slots and place the hub in position. Tighten up the spindle nuts.

For the most satisfactory results it is advisable to rebuild the wheel with a special Cyclo hub. These are available in standard form or with internal expanding brakes for solo or tandem.

Spoke lengths are given in the attached table. Use 14G spokes for solo machines and 13G for tandems.

ALIGNMENT

With a straight edge—or by eye if the operator is experienced—check the alignment of the chain. This is correct on the three-speed Cyclo if the chain is lined up when it is on the middle-gear cog. Check the alignment of the rim with that of the front wheel. This should not be necessary if the dishing of the wheel has been carried out correctly and both chain stays have been opened equally.

CHAIN CLEARANCE

With the chain line correct on middle gear and a small high-gear cog fitted, it may happen that the chain fouls the seat stay when running in high gear. If this happens the remedy is to spread the chain stays to a greater degree and to add packing washers.

With the chain stays spread to the proper degree and suitable washers inserted, and with the chain line correct on middle gear and with sufficient clearance for the chain on high gear, the hub portion of the gear is completely and correctly assembled.

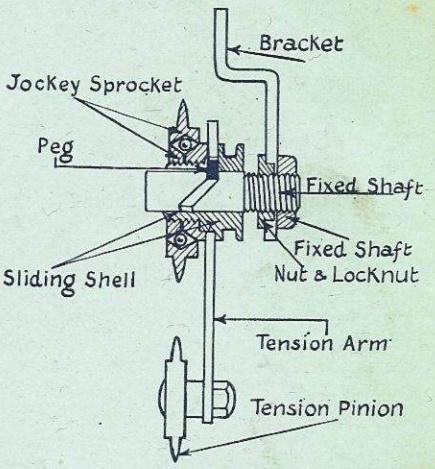
ACTUATING GEAR BRACKET

Two types of bracket for the actuating gear are available, one of which is designed to be brazed-up whilst the other clips on. The former is, of course, preferable.

The bracket should be positioned so that the operating cog comes as close as possible to the low-gear cog. The proper position for various sizes of low-gear cog is obtained when the distance between the centre of the hub spindle and the centre of the actuating spindle—measured horizontally—are as given below:—

NO. OF TEETH ON LOW GEAR COG	DISTANCE BETWEEN CENTRES	NO. OF TEETH ON LOW GEAR COG	DISTANCE BETWEEN CENTRES
18	2⅛″		
19	2¼″	23	2 9/16″
20	2⅜″	24	2⅝″
21	2 7/16″	26	2¾″
22	2½″	28	2 7/8″

With the variation in chain stays on different machines some difficulty may be experienced in aligning the brazed-up bracket. Having placed the bracket in the correct position in relation to the spindle, see that the face to which the actuating spindle bolts is absolutely vertical and brazed up.



Details of the operating gear are shown in this sectioned view

After this has been done it is necessary to check that the face is parallel to the chain line, and if not true to set it with a large adjustable spanner or a wringing tool.

When fitting a clip-on type bracket it is advisable to pack out the rearmost half of the clip with a strip of tin in order that both halves of the clip will grip the tapering chain stay

	STANDARD HUB	SOLO BRAKE	SUPER TANDEM BRAKE	TANDEM BRAKE
26″ × 1⅛″ solo	11⅛″	10⅛″	—	—
26″ × 1¼″ solo	11″	10⅜″	—	—
26″ × 1⅜″ tandem	11 1/16″	—	*9⅝″ drum side, 9¼″ gear side	*10″ drum side, 9¾″ gear side
26″ × 1½″ tandem	—	—	*9¾″ drum side, 9¼″ gear side	*9¾″ drum side, 9⅝″ gear side

N.B.—Lace over 3 except where marked * when lace over 2.

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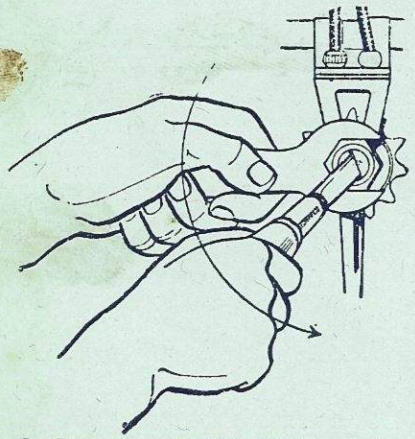
equally. To make a perfect job with this type of bracket we recommend that the bracket be correctly positioned and aligned in the same way as described above for a brazed bracket. Then tighten the clamping nuts, and finally drill a $\frac{1}{8}$in. diameter hole through the clip into the chain stay and drive in a suitable dowel pin.

ACTUATING MECHANISM

Unscrew the large nut on the end of the actuating spindle and pass the spindle through the hole in the bracket. An adjusting nut which is shouldered will now be found on the spindle. This is for lateral adjustment of the spindle.

A drum, round which the control cable passes, will be found on the actuating spindle, and this has a hole



Locking the actuating spindle. It is important that the slot be in the position shown when the nut has been fully tightened

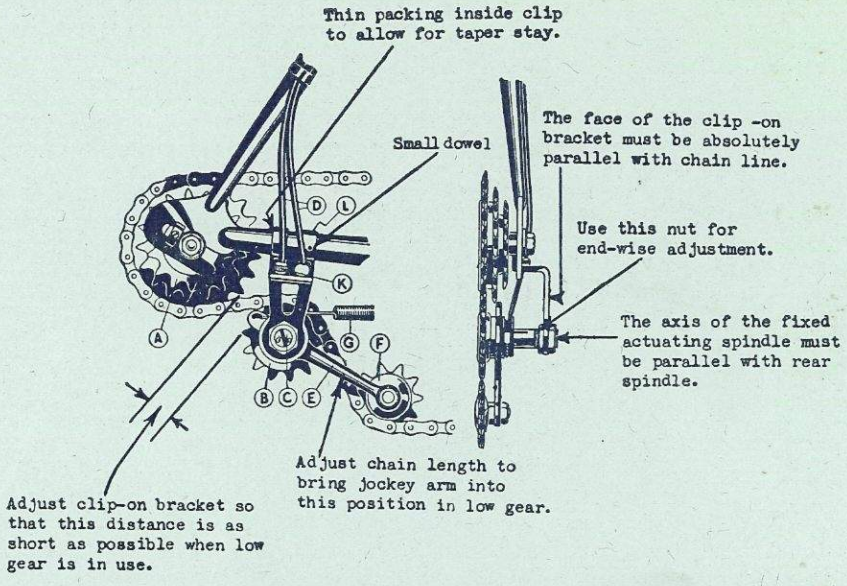
for the nipple peg. A screwdriver slot will also be found on the end of the actuating spindle.

Turn the spindle until the screwdriver slot is in the "11 o'clock" position as shown in the illustration, and turn the cable drum until the hole for the nipple peg points vertically downwards. Now screw up or unscrew the adjusting nut until the actuating cog is dead in line with the middle-gear cog and tighten the lock nut, at the same time preventing the spindle from turning by means of a *wide-bladed* screwdriver. It is most important to see that the slot in the spindle end still remains in the "11 o'clock" position.

The actuating spindle should now, if the bracket has been correctly fitted, be parallel with the rear spindle.

THE CONTROL

This is of the twin-wire type, and if a new gear is being fitted is supplied complete with nipples soldered up in the correct position.



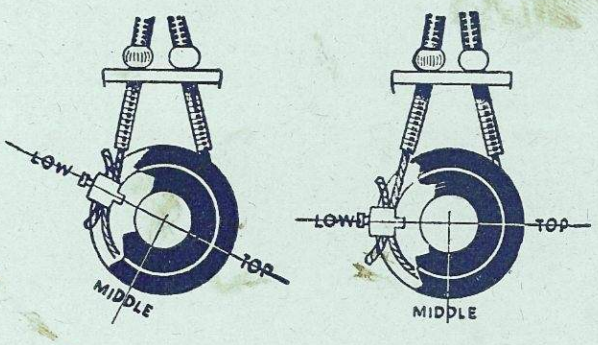
Points to watch when fitting a clip-on bracket. The figures refer to: (A) top gear sprocket; (B) jockey sprocket; (C) fixed slotted actuating spindle; (D) transmission cables; (E) tension arm; (F) tension sprocket; (G) tension spring; (K) milled ball-bearing spindle; (L) clip-on bracket

Fit the actuating-arm nipple first. To do this it is necessary to remove the actuating spindle from its bracket, taking care not to upset the adjustment made previously. Thread the loop in the cable between the two balls through the slot in the bracket with the milled ball at rear, and pass the loop round the drum, pressing the nipple peg into its hole. Refix the actuating arm to its bracket, still keeping the slot on the spindle in the "11 o'clock" position.

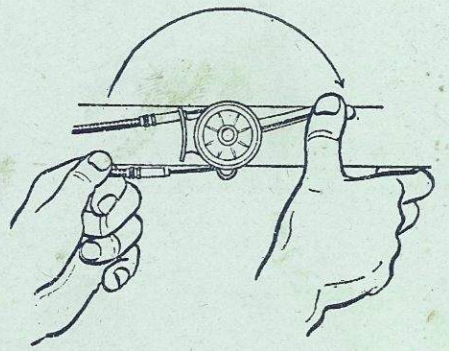
Run the twin cables up the seat stay and along the top tube, taking care to avoid sharp bends. Secure them with frame clips where necessary in order to achieve a neat appearance.

Secure the control-lever clip to the top tube with the drum vertical and on the right-hand side of the top tube. Place the cable nipple in the slot on the drum with the adjuster of the cable which leads to the milled ball at the top. Next place this adjuster in its slot and press the control lever forward and down as far as possible, thus straining the cable until the other adjuster can be hooked into its slot. Whilst this is being done both adjusters should, of course, be fully slackened off.

With the cables in place, take up all slack in the cables and check their travel. On no account should the nipple of the actuating arm rise above a horizontal line passing through the centre of the actuating spindle.



At left is an incorrectly fitted transmission. The correct adjustment is also shown



Straining the transmission into place

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CHAIN TENSIONER

Fit the chain tensioner clip to the chain stay between bracket and bridge and hook the spring into place with the open side of the hook on the outside of the slot in the jockey sprocket arm. If the spring needs shortening, as is sometimes the case with short wheelbase machines, some coils can be removed *from the front end only*. The tension should be adjusted so that it is just adequate in the high-gear position. Check with the chain in place.

THE CHAIN

The chain should be lengthened by about six links, and should be of such a length that when the low gear is in position the arm carrying the jockey sprocket or pulley should be as high as possible. If the chain is any longer than this there will be insufficient spring tension on middle and high gears, the chain may tend to jump off and excessive wear will be caused.

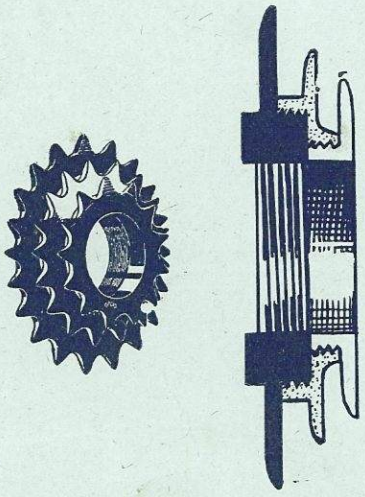
Use the spring-clip type of chain connector. The nut and bolt type is apt to foul.

Place the lever in high—as far back as possible—and run the chain over the small cog on the triple free wheel, pass it over the actuating cog and the jockey sprocket. Fit the connector. Make a final check of the alignment and the job is complete.

SERVICE ADJUSTMENTS

LUBRICATION

To lubricate the triple free wheel, lay the machine on its side with the gear uppermost, and pour a good quality cycle lubricant into the centre of the gear cluster. Turn the wheel slowly and the oil will penetrate to the free wheel centre. The manufacturers recommend the use of Wakefield Everyman cycle oil.



This sectioned view shows how the triple free wheel is built up

The actuating cog bearings and the jockey sprocket bearings are well protected. After long service they should be dismantled, cleaned and packed with light grease.

Oil the actuating cog spindle regularly and occasionally brush over with petrol or paraffin.

CHANGING COGS

The low gear cog which forms the outer ring of the freewheel has a right-handed male thread on the outside. A female thread on the middle gear cog mates with this, leaving a second female thread on the outside into which a male right-hand thread on the high gear cog fits.

To change cogs two chain wrenches are required. To remove the high gear cog remove chain and wheel and place the spindle vertically in the vice, gears uppermost. Grip the middle gear cog with one chain wrench, and with the other unscrew the high gear cog in an anti-clockwise direction.

If the middle gear cog is to be changed grip the low gear and middle gear cogs in a similar manner and unscrew the latter.

To fit new cogs or to replace the old, reverse these operations.

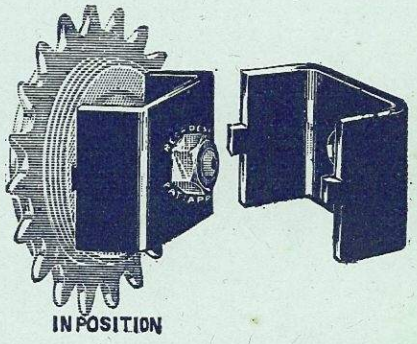
REMOVING FREE WHEEL

Remove high gear and middle gear cogs in one unit by gripping the low gear cog and unscrewing middle gear cog. Remove spindle nut, thread a Cyclo free wheel remover over the spindle and insert the two pegs in the slots in the free wheel body. Screw on the spindle nut to hold the tool firmly in position and turn the wheel over. Grip the tool in the vice and rotate the rim in an anti-clockwise direction. When the free wheel has started to unscrew, slacken off the spindle nut slightly to allow the free wheel to come away. Continue until the thread is free.

In stubborn cases soak the free wheel overnight in a bath of paraffin or penetrating oil.

DISMANTLING FREE WHEEL

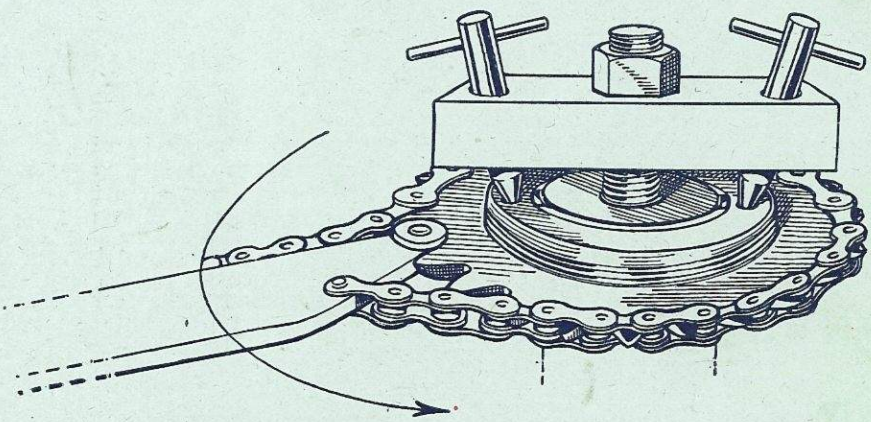
As on most free wheels the end plate of the Cyclo triple free wheel has a left-hand thread. It is provided with two pinholes, and two methods are available for its removal.



The Cyclo free-wheel remover

Place the wheel spindle vertically in the vice with the gear uppermost. Remove middle and high gear cogs as described above. Press your body against the rim to prevent it rotating and with a soft drift, punch the end plate round in a clockwise direction.

The alternative and better method is to use a Rosa free-wheel remover which has two screwed-in pegs with pointed ends. These pegs are screwed in at an angle to the body of the tool so that the centres of the points are adjustable. Adjust the pegs to fit the pinholes in the free wheel end plate, remove the spindle nut, thread the



Rosa Universal free-wheel remover used in conjunction with a chain wrench

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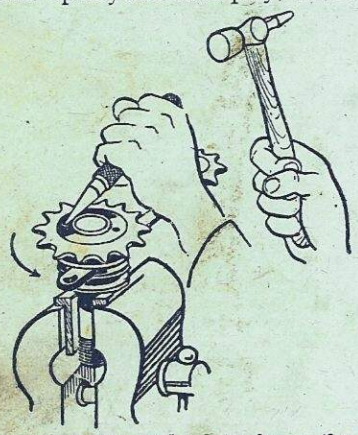
tool into place and hold it there by screwing the spindle nut over it. Turn the wheel over, hold the tool in the vice and unscrew, using a chain wrench on the low gear cog and turning the latter in a *clockwise* direction.

This tool serves a double purpose since by turning the rim in an *anti-clockwise* direction the free wheel body can be unscrewed from the hub. A further advantage of having this tool in the workshop is that it will fit any make of free wheel. It costs 4s. 6d.

FREE WHEEL END PLAY

It is inadvisable to allow excessive end play to develop in the free wheel. To take up any excessive play, remove



Removing the end plate from the operating cog to take up end play by shim removal

the middle gear and high gear cogs and take off the end plate as described above. A number of shims will be found behind the end plate and one or more should be removed. Replace the end plate, tighten it up and recheck. If the free wheel binds, too many shims have been removed; if there is still excessive play, remove another shim.

ACTUATING COG

If side play develops in the actuating cog, remove the chain and actuating spindle, then unhook the control cable from its drum. After removing the adjusting nut place the spindle

A useful all-purpose spanner

vertically in the vice, using soft jaws, and unscrew the end plate using a soft drift and turning it in an anti-clockwise direction. The adjustment is made by removing shims as in the free wheel.

When making this adjustment the opportunity of flushing out the bearings and repacking them with grease should be taken.

To refit, screw on the adjusting nut —shoulder outward—hook the control cable loop over the drum and place the nipple in position. Set the slot in the end of the spindle to the "11 o'clock" position and screw the lock nut home. Set the control so that the nipple on the actuating spindle drum is pointing vertically downwards. The actuating cog should now be in line with the chain wheel and middle gear cog. If it is not, screw up or unscrew the adjusting nut until alignment is secured.

TENSIONING COG

This has a cone adjustment which can be made by unscrewing the fixing nut and turning the cone.

NEW CHAINS

As in any ordinary chain transmission the wear is divided between cog and chain, so that when a new chain is fitted to old cogs a certain amount of harshness will be found. On the Cyclo gear the bulk of this roughness will be found when running in high gear, since the high-gear cog is the smallest of the three.

If harshness is experienced through "hooking" of the high-gear cog, replace it or instruct the rider not to use this gear for two or three hundred miles until the new chain has bedded down.

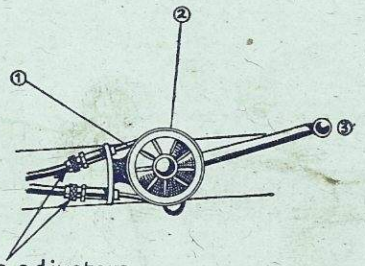
CABLE DETAILS

INNER WIRE REPAIRS

Trouble with a properly fitted transmission is seldom encountered, but if through neglect or faulty adjustment an inner wire breaks repairs are simple with the latest type Cyclo solderless nipples.

Remove nipples from control lever and actuating spindle, unclip outer cables from frame. Measure the length of each half of the outer casing and add the two together. To this dimension add 7in. and cut a length of inner wire to the resulting length.

Solder a No. 30 nipple or screw on a No. 30A solderless nipple to the



Cable adjusters

Control lever positions

exact centre of this wire. Pass an end through each of the cable adjusters and outer casings, and pull the ends tight so that the ends of the cable adjusters bear against the control lever nipple.

Next pass the free ends in opposite directions through the hole in a No. 32 solderless nipple until there is a distance of exactly 3in. between the ends of the outer casings and the centre of the nipple with the inner wires pulled through to their fullest extent. Tighten up the nipple screw and refit transmission as directed under "Fitting" instructions.

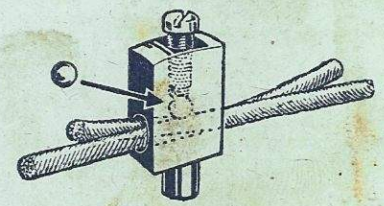
RENEWING COMPLETE TRANSMISSION

Measure off the correct length of outer casing and cut off two lengths to suit. At one end of each length

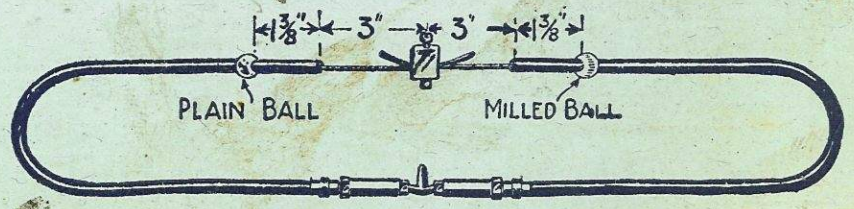
The adjuster and locknut at the control end of the cable

strip off the protective covering for a distance of 1½in. and no more. Slide on the stop balls which, when correctly fitted, should be 1⅜in. from the end of the outer casing. If this length is exceeded, cut a coil or two from the end of the outer casing to suit.

Now proceed as described under "Inner Wire Repairs."



This useful nipple makes cable fitting easy. A steel ball is used to grip the cables without damage



Full dimensions for fitting the transmission

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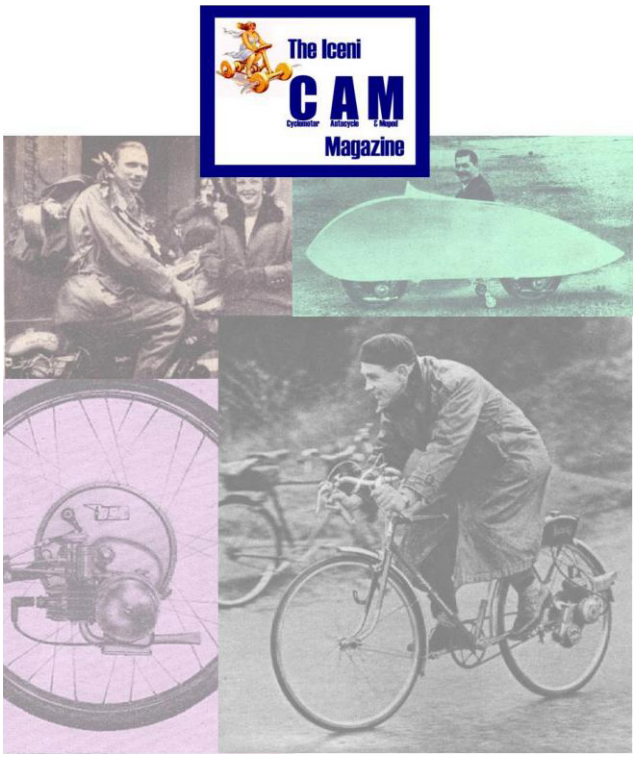

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