

BURMAN & SONS,
LTD.

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BIRMINGHAM.

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BURMAN & SONS LTD.

RYLAND ROAD,
BIRMINGHAM.

Instructions Leaflet for GEAR BOXES

Models "W" "T" "R" "G" "A" "BA" "C" & "H."

IN setting out this leaflet, we will endeavour to explain the general features of the Burman Gear Box to the advantage of all users. A feature of the 3-speed Gear Boxes "T," "W," "R" & "G" is that the lay-out is identical in each box. The same practice is also followed in the 4-speed units "BA," "C" and "A," there being only a slight variation in the Model "A" in the clutch operation and selector mechanism.

In view of the above remarks, the following instructions can be applied according to the type of Gear Box (3 or 4-speed) which is being overhauled.

One of the main features is that all gears, in both 3 and 4-speed units, are constantly in mesh, and gear changes are effected by means of dog clutches of ample dimensions (with the exception of certain 1934 Gear Boxes which will be described in a later paragraph). The positions of the gears themselves are controlled inside the Gear Box, independently of tank quadrants, by means of a patent rack and pawl mechanism, this providing an efficient gear change without fear of overshooting the required position.

Models "R" "T" "W" and "G" Gear Boxes.

To dismantle a Gear Box of the 3-speed type, it is necessary first to remove the clutch lever bracket and kickstarter, after which the nut on the kickstarter end of the mainshaft should be unscrewed. To unscrew this nut (R.H. Thread) it is advisable to engage 2nd gear and lock the wheel with the foot brake, when no difficulty should be experienced in removing the nut. When the nut is unscrewed, the ratchets can be withdrawn with the fingers and after removing the nuts, holding the kickstarter case in position, by drawing off the case, the internals will be exposed. To remove the gears themselves, the clutch and mainshaft should be withdrawn en bloc and after unscrewing the pawl spring plug, situated directly under the box on Models "R," "T" and "W," but on the L.H. side of Gear Box on Model "G," directly above the kick starter centre pin lug, the gears can be taken out.

When reassembling, the two Sliding Gears should be correctly meshed with each other by means of the flanges provided, and also the operating block fitted in the groove in the Mainshaft Sliding Gear and connected to the peg on the bell-crank lever. We would particularly stress that on no account should the screw situated on the L.H. side of the Gear Box (looking from kickstarter side of Gear Box) be removed or loosened, unless when dismantling.

Models "BA" "G" and "A" Gear Boxes.

The construction of the 4-speed Gear Boxes differ from the 3-speed type, insomuch as the Gear control is governed by a camshaft fitted with Alum-Bronze operating forks. By reason of the fact that this camshaft is mounted on roller bearings, friction is reduced to a minimum and a very smooth action is produced. As with 3-speed units, the gears are in constant mesh and in Gear Boxes prior to 1934. Gear changes are effected by means of dog clutches, but for the 1934 season a method has been evolved of gear changing which results in instantaneous, smooth and silent gear changing. In place of the five dogs, the actual gear teeth are extended and engage with internal teeth cut on the face of the adjoining gears, thus giving a minimum of backlash with gear change of extreme efficiency.

To dismantle a 4-speed Gear Box, the outer lever should be removed together with nuts around the kickstarter case cover, but unlike the 3-speed units, it is unnecessary to dismantle the kickstarter. When the kickstarter case cover has been removed, it only remains to unscrew the mainshaft nut and the small nuts holding the case in position when the gears can be exposed. As with the 3-speed, it is necessary to release the gears by removing the pawl spring and the gears can now be withdrawn from the shell, although it must be noted that the whole assembly should be withdrawn en bloc.

To reassemble the unit, the operations should be reversed, but particular attention should be paid to the fitting of the camshaft rollers and sector mechanism. The rollers should be held in position by means of a thick grease, when the kickstarter case can be replaced easily. Both the small gear on the end of the camshaft and the gear sector are stamped with the letter "O" and these markings should coincide when assembled, thus enabling you to determine that all Gears can be obtained perfectly.

Model "H" Gear Boxes.

The Model "H" unit is of the 4-speed type but the construction is similar to that of the 3-speed unit and it is, therefore, unnecessary to give details, with but one or two exceptions. As with the 3-speed, when dismantling, the mainshaft should be withdrawn with the clutch en bloc which will enable you to remove the gears; but when reassembling, it is necessary to fit the layshaft assembly first, with the two sliding members together. It is between the flanges of these two sliding gears that the operating block is fitted and the two gears are, of course, held together by the mainshaft sliding gear which should be fitted to clamp the flanges of the layshaft gears before the mainshaft is fitted.

Clutches.

The general principle of the Clutch assembly is of the same throughout, of entire range, with the exception of Model "G." They are of the multi-plate type, consisting of insert plates and plain steel plates to which latter is given close attention to ensure the smoothness and lightness for which we are noted. Another feature of the Burman Clutch is the shock absorber, which consists of shaped rubbers and plates and this also assists in providing a smooth, even drive.

All Clutches are provided with a roller race, which is not affected when withdrawing the Clutch, with the result that it runs perfectly true and eliminates undue wear. The operation of the Clutch is effected by means of a rod passing through the mainshaft and adjustment is provided in the clutch spring plate.

In regard to the use of the Clutch, the following points should be noted:— $\frac{1}{16}$ " clearance should always be kept between the end of the push rod and the ball in the clutch lever. The correct adjustment for the spring adjusting nuts is flush with the spring plate. Due to the lightness of the Clutch, it is unnecessary to fully withdraw the Clutch but only to momentarily free the plates to make a clean, silent gear change.

The assembly of the Model "G" Clutch is different insomuch as it is only a single plate type, the spring tension being given by an ample sized spring and fastened by the mainshaft nut.

Lubrication.

We do not recommend the use of oil in our Gear Boxes. After exhaustive tests we advise Wakefield's Castrolase Medium, Gargoyle Mobilgrease No. 2, or Shell Motor Grease Soft. These are light greases, which effectually lubricate the wearing parts while not being subject to changes in viscosity to the same extent as gear oil, and actually results in less loss through friction and churning than does oil. These greases can be obtained at all garages, but should a user not be able for any reason to obtain them locally, we shall be pleased to make arrangements at his request for his nearest supplier to carry adequate stocks at all times.

It is essential to pay careful attention to the lubrication of the Gear Box, particularly should speedometer drive be incorporated or a foot change fitted. When Gear Boxes leave our works they are fully charged with grease and there will probably be a slight leakage until the correct level has been reached, and to maintain this level it is necessary to add 2—3 ounces of either of the specified greases every 1,000 to 1,200 miles. If speedometer drive is fitted to the Gear Box we advise the occasional removal of the small spindle, which in the 3-speed and Model "H" type Gear Boxes is housed in the clutch lever bracket and in the 4-speed type Models "C" and "BA," in the kickstarter case cover, thus it is quite a simple matter to remove the part. Before replacing the spindle it should be carefully greased and when refitting the clutch lever bracket to the Gear Box it should be packed with grease; also it is advisable to add grease to the foot change mechanism periodically.

Foot Gear Changes.

The general principle of the whole range of foot changes is on the ratchet and pawl system, gear changes being effected by means of a double edged pawl engaging with a ratchet. A special feature of the mechanism is the aluminium box loaded with springs which, by reason of its construction, controls the amount of movement and prevents the user from passing through any particular gear, also the operating lever is brought back to the same position after each gear change.

To dismantle a foot change of the 3-speed or Model "H" type, it is advisable to remove the kickstarter case which will enable the user to dismantle the control without any difficulty.

The whole assembly is mounted on a splined sleeve that passes through a special bush, which latter is a press fit in the kickstarter case and connects with the actuating lever inside the Gear Box, being locked together by a bolt which passes through the entire assembly.

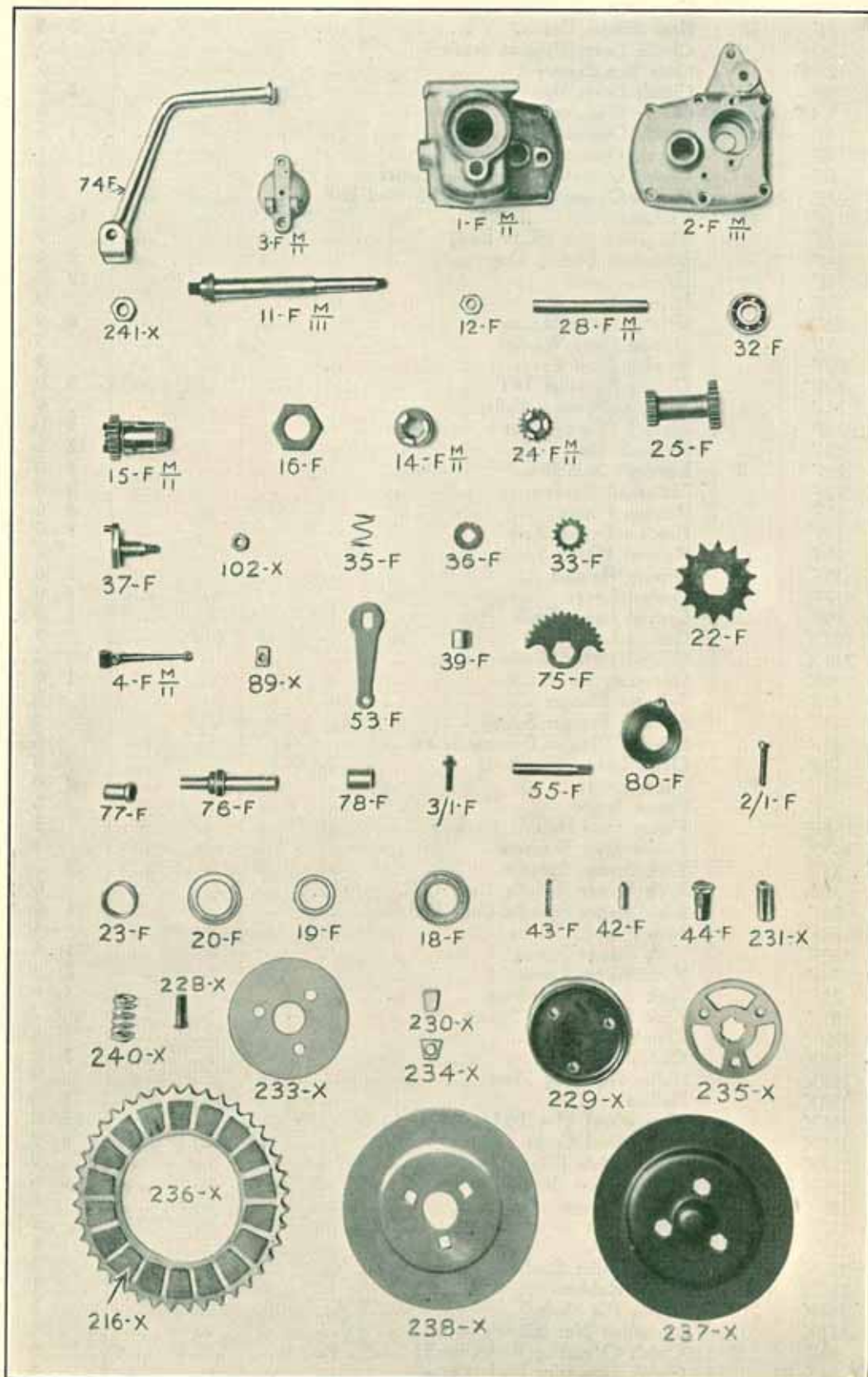
To assemble the control, the sleeve should be fitted after which the spring box and quadrant and it only remains for you to add the ratchet and pawl, following which the control should be locked tightly with the bolt and nut.

A very special feature of the 4-speed foot changes, Models "C" and "BA," is that the mechanism is totally enclosed, which not only excludes the entrance of any foreign matter but gives the control an extremely neat appearance. The principle of this type of control is similar to that of the 3-speed, the only actual difference being in the method of assembly.

When the foot change has been dismantled, which is carried out by unscrewing the six nuts around the cover and removing the latter, thus exposing the whole mechanism, you will discover that the assembly is very simple.

To reassemble, it is necessary to first refit the sector, this engaging with the Gear on the end of the camshaft and the correct location is determined by the coinciding of the letter "O" stamped on both sector and camshaft. The remaining portion of the control is already in position in the kickstarter case cover and by affixing the pawl to the quadrant directly facing the ratchet by means of a thick grease, the kickstarter case cover can then be refitted to the Gear Box. When this work has been completed the foot change should be carefully tested by operating with the hand. You will realise that it is impossible to fully describe all points in this leaflet but any points upon which you are not quite clear, we shall be pleased to assist you with if you will get in touch with us.

PRICE LIST OF SPARE PARTS FOR BURMAN MODEL "F" GEAR BOX.



BURMAN & SONS LIMITED

Telephone :
Calthorpe
2641-2-3.

RYLAND ROAD,
BIRMINGHAM, 15.

Telegrams :
"Burmanth,
Birmingham."

When Ordering Spares, the Name and Type of Machine, together with Letters and Number of Gear Box, must be quoted. If possible, send parts as patterns.

Part No.	Mark No	NAME OF PART.	Price	
			s.	d.
1F	II	Gear Box	10	0
2F	III	Kick Starter Case... ..	7	6
2/1F	I	Clutch Lever Bracket Screw		3
2/1F	II	Gear Box Screws... ..		3
3F	II	Clutch Lever Bracket	2	6
3/1F	...	Grease Gun Stud		6
4F	II	Clutch Operating Lever	1	6
5F	...	Clutch Operating Lever Pin		3
6F	...	Clutch Operating Lever Pin Cotter		1
7F	...	Clutch Operating Lever Clutch Rod Ball		1
11F	III	Mainshaft	12	6
12F	...	Mainshaft Nut (K.S. End)		3
14F	II	Mainshaft Sliding Dog	3	6
15F	II	Driving Gear	12	6
16F	...	Driving Gear Nut		9
18F	...	Driving Gear Bearing	8	0
19F	...	Driving Gear Washer		3
20F	...	Bearing Dust Cover		3
22F	...	Driving Sprocket 14T	5	0
23F	...	Sprocket Spacing Collar		6
24F	...	Second Driving Gear	5	0
25F	...	Layshaft Gear	12	6
28F	II	Layshaft Spindle	3	0
32F	...	Mainshaft Bearing... ..	6	0
33F	...	Ratchet Pinion	4	6
34F	...	Ratchet Pinion Bush	1	0
35F	...	Ratchet Pinion Spring		6
36F	...	Driving Ratchet	3	6
37F	...	Control Lever	4	0
39F	...	Control Lever Bush	1	0
102X	...	Control Lever Nut		3
243X	...	Control Lever Washer		2
89X	...	Operating Block	1	6
42F	...	Selector Plunger		6
43F	...	Selector Plunger Spring		4
44F	...	Selector Plunger Bearing Screw		6
53F	I	Outer Lever (Standard)	2	0
53F	IV	Outer Lever	2	0
55F	...	Frame Studs		6
56F	...	Frame Stud Nuts		3
147X	...	Frame Stud Washers		3
76F	...	Kick Starter Spindle	5	0
77F	...	Kick Starter Spindle Bush G.B.	1	6
78F	...	Kick Starter Spindle Bush K.S.C.	1	0
79F	...	Stop Peg		4
80F	...	Kick Starter Spring	1	6
74F	...	Kick Starter Lever	7	6
75F	...	Kick Starter Quadrant	3	6
81F	...	Kick Starter Case Spring Pin		2
229X	...	Clutch Cover	1	6
235X	...	Clutch Centre	7	6
233X	...	Roller Retaining Plate		9
239X	...	Rollers (set)	3	6
236X	...	Chainwheel $\frac{1}{2}$ " x 205" x 40T	15	0
216X	...	Chainwheel Corks (set)	1	0
237X	...	Clutch Plate (Outer)	5	0
238X	...	Clutch Plate (Inner)	4	6
240X	...	Clutch Springs		4
232X	...	Spring Bolt		2
231X	...	Spring Pillar		6
228X	...	Spring Pillar Stud		3
230X	...	Buffer Rubber		1
234X	...	Spring Pin Pads		2
241X	...	Mainshaft Nut (Clutch end)		4
73F	II	Clutch Operating Rod (Small)		6
85F	...	Clutch Operating Rod (Large)		6
82F	...	Kick Starter Case Plug (for use with less K.S.)		3
83F	...	Mainshaft Spacing Tube (for use with less K.S.)		6
Co14	XXI or XXII	Control Lever	5	0
Co20	II	Control Lever Centre Pin	1	6
Co21	I	Control Spring		3
Co21	II	Control Spring		4
242X	...	Mainshaft Washer		3

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THE GEARS.

These are made of oil hardening nickel chrome steel, and are therefore stronger and more durable than gears made of case hardening steel. They are in constant mesh, changes being effected by dog clutches of ample dimensions. The layshaft assembly runs on long phosphor bronze bushes, and silence on all gears is a feature of all Burman gearboxes. The gears are positively located in position by a rack and pawl mechanism, which together with the specially designed dog clutches, allows a smooth and rapid change without missing or over-running the gears. The whole runs in lubricant which circulates to all bearings.

THE CLUTCH.

This is of the multiplate type, running dry. Cork inserted plates are interleaved with steel plates, the pressure being provided by springs spaced on the mean diameter of the clutch plates. Fabric inserts may be obtained in place of cork if desired, for special purposes. The clutch incorporates a shock absorber, and the chainwheel runs on special roller bearings. A feature of the Burman clutch is its extreme lightness and smoothness, which is unapproached by any other motorcycle clutch. Control is by handlebar lever and Bowden cable, together with foot operation if required.

THE KICKSTARTER.

This, while enclosed in the gearbox, is quite separate from the gear mechanism, the quadrant, on its own axle, operating a ratchet and ratchet pinion on the mainshaft. When the kickstarter is not actually in use, it is completely dissociated from the working mechanism, which is a considerable improvement on the layshaft type of kickstarter which limits the size of the layshaft bearings, and leads to quick wear and noisy gears.

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THE CONTROLS.

All models are now available with positive action foot control and Models C and BA four speed gear boxes have a totally enclosed foot control. The hand control can be supplied either with long control lever lying along the tank or short vertical lever. Universal ball joints or yoke ends can be supplied on the rods.

SPEEDOMETER DRIVE.

Provision is made for speedometer drive on all gearboxes, the drive being taken by spiral gears from the layshaft, ensuring adequate protection and lubrication, and a neat and positive drive, as opposed to many types of gearbox speedometer drive which are mechanically unsound, and are not designed as an integral part of the gearbox.

TYPES OF FITMENT.

All gearboxes, except Model AP, are made with three types of fitment: (a) with fixing studs at the top of the gearbox, for diamond type frames, (b) with fixing studs at bottom of box, for loop and cradle frames, (c) the patent Burman pivotal fixing, in which the gearbox is pivoted at the top in such a way that when the gearbox is swung about its axis to make adjustment for chain wear, no adjustment of gear control is necessary, the control arm having the same centre as the pivot mounting on the gearbox. This type is adaptable to almost any type of frame and simplifies frame construction to a very considerable extent, as well as being extremely strong and rigid.

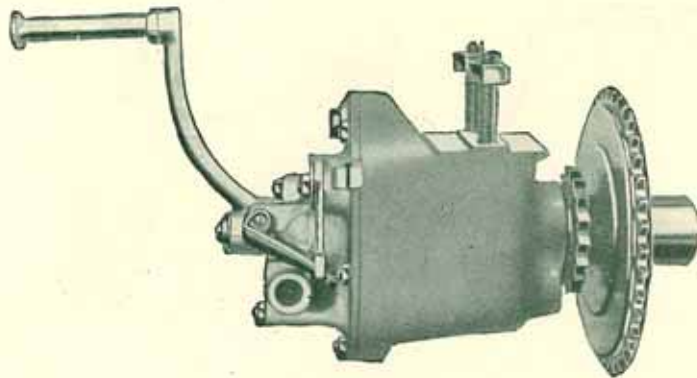
LUBRICATION.

All boxes are sent out filled with Grease, and should be replenished every 1,000 miles with approximately 2 or 3 ozs. **of either Wakefield's Castrolease Medium, Gargoyle Mobilgrease No. 2, or Shell Motor Grease Soft.**

SERVICE.

Full instructions as to the upkeep of the gearbox together with particulars of servicing facilities, are to be found in our Instruction Books.

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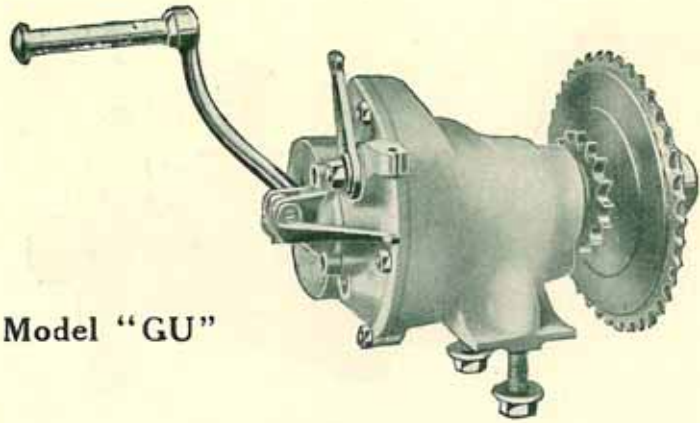


Model "G"

- SPECIFICATION.** 3-speed. All chain drive, with clutch and 2 stud top or bottom fixing ("GU") or Burman Patent PIVOTAL fixing ("GP").
Single plate clutch for engines of 150 or 175 c.c.
2 plate clutch for engines up to 250 c.c., S.V. or two stroke.
- CHAINLINES.** Front: $3\frac{7}{16}$ " (87mm.) or 3" (76mm.).
Rear: $2\frac{3}{8}$ " (66mm.) or $2\frac{1}{8}$ " (55mm.).
- CHAIN WHEELS.** 40 teeth clutch, 17 teeth rear, for chain $\frac{1}{2}$ " (12.7mm.) pitch, $\frac{3}{16}$ " (.205") (5mm), or $\frac{5}{16}$ " (.305") (7.9mm.) wide.
- GEAR RATIO.** 1—1.67—2.78.
- CONTROL.** Long or short tank control or foot operated control.
- SPEEDOMETER DRIVE.** Can be supplied. Details overleaf.
- WEIGHT.** 13 lbs. (5.895 kg.).

This weight is for standard gear boxes, with grease but without controls. Add 11 ozs. (0.311 kg.) for clutch control and for tank control see special control section of catalogue.

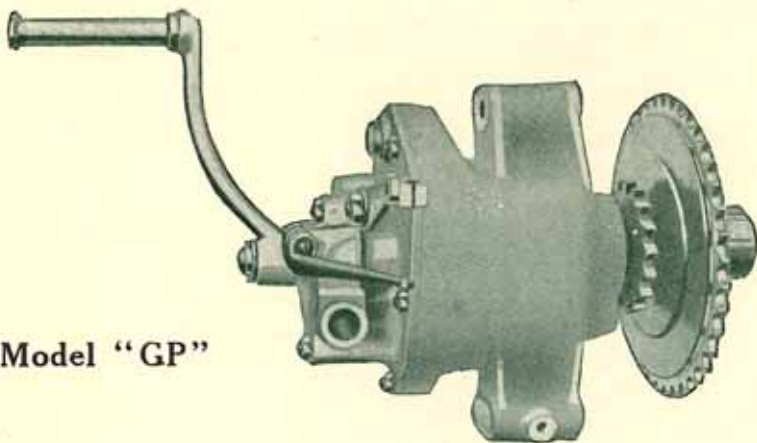
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Model "GU"

SPEEDOMETER DETAILS.

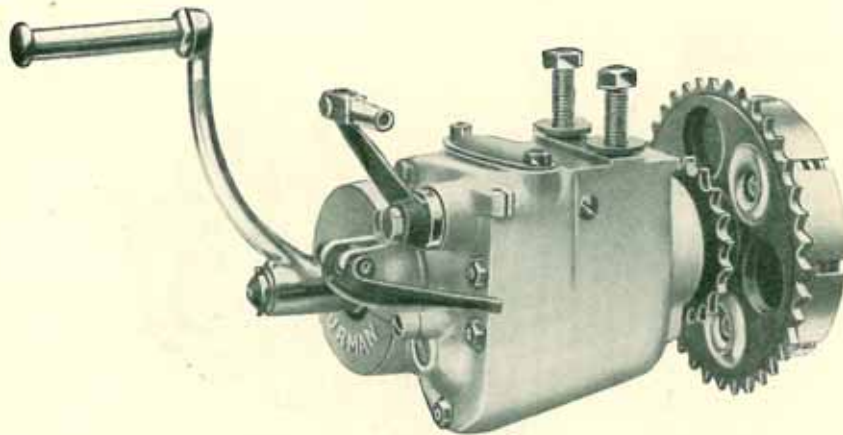
<i>Diameter of Rear Wheel</i>	<i>Rear Hub Sprocket</i>	<i>Flex Speed</i>
25" (635mm.) ...	47 teeth $\times \frac{1}{2}$ " (12.7mm.) ...	3360 r.p.m. (2088 r.p.km.)
" ...	" ...	1610 r.p.m. (1000 r.p.km.)



Model "GP"

*2 Plates. No. 145.00
3 Plates No. 150.00.*

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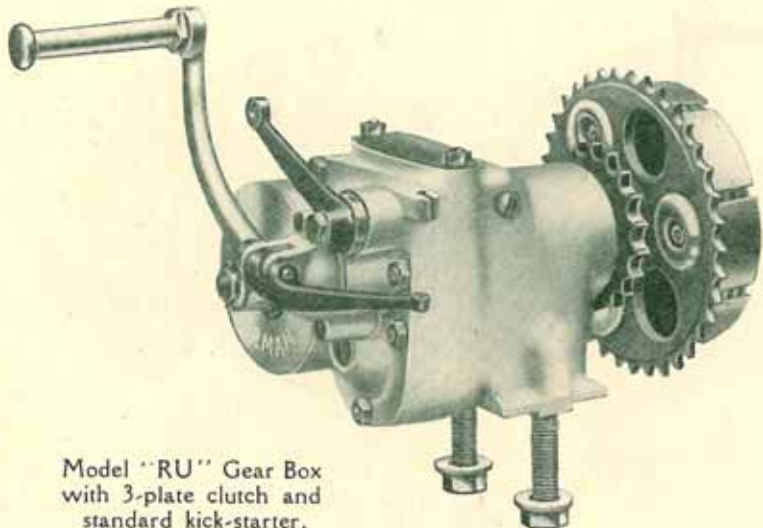


Model "R"

- SPECIFICATION.** 3-speed. All chain drive, with clutch and shock absorber, and 2 stud top or bottom fixing ("RU") or Burman Patent PIVOTAL Fixing ("RP").
2 plate clutch for engines up to 200 c.c. O.H.V.
3 250 c.c. O.H.V. or 300 c.c. "SV"
- CHAINLINES.** Front: $3\frac{7}{16}$ " (87 mm.) or 3" (76 mm.)
Rear: $2\frac{5}{8}$ " (66 mm.) or $2\frac{3}{16}$ " (55 mm.)
- CHAIN WHEELS.** 37 teeth clutch, 19 teeth rear, for chain $\frac{1}{2}$ " (12.7 mm.) pitch, $\frac{3}{16}$ " (.205") (5 mm.) or $\frac{5}{16}$ " (.305") (7.9 mm.) wide.
- GEAR RATIOS.** Standard Ratio ... 1—1.62—2.64
Close Ratio A ... 1—1.33—1.96
- CONTROL.** On tank tube or foot operated direct on box.
- SPEEDOMETER DRIVE.** Can be supplied. Details overleaf.
- WEIGHT.** 2 plate, $15\frac{1}{2}$ lbs. (7.030 kg.) 3 plate, 16 lbs. (7.257 kg.)

These weights are for standard gear boxes, with grease but without controls. Add 11 ozs. (0.311 kg.) for clutch control and for tank control see special control section of catalogue.

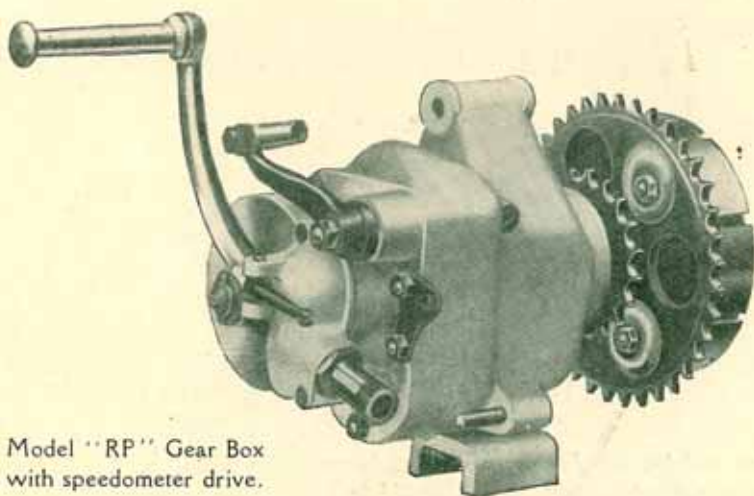
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Model "RU" Gear Box
with 3-plate clutch and
standard kick-starter.

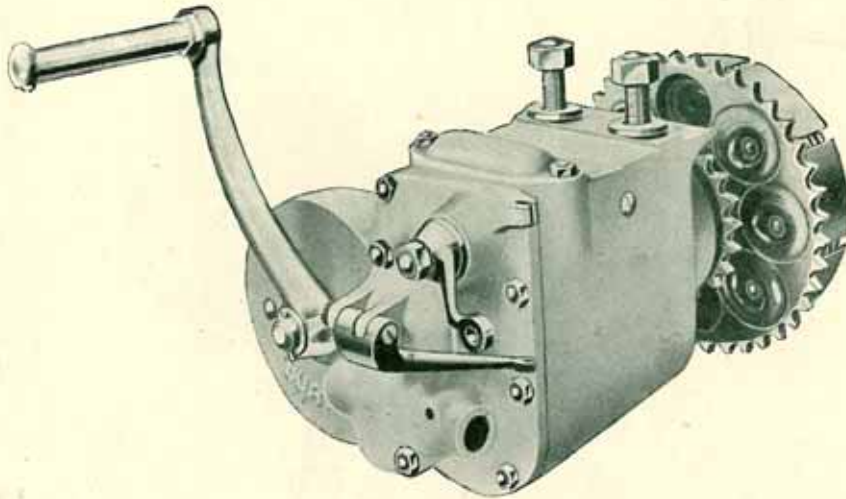
SPEEDOMETER DETAILS.

<i>Gear Ratio</i>	<i>Diameter of Rear Wheel</i>	<i>Rear Hub Sprocket</i>	<i>Flex Speed</i>
Standard	25" (635 mm.)...53 teeth	$\times \frac{1}{4}$ " (12.7 mm)...	3360 r.p.m. (2088 r.p.km.)
"	" ...	" "	... 1610 .. (1000 ..)
Close Ratio A	" ...	" "	... 2240 .. (1392 ..)



Model "RP" Gear Box
with speedometer drive.

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Model "W"

SPECIFICATION. 3-speed. All chain drive, with clutch and shock absorber, and 2 stud top or bottom fixing ("WU") or Burman Patent PIVOTAL fixing ("WP").
3 plate clutch for engines up to 350 c.c. O.H.V.

CHAINLINES. Front: $3\frac{7}{16}$ " (87 mm.) or 3" (76 mm.)
Rear: $2\frac{3}{8}$ " (66 mm.), $2\frac{7}{16}$ " (62 mm) or $2\frac{3}{16}$ " (55 mm.)

CHAIN WHEELS. 40 teeth clutch, 21 teeth rear, for chain $\frac{1}{8}$ " (12.7 mm.) pitch, $\frac{5}{16}$ " (.305") (7.9 mm.) wide. 33 teeth clutch, 18 teeth rear, for chain $\frac{3}{8}$ " (15.9 mm.) pitch, $\frac{3}{8}$ " (9.5 mm.) wide.

GEAR RATIOS.

Standard Ratio	...	1-1.59-2.6
Close Ratio A	...	1-1.29-1.67
" " B	...	1-1.29-1.83
*Special Low Ratio	...	1-1.84-3.4

*This is a non-standard ratio and a small additional charge will be made where supplied.

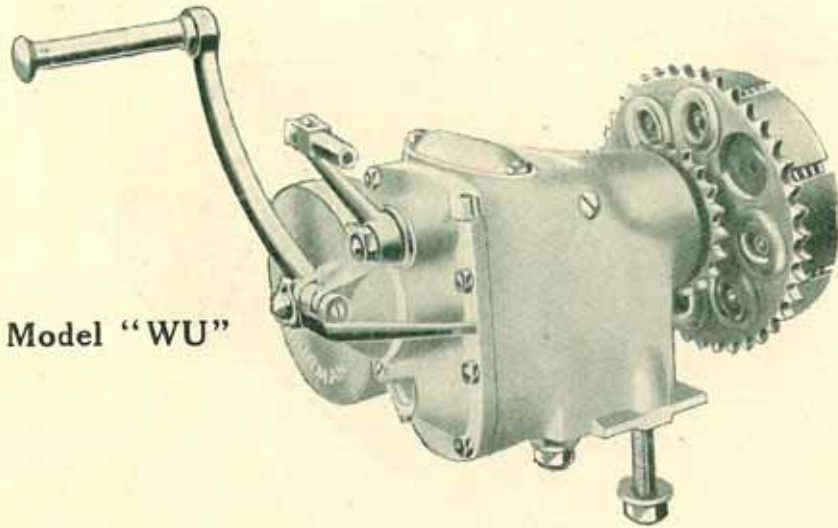
CONTROL. On tank tube or foot operated direct on box.

SPEEDOMETER DRIVE. Can be supplied. Details overleaf.

WEIGHT. $20\frac{1}{2}$ lbs. (9.298 kg.)

This weight is for standard gear boxes, with grease but without controls. Add 11 ozs. (0.311 kg.) for clutch control and for tank control see special control section of catalogue.

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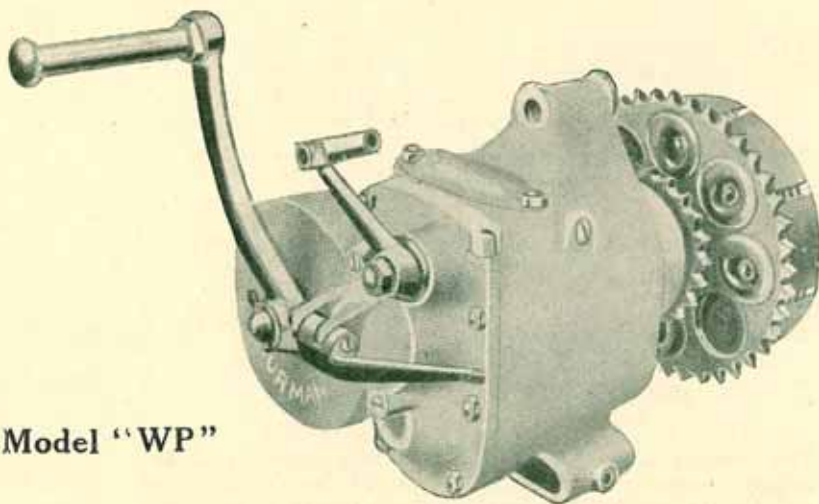


Model "WU"

SPEEDOMETER DETAILS.

<i>Gear Ratio</i>	<i>Diameter of Rear Wheel</i>	<i>Rear Hub Sprocket</i>	<i>Flex Speed</i>
Standard ...	26" (660 mm.) ...	51 teeth $\times \frac{1}{2}$ " (12.7 mm) ...	3360 r.p.m. (2088 r.p.km.)
" ...	" ...	53	1610 .. (1000 ..)
" ...	27" (685 mm.) ...	53	3360 .. (2088 ..)
" ...	" ...	55	1610 .. (1000 ..)

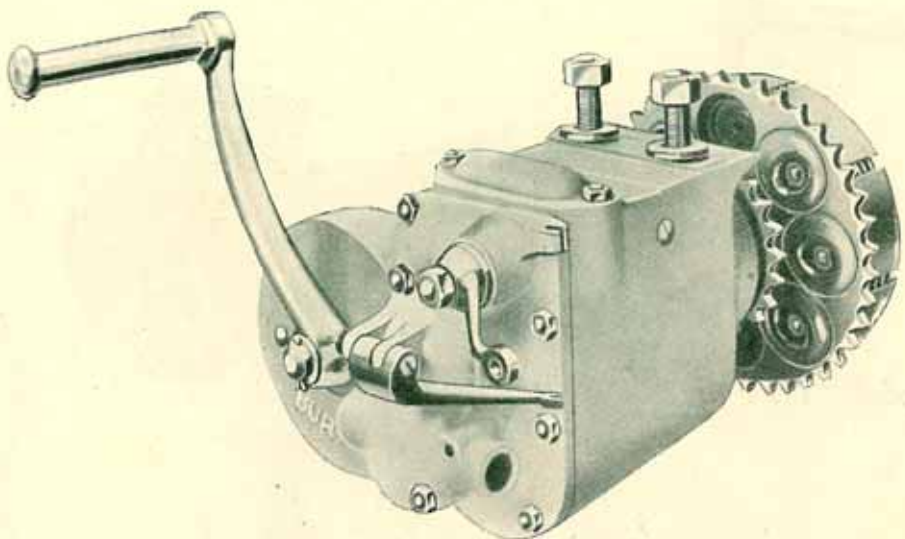
By arrangement with the speedometer manufacturers, special instruments can be obtained to give a correct reading with the close gear ratios.



Model "WP"

3 Plates No. 180.00
 4 Plates No. 190.00.

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Model "T"

SPECIFICATION. 3-speed. All chain drive. with clutch and shock absorber and 2 stud or 4 stud top or bottom fixing (TU) or Burman Patent PIVOTAL fixing (TP).
 3 plate clutch for engines up to 500 c.c. S.V.
 4 " " " " " " 500 c.c. O.H.V.

CHAINLINES. 2 stud and Pivotal fixing.
 Front: $3\frac{7}{16}$ " (87 mm.), $3\frac{1}{4}$ " (83 mm.) or 3" (76 mm.)
 Rear: $2\frac{3}{8}$ " (67 mm.), $2\frac{1}{16}$ " (62 mm.) or $2\frac{1}{8}$ " (56 mm.)
 4 stud fixing.
 Front: $3\frac{3}{8}$ " (98 mm.) or $3\frac{7}{16}$ " (87 mm.)
 Rear: $2\frac{3}{8}$ " (73 mm.) or $2\frac{1}{16}$ " (62 mm.)

CHAIN WHEELS. 40 teeth clutch, 21 teeth rear, for chain $\frac{1}{2}$ " (12.7 mm.) pitch, $\frac{1}{16}$ " (.305") (8 mm.) wide. 33 teeth clutch, 18 teeth rear, for chain $\frac{3}{8}$ " (16 mm.) pitch. $\frac{1}{4}$ " (6.3 mm.) or $\frac{3}{8}$ " (9.5 mm.) wide.

GEAR RATIOS.

High Ratio	...	1-1.5-2.07
Standard Ratio	...	1-1.63-2.9
Close Ratio A	...	1-1.27-1.62
.. .. B	...	1-1.38-1.9
.. .. C	...	1-1.38-1.76
.. .. D	...	1-1.27-1.76

CONTROL. On tank tube, or foot operated direct on box.

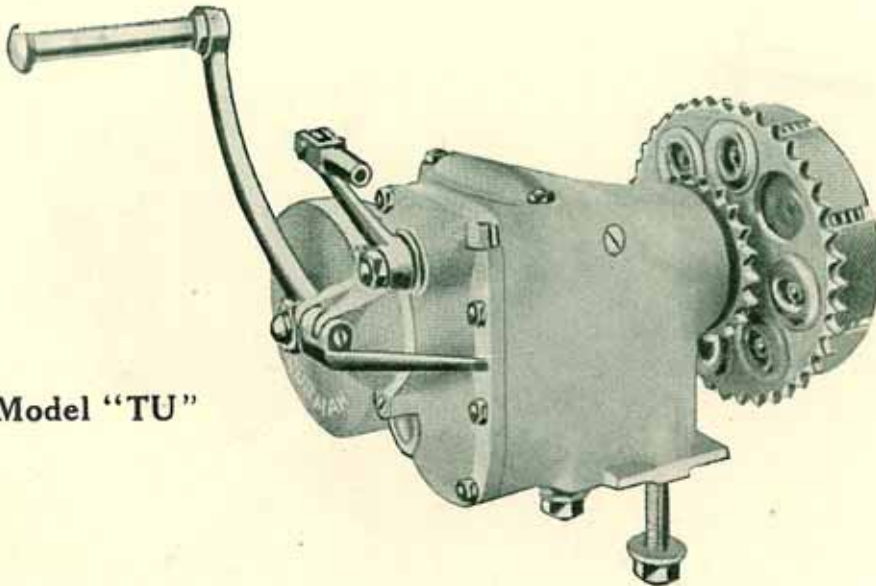
SPEEDOMETER DRIVE. Can be supplied. Details overleaf.

WEIGHT. 3 plate, 25½ lbs. (11.567 kg.) 4 plate, 26 lbs. (11.793 kg.)

These weights are for standard gear boxes, with grease but without controls. Add 11 ozs. (0.311 k.g.) for clutch control and for tank control see special control section of catalogue.

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Model "TU"

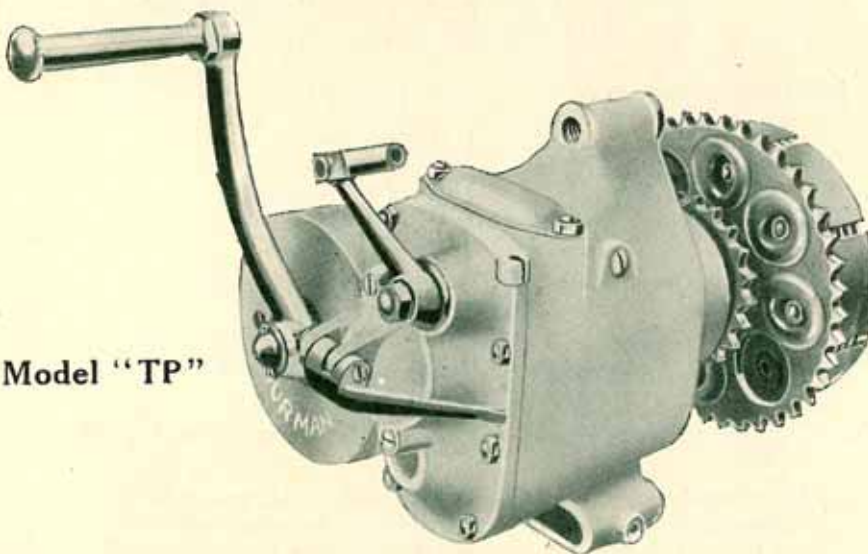


SPEEDOMETER DETAILS.

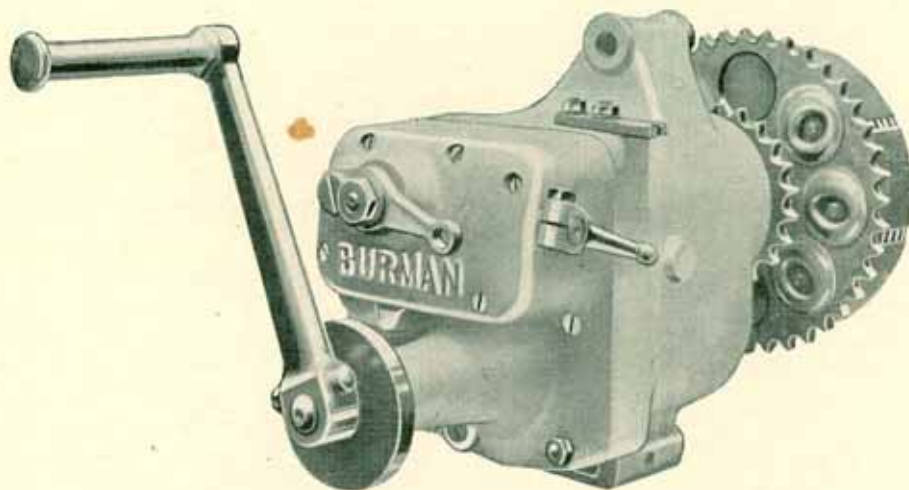
<i>Gear Ratio</i>	<i>Diameter of Rear Wheel</i>	<i>Rear Hub Sprocket</i>	<i>Flex Speed</i>
Standard	27" (685 mm.)	45 teeth $\times \frac{3}{8}$ " (16 mm.)	3360 r.p.m. (2088 r.p.km.)
"	26" (660 mm.)	43 " "	" "
"	26" "	42 " "	" "
"	27" (685 mm.)	53 teeth $\times \frac{1}{2}$ " (12.7 mm.)	" "
"	27" "	44 teeth $\times \frac{3}{8}$ " (16 mm.)	1610 r.p.m. (1000 r.p.km.)
"	27" "	51 teeth $\times \frac{1}{2}$ " (12.7 mm.)	" "
"	26" (660 mm.)	50 " "	" "
High	27" (685 mm.)	48 teeth $\times \frac{3}{8}$ " (16 mm.)	" "
"	26" (660 mm.)	54 teeth $\times \frac{1}{2}$ " (12.7 mm.)	" "

By arrangement with the speedometer manufacturers, special instruments can be obtained to give a correct reading with the close gear ratios.

Model "TP"



BURMAN



Model "AP"

SPECIFICATION. 4-speed. All chain drive, with clutch and shock absorber, and Burman Patent PIVOTAL fixing.

4 plate clutch for engines up to 500 c.c. S.V or O.H.V.

CHAINLINES. Front: $3\frac{7}{16}$ " (87mm.) or 3" (76mm.).

Rear: $2\frac{5}{8}$ " (66mm.), $2\frac{7}{16}$ " (62mm.) or $2\frac{3}{16}$ " (55mm.).

CHAIN WHEELS. 40 teeth clutch, 21 teeth rear, for chain, $\frac{1}{2}$ " (12.7mm.) pitch, $\frac{7}{16}$ " (.305") (7.9mm.) wide, 33 teeth clutch, 18 teeth rear for chain, $\frac{3}{8}$ " (15.9mm.) pitch, $\frac{3}{8}$ " (9.5mm.) wide.

GEAR RATIO. 1—1.225—1.61—2.67.

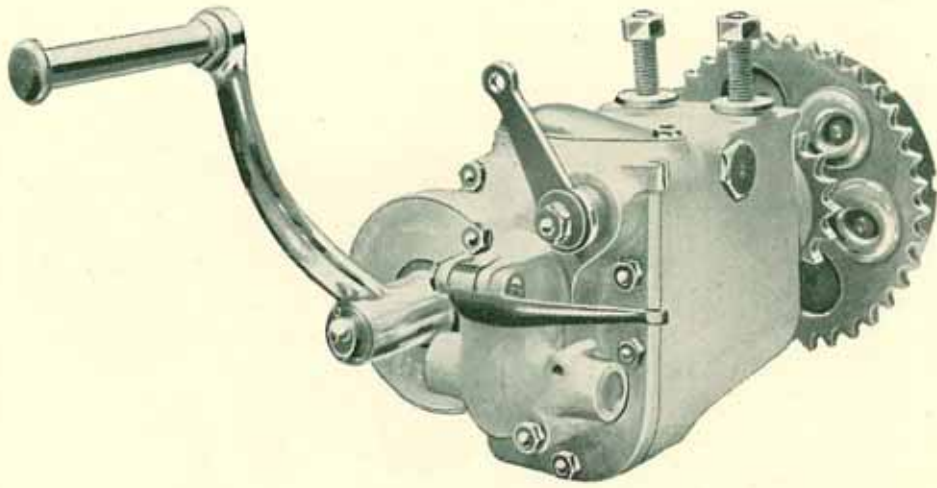
CONTROL. On tank side or Foot operated direct on Box.

SPEEDOMETER DRIVE. Not available for this model.

WEIGHT. 30 lbs. 5 oz. (13.7 kg.)

This weight is for standard gear boxes, with grease but without controls. Add 11 ozs. (0.311 kg.) for clutch control and for gear control see special control section of catalogue.

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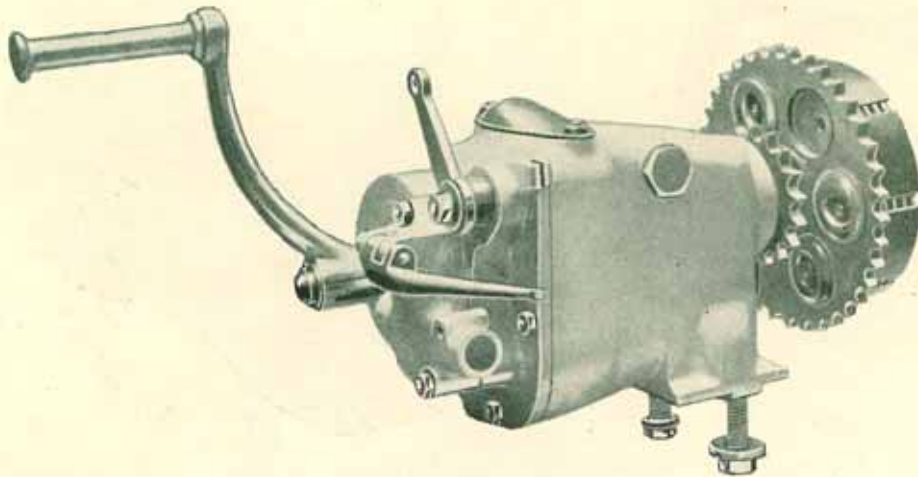


Model "H"

- SPECIFICATION.** 4-speed. All chain drive, with clutch and shock absorber, and 2 stud top or bottom fixing ("U") or Burman Patent PIVOTAL Fixing ("P").
2 plate clutch for engines up to 200 c.c.O.H.V. or 250 cc."SV"
3 250 c.c.O.H.V. or 350 c.c."SV"
- CHAINLINES.** Front: $3\frac{7}{16}$ " (87 mm.) or 3" (76 mm.)
Rear: $2\frac{8}{8}$ " (66 mm.) or $2\frac{3}{16}$ " (55 mm.)
- CHAIN WHEELS.** 37 teeth clutch, 19 teeth rear, for chain $\frac{1}{2}$ " (12.7 mm.) pitch, $\frac{3}{16}$ " (.205") (5 mm.) or $\frac{5}{16}$ " (.305") (7.9 mm.) wide.
- GEAR RATIO.** 1—1.28—1.64—2.73.
- CONTROL.** On tank tube or foot operated direct on box.
- SPEEDOMETER DRIVE.** Can be supplied. Details overleaf.
- WEIGHT.** 2 plate, 19 lbs. 5 oz. (8.723 kg.) 3 plate, 19 lbs. 13 oz. (8.980 kg.)

These weights are for standard gear boxes, with grease but without controls. Add 11 ozs. (0.311 kg.) for clutch control and for tank control see special control section of catalogue.

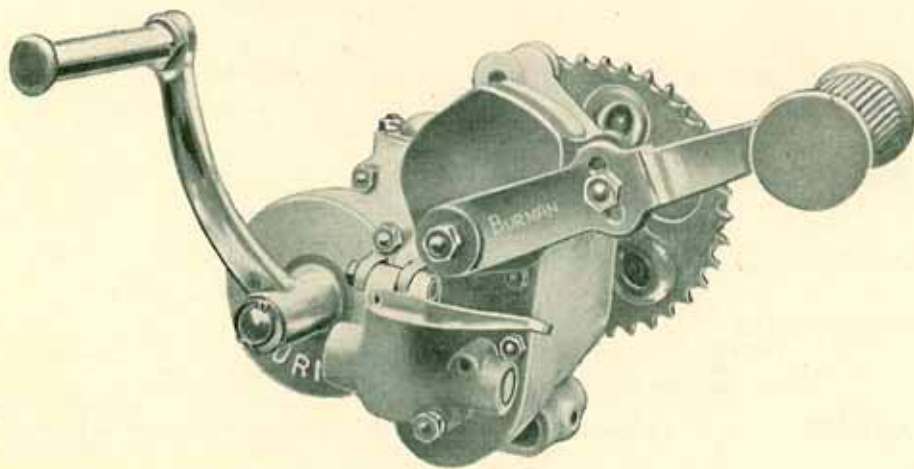
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Model "HU" Gear Box
with 3-plate clutch and
standard kick-starter.

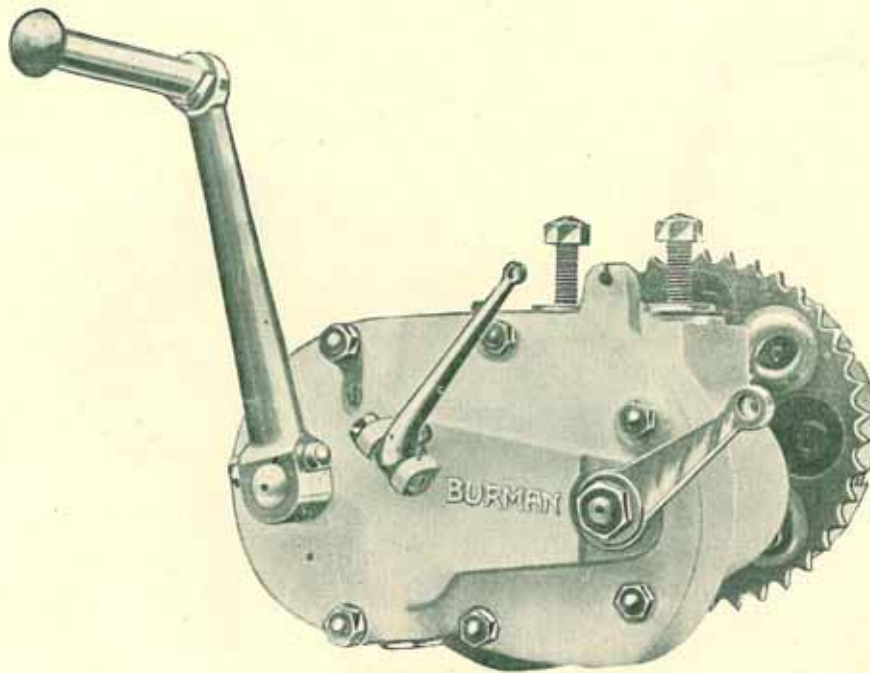
SPEEDOMETER DETAILS.

<i>Diameter of Rear Wheel</i>	<i>Rear Hub Sprocket</i>	<i>Flex Speed</i>
25" (635 mm.)...53 teeth	$\times \frac{1}{2}$ " (12.7 mm)...	1610 r.p.m. (1000 r.p.km.)



Model "HP" Gear Box
with Foot Control.

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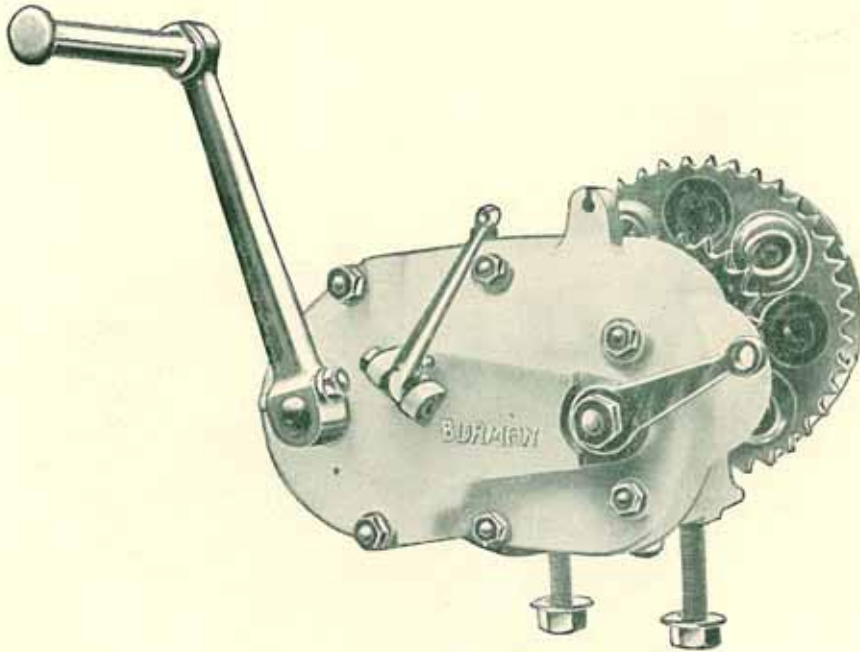


Model "C"

- SPECIFICATION.** 4-speed. All chain drive, with clutch and shock absorber, and 2 stud top or bottom fixing ("CU") or Burman Patent PIVOTAL fixing ("CP").
3 plate clutch for engines up to 350 c.c., O.H.V. or 500 c.c., S.V.
- CHAINLINES.** Front: $3\frac{7}{16}$ " (87mm.) or 3" (76mm.).
Rear: $2\frac{8}{8}$ " (66mm.), $2\frac{7}{16}$ " (62mm.) or $2\frac{3}{16}$ " (55mm.).
- CHAIN WHEELS.** 40 teeth clutch, 21 teeth rear, for chain, $\frac{1}{2}$ " (12.7mm.) pitch, $\frac{5}{16}$ " (.305") (7.9mm.) wide, 33 teeth clutch, 18 teeth rear for chain, $\frac{5}{8}$ " (15.9mm.) pitch, $\frac{3}{8}$ " (9.5mm.) wide.
- GEAR RATIOS.** Standard Ratio 1—1.28—1.5—2.66.
Close Ratio A 1—1.18—1.5—1.9.
- CONTROL.** On tank side or totally enclosed foot change.
- SPEEDOMETER DRIVE.** Can be supplied. Details overleaf.
- WEIGHT.** 25 lbs. (11.338 kg.) Add $\frac{1}{2}$ lb. (.227 kg.) for 3-speed and reverse.

This weight is for standard gear boxes, with grease but without controls. Add 11 ozs. (0.311 kg.) for clutch control and for gear control see special control section of catalogue,

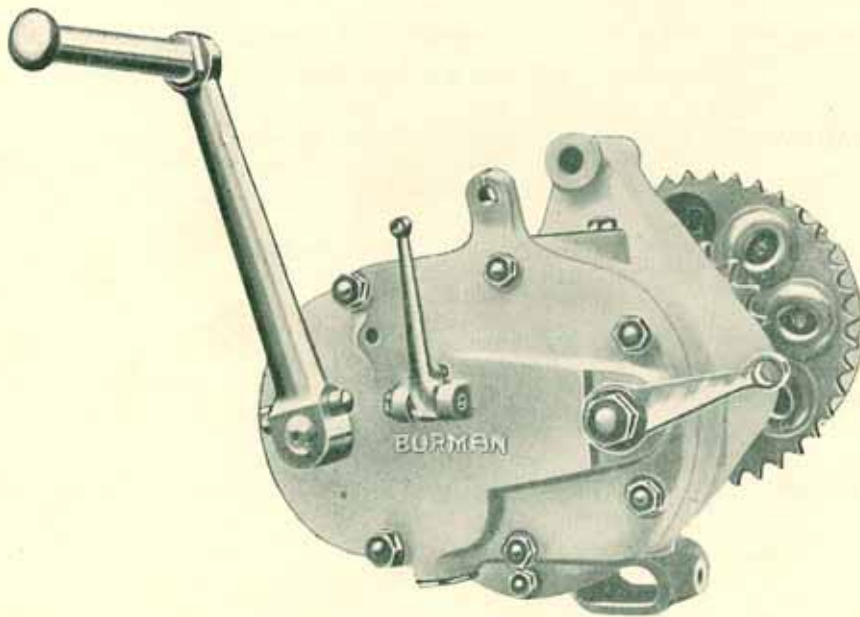
BURMAN



Model "CU"

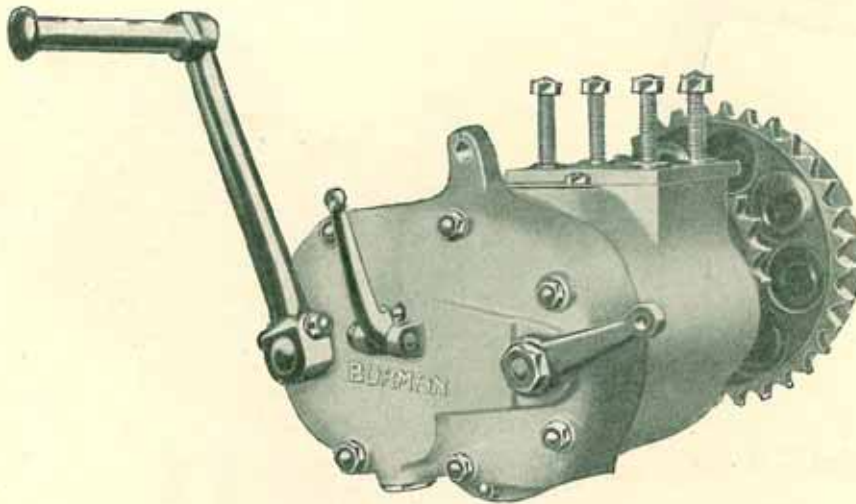
SPEEDOMETER DETAILS.

<i>Diameter of Rear Wheel</i>		<i>Rear Hub Sprocket</i>		<i>Flex Speed</i>
26" (660 mm.)	...	53 teeth $\times \frac{1}{8}$ " (12.7 mm.)	...	1610 r.p.m. (1000 r.p.km.)
"	...	"	...	2240 .. (1392 ..)
"	...	45 teeth $\times \frac{3}{8}$ " (16 mm.)	...	1610 .. (1000 ..)
"	...	"	...	2240 .. (1392 ..)



Model "CP"

BURMAN



Model "BA"

SPECIFICATION. 4-speed. All chain drive, with clutch and shock absorber, and 4 stud top or bottom fixing (BAU) or Burman Patent PIVOTAL fixing (BAP).

3 plate clutch for engines up to 500 c.c., S.V.
4 plate clutch for engines of 500 c.c., O.H.V., or over.

CHAINLINES. Front: $3\frac{7}{8}$ " (98mm.) or $3\frac{7}{16}$ " (87mm.) *Wegens of*
Rear: $2\frac{3}{4}$ " (73mm.) or $2\frac{7}{16}$ " (62mm.) *to be made*
Maakt fra midden of
Opdringingen.

CHAIN WHEELS. 40 teeth clutch, 21 teeth rear, for chain $\frac{1}{2}$ " (12.7mm.) pitch, $\frac{5}{16}$ " (.305") (7.9mm.) wide.
33 teeth clutch, 18 or 19 teeth rear, for chain $\frac{3}{8}$ " (15.9mm.) pitch, $\frac{3}{8}$ " (9.5mm.) wide.

GEAR RATIOS. Standard Ratio: 1—1.47—1.84—3.14.
High Ratio: 1—1.26—1.69—2.67.
Close Ratio A: 1—1.16—1.45—1.82.

This model can also be supplied with three speeds forward and one reverse (models BAR etc.) when the gear ratios will be 1—1.84—3.14 Reverse 2.76.
Other details as Model BA.

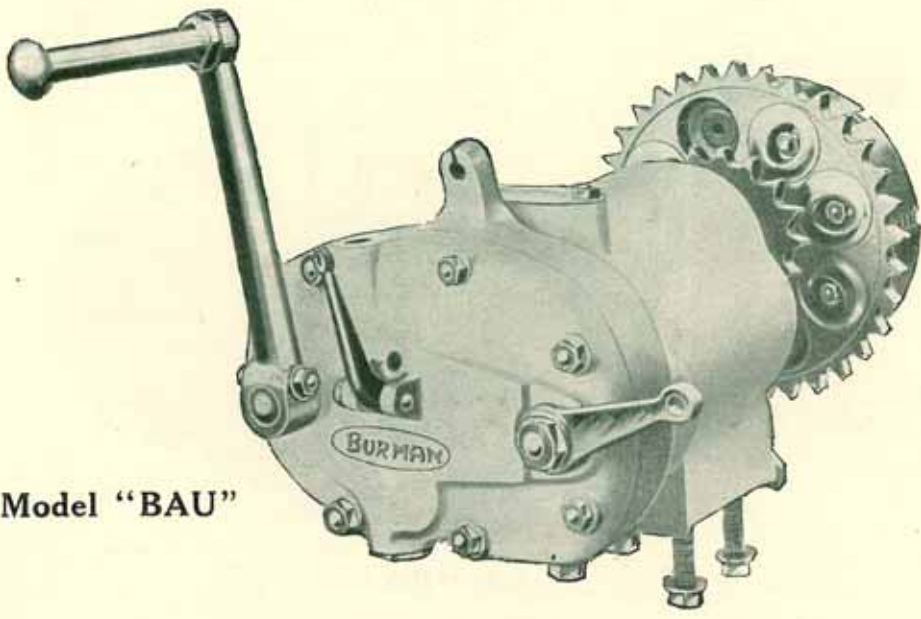
CONTROL. On tank side, or totally enclosed Foot change.

SPEEDOMETER DRIVE. Can be supplied. Details overleaf.

WEIGHT. 31 lbs. (14.059 kg.). Add $\frac{1}{2}$ lb. (.227 kg.) for three speed and reverse.

This weight is for standard gear boxes, with grease but without controls. Add 11 ozs. (0.311 kg.) for clutch control, and for gear control see special control section of catalogue.

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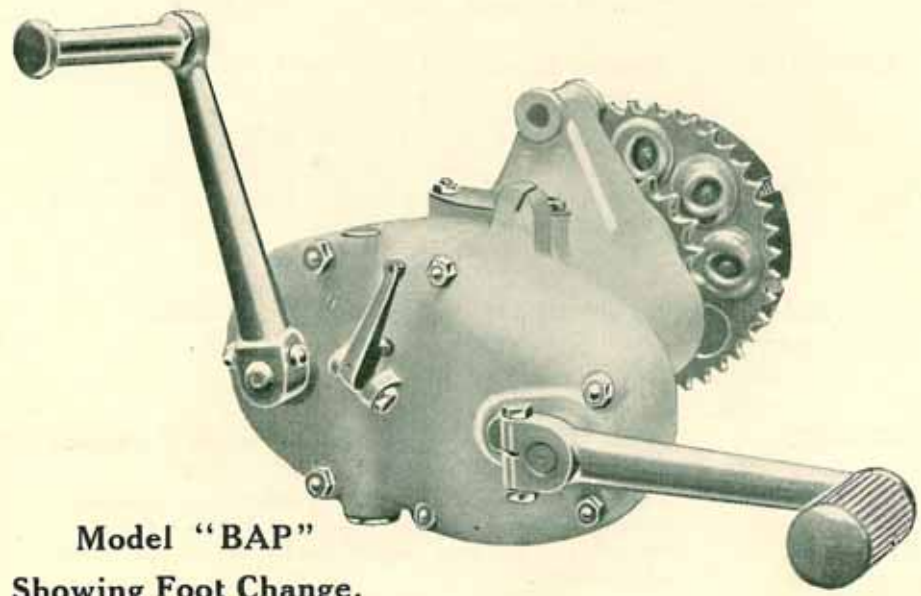


Model "BAU"

SPEEDOMETER DETAILS.

<i>Diameter of Rear Wheel</i>	<i>Rear Hub Sprocket</i>	<i>Driving Sprocket</i>	<i>Flex Speed</i>
27" (685mm.) ...	53 teeth × 1/2" (12.7mm.) ...	21 teeth ...	1610 r.p.m. (1000 r.p.km.)
" " ...	" " ...	" " ...	2240 " (1392 ")
" " ...	46 teeth × 3/8" (16mm.) ...	18 teeth ...	1610 " (1000 ")
" " ...	" " ...	" " ...	2240 " (1392 ")
26" (660mm.) ...	47 teeth × 3/8" (16mm.) ...	19 teeth ...	2240 " (1392 ")

The above particulars apply only to high ratio gears. By arrangement with the speedometer manufacturers, special instruments can be obtained to give a correct reading with the other gear ratios.



Model "BAP"
Showing Foot Change.

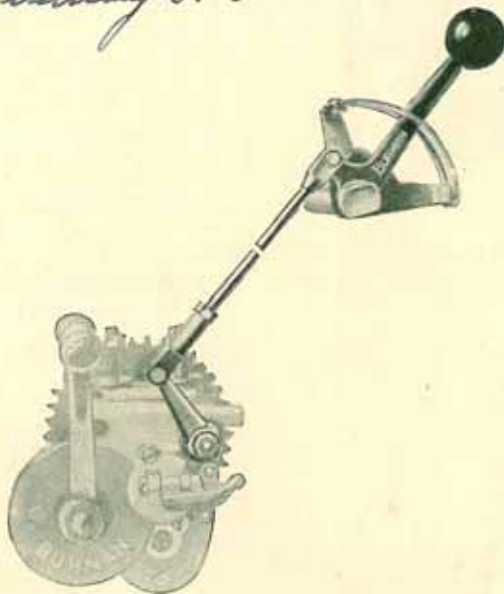
BURMAN

CONTROLS.

The various types of gear control for Burman gear boxes are illustrated here-
under. For all the three-speed gear boxes the position of the control gate
must be fixed so as to give approximately 90° between the centre lines of the
lever and rod when in middle gear. For the four-speed gear boxes this angle
must be given when in the neutral position between second and third gears
with the lever in the middle of the gate.

1. TANK TUBE CONTROL.

Howe Manufacturing Co. S. W. Chicago.



This type of control can be supplied for either three or four speed gear boxes
and with or without a clip-on or braze-on lug for the tank tube, the diameter
of which should be stated when ordering, together with length of rod.

Approximate weight: 2 lbs. 7 ozs. (1.105 kg.).

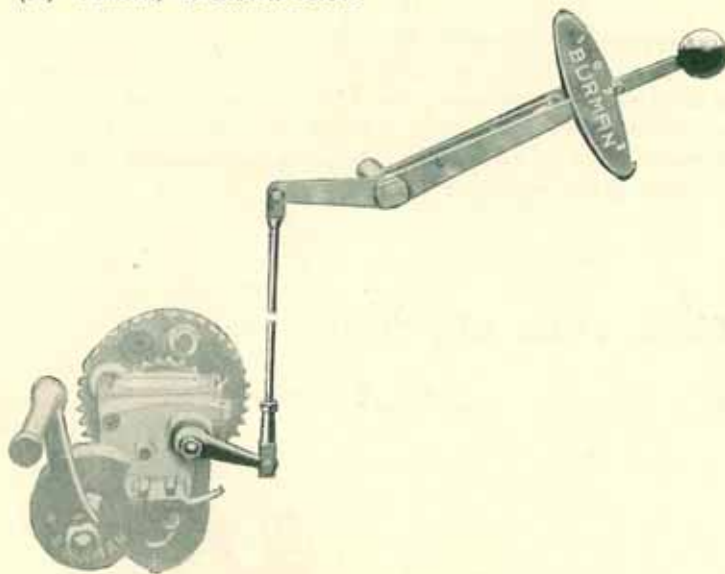
This includes $1\frac{1}{8}$ " lug (14 ozs. = .397 kg.) and 21" rod (8 ozs. = .227 kg.).

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2. LONG TANK CONTROL.

This is of two types, the gate in each case being designed for attachment to the tank side.

(A) Pattern, as shown below.

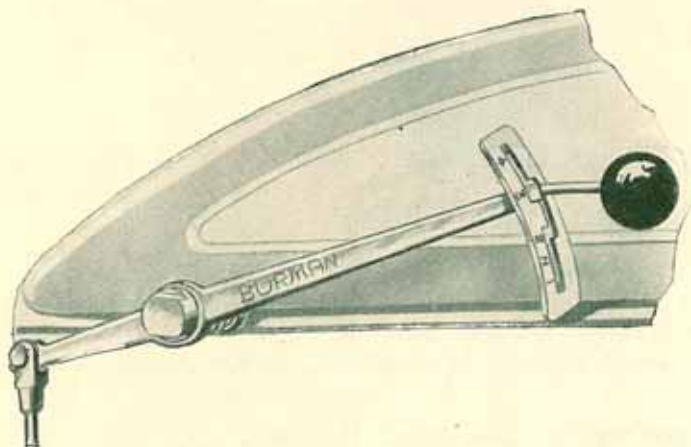


This type is only suitable for three-speed gear boxes.

Weight: 2 lbs. (.907 kg.).

This includes 12½" rod (7 ozs. = .199 kg.).

(B) Pattern.



This pattern is available for three or four speed gear boxes.

Weight: 1 lb. 5 ozs. (.595 kg.).

This includes 12½" rod (7 ozs. = .199 kg.).

BURMAN

GEAR BOX SYMBOLS AND SPECIFICATION.

Symbols representing the type of Gear Box, followed by the serial number of the Gear Box, are stamped on the Kick Starter Case of all Burman Gear Boxes. An explanation of these symbols is given hereunder:—

Three Speed.

G	...	2 stud top fixing	...	Single or plate clutch.
GU	...	2 stud bottom fixing	...	.. .. ..
GP	...	Pivotal fixing	...	.. .. ..
R	...	2 stud top fixing	...	2 or 3 plate clutch.
RU	...	2 stud bottom fixing	...	.. .. ..
RP	...	Pivotal fixing	...	.. .. ..
W	...	2 stud top fixing	...	3 plate clutch.
WU	...	2 stud bottom fixing	...	.. .. ..
WP	...	Pivotal fixing	...	.. .. ..
T	...	2 or 4 stud top fixing	...	3 or 4 plate clutch.
TU	...	2 or 4 stud bottom fixing	...	.. .. ..
TP	...	Pivotal fixing	...	.. .. ..
AP	...	Pivotal fixing only	...	3 or 4 plate clutch.

Four Speed.

H	...	2 stud top fixing	...	2 or 3 plate clutch.
HU	...	2 stud bottom fixing	...	.. .. ..
HP	...	Pivotal fixing	...	.. .. ..
C	...	2 stud top fixing	...	3 or 4 plate clutch.
CU	...	2 stud bottom fixing	...	.. .. ..
CP	...	Pivotal fixing	...	.. .. ..
BA	...	4 stud top fixing	...	3 or 4 plate clutch.
BAU	..	4 stud bottom fixing	...	.. .. ..
BAP	...	Pivotal fixing	...	.. .. ..

Three Speed and Reverse.

BAR	...	4 stud top fixing	...	3 or 4 plate clutch.
BAUR	...	4 stud bottom fixing	...	.. .. ..
BAPR	...	Pivotal fixing	...	.. .. ..

The gear ratios will be designated, where applicable, High Ratio, Standard Ratio, Close Ratios A, B, C or D. The above symbols will therefore be followed by the undermentioned in the order given:—

B	...	for Balloon Tyre Chainlines.
D	...	.. Speedometer Drive.
H	...	.. High Ratio Gears.
CA	...	.. Close Ratio A.
CB	...	.. Close Ratio B.
CC	...	.. Close Ratio C.
CD	...	.. Close Ratio D.

A group of letters without any indication as to gear ratio will accordingly be understood to represent a Gear Box with Standard Ratio Gears.