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RALEIGH

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This Guarantee applies only to those parts of the bicycle or tricycle manufactured by us and in the case of defects in components such as tyres, rims and saddles, the purchaser should refer to the respective manufacturers of these components.

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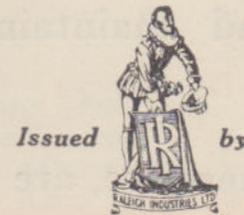
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CYCLE *Maintenance* HANDBOOK

Raleigh Industries Limited

including

Sturmey-Archer Hub Gears and Brakes
Dynohub Lighting Equipment, etc.



RALEIGH INDUSTRIES LIMITED

Makers of Fine Bicycles

NOTTINGHAM

ENGLAND

FOREWORD

The instructions given in the following pages cover all points of adjustment and lubrication and will help you to maintain your bicycle in perfect condition. With its aid you will enjoy many miles of happy and trouble-free cycling.

Our Dealers are ably supported, not only by the Service Organisation of our Wholesale Depots and Distributing centres throughout the world, but by our factory at Nottingham, which has had over 60 years' valuable experience of building and maintaining quality bicycles.

Such Dealers, therefore, are in a position to give satisfaction in any matter on which you may desire further advice or assistance.

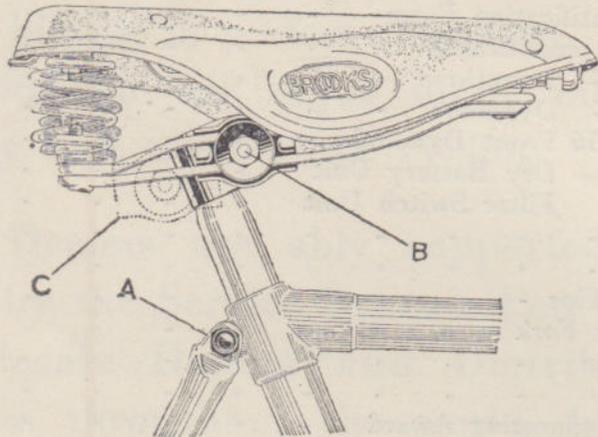
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To adjust the

Height of Saddle

Slacken nut "A", move saddle to required height, then tighten nut "A". At least $2\frac{1}{2}$ " of the seat pillar should remain in the frame. For the correct position of the saddle, see below. The lateral position of the saddle may be adjusted by slackening nuts "B" on each side and sliding saddle chassis forward or backward as desired. If saddle is still too far forward, remove saddle and reverse the clip so that nuts "B" are at position "C" at rear of seat pillar, then slide saddle to the desired position. Tighten nuts "B" equally.



Riding Position

Correct saddle-height can be determined by the rider placing his heels on the pedals when at their lowest position, with the leg fully extended. This allows for a slight bend in the knee when pedalling with the ball of the foot on the pedal. The nose of the saddle should be about three inches behind a vertical line cutting through the centre of the bottom bracket; the nose of the saddle tilted slightly upwards.

With the handlebar grips approximately in line with the top of the saddle, the rider should feel his weight is so balanced that the hands rest lightly on the handlebars, thus preventing strain on the wrists and forearms.

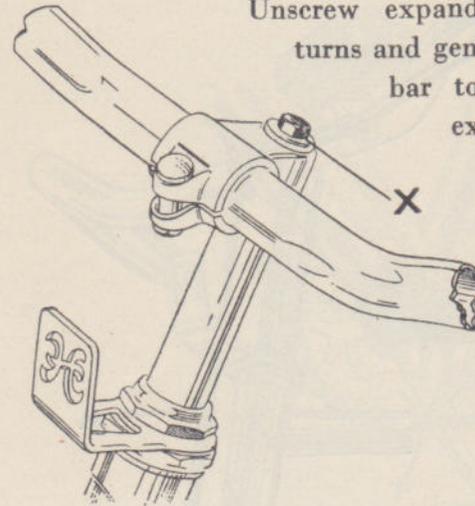
A sound general rule is to adjust the position so as to disperse the weight of the rider's body evenly over the three points of contact, i.e. handlebars, saddle and pedals.

To adjust the

Height of Handlebar

CALLIPER BRAKE MODELS

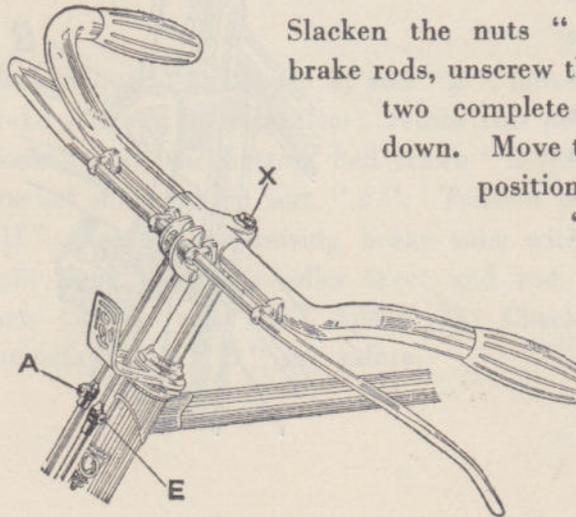
Unscrew expander bolt "X" two complete turns and gently tap it down. Move handlebar to desired position and tighten expander bolt. At least $2\frac{1}{2}$ " of handlebar stem must remain in the fork steering tube.



If bicycle is fitted with a head clip (not illustrated) slacken head clip nut, move handlebar to the desired position and tighten head clip nut.

ROD BRAKE MODELS

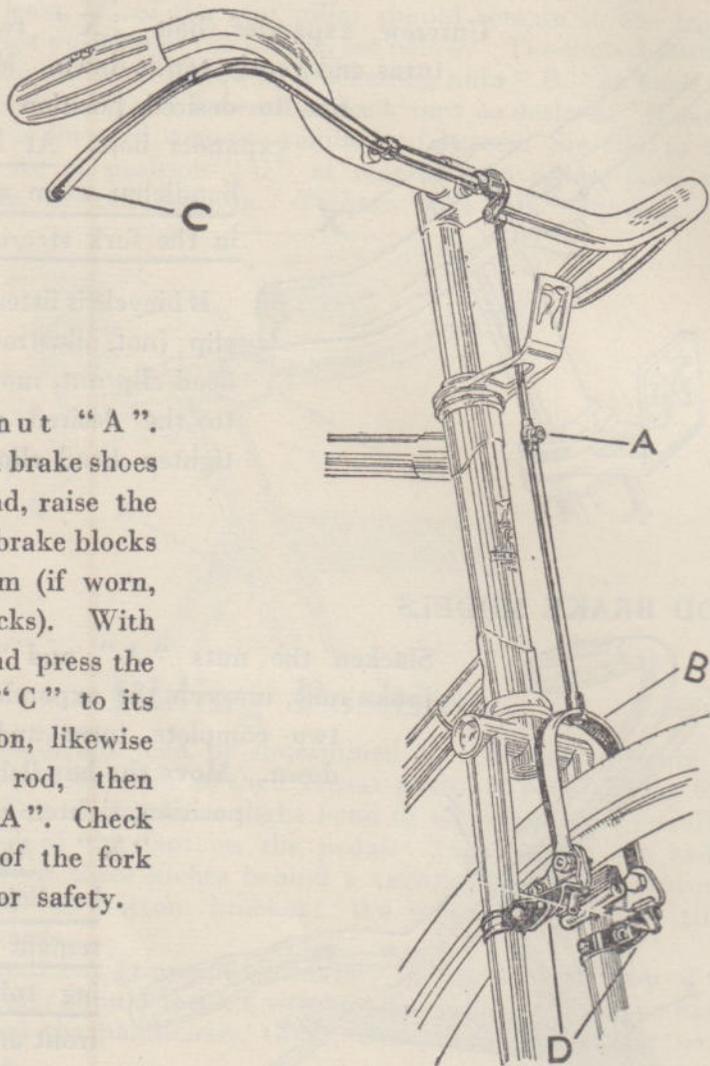
Slacken the nuts "A" and "E" on the brake rods, unscrew the expander bolt "X" two complete turns and gently tap down. Move the handlebar to desired position, tighten expander bolt "X". At least $2\frac{1}{2}$ " of handlebar stem must remain in fork steering tube.



Adjust front and rear brakes as detailed on pages 6 and 7 or 8 and 9.

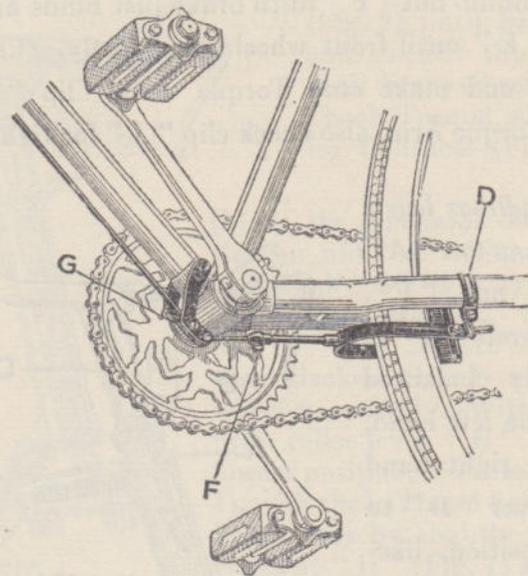
To adjust the
Rod-operated Front Brake

Slacken nut "A". Holding both brake shoes with left hand, raise the stirrup until brake blocks just clear rim (if worn, fit new blocks). With the right hand press the roller lever "C" to its lowest position, likewise the brake rod, then tighten nut "A". Check the position of the fork clips "D" for safety.



To adjust the
Rod-operated Rear Brake

Slacken nuts "E" (page 5) and "F", move the brake stirrup until brake blocks just clear rim; retain this position (if worn, fit new blocks). Set the bottom bell crank "G" until it touches bottom bracket and tighten nut "F". Tension the brake rods at point "H" (page 9) by raising brake tube with left hand. With the right hand press the roller lever and rod to its lowest position, then tighten nut "E" (page 5). Check the position of the chainstay clips "D" for safety.

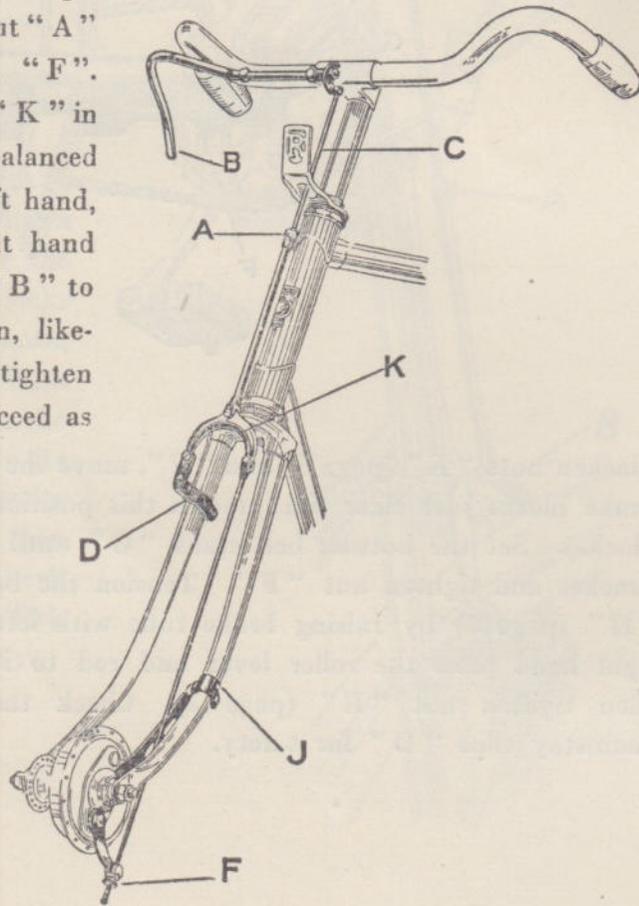


To adjust the

Rod-operated Front Hub Brake

(a) Tighten thumb nut "F" until brake just binds and then slacken thumb nut "F" until front wheel spins freely. Check clip "D" for tightness and make sure Torque Arm Clip "J" completely engages the Torque Arm, also check clip "J" for tightness.

(b) If the handlebar height is altered slacken nut "A" and thumb nut "F". Hold stirrup arch "K" in a horizontally balanced position by the left hand, and with the right hand press roller lever "B" to the lowest position, likewise rod "C", then tighten nut "A" and proceed as paragraph (a).



8

To adjust the

Rod-operated Rear Hub Brake

(a) Tighten thumb nut "F" (Fig. 2) until brake just binds and slacken thumb nut "F" until rear wheel spins freely. Check Torque Arm Clip "J" for tightness (Fig. 2).

(b) If the handlebar height is altered slacken nut "E" (Fig. 1), set bottom bell crank "G" (Fig. 2) until it touches the bottom bracket. Tighten thumb nut "F" (Fig. 2) until brake just binds, then slacken thumb nut "F" until wheel spins freely. With the right hand press roller lever "B" (Fig. 1) to its lowest position, likewise rod "C" (Fig. 1), with the left hand lightly tension the brake rods by slightly raising the bell crank at "H" (Fig. 1) and tighten nut "E" (Fig. 1). Re-check rear wheel for free running and check Torque Arm Clip "J" (Fig. 2) for tightness.

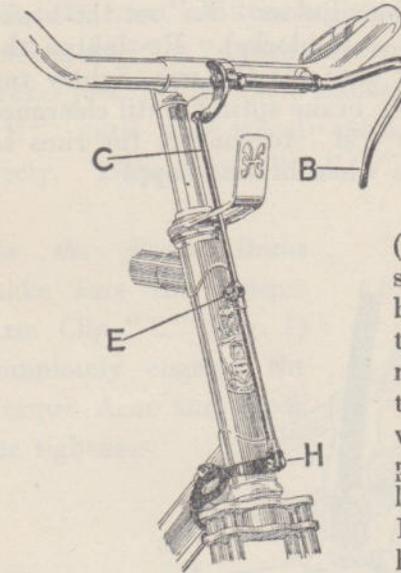


FIG. 1.

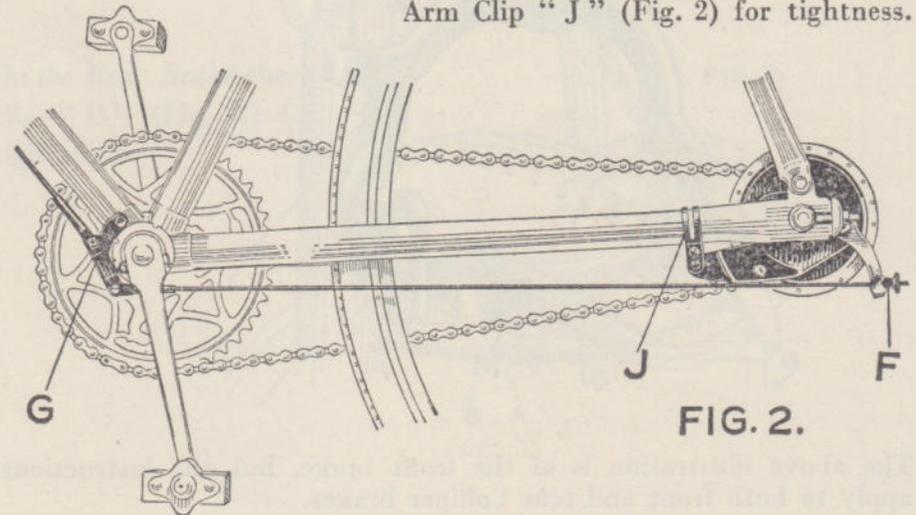


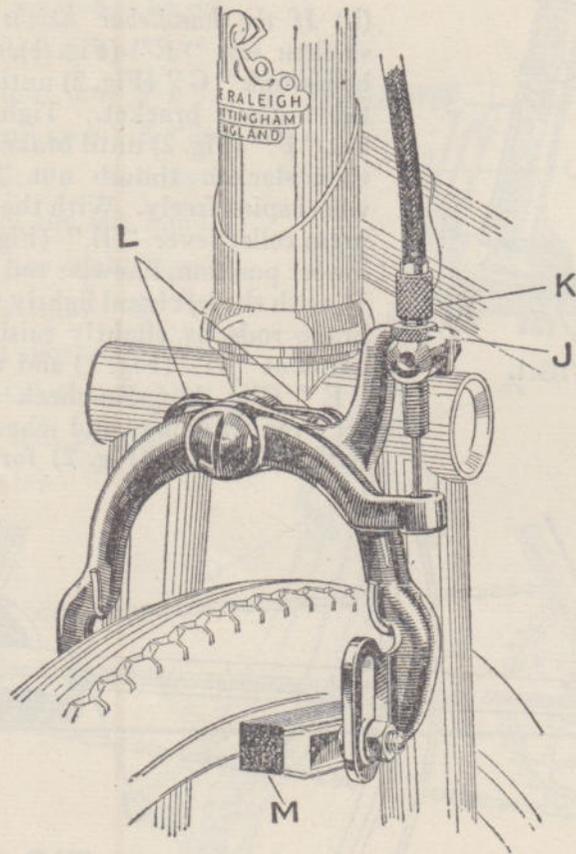
FIG. 2.

9

To adjust the

Calliper Front and Rear Brakes

Slacken the finger-nut "J". With the adjuster "K" set the brake blocks to just clear rim (if worn, fit new blocks). Re-tighten the finger-nut "J". If one brake block contacts the rim, lightly tap down the opposite side coil "L" of the brake spring, until clearance is equidistant. Set the brake blocks "M" to contact the rims so that they do not touch the tyre walls when brake is applied.



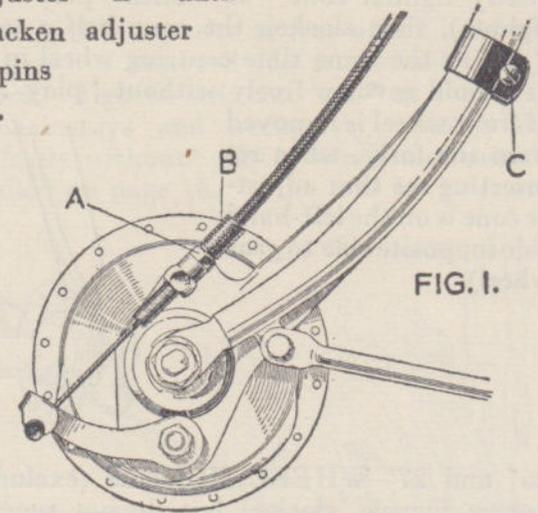
The above illustration is of the front brake, but the instructions apply to both front and rear Calliper brakes.

To adjust the

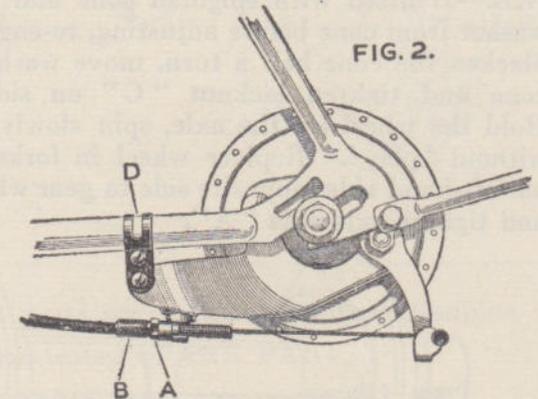
Cable-operated Hub Brakes

For both front and rear brakes (Figs. 1 and 2) slacken nut "A", turn adjuster "B" until brake just binds, then slacken adjuster "B" until the wheel spins freely. Tighten nut "A".

On the Front Brake make sure the Torque Arm Clip "C" (Fig. 1) completely engages the Torque Arm and check for tightness.



On the Rear Brake check clip "D" (Fig. 2) for tightness.

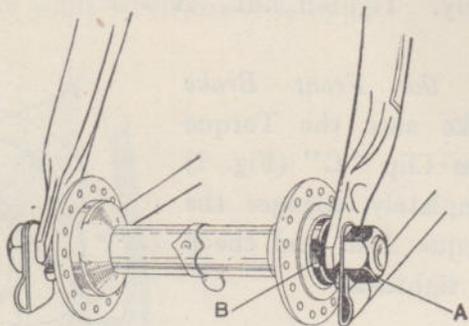


To adjust the Front Wheel

28" WHEEL, BALLOON, CARRIER AND 17"/15½" JUNIOR MODELS

Slacken the axle nut "A" only on the adjusting cone side (left-hand), gently tighten cone "B" until 'play' is removed (do not over-tighten), then slacken the cone half a turn. Tighten the axle nut "A" at the same time centring wheel in forks. Spin wheel slowly. It should revolve freely without 'play'.

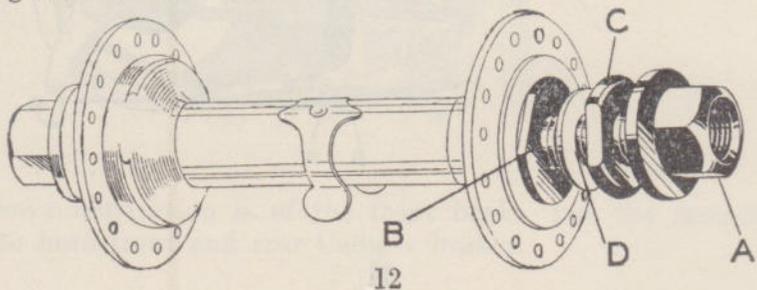
If front wheel is removed from the forks, when re-inserting see that adjuster cone is on the left-hand side (opposite side to gear wheel).



26" and 27" WHEEL MODELS (excluding Balloon)

Invert bicycle, slacken but do not remove axle nuts and washers "A"—remove wheel. Slacken locknut "C" on side where axle is grooved, and gently tighten cone "B" until all 'play' is removed—do not over-tighten.

N.B.—If fitted with spigoted cone and serrated washer, disengage washer from cone before adjusting, re-engage washer after adjusting. Slacken the cone half a turn, move washer "D" until it abuts the cone and tighten locknut "C" on side where axle is grooved. Hold the wheel by the axle, spin slowly. It should revolve freely without 'play'. Replace wheel in forks with grooved end of axle on left-hand side (opposite side to gear wheel). Centre wheel in forks and tighten axle nuts "A".



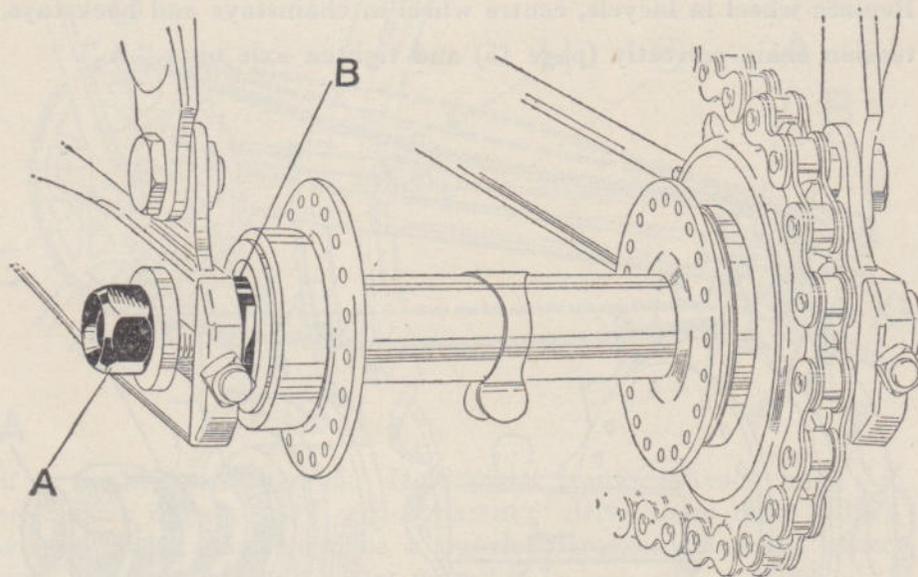
12

To adjust the

Rear Wheel

28" WHEEL, BALLOON, CARRIER AND 17"/15½" JUNIOR MODELS

Slacken axle nut "A" only on side opposite to free-wheel. Gently tighten cone "B" until 'play' is removed (do not over-tighten), then slacken cone half a turn. Tighten axle nut "A" at the same time centring wheel in chainstays and backstays. Spin wheel slowly. It should revolve freely without 'play'. On Junior models check chain tension as detailed on page 16.



Whenever replacement parts are required, fit only Genuine
R.I. Precision-tested SPARE PARTS.

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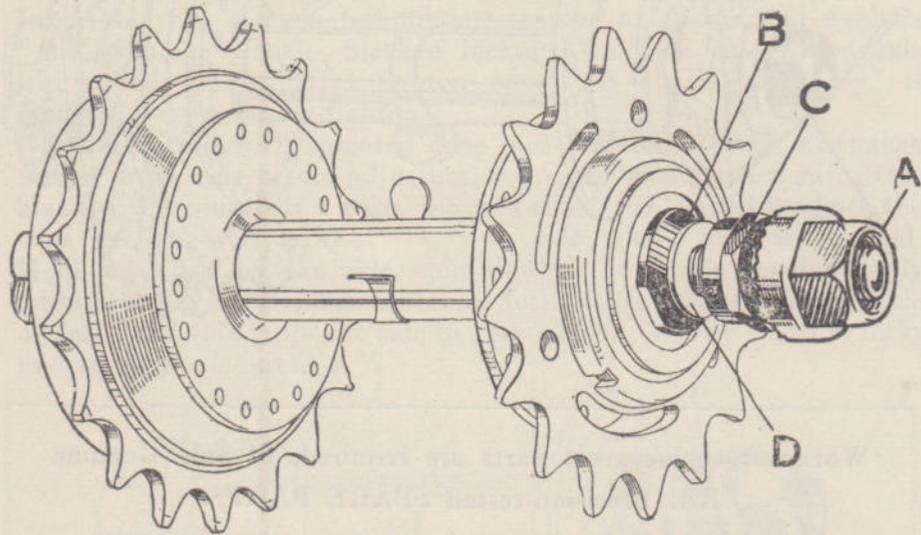
13

26" and 27" WHEEL MODELS

Invert bicycle, slacken, but do not remove, axle nuts and washers "A"—remove wheel. Slacken locknut "C" on side where axle is grooved, and gently tighten cone "B" until all 'play' is removed.

N.B.—If fitted with spigoted cone and serrated washer, disengage washer from cone before adjusting, re-engage washer after adjusting.

Slacken the cone half a turn and tighten locknut "C". Hold wheel by the axle, spin slowly. It should revolve freely without 'play'. Replace wheel in bicycle, centre wheel in chainstays and backstays, tension chain correctly (page 15) and tighten axle nuts "A".



To adjust the

Crank, Bottom Bracket and Chain Drive

Invert bicycle, slacken rear axle nuts "A" and rear brake. On Roadster models slacken chain adjuster nuts "B" for about $\frac{1}{8}$ ". Move wheel forward to allow chain to slacken. Take off "C" spring link on the chain, by forcing the ends of the "C" forward, remove the link plate and half link, finally remove the chain. Clean and

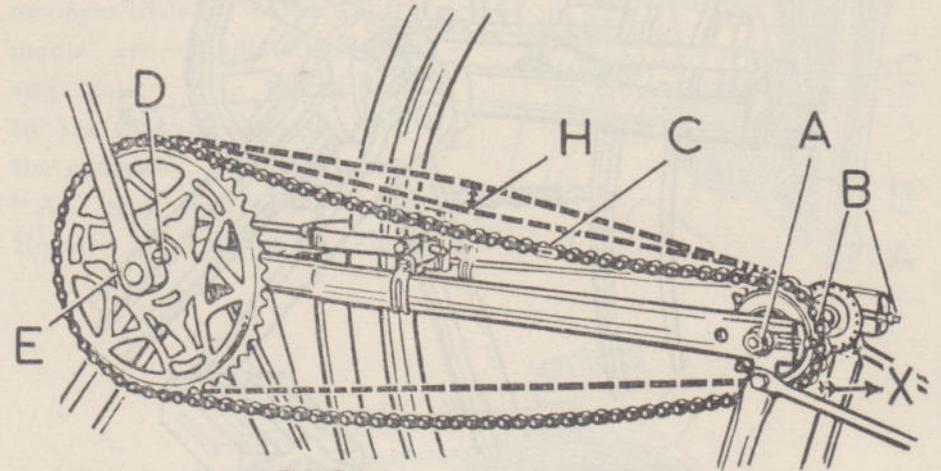


FIG. 1.

oil as detailed on page 35. Hold pedal cranks in each hand; if loose, slack cotters "D" are apparent; drive them tight with a hammer, using hard-wood as a punch—damage will result otherwise. Re-tighten crank cotter nuts "E".

To adjust bottom bracket bearing (Fig. 2), slacken locking "F". Firmly screw up the cup "G" without excessive pressure, then slacken about $\frac{1}{8}$ of a turn and tighten locking "F". Test bearing for free running.

Loop chain over rear sprocket and gear wheel. Fit the half link with the link plate and the "C" spring link on the outside—taking care to position the closed end of the spring link in the direction of rotation. The chain tension is correct when at point "H" it can be moved about $\frac{1}{2}$ " (See Fig. 1).

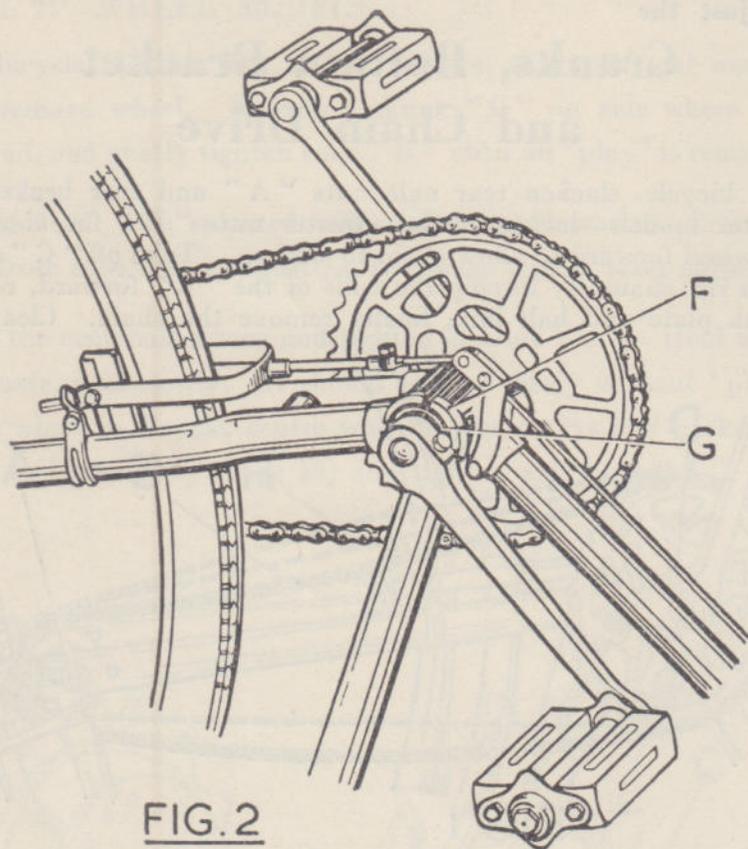


FIG. 2

28" WHEEL, BALLOON AND CARRIER MODELS

Tighten adjuster nuts "B" (Fig. 1) until tension is correct, and wheel is central in chainstays and backstays. Tighten axle nuts "A". Re-adjust rear brake (for details see pages 7 or 9).

26" and 27" WHEEL AND JUNIOR MODELS (excluding Balloon)

Move wheel in direction of "X" (Fig. 1) by hand until the chain tension is correct. Tighten axle nut "A" on chainside only, set wheel central in chainstays and backstays, then tighten remaining axle nut "A". Re-adjust the rear brake (for details see pages 7 and 9 for rod brakes and on pages 10 and 11 for cable brakes).

The Gearcase

If cycle is fitted with a Gearcase, it is necessary, before attempting adjustments shown on pages 13 and 15, to remove Gearcase End Cap. To do this remove the screw or screws "A" (one on 28" wheel models, two on 26" wheel models) Fig. 1, also remove the two slides "B" and end cap "C", then proceed either as detailed on pages 13 or 15. After adjustments are completed replace end cap "C", taking care to see that all lips fit inside the gearcase. Replace screws "A" and refit slides "B". Rotate rear wheel to check

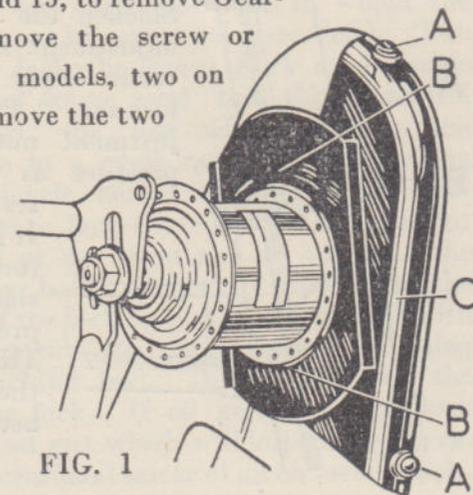


FIG. 1

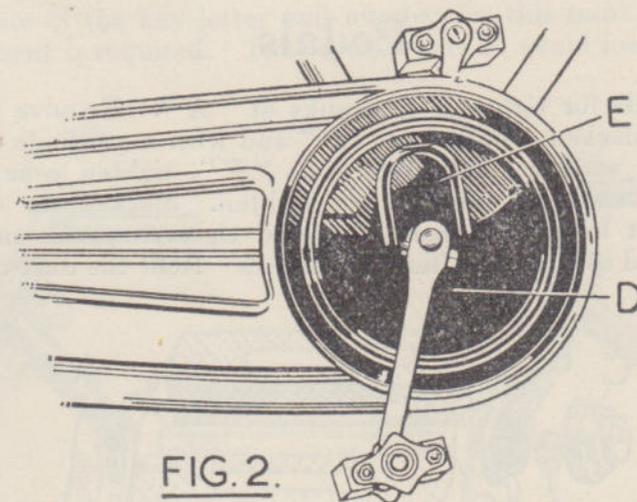
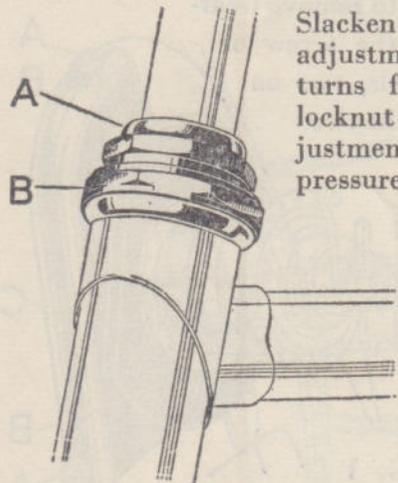


FIG. 2.

free running. If disc "D" (Fig. 2) is removed be sure to replace slide "E" in the uppermost position.

To adjust the
Steering Head



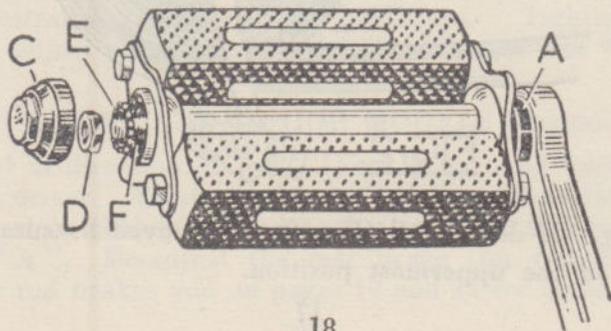
Slacken the locknut "A", gently turn the adjustment nut "B" clockwise until head turns freely without 'play', and tighten locknut "A". When tightening the adjustment nut "B" do not use excessive pressure as damage to the ballraces will result.

If bicycle is fitted with a head clip (not illustrated) it is necessary to slacken the Head Clip Nut before proceeding as previous paragraph. This nut should be tightened after the steering head adjustment has been completed.

To adjust the

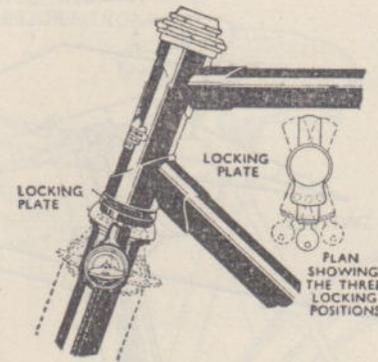
Pedals

Check pedals for tightness in cranks at "A". Remove the dust-cap "C", slacken spindle nut "D" and with a penknife disengage the locking washer "E" from cone "F", tighten cone until all 'play' is removed; do not over-tighten. Slacken the cone half a turn, refit locking washer "E" and tighten spindle nut "D". Pedal should spin freely after adjustment. Refit the dust-cap "C".



The Patent Front Fork Lock

THE LOCK

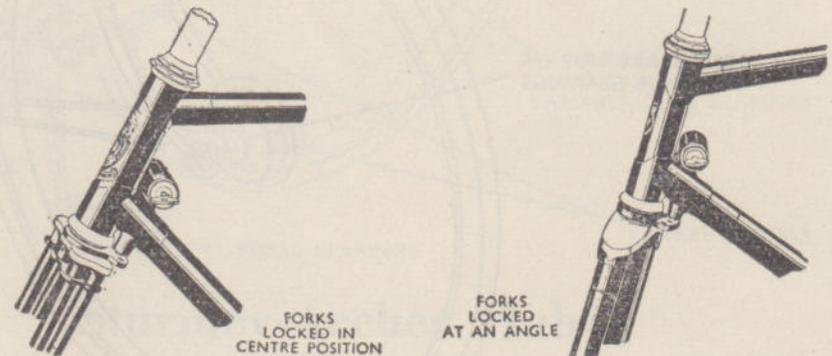


There are three positions in which the lock can be operated (see left). Two which lock the Front Fork at an angle to the frame and the third, central position, for use when parking the bicycle in a cycle rack. When parking the bicycle beside the kerb, it is advisable to lock the cycle with the Front Wheel at an angle and to see that the locking bolt is correctly housed in the hole of the locking plate. Never lock with bolt outside the plate, thereby exposing the locking bolt. Do not lubricate the key or lock. If oil gets into the lock

mechanism, it may collect dust and grit which will impede its operation. All that is necessary is an occasional smear of oil on locking bolt.

THE KEY

Make a note of the key letter and number, as this must be quoted if replacement is required. Take special care to avoid loss of key.



DO NOT RIDE OR LEAVE BICYCLE WITH KEY STILL IN THE LOCK

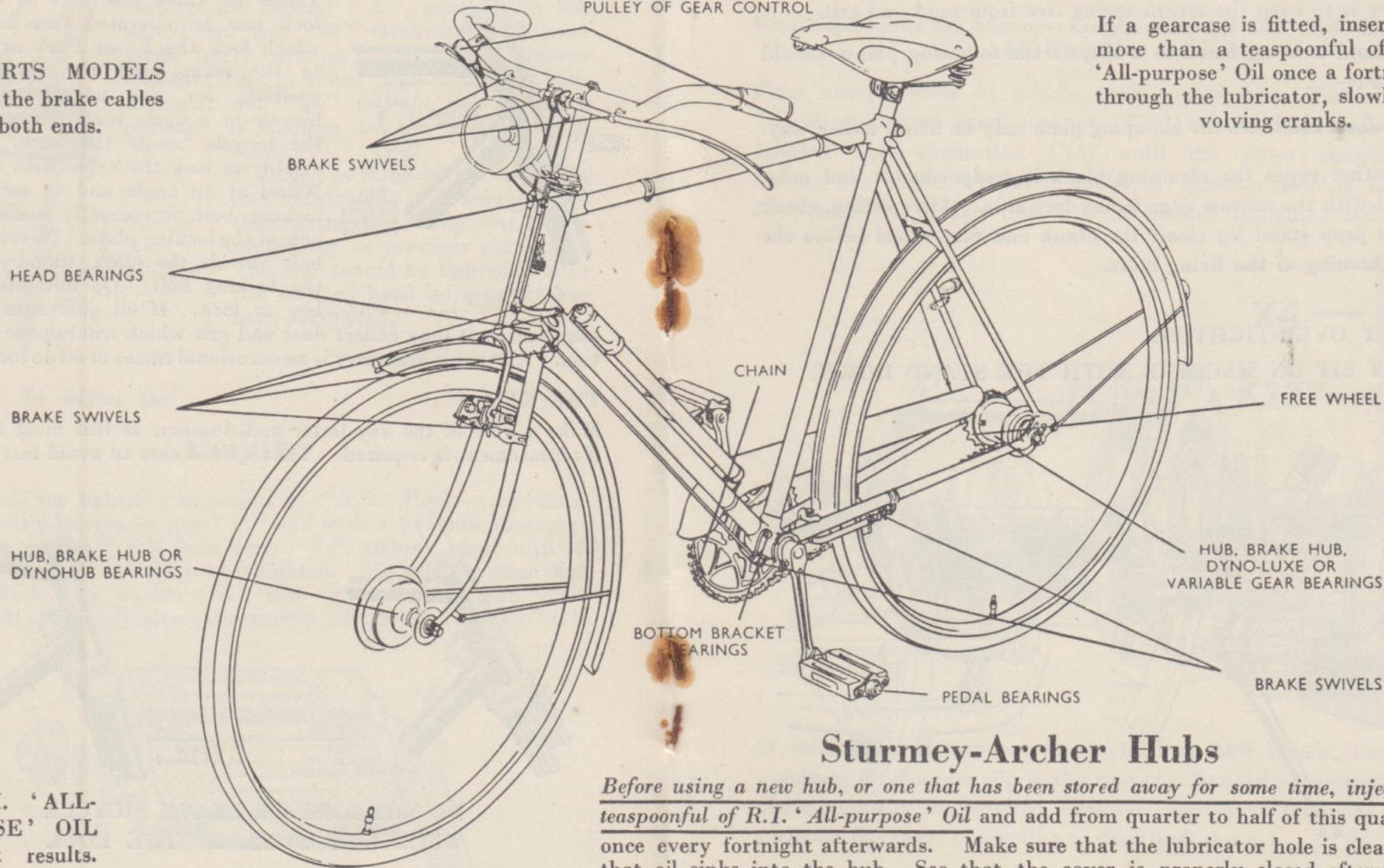
Where to Lubricate

To ensure sweet running and long life of wearing parts lubricate once a fortnight at all points shown on diagram.

TRIGGER CONTROL OR QUADRANT AND
PULLEY OF GEAR CONTROL

If a gearcase is fitted, insert not more than a teaspoonful of R.I. 'All-purpose' Oil once a fortnight, through the lubricator, slowly revolving cranks.

On SPORTS MODELS
lubricate the brake cables
at both ends.



Use R.I. 'ALL-PURPOSE' OIL for best results.

Sturmey-Archer Hubs

Before using a new hub, or one that has been stored away for some time, inject one teaspoonful of R.I. 'All-purpose' Oil and add from quarter to half of this quantity once every fortnight afterwards. Make sure that the lubricator hole is clear and that oil sinks into the hub. See that the cover is properly closed afterwards. Oil trigger control inner wire occasionally. Do not use thick oil or grease.

Prop Stand

This unit does not require lubrication, and the only maintenance necessary is to keep the return spring free from mud and grit.

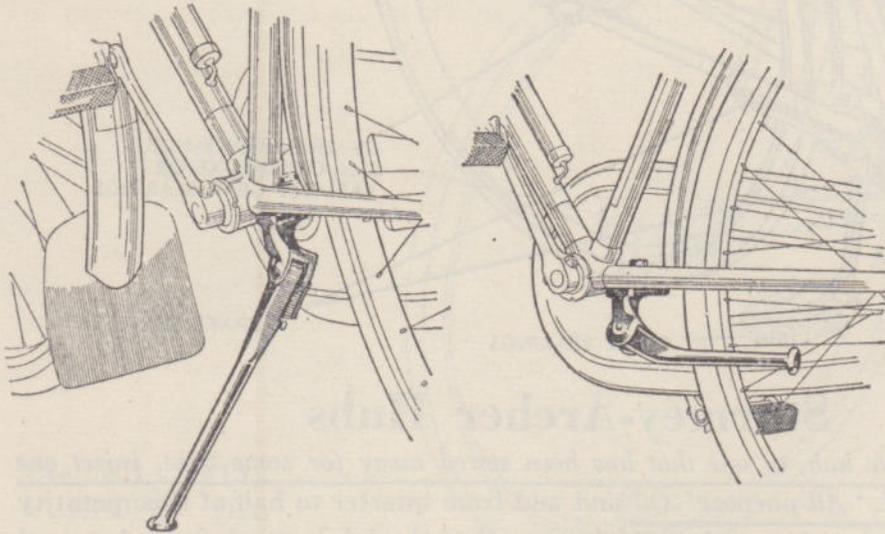
If the stand is being fitted to a bicycle the following points should be noted:—

On 28" wheel machines the clamping plate may be fitted either way.

On all other types the clamping block is wedge-shaped and must be fitted with the narrow edge facing forwards. After fitting, check that the prop stand leg clears the crank and rear wheel before the final tightening of the fixing bolts.

DO NOT OVER-TIGHTEN.

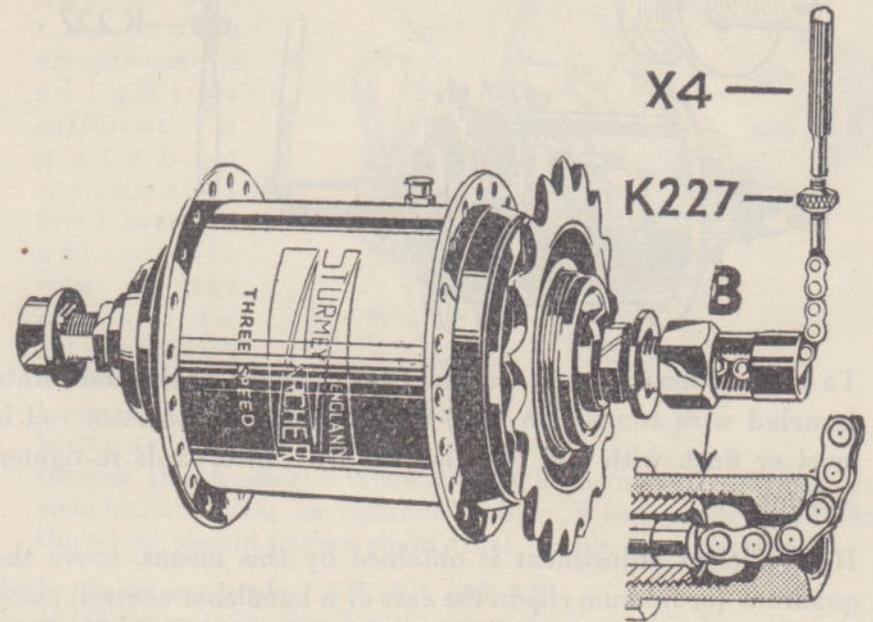
DO NOT SIT ON MACHINE WITH THE STAND DOWN.



Sturmey-Archer Gear Hubs, Brake Hubs and Dynohubs

Gear adjustment for Sturmey-Archer AW, AB and TCW hubs and AG Dynothree hub.

Place control lever in middle gear position, i.e. Normal Gear. To adjust, loosen small locknut (K227) above chain and rotate knurled wire connection (X4) until the outer shoulder on indicator attached to small chain at sprocket side is level or flush with end of axle (See B). Afterwards re-tighten locknut.



If insufficient adjustment is obtained by this means, move the quadrant (or fulcrum clip in the case of a handlebar control) along the top tube in the required direction, and make the final adjustment on the chain connection as described above.

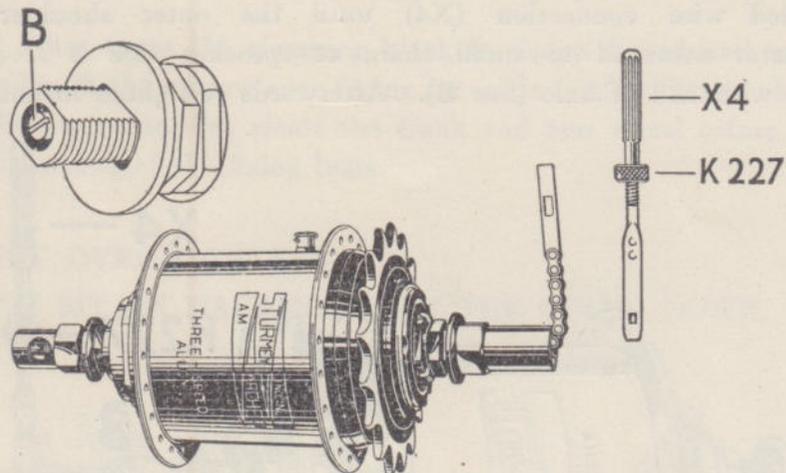
Should gears slip, check and re-adjust immediately.

Gear adjustment for Sturmey-Archer AM, ASC and AC 3-speed hubs, FW, FM and FC 4-speed hubs and FG Dynofour hub.

Place control lever in :—

Middle gear position ("N" in trigger control window), i.e. normal gear for AM, ASC and AC hubs.

Low gear ("L" in trigger control window), i.e. next to bottom gear for FW, FM, FC and FG hubs.



To adjust, loosen small locknut (K227) above chain and rotate knurled wire connection (X4) until the end of indicator rod is level or flush with end of axle (See B). Afterwards re-tighten locknut.

If insufficient adjustment is obtained by this means, move the quadrant (or fulcrum clip in the case of a handlebar control) along the top tube in the required direction, and make the final adjustment on the chain connection as described above.

Should gears slip, check and re-adjust immediately.

Lubrication.

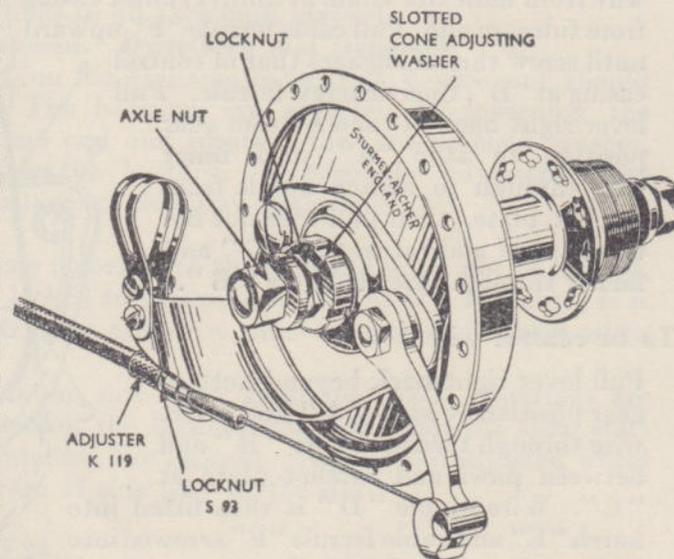
See pages 20-21.

Bearing adjustment for Sturmey-Archer hubs.

The right-hand cone is fixed at Works and should not be touched. Bearings are adjusted by loosening the locknut on the left-hand side and adjusting the cone suitably, then re-tightening the locknut. A properly adjusted wheel should have a trace of side play at the rim. This adjustment automatically sets all the bearings in the hub.

Bearing adjustment for BF, BR, AB and TCW Hubs.

The adjustment is carried out in exactly the same way as described above, but the cone arrangement is slightly different. A notched washer is fitted over the adjustable cone on the brake side. Adjustment is effected by loosening the locknut and turning this washer. When correct adjustment is obtained the cone locknut must be tightened fully. When correctly adjusted the wheel should have a slight trace of side play at the rim.



Brake lining renewals. BF, BR and AB.

If efficiency is impaired and cannot be corrected by adjustment, brake linings may be worn and need renewal. Your Dealer should be consulted, he will arrange to re-line the brake shoes.

Brake. TCW.

Lubrication of the gear automatically provides for the brake mechanism. No other attention is necessary. If the brake requires attention the dealer should be consulted.

Sturmey-Archer Patent Handlebar Trigger 'Flick' Control

To remove control wire.

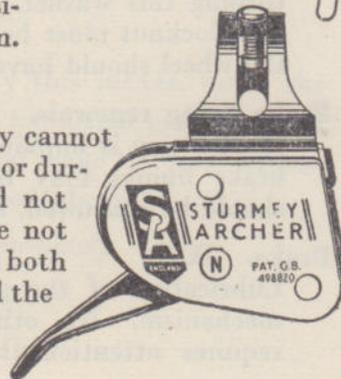
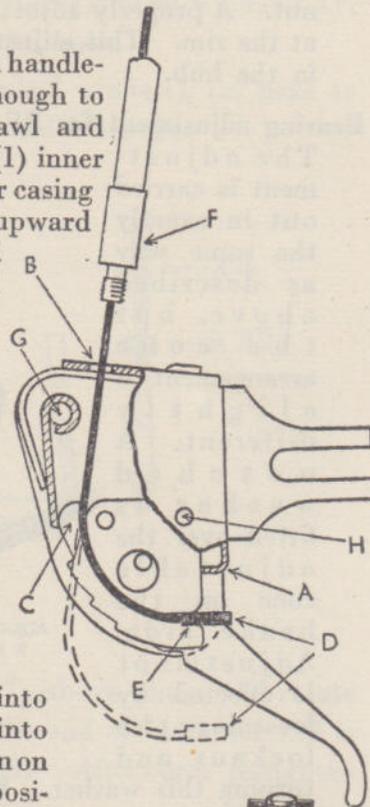
It is not necessary to remove control from handlebar if the lever can be pulled back far enough to allow cable nipple to pass between pawl and ratchet plate. Procedure is:—Detach (1) inner wire from indicator chain at hub; (2) outer casing from fulcrum clip. Pull cable ferrule "F" upward until screw thread engages that of control casing at "B", then unscrew ferrule. Pull lever right back beyond bottom gear position to stop "A", push inner wire through to detach nipple from ratchet plate, then pull wire out between pawl and ratchet at "C" and finally through threaded hole "B".

To fit control wire.

Pull lever right back beyond bottom gear position to stop "A" and insert wire through threaded hole "B" and between pawl and ratchet plate at "C". Wire nipple "D" is then fitted into notch "E" and cable ferrule "F" screwed into "B" until it rotates freely. Keeping tension on wire, push lever forward into top gear position. Control is then ready for re-connection.

Pawl and Pawl Spring.

These two parts are designed so that they cannot drop out through breakage of control wire or during removal or replacement. They should not normally need renewal, therefore they are not readily detachable. If a new part is required both rivets "G" and "H" must be removed, and the complete trigger mechanism withdrawn. New rivets must be used in re-assembly.



Sturmey-Archer Front Dynohub, Dynothree and Dynofour

IMPORTANT WARNING.

Should it ever be necessary to separate the armature from the magnet a "keeper ring" for magnet must be used. The armature is removed by pushing it out with the keeper ring and replaced by reversing the process; in other words, either the armature or keeper ring must always be in the magnet. If separation occurs, even for an instant, loss of magnetism will result. This applies to all Dynohub magnets.

Hub Bearing Adjustment. Dynothree and Dynofour.

The cone away from the Dynamo is fixed at Works and should not be moved. The bearings are adjusted by loosening the locknut at dynamo end and rotating the four-notched washer, then re-tightening the locknut. A correctly adjusted wheel must have only a trace of side play at the rim.

Front Dynohub.

The dynamo-side cone is locked to the axle and must not be moved. The armature is locked to this cone by means of a locknut. If it is necessary to remove armature note number of washers when replacing same.

Adjustment is on the side away from the dynamo. Bearings are adjusted by loosening the locknut and adjusting the cone suitably, then re-tightening the locknut. A properly adjusted wheel should have a trace of side play at the rim.

Gear Adjustment.

See pages 23 and 24.

Lubrication.

See pages 20-21.

Headlamp.

This is fixed by means of a single clamping bolt. Do not attempt to alter the lamp angle without first loosening clamping bolt. The front is detachable by undoing the screw at the bottom for access to the bulb and connections. The switch has three positions: "On" is towards the right hand when seated on the bicycle and "Off" to the left; the central position is only used on DBU sets.

Rear Lamp.

This is fixed by clip to rear stay. The dome unscrews to give access to the bulb. Earthing is only necessary for Dynothree and Dynofour, and this is covered by wiring instructions given overleaf.

Wiring.

Wiring connections are inside lamp; wires enter lamp through a hole in the fixing bracket. To reach connections lamp front must be removed.

1. For front Dynohub (G.H.6):— Headlamp end.

Black wire to upper R.H. switch connection. Red wire to centre switch connection. Two bare wires to lower centre connection.

Dynohub.

Two hook connections to hub terminals.

Rear Lamp.

Black wire (large tag) to clip screw. Red wire (small tag) to terminal.

2. For Dynothree (A.G.) and Dynofour (F.G.) hubs:—

Headlamp end.

Black wire to upper R.H. switch connection. Red wire to centre switch connection.

Dynohub.

Two hook connections to hub terminals.

Rear Lamp.

Black wire (large tag) to clip screw. Red wire (small tag) to terminal.

Earth wire.

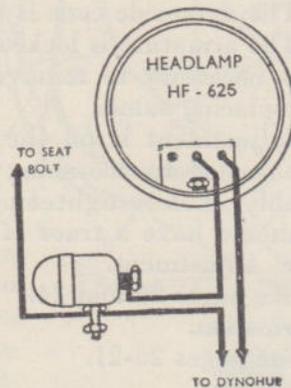
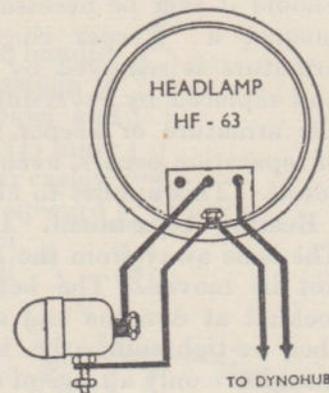
Rear lamp clip screw to seat bolt.

Bulbs.

G.H.6. Head—6v. .3 amp.; Rear—6v. .04 amp.

F.G. and A.G. Head—6v. .25 amp.; Rear—6v. .01 amp.

Correct bulbs must be used.



Illustrations show switch plate as seen in headlamp with front removed.

Dry Battery Unit

(Type D.B.U.)

Hub instructions are as shown on pages 23 and 27.

Headlamp.

The headlamp is identical with the one described on page 27, but the wiring arrangements are different and are shown overleaf.

There are three switch positions. When seated on the cycle looking at back of headlamp, the lever positions are "Dynamo" to the right, "Battery" to the left and "Off" when central.

Rear Lamp.

The dome unscrews to give access to bulb. It is not necessary to remove enamel from frame for earthing as this is arranged through wiring system.

Battery Unit.

This is fitted to seat tube of cycle frame and contains three $1\frac{1}{2}$ volt Dry Cells. These are NOT re-chargeable and must be replaced with new cells when exhausted. Earthing is by means of the spring clip at the base.

The wiring is attached to the terminals at the top of the container. There are only two terminals and these are of different sizes so that wires cannot be wrongly connected. The batteries are replaced by removal of a spring at the base of the container. The spring ring and its groove *must* be kept clean and slightly greased to prevent corrosion. The rubber cap should be pulled down over the wiring.

Batteries.

Standard equipment is Drydex T.20 or Ever-Ready U.2, but any equivalent is suitable. These are fitted one above another as in an ordinary torch. They should be removed as soon as exhausted to avoid corrosion. Their removal does not affect Dynamo lighting in any way.

Wiring for Front and Rear D.B.U.

Headlamp end.

Black wire to upper R.H. switch connection.

Bare wire to lower centre connection.

Red wire to upper centre switch connection.

Green wire to upper L.H. switch connection.

Dynohub.

Two hook connections to hub terminals.

Rear Lamp.

Black wire (large tag) to clip screw.

Red wire (small tag) to terminal.

Battery Container.

Red wire (large tag) to centre terminal.

Black wire (small tag) to side terminal.

Earth Wire.

Rear lamp clip to seat bolt.

On rear dynohubs the two main cables are held together by sleeving at various points.

Bulbs.

Front D.B.U. Head—6v. .3 amp. No. GL471.
Rear—6v. .04 amp. No. GL223.

Rear D.B.U. Head—6v. .25 amp. No. GL448.
Rear—6v. .04 amp. No. GL228.

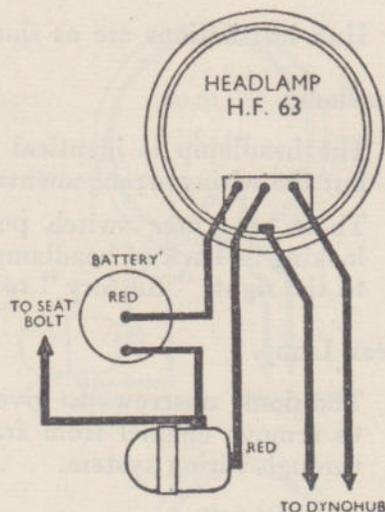


Illustration shows switch plate as seen in headlamp with front removed.

Filter Switch Unit

(Type F.S.U.)

Hub instructions are as given on pages 24 and 27.

Headlamp.

The headlamp is identical with the one described on page 27, but the wiring arrangements are different and are shown overleaf.

The switch has three positions. When seated on the cycle looking at the back of the headlamp, the lever positions are "On" to the right and "Off" to the left; the central position is only used on DBU sets.

Rear Lamp.

The dome unscrews to give access to the bulb. Rear lamp is earthed by wire to seat lug.

Battery Unit.

This is fitted to seat tube of cycle frame and contains three $1\frac{1}{2}$ volt dry cells. These are not re-chargeable and must be replaced with new cells when exhausted.

The Filter Switch is fitted permanently at the top. Batteries are replaced by removal of a spring at the base of the container. The spring ring and its groove *must* be kept clean and slightly greased to prevent corrosion. The rubber cap should be pulled down over the wiring.

Batteries.

Standard equipment is Drydex T.20 or Ever-Ready U.2, but any equivalent is suitable. These are fitted above one another as in an ordinary torch. They should be removed as soon as exhausted to avoid corrosion. Note that, if necessary, the set can be run without batteries when it will function as a normal dynamo lighting set.

Wiring.

Wires enter headlamp through hole in fixing bracket. For access to connections lamp front must be removed.

Head Lamp.

Red connection to upper centre switch connection.

Green connection to upper R.H. switch connection.

Tail Lamp.

Large black tag to rear lamp clip screw. Red tag to rear lamp terminal.

F.S.U.

Black tags of wire from dynohub to two terminals at front of filter switch. Large red tag to F.S.U. centre terminal. Black tag to remaining terminal.

Dynohub.

Two hook connections to hub terminals.

Earth Wire.

Rear lamp clip screw to seat bolt.

Bulbs.

Head—6v. .2 amp. No. GL474.

Rear—6v. .04 amp. No. GL228.

Correct bulbs must be used.

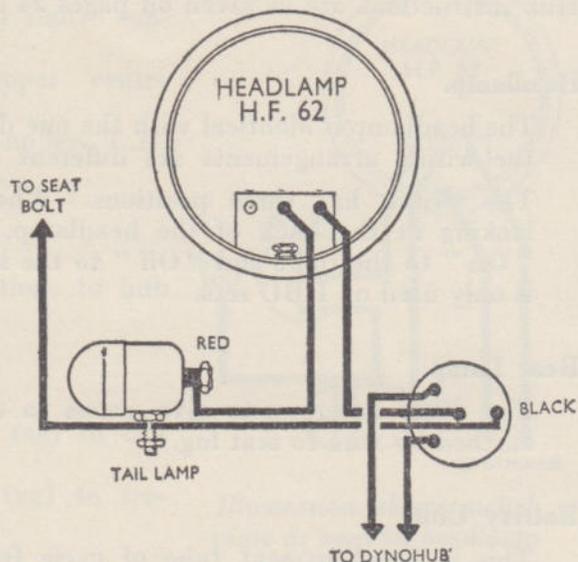


Illustration shows switch plate as seen in headlamp with front removed

Gear Ratio Tables

**AW,
AB,
ABC,
AG
and
TCW**

| Bracket Chain Wheel | No. of Teeth on Hub Sprocket | 26" WHEELS | | | 28" WHEELS | | |
|---------------------|------------------------------|------------|------|-------|------------|------|-------|
| | | Low | Mid. | High | Low | Mid. | High |
| 44 | 16 | 53.6 | 71.5 | 95.3 | 57.8 | 77.0 | 102.7 |
| | 17 | 50.5 | 67.3 | 89.8 | 54.4 | 72.5 | 96.7 |
| | 18 | 47.7 | 63.6 | 84.8 | 51.3 | 68.4 | 91.2 |
| | 19 | 45.2 | 60.2 | 80.3 | 48.6 | 64.8 | 86.4 |
| | 20 | 42.9 | 57.2 | 76.3 | 46.2 | 61.6 | 82.1 |
| 46 | 16 | 56.0 | 74.7 | 99.6 | 60.4 | 80.5 | 107.3 |
| | 17 | 52.7 | 70.3 | 93.7 | 56.9 | 75.8 | 101.1 |
| | 18 | 49.8 | 66.4 | 88.5 | 53.6 | 71.5 | 95.3 |
| | 19 | 47.2 | 62.9 | 83.9 | 50.9 | 67.8 | 90.4 |
| | 20 | 44.9 | 59.8 | 79.7 | 48.3 | 64.4 | 85.9 |
| 48 | 16 | 58.5 | 78.0 | 104.0 | 63.0 | 84.0 | 112.0 |
| | 17 | 55.1 | 73.4 | 98.0 | 59.3 | 79.1 | 105.5 |
| | 18 | 52.0 | 69.3 | 92.4 | 56.0 | 74.7 | 99.6 |
| | 19 | 49.3 | 65.7 | 87.6 | 53.0 | 70.7 | 94.3 |
| | 20 | 46.8 | 62.4 | 83.2 | 50.4 | 67.2 | 89.6 |

AM

| Bracket Chain Wheel | No. of Teeth on Hub Sprocket | 26" WHEELS | | | 27" WHEELS | | |
|---------------------|------------------------------|------------|------|-------|------------|------|-------|
| | | Low | Nor. | Top | Low | Nor. | Top |
| 44 | 14 | 70.7 | 81.7 | 94.2 | 73.6 | 84.8 | 97.9 |
| | 15 | 66.2 | 76.3 | 87.9 | 69.7 | 79.2 | 91.3 |
| | 16 | 62.1 | 71.5 | 82.6 | 64.3 | 74.2 | 86.6 |
| | 17 | 58.3 | 67.3 | 77.7 | 60.7 | 69.9 | 80.8 |
| | 18 | 55.2 | 63.6 | 73.5 | 57.2 | 66.0 | 76.2 |
| 46 | 14 | 74.0 | 85.4 | 98.6 | 77.0 | 88.7 | 102.5 |
| | 15 | 69.1 | 79.7 | 92.0 | 71.8 | 82.8 | 95.6 |
| | 16 | 64.8 | 74.7 | 86.2 | 67.3 | 77.6 | 89.5 |
| | 17 | 61.2 | 70.3 | 81.3 | 63.3 | 73.0 | 84.2 |
| | 18 | 57.6 | 66.4 | 76.8 | 59.8 | 69.0 | 79.6 |
| 48 | 14 | 77.4 | 89.1 | 103.0 | 80.3 | 92.5 | 107.0 |
| | 15 | 72.1 | 83.2 | 96.0 | 75.0 | 86.4 | 100.0 |
| | 16 | 67.7 | 78.0 | 90.0 | 70.2 | 81.0 | 93.5 |
| | 17 | 63.7 | 73.5 | 85.0 | 66.1 | 76.2 | 88.0 |
| | 18 | 60.0 | 69.3 | 80.2 | 62.5 | 72.0 | 83.2 |

ASC

| Chain Wheel | Sprocket | 26" WHEELS | | | 27" WHEELS | | |
|-------------|----------|------------|------|------|------------|------|------|
| | | 1 Low | 2 | 3 | 1 Low | 2 | 3 |
| 44 | 14 | 61.3 | 73.5 | 81.7 | 63.6 | 76.3 | 84.8 |
| | 15 | 57.3 | 68.7 | 76.3 | 59.4 | 71.2 | 79.2 |
| | 16 | 53.6 | 64.3 | 71.5 | 55.7 | 66.8 | 74.2 |
| | 17 | 50.5 | 60.6 | 67.3 | 52.4 | 62.9 | 69.9 |
| | 18 | 47.7 | 57.2 | 63.6 | 49.5 | 59.4 | 66.0 |
| | 19 | 45.2 | 54.2 | 60.2 | 46.8 | 56.2 | 62.5 |
| | 20 | 42.9 | 51.5 | 57.2 | 44.5 | 53.4 | 59.4 |
| 46 | 14 | 64.0 | 76.9 | 85.4 | 66.5 | 79.9 | 88.7 |
| | 15 | 59.8 | 71.7 | 79.7 | 62.1 | 74.5 | 82.8 |
| | 16 | 56.0 | 67.2 | 74.7 | 58.2 | 69.8 | 77.6 |
| | 17 | 52.7 | 63.3 | 70.3 | 54.8 | 65.7 | 73.0 |
| | 18 | 49.8 | 59.8 | 66.4 | 51.7 | 62.1 | 69.0 |
| | 19 | 47.2 | 56.6 | 62.9 | 48.9 | 58.8 | 65.4 |
| | 20 | 44.9 | 53.0 | 59.8 | 46.5 | 55.9 | 62.1 |
| 48 | 14 | 66.8 | 80.1 | 89.1 | 69.3 | 83.2 | 92.5 |
| | 15 | 62.4 | 74.9 | 83.2 | 64.8 | 77.8 | 86.4 |
| | 16 | 58.5 | 70.2 | 78.0 | 60.7 | 72.9 | 81.0 |
| | 17 | 55.1 | 66.1 | 73.5 | 57.1 | 68.6 | 76.2 |
| | 18 | 52.0 | 62.4 | 69.3 | 54.0 | 64.8 | 72.0 |
| | 19 | 49.3 | 59.1 | 65.7 | 51.1 | 61.4 | 68.2 |
| | 20 | 46.8 | 56.2 | 62.4 | 48.6 | 58.3 | 64.8 |

Gear Ratio Tables

FW
and
FG

| Chain Wheel | Sprocket | 26" WHEELS | | | | 28" WHEELS | | | |
|-------------|----------|------------|------|------|------|------------|------|------|-------|
| | | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| | | Low | | | High | Low | | | High |
| 44 | 16 | 47.7 | 56.5 | 71.5 | 90.5 | 51.3 | 60.8 | 77.0 | 97.5 |
| | 17 | 44.9 | 53.2 | 67.3 | 85.2 | 48.3 | 57.3 | 72.5 | 91.8 |
| | 18 | 42.4 | 50.2 | 63.6 | 80.5 | 45.6 | 54.0 | 68.4 | 86.6 |
| | 19 | 40.1 | 47.6 | 60.2 | 76.2 | 43.2 | 51.2 | 64.8 | 82.0 |
| | 20 | 38.1 | 45.2 | 57.2 | 72.4 | 41.1 | 48.6 | 61.6 | 78.0 |
| 46 | 16 | 49.8 | 59.0 | 74.7 | 94.5 | 53.7 | 63.6 | 80.5 | 101.9 |
| | 17 | 46.9 | 55.5 | 70.3 | 89.0 | 50.5 | 59.9 | 75.8 | 95.9 |
| | 18 | 44.3 | 52.5 | 66.4 | 84.0 | 47.7 | 56.5 | 71.5 | 90.5 |
| | 19 | 41.9 | 49.7 | 62.9 | 79.6 | 45.2 | 53.6 | 67.8 | 85.8 |
| | 20 | 39.9 | 47.2 | 59.8 | 75.7 | 42.9 | 50.9 | 64.4 | 81.5 |
| 48 | 16 | 52.0 | 61.6 | 78.0 | 98.7 | 56.0 | 66.4 | 84.0 | 106.3 |
| | 17 | 49.0 | 58.0 | 73.5 | 93.0 | 52.7 | 62.5 | 79.1 | 100.2 |
| | 18 | 46.2 | 54.7 | 69.3 | 87.7 | 49.8 | 59.0 | 74.7 | 94.6 |
| | 19 | 43.8 | 51.9 | 65.7 | 83.2 | 47.1 | 55.8 | 70.7 | 89.5 |
| | 20 | 41.6 | 49.3 | 62.4 | 79.0 | 44.8 | 53.1 | 67.2 | 85.0 |

FM

| Chain Wheel | Sprocket | 26" WHEELS | | | | 27" WHEELS | | | |
|-------------|----------|------------|------|------|-------|------------|------|------|-------|
| | | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| | | Low | | | High | Low | | | High |
| 44 | 14 | 54.5 | 70.1 | 81.7 | 91.9 | 56.5 | 72.6 | 84.8 | 95.5 |
| | 15 | 50.9 | 65.4 | 76.3 | 85.8 | 52.8 | 67.8 | 79.2 | 89.1 |
| | 16 | 47.7 | 61.3 | 71.5 | 80.4 | 49.5 | 63.6 | 74.2 | 83.5 |
| | 17 | 45.2 | 57.7 | 67.3 | 75.7 | 46.6 | 59.9 | 69.9 | 78.6 |
| | 18 | 42.4 | 54.5 | 63.6 | 71.5 | 44.0 | 56.5 | 66.0 | 74.2 |
| 46 | 14 | 56.9 | 73.2 | 85.4 | 96.1 | 59.1 | 76.0 | 88.7 | 99.7 |
| | 15 | 53.1 | 68.4 | 79.7 | 89.7 | 55.2 | 70.9 | 82.8 | 93.1 |
| | 16 | 49.8 | 64.1 | 74.7 | 84.0 | 51.7 | 66.5 | 77.6 | 87.3 |
| | 17 | 46.9 | 60.3 | 70.3 | 79.1 | 48.7 | 62.4 | 73.0 | 81.9 |
| | 18 | 44.3 | 56.9 | 66.4 | 74.7 | 46.0 | 59.1 | 69.0 | 77.6 |
| 48 | 14 | 59.7 | 76.4 | 89.1 | 100.2 | 61.7 | 79.3 | 92.5 | 104.1 |
| | 15 | 55.5 | 71.3 | 83.2 | 93.6 | 57.6 | 74.0 | 86.4 | 97.2 |
| | 16 | 52.0 | 66.9 | 78.0 | 87.7 | 54.0 | 69.4 | 81.0 | 91.0 |
| | 17 | 49.0 | 63.0 | 73.5 | 82.7 | 50.8 | 65.3 | 76.2 | 85.0 |
| | 18 | 46.2 | 59.4 | 69.3 | 78.0 | 48.0 | 61.7 | 72.0 | 81.0 |

FC

| Chain Wheel | Sprocket | 26" WHEELS | | | | 27" WHEELS | | | |
|-------------|----------|------------|------|------|------|------------|------|------|-------|
| | | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| | | Low | | | High | Low | | | High |
| 44 | 14 | 61.3 | 73.5 | 81.7 | 89.2 | 63.6 | 76.3 | 84.8 | 92.6 |
| | 15 | 57.3 | 68.7 | 76.3 | 83.3 | 59.4 | 71.2 | 79.2 | 85.5 |
| | 16 | 53.6 | 64.3 | 71.5 | 78.1 | 55.7 | 66.8 | 74.2 | 80.9 |
| | 17 | 50.5 | 60.6 | 67.3 | 73.4 | 52.4 | 62.9 | 69.9 | 76.2 |
| | 18 | 47.7 | 57.2 | 63.6 | 69.3 | 49.5 | 59.4 | 66.0 | 72.0 |
| 46 | 14 | 64.0 | 76.9 | 85.4 | 93.2 | 66.5 | 79.9 | 88.7 | 96.7 |
| | 15 | 59.8 | 71.7 | 79.7 | 87.0 | 62.1 | 74.5 | 82.8 | 90.4 |
| | 16 | 56.0 | 67.2 | 74.7 | 81.5 | 58.2 | 69.8 | 77.6 | 84.7 |
| | 17 | 52.7 | 63.3 | 70.3 | 76.8 | 54.8 | 65.7 | 73.0 | 79.7 |
| | 18 | 49.8 | 59.8 | 66.4 | 72.4 | 51.7 | 62.1 | 69.0 | 75.3 |
| 48 | 14 | 66.8 | 80.1 | 89.1 | 97.2 | 69.3 | 83.2 | 92.5 | 100.4 |
| | 15 | 62.4 | 74.9 | 83.2 | 90.8 | 64.8 | 77.8 | 86.4 | 94.3 |
| | 16 | 58.5 | 70.2 | 78.0 | 85.1 | 60.7 | 72.9 | 81.0 | 88.5 |
| | 17 | 55.1 | 66.1 | 73.5 | 80.2 | 57.1 | 68.6 | 76.2 | 83.1 |
| | 18 | 52.0 | 62.4 | 69.3 | 75.6 | 54.0 | 64.8 | 72.0 | 78.5 |

Hints and Tips

TO CLEAN CHROMIUM. Dip a piece of rag in a solution of soft soap and hot water, wipe over, then polish by rubbing lightly with a clean rag and just a trace of oil. Chromium plating requires no other attention. Heavy rubbing should be avoided.

Do not use any kind of metal-polish on chromium-plated parts.

TO CLEAN ENAMEL. Remove all dirt with a wet rag, taking good care not to scratch the enamel. Apply a good polish of the wax type and polish with a clean dry cloth. We recommend that the wax polish be used about once in three months.

Soda must never be used to clean any part.

FREEWHEEL. Dirt accumulates in the freewheel, so clean it out occasionally by injecting paraffin; afterwards lubricate with R.I. 'All-purpose' Oil. Heavy body oil thinned down with paraffin will clog the freewheel mechanism. It is not necessary to remove the freewheel from the hub for cleaning purposes.

CHAIN. Oil the chain once a fortnight, using R.I. 'All-purpose' Oil. Occasionally thoroughly clean the chain. Remove it from the bicycle (see page 15) and wash in a paraffin bath. Dry with a clean rag and then thoroughly lubricate by immersing in R.I. 'All-purpose' Oil. If the bicycle is fitted with a gearcase, occasionally insert not more than a teaspoonful of R.I. 'All-purpose' Oil through the lubricator, slowly revolving the cranks so that the whole of the chain is evenly lubricated.

FRONT FORK LAMP BRACKETS. It is of the utmost importance for the safety of the rider that the front fork lamp bracket is properly fixed on the lamp peg, which is fitted on the inside of either the left-hand or right-hand fork blade. Our front fork lamp bracket is designed for use in conjunction with this safety peg and must therefore never be fitted to a fork for which it is not designed.

REMEMBER THAT THE FITTING OF A MOTOR ATTACHMENT NULLIFIES THE GUARANTEE GIVEN WITH THE MACHINE.

Care of Tyres

CORRECT RIM SIZES. Tyres can only be fitted to the rims for which they are designed. All covers are marked with the size which is also stamped on the rim.

INFLATION PRESSURES. To obtain maximum mileage tyres should be inflated hard. Running a tyre in an under-inflated condition causes rapid tread wear and early failure of the casing. This is particularly important with lightweight types. It is also harder to propel.

USE OF BRAKES. Hard braking causes excessive tyre wear, therefore only use brakes fully in an emergency.

OIL AND PARAFFIN. Oil and Paraffin must not be allowed to come into contact with tyres, or to run along the spokes and reach the tube through the spoke holes in the rim. Both have an immediate and adverse effect upon rubber.

FITTING. See that the rim tape is correctly positioned in the centre of the rim and is not loose. Slightly inflate the inner tube and place it within the cover. Pass the valve through the valve hole and push the first wire edge on to the rim. Now commence to fit the second wire edge at a point diametrically opposite the valve. Keep the wire down in the well of the rim and gradually place it in position, working a little on each side and keeping the wires in the rim well. The last few inches may be gently levered over with a small tyre lever or preferably pushed over by hand. Next, inflate a little and make quite certain that the cover is correctly seated on the shoulders of the rim by pushing it away from the rim with the fingers. When released, the cover should spring back on to the rim shoulder. Fully inflate and tighten the rim nut. Finally, check for truth by rotating, if not, repeat instructions above.

REMOVAL. Completely deflate by removal of all valve parts. Push the two wire edges off the shoulder of the rim right down into the well. With a small tyre lever, lift a portion of the wire edge near the valve over the side of the rim. The remainder will then come over quite easily. The inner tube and cover can then be removed without difficulty.

REMOVAL FOR REPAIR. After repairing a puncture examine inside of the cover and ensure that the cause of the trouble is removed. If the canvas is split it should be repaired. If the rear wheel is not removed from the machine during repair, see that the inner tube does not become smeared with oil from the chain.

NATIONAL ENGINEERING AWARD

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and most up-
to-date Cycle
Factory, where
employees enjoy
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eering Awards.*



Riding Position

There is no hard and fast rule governing the correct riding position, as this entirely depends upon the build and requirements of the individual. A few general hints, however, will help the uninitiated to determine the most comfortable riding position for themselves and so add to the enjoyment of cycling. A sound general rule is to adjust the position so as to disperse the weight of the rider's body evenly over the three points of contact, i.e. handlebars, saddle and pedals.

Correct saddle-height can be determined by the rider placing his heels on the pedals when at their lowest position, with the leg fully extended. This allows for a slight bend in the knee when pedalling with the ball of the foot on the pedal. The nose of the saddle should be about three inches behind a vertical line cutting through the centre of the bottom bracket; the nose of the saddle tilted slightly upwards.

With the handlebar grips approximately in line with the top of the saddle, the rider should feel his weight is so balanced that the hands rest lightly on the handlebars, thus preventing strain on the wrists and forearms.

On Sports models it is possible to adjust the angle at which handlebar grips are set by loosening the clip bolt nut and setting handlebars at desired angle, then re-tightening nut.

We recommend the rider to try the saddle at various heights and angles; moving it from or towards the handlebars, at the same time experimenting with the height of the handlebars until a suitable position is found.

Ball Bearing Chart

| Model | Location | Symbol | Size | No. in each Race | Total |
|--------------------------------|------------------------|--------|-------|------------------|-------|
| Carrier | Head—Top and Bottom... | 329 | 3/16" | 21 | 42 |
| Tricycle | Head—Top and Bottom... | 328 | 1/8" | 28 | 56 |
| All other models | Head—Top and Bottom... | 328A | 5/32" | 25 | 50 |
| All models | Bottom Bracket | 330 | 1/4" | 11 | 22 |
| Tricycle | Pedals | 328A | 5/32" | 10 (outer) | 46 |
| R.R.A. | Pedals | 328 | 1/8" | 13 (inner) | |
| All other models | Pedals | 328 | 1/8" | 12 | |
| | | 328A | 5/32" | 11 | 44 |
| Carrier and Heavy Rider | Front Wheel | 330 | 1/4" | 8 | 16 |
| | Rear Wheel | 330 | 1/4" | 8 | 16 |
| Tricycle | Front Wheel | 328A | 5/32" | 11 | 22 |
| | Rear Axle... .. | 329 | 3/16" | 16 | 32 |
| All other models | Front Wheel | 329 | 3/16" | 10 | 20 |
| | Rear Wheel | 330 | 1/4" | 8 | 16 |

Bicycle Identification Form

You should complete this form and keep it safely for production to the police should your bicycle be lost or stolen.

Owner's Name..... RM Butler

Address..... 121 Devizes Road

H. Horton Trowbridge Wilts

Lady's or Gent's..... Gents

Machine No..... AA 58673

Make and Frame Size..... Raleigh 23 inch

Colour..... Black

Cycle Lock Key No..... NGN 23

Other Details..... Black Saddle bag hub dynamo

3 speed Pump