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bicycle components and accessories catalogue

Issued by

RALEIGH INDUSTRIES LTD

1971
THE QUEEN'S
AWARD TO INDUSTRY

Raleigh Industries Ltd., Nottingham, England. A TI Company

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A  COMPANY

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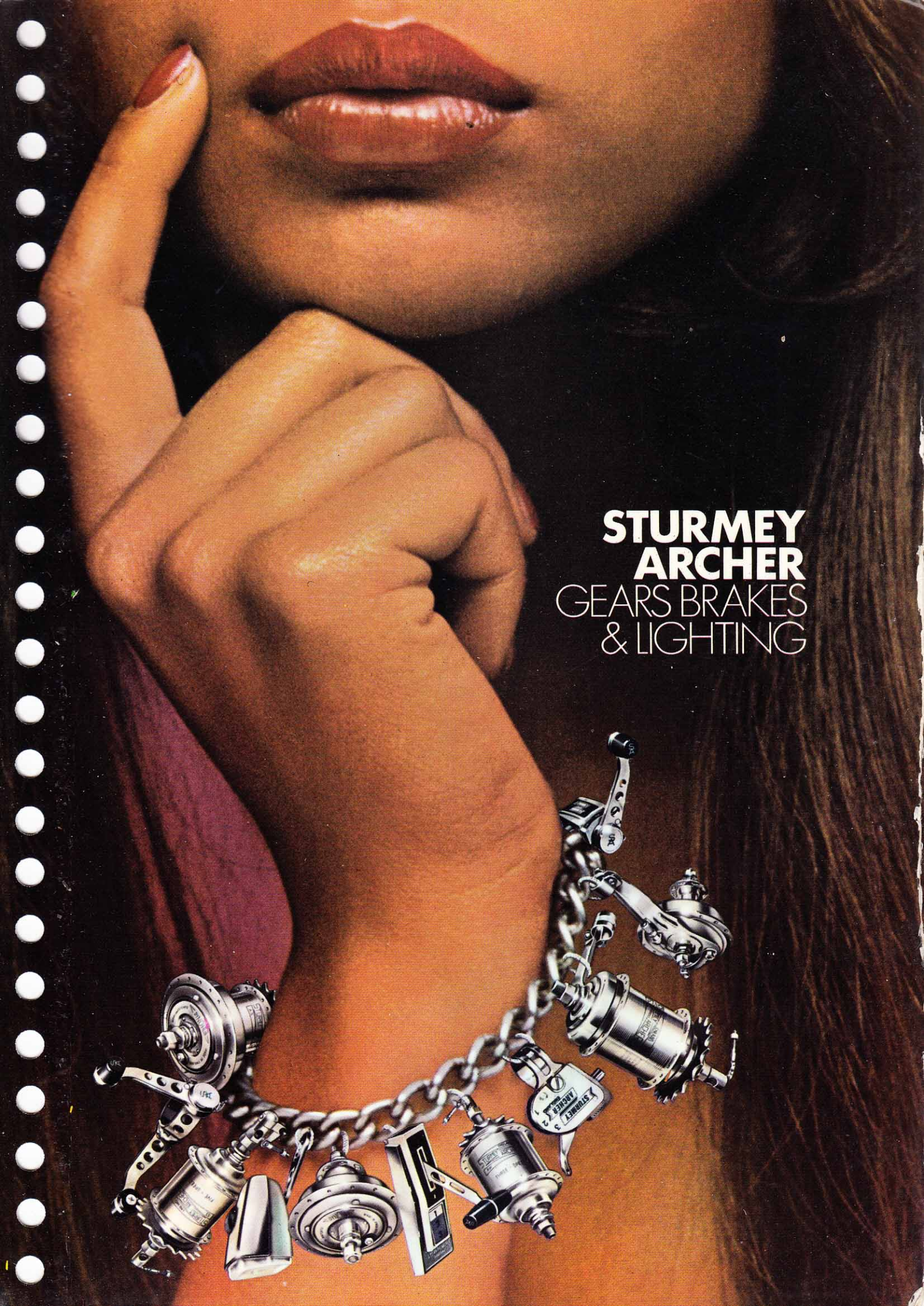
STURMEY
ARCHER
GEARS BRAKES
& LIGHTING

GEARS, BRAKES, & LIGHTING

For the past seventy years Sturmey-Archer have been pioneers in the design and manufacture of variable geared hubs, hub brakes and "Dynohub" lighting equipment. This is a history of progressive research, development and effort to make cycling safer and easier. Today Sturmey-Archer provide a range of products which has made possible the production of the modern fully equipped bicycle. Such fitments have now become standard on bicycles throughout the world.

This catalogue gives full specification details of the entire range together with comprehensive service notes prepared specially to assist the trade. Each hub is dealt with separately and entirely, covering all matters of fitment, maintenance and repair, together with full details of service spare parts which are readily available.

In the Sturmey-Archer range there is a gear to suit every rider – racing enthusiast, clubman, everyday cyclist, children's "fun bikes" – all have the advantages of modern enclosed hub gears with oil bath lubrication and complete protection from weather and damage. Hub gears provide the very latest innovations in bicycle gear change, coupled with maximum efficiency.

MODERN BICYCLES NEED MODERN EQUIPMENT – STURMEY-ARCHER – OF COURSE!

STURMEY ARCHER

AW HUB GEAR

3 SPEED WIDE RATIO GEAR

Sturmey-Archer – pioneers in bicycle hub gears, brakes and lighting equipment – lead the world with the famous AW 3 speed gear. This supreme example of precision engineering needs no introduction to over sixty million riders for whom Sturmey-Archer has made cycling easier.

Discerning cyclists choose this modern 'built-in' hub gear. Fully enclosed in chrome plated shell with oil-bath protection from water and dirt – providing smooth running and easy gear change.

Acclaimed as the most popular 3 speed hub gear in use throughout the world today.

Built to withstand heavy all purpose riding under all weather and terrain conditions.

Suitable for all makes of bicycles.

Fully supported by world-wide service.

GET INTO TOP GEAR WITH STURMEY-ARCHER

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AW HUB GEAR

STURMEY ARCHER

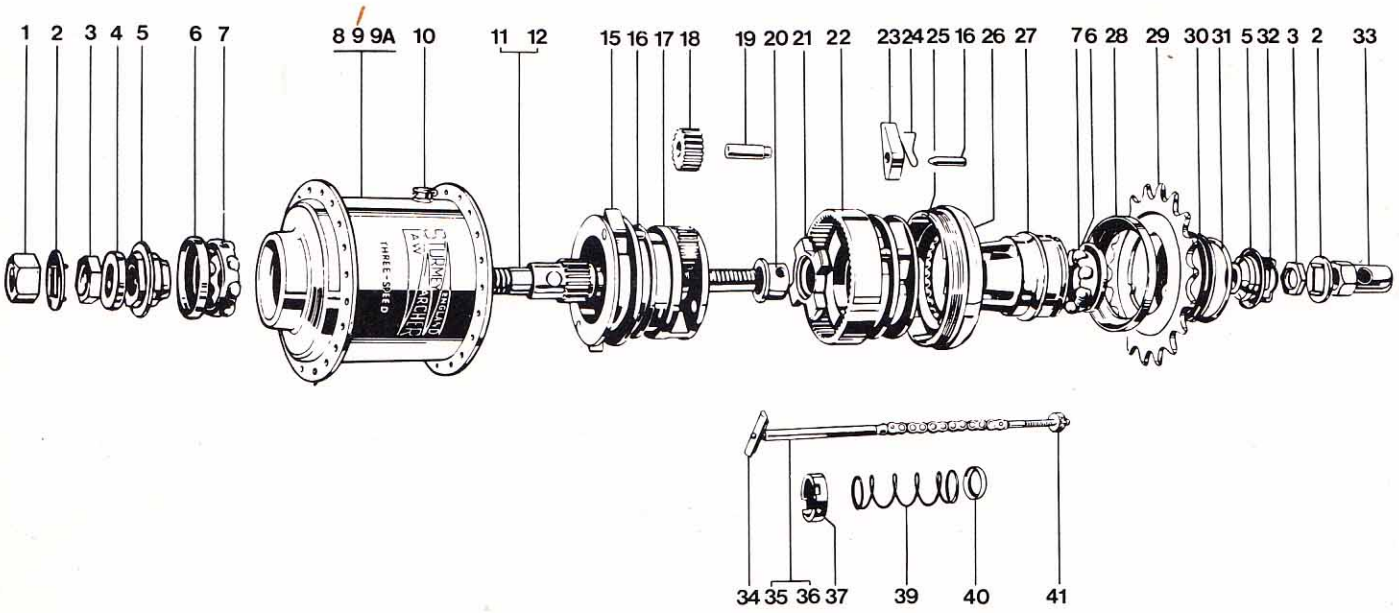


PHOTO No.	SALES No.	DESCRIPTION
1	HMN 128	L.H. Axle Nut
2	HMW 145	Axle Lock Washer
3	HMN 132	Lock Nut
4	HMW 129	Axle Washer, $\frac{1}{8}$" (3.2 mm)
5	HSA 101	Cone with Dust Cap
6	HSA 102	Outer Dust Cap
7	HSA 103	Ball Cage (with Ball Bearings)
8	HSA 104	Shell–40 hole–and Ball Cup Combined
9	HSA 105	Shell–36 hole–and Ball Cup Combined
9A	HSA 239	Shell–28 hole–and Ball Cup Combined
10	HSA 106	Lubricator
11	HSA 107	Axle – $5\frac{3}{4}$" (146 mm)
12	HSA 108	Axle – $6\frac{1}{4}$" (159 mm)
15	HSA 111	Low Gear Pawl
16	HSA 112	Pawl Pin
17	HSA 113	Planet Cage
18	HSA 115	Planet Pinion
19	HSA 114	Pinion Pin
20	HSA 116	Clutch Sleeve
21	HSA 117	Clutch
22	HSA 118	Gear Ring

PHOTO No.	SALES No.	DESCRIPTION
23	HSA 119	Gear Ring Pawl
24	HSA 120	Pawl Spring
25	HSA 121	R.H. Ball Ring
26	HSA 122	Inner Dust Cap
27	HSA 123	Driver
28	HSL 701	Sprocket Dust Cap
29	HSL 714/ HSL 720 HSL 722	Sprocket, 14–20T and 22T
30	HMW 127	Sprocket Spacing Washer
31	HSL 721	Sprocket Circlip
32	HMW 147	Cone Lockwasher
33	HMN 129	R.H. Axle Nut
34	HSA 124	Axle Key
35	HSA 125	Indicator Coupling–$5\frac{3}{4}$" (146mm) Axle
36	HSA 126	Indicator Coupling–$6\frac{1}{4}$" (159mm) Axle
37	HSA 127	Thrust Ring
39	HSA 128	Clutch Spring
40	HSA 129	Clutch Spring Cap
41	HMN 134	Indicator Coupling Connection Lock Nut

GENERAL NOTES.

1. **GEAR RATIOS**:– The AW hub provides three gears – (1) Low Gear – decrease of 25%. (2) Normal Gear, i.e. direct drive. (3) High Gear – increase of $33\frac{1}{3}$%.
2. **SPROCKETS**:– A range of sprockets from 14T to 20T, and also 22T, is available for this hub.
3. **LUBRICATION**:– A NEW HUB MUST BE OILED BEFORE USE through the lubricator on the hub shell. Afterwards add a few drops of oil every month. USE ONLY STURMEY-ARCHER OIL – DO NOT use thick oil or grease.

STURMEY ARCHER

AW HUB GEAR

TO DIS-ASSEMBLE THE AW HUB. (See exploded view).

1. Remove *left-hand* locknuts 1 and 3, washers 2 and 4 and cone 5.
2. Unscrew right-hand ball ring 25 from hub shell 9 (use hammer and punch) and withdraw gear unit.
3. Detach the low gear pawls 15, pins 16 and springs 24. Take off the right-hand locknut 33 and 3, washers 2 and 32 cone 5.
4. Lift off clutch spring cap 40, and spring 39, driver 27, ball ring 25, and gear ring 22.
5. Detach gear ring pawls 23, pins 16 and springs 24.
6. Remove thrust ring 37, unscrew indicator rod 36.
7. Push out axle key 34, take off sliding clutch 21 and sleeve 20.
8. Lift off planet cage 17, remove planet pinions 18 and pins 19.

POINTS TO CHECK.

1. Freedom of clutch in driver. This should slide up and down easily.
2. Axle between centres for straightness.
3. All gear teeth for wear or chipping.
4. All races for wear.
5. Pinion pins, sliding clutch and gear ring dogs for rounding of engagement points.
6. Pawls and pawl ratchets for wear.

TO ASSEMBLE THE AW HUB.

1. Hold axle 11 in a vice (slot for axle key above the sun pinion) fit the planet cage 17.
2. Add the planet pinions and pins 18 and 19 – small end outwards.
3. Fit sleeve 20, clutch 21, axle key 34, and screw in the indicator rod 36.
4. Locate thrust ring 37 over axle key 34.
5. Place pawls 23, pins 16 and springs 24 into gear ring 22, See Fig. 'A', and fit this over planet cage 17.
6. Position the right-hand ball ring 25 over gear ring 22.
7. Add the driver 27 complete with fittings. See Fig. 'B'.
8. Slide clutch spring 39 and cap 40 over the axle.
9. Screw up the right-hand cone 5 finger-tight. Then slacken it *half a turn* and lock in that position with lock washer 32 and locknut 3.
   NOTE. Cone *must not* be unscrewed more than half a turn as that would throw the gear mechanism out of adjustment.
10. Fit the planet cage pawls 15, pins and springs 23 and 24. See Diagram 'C'.
11. Screw the gear unit into the hub shell and tighten ball ring 25.
12. Screw on left-hand cone 5, and add washers 4 and 2 and locknut 3 and adjust the hub bearings.

Fig.A

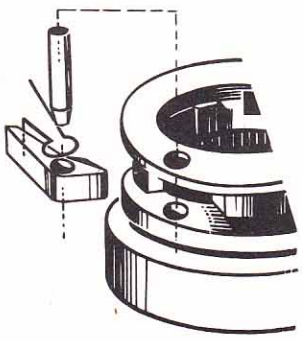


Fig.B

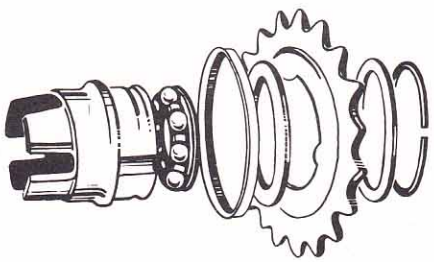
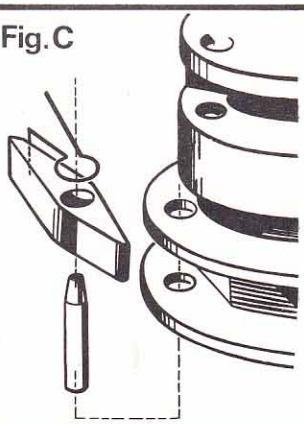


Fig.C



BEARING ADJUSTMENT.

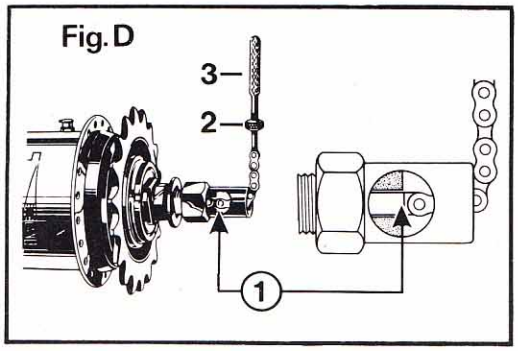
Right side cone adjustment. Screw cone down finger-tight, then slacken half a turn and lock in this position. NOTE. Turning it back more than this will affect the gear engagement.
On the left side loosen locknut and adjust the cone suitably then re-tighten locknut. A correctly adjusted wheel has a trace of side play at the rim.

AW HUB GEAR

STURMEY ARCHER

GEAR ADJUSTMENT. See Fig. 'D'.

Place the gear control in No. 2 position. Screw the cable connection (3) until the end of the indicator rod is exactly level with the *extreme end* of the axle. This can be seen through 'window' in the right-hand nut (see 1). Now tighten locknut (2).
ALL GEARS ARE NOW SET.



GEAR CHANGING

The gear change is quick and easy and should be made smartly.
Continue pedalling, but ease pressure on pedals whilst changing gear.

GEAR CONTROLS.

Sturmey-Archer offer a choice of three different gear controls –

* Trigger Control – handlebar fitting with reliable simplicity.
* Auto Twistgrip – consistently controlled adjustment and 'slick' gear change.
* Sportshift – the latest 'shift' control for 'fun' cycling.

All these features are provided to ensure the modern cyclist enjoys trouble free precision gear change.

GEAR CORRECTION GUIDE (AW GEAR).

NOTE. The major cause of trouble is faulty gear adjustment. Check to see that the end of the indicator rod is level with end of axle when gear control is in No. 2 position. If the complaint is sluggish gear-change or stiffness this may point to lack of oil.

SYMPTOM	FAULT	REMEDY
Slipping in low gear (1).	1. Sliding clutch worn. 2. Indicator not screwed in fully. 3. R.H. cone wrongly adjusted. 4. Kinks in control wire. 5. Twisted indicator chain.	1. Replace. 2. Re-adjust. 3. Re-adjust. 4. Replace. 5. Replace.
Self-changing gear action between 1st gear and 2nd gear.	1. Worn gear ring pawls.	1. Replace.
Slipping in normal gear (2nd).	1. Gear ring dogs and/or clutch worn.	1. Replace.
Slipping in top gear (3).	1. Pinion pins and/or clutch worn. 2. Weak or distorted axle spring. 3. Incorrect R.H. cone adjustment. 4. Grit between clutch sleeve and axle	1. Replace. 2. Fit new spring. 3. Re-adjust. 4. Clean.
Hub runs stiffly. Drag on pedals.	1. Too many balls in ball-ring. 2. Cones too tight. 3. Chainstay ends not parallel. 4. Corrosion. 5. Distorted dust caps.	1. Fit 24 only. 2. Re-adjust. 3. Correct. 4. Clean and use S.A. oil. or S.A.E. 20. 5. Replace.
Sluggish gear change.	1. Distorted axle spring. 2. Bent axle. 3. Worn indicator chain link. 4. Lack of oil or frayed wire.	1. Replace. 2. Replace. 3. Replace. 4. Oil or replace.

STURMEY ARCHER

S2 HUB GEAR

AUTOMATIC 2 SPEED GEAR

The Sturmey-Archer S2 two speed gear, notable for its simplicity of operation, eliminating the need for hand controls and cables, provides a quick, effortless gear change by means of a slight back pedalling movement.

This automatic 2 speed hub, admirably suitable for small wheel and folding bicycles in particular, is another successful newcomer to the versatile Sturmey-Archer range of gears, brakes and lighting equipment.

GO AUTOMATIC WITH STURMEY-ARCHER

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S2 HUB GEAR

STURMEY ARCHER

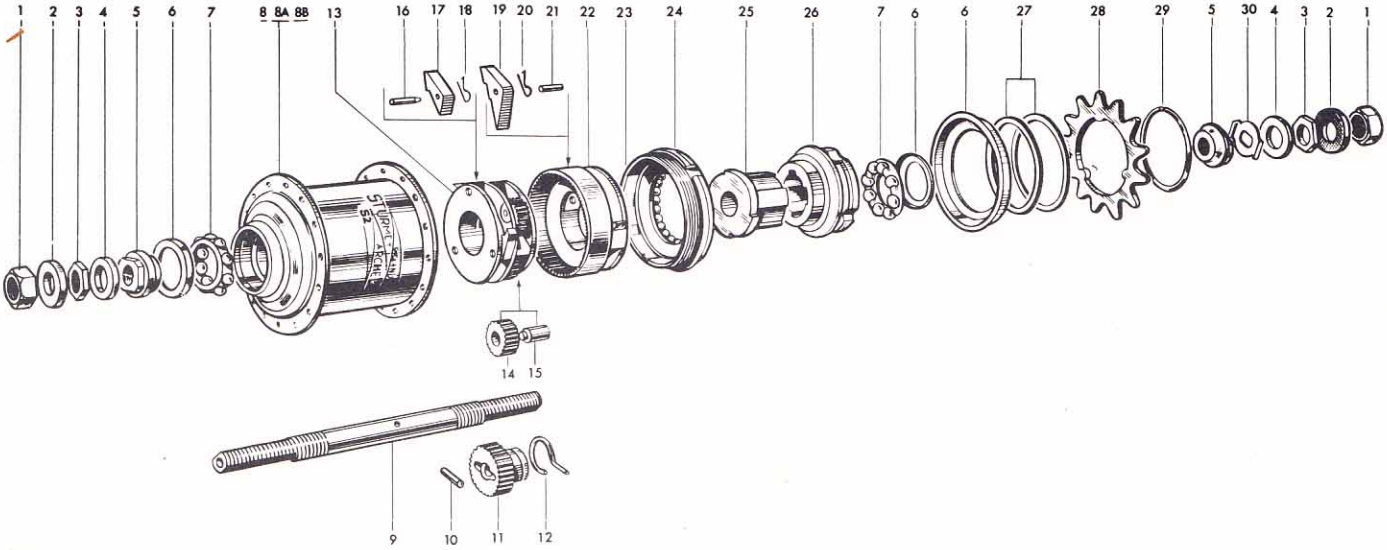


PHOTO No.	SALES No.	DESCRIPTION
1	HMN 128	Axle Nut
2	HMW 124	Axle Washer
3	HMW 132	Locknut
4	HMW 129	Washer
5	HSA 257	Cone
6	HSA 241	Dustcap
7	HSA 103	Ball Cage with ($\frac{1}{4}$" dia.) Bearings
8	HSA 259	Hub Shell with Ratchet Ring (36 Hole)
8A	HSA 312	Hub Shell with Ratchet Ring (28 Hole)
8B	HSA 258	Hub Shell with Ratchet Ring (40 Hole)
9	HSA 242	Axle $5\frac{3}{4}$" (146 mm)
	HSA 243	Axle $6\frac{1}{4}$" (159 mm)
10	HSA 244	Sun Pinion Pin
11	HSA 245	Sun Pinion
12	HSA 246	Sun Pinion Spring
13	HSA 247	Planet Cage
14	HSA 248	Planet Pinion

PHOTO No.	SALES No.	DESCRIPTION
15	HSA 249	Planet Pinion Pin
16	HSA 112	Pawl Pin (Planet Cage)
17	HSA 250	Pawl (Planet Cage)
18	HSA 120	Pawl Spring (Planet Cage)
19	HSA 252	Gear Ring Pawl
20	HSA 253	Pawl Spring (Gear Ring)
21	HSA 254	Pawl Ring (Gear Ring)
22	HSA 251	Gear Ring
23	HSA 121	Ball Ring
24	HSA 122	Inner Dust Cover
25	HSA 256	Gear Selector Cam
26	HSA 255	Driver
27	HMW 127	Sprocket Washer $\frac{1}{16}$" (1.6 mm)
28	HSL 714–22	14T–22T Sprocket
29	HSL 721	Circlip
30	HMW 147	Cone Locking Washer

GENERAL NOTES.

1. The S2 hub provides two gears. The direct drive is in normal gear. Low gear provides a drop of 28.6% from normal.
2. **LUBRICATION**:–A NEW HUB MUST BE OILED BEFORE USE through the lubricator on hub shell. Afterwards add a few drops of oil every month. USE ONLY STURMEY-ARCHER OIL – DO NOT use thick oil or grease.
3. It is important that the axle should be prevented from rotating in the chainstay slots and the flats on the axle are provided for this purpose. If the fork ends are too wide for the axle, special lock washers are supplied.

AUTOMATIC GEAR CHANGING

The gear change is quick, easy—and automatic—push pedals gently backwards until the mechanism clicks into the other gear.

STURMEY ARCHER

S2 HUB GEAR

TO DIS-ASSEMBLE THE S2 HUB. (See exploded view).

1. Remove axle nuts 1 and washers 2 from rear wheel.
2. Remove left-hand locknut 3, washer 4 and cone 5.
3. Unscrew right-hand ball ring 24 (use hammer and punch), withdraw gear unit.
4. Hold left-hand end of axle in vice and remove right-hand locknut 3, washers 4 and 30 and right-hand cone 5. Take off – sprocket 28, with driver 26 also ball cage 7. Lift off gear selector cam 25, and gear ring 22.
5. Prise off – sun pinion spring 12 from sun pinion 11 then lift off planet cage 13 complete with pinions, pawls and pins.
6. Remove sun pinion 11 and dowel pin 10 from axle 9.
7. Remove pins 16, pawls 17 and springs 18 from the planet cage also remove pawls 19, springs 20 and pins 21 from gear ring.

POINTS TO CHECK.

1. That axle is not bent.
2. All gear teeth for wear or chipping.
3. All races for wear or pitting.
4. Operating cam and gear ring for rounding of engagement points.
5. Pawls and pawl ratchets for wear.

TO ASSEMBLE THE HUB.

1. Fit left-hand end of axle in vice (dowel pin towards right-hand end).
2. Push dowel pin 10 into axle 9. Fit sun pinion 11 on axle and locate pinion on dowel pin.
3. Fit planet cage 13 on to axle, add planet pinions 14 and pins 15. (small end down) Now fit pawls 17, springs 18 and pawl pins 16 (small end down) – See Fig. 'A'.
4. Fit sun pinion spring 12 into sun pinion 11.
5. Fit pawls 19, pins 21 and springs 20 into gear ring – See Fig. 'B' – and fit this assembly over planet cage pinions – check that leg of sun pinion spring fits in circular recess inside gear ring 22. Fit right-hand ball ring 24 (complete with 24 ball bearings) over gear ring 22. Locate gear selector cam 25 inside gear ring. Fit together – driver 26, sprocket 28, spacing washers 27 and circlip 29 – See Fig. 'C' and locate driver assembly over selector cam splines.
6. Screw down the right-hand cone 5 finger tight, then loosen it half a turn, fit cone lock washer 30, spacing washer 4 and locknut 3. Now screw internals into hub shell.
   N.B. Turn axle backwards to allow ball ring to be screwed fully into hub shell, tighten ball ring
7. Fit left-hand cone 5, locknut 3 and adjust hub bearings, i.e. a trace of side play at wheel rim – no play at hub. Replace wheel in cycle frame and ensure wheel is central in cycle chainstays. Tighten axle nuts securely.

Fig. A

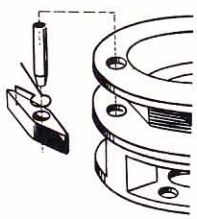


Fig. B

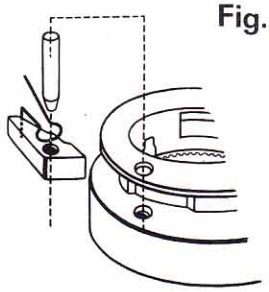
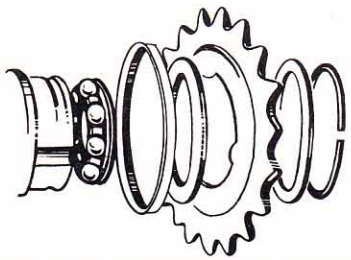


Fig. C



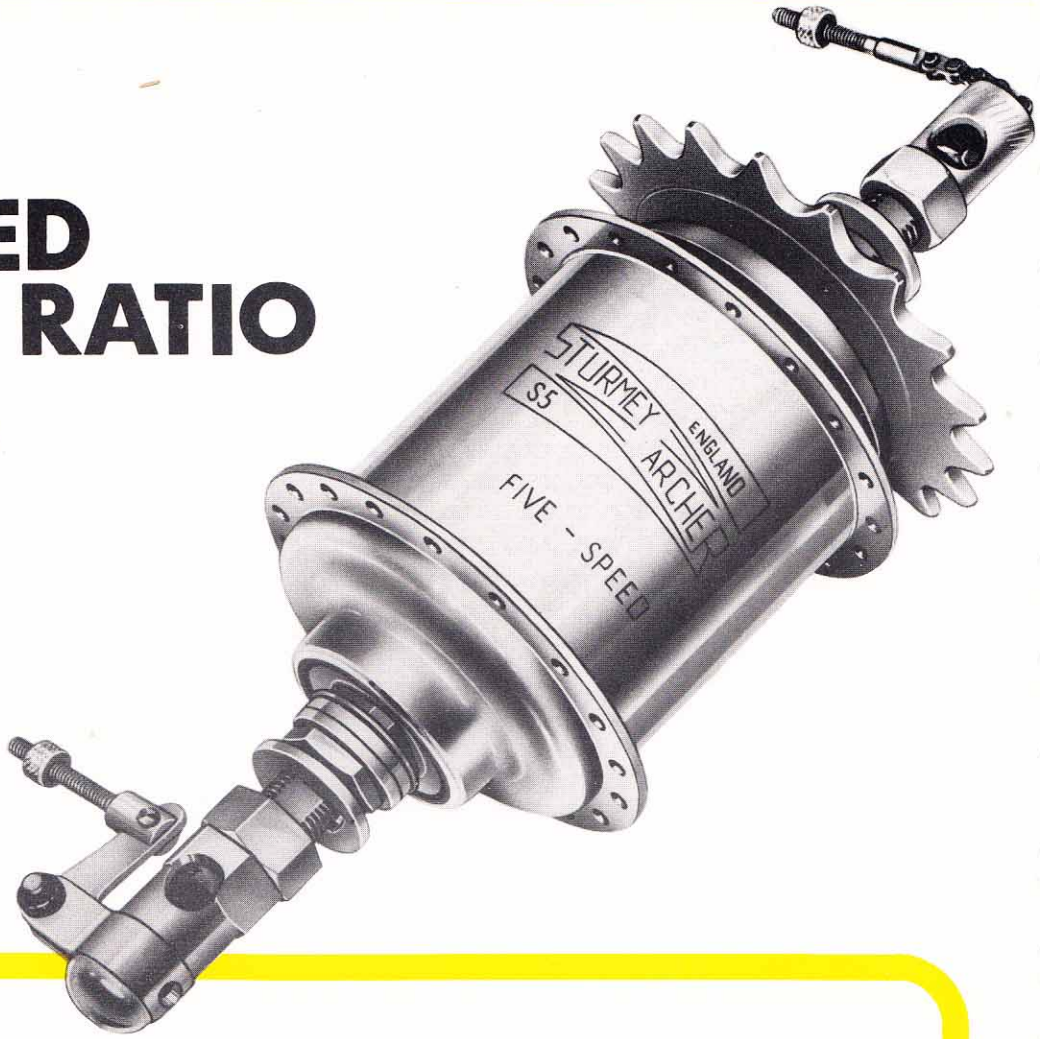
BEARING ADJUSTMENT.

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 must have a trace of side play at the rim. This adjustment automatically sets all the bearings in the hub.
The right-hand cone is fixed at Works and should *not* be touched. If, however, the hub has been dismantled, then the right-hand cone will need re-setting. – This should be done before the left-hand cone is fitted.
Correct adjustment is to screw down the cone *finger-tight,* then slacken – *half* a turn – and lock in this position with special washer and locknut. *Note particularly that turning it back more than this will affect the gear engagement.*

S5 HUB GEAR

STURMEY ARCHER

5 SPEED WIDE RATIO GEAR



The world's first fully enclosed 5-speed hub gear – S5 – takes hub gear cycling into a new era.

Designed to the exacting requirements of cyclists throughout the world, the Sturmey-Archer S5 gear provides 5 star***** gearing with a difference!

* Fully enclosed – less danger of accidental damage.
* Weather-proof – free from water, grit and dirt.
* Oil bath lubrication – smooth running, minimum wear and maintenance.
* Precision engineered – simple gear-change, balanced loading.
* Compact size – lightness, clean lines.

No other 5 SPEED MULTIPLE GEAR OFFERS THESE ADVANTAGES!

CRUISE INTO OVERDRIVE WITH THE STURMEY-ARCHER 5 SPEED GEAR

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S5 HUB GEAR

STURMEY ARCHER

TO DIS-ASSEMBLE THE S5 HUB. (See exploded view).

1. Remove from left-hand side, bell crank 1, axle nut 2, lock washer 3, locknut 4, washer 5 and cone 6.
2. Unscrew right-hand ball ring 21 from hub shell 9 (using hammer and punch) and withdraw internals.
3. Hold axle in a vice, remove right-hand axle nut 29, washer 3, locknut 4, cone lock washer 28 and cone 6.
4. Lift off, clutch spring 47 and cap 48, the driver assembly 23, ball ring 21 and gear ring 18.
5. Remove thrust ring 45. Push out axle key 44 and remove the clutch sleeve 42 and sliding clutch 43.
6. Push out the pinion pins 17 and remove the pinions 16 and planet cage 12. *N.B.* The low gear pawl pins are riveted in position. (If necessary to remove file riveted part flat.)
7. TO REMOVE SUN PINIONS:–unscrew locknut 32, lock washer 33 and dog ring 34.
8. Push sun pinions 37 and 38 on to the axle dogs and pull out sleeve 36 from inside the small pinion. Push out axle key 35.
9. Slide sun pinions, sleeve and low gear spring 39 off the axle.

POINTS TO CHECK.

1. Slide clutch up and down inside driver, see that movement is free.
2. Check only 24 balls (3/16 inch diameter) in right-hand ball ring.
3. Examine gear ring for cracks, chipping, or signs of wear on internal dogs and teeth.
4. Check that axle is straight.

EXAMINE FOR WEAR ON ENGAGEMENT POINTS:–

5. All ball races; 6. Sliding clutch; 7. All pinion teeth; 8. Planet cage dogs and gear ring dogs; 9. All pawls and pawl ratchets; 10. Axle dogs.

TO ASSEMBLE THE S5 HUB.

1. Prepare sub-assemblies – see Figs. 'A', 'B' and 'C'.
   (a) Fit the pawls, pins and springs into the gear ring – See Fig. 'A'.
   (b) Assemble driver sprocket, spacing washers, circlip – See Fig. 'B'.
   (c) Rivet the pawls, pins and springs into the planet cage – See Fig. 'C'.
2. From the left (short slot) end of the axle, slide on low gear spring 39, primary sun pinion 38, secondary sun pinion 37 and sleeve 36 in that order.
3. Hold pinions up to axle dogs – withdraw the sleeve until keyhole is exposed, insert key 35. *N.B.* (The hole through the key must be in line with the bore of axle). Release the pinions, and secure the key.
4. Fit the dog ring 34 over axle 'square', and secondary sun pinion teeth, secure with lock washer 33, locknut 32 (turn down edge of lock washer over two sides of locknut).
5. From the right:–Fit the planet cage assembly 12.
6. Add planet pinions 16 and pins 17. The marked teeth must point radially outwards as Diagram 'D'. To check the 'timing', engage the gear ring with the pinions. It should rotate quite freely. Remove gear ring.
7. Fit the clutch sleeve 42 (flange first), the sliding clutch 43 (with the recess over the flange of the sleeve) the key 44 and the thrust ring 45.
8. Push indicator rod 49 into right end of axle and screw into axle key 44.
9. Fit the gear ring assembly 18, the right-hand ball ring 21, the driver assembly 23, the clutch spring 47 and cap 48.
10. Screw on right-hand cone 6 (finger-tight). Then slacken it half a turn and lock in that position with lock washer 28 and locknut 4. DO NOT unscrew more than half a turn.
11. Oil gear unit and screw mechanism into hub shell 9, and tighten ball ring 21.
12. Fit the left-hand cone, (6), washer (5), and locknut (4), and adjust the hub bearing.

Fig.A

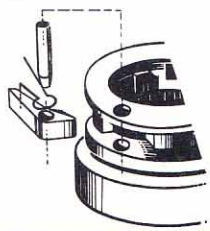


Fig.B

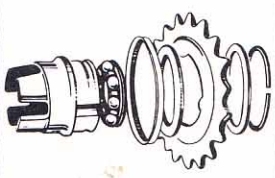


Fig.C

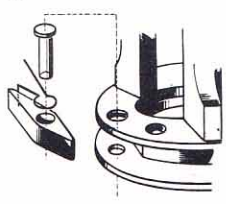
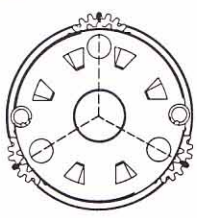


Fig.D



STURMEY ARCHER

S5 HUB GEAR

BEARING ADJUSTMENT.

Loosen locknut on the LEFT-HAND side and adjust cone suitably, then re-tighten locknut. A correctly adjusted wheel has side play at the rim only.

GEAR CONTROLS

The new Sturmey-Archer S5 hub has a choice of two foolproof controls; both giving rapid gear change at any speed.

* Dual levers, with the smooth slick action for the rider who wants reliable simplicity.
* Twinshift, for the young rider who wants the 'extra' feel of Grand Prix performance.

GEAR CHANGING

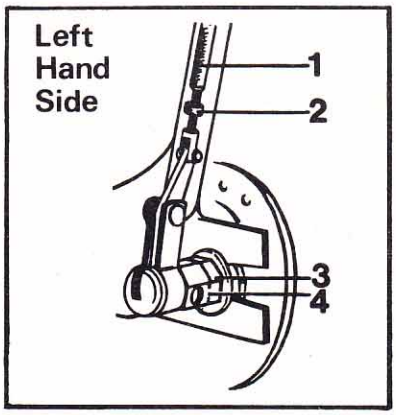
The gear change is quick and easy and should be made smartly. *Continue pedalling, but ease pressure on pedals whilst changing gear.*

GEAR ADJUSTMENT.

Foreword:–The S.5 hub gear is of precision manufacture and will give satisfactory service if maintained and adjusted correctly. It is most important to ensure total engagement of the sun pinion dogs with their respective axle dogs which is achieved by careful attention to simple adjustment procedure as follows:–

LEFT HAND SIDE

1. With both right and left-hand control levers in the forward position, insert push rod into axle, screw bellcrank unit (4) right up to axle nut (3) and then unscrew slightly to align with cable.
2. Screw knurled cable connection (1) halfway on to bellcrank arm, leaving locknut (2) loose. Now slide fulcrum clip along until slackness in cable is taken up.
3. **This is most important**– Manipulate pedal cranks backwards and forwards with the rear wheel stationary, whilst pulling the lefthand control lever into backward position. Drive can be felt through the pedals when mechanism is fully engaged.
4. Pull out bellcrank arm with fingers and adjust knurled connection (1) to take up all slackness in the cable.
5. Tighten lock nut (2) up to knurled connection.



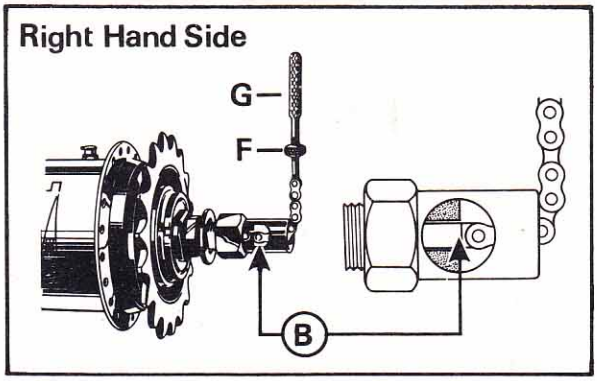
Note–The S5 hub has a visual indication of correct left-hand side adjustment by means of a circular hole in the bellcrank (4) and a red band on the push rod. Adjustment is carried out as described above, but a visual check can also be made that the Drive Mechanism is fully engaged since the red band on the push rod should be almost completely hidden inside the axle.

Should gears slip – check and adjust immediately.

RIGHT HAND SIDE

1. With the right hand control lever in central position – screw down locknut (F).
2. Look through the circular 'window' in the axle nut (Fig. B), and screw down cable adjuster (G) until you see the last link in the chain is clear of axle.
3. Now adjust cable until THE END OF ROD IS EXACTLY LEVEL WITH THE OUTSIDE END OF THE AXLE as shown (Fig. B).
4. Tighten locknut (F) up to cable adjuster (G).

Should gears slip – check and adjust immediately



S5 HUB GEAR

STURMEY ARCHER

GEAR CORRECTION GUIDE.

NOTE: The major cause of trouble is faulty gear adjustment. Check to see that the end of the indicator rod – on right side of hub – is level with the extreme end of the axle when gear control lever is in No. 3 gear position. If the complaint is sluggish gear change or stiffness, this may point to lack of oil. Hub should be oiled and re-tested before going further. If the fault persists, the following chart should locate the trouble.

SYMPTOM	FAULT	REMEDY
No super low gear (1).	1. Control cable (left side) too slack. 2. Low gear pawls upside down or reversed.	1. Tighten control cable. 2. Re-assemble low gear pawls.
Difficulty in engaging low gears 1 and 2.	1. No lubricant on inside cables. 2. Faulty low gear spring. 3. Axle key bent.	1. Lubricate. 2. Fit new spring. 3. Fit new key.
Slips in super low gear (1).	1. Kinks in gear cable. 2. Faulty coiling of low gear spring. 3. Incorrectly fitted pawl spring.	1. Fit new control cable. 2. Fit new spring. 3. Fit pawl springs correctly.
Alternates between super low (1) or low gear (2) and normal gear (3).	1. Worn gear ring pawls.	1. Fit new pawls.
Slips in low (2) and super low gear (1).	1. Dog ring locknut loose. 2. Weak low gear spring. 3. Dog ring teeth worn.	1. Examine ring teeth. Tighten locknut. 2. Fit new spring. 3. Fit new dog ring.
Slips in low (2) and high gear (4).	1. Overtight cable left side.	1. Re-adjust cable end connector at hub.
Slips in normal gear (3).	1. Gear ring splines and sliding clutch worn.	1. Fit new parts.
Slips in high (4) and super high gear (5).	1. Planet cage dogs and clutch worn. 2. Incorrect right-hand cone adjustment. 3. Tight clutch spring.	1. Fit new parts and re-adjust. 2. Re-adjust. 3. Clean hub and fit new spring.
Hub runs stiffly, drag on pedals when free-wheeling.	1. Planet pinions not 'timed' correctly. 2. Too many balls fitted in ball ring. 3. Incorrect cone adjustment. 4. Chainstay ends not parallel. 5. Corrosion due to lack of lubrication. 6. Distorted dust caps.	1. Re-time pinions. 2. Fit 24 balls only. 3. Re-adjust both cones. 4. Correct chainstay ends. It is essential that the ends are parallel. 5. Clean hub thoroughly and oil. 6. Check dust caps and replace if distorted.
No gears.	1. Pawls stuck.	1. Lubricate with S.A. oil.
Sluggish gear change.	1. Distorted axle spring. 2. Bent axle. 3. Worn gear indicator chain link. 4. Rusty or frayed cables.	1. Fit new spring. 2. Replace axle. 3. Replace indicator and chain. 4. Lubricate cables or replace.

STURMEY ARCHER

S3C TRICOASTER HUB

COASTER HUB BRAKE COMBINED WITH AW 3 SPEED GEAR

This newcomer to the Sturmey-Archer range provides in one hub shell the most efficient combination of gears with a coaster brake. Speedy gear change — smooth stopping power by a reverse turn of the pedals.

The brake action is entirely independent of gear adjustment and completely positive at all times.

No other hub offers *all* these unique advantages –

* The world famous AW wide ratio 3 speed gear
* Completely positive back-pedal brake
* Wide range of gear controls – trigger, auto-twist grip, sportshifts – to suit all models of bicycles.
* Fully enclosed – weather proof – oilbath lubrication.

THE GEAR THAT MAKES CYCLING EASIER-
THE BRAKE THAT MAKES CYCLING SAFE!

STURMEY ARCHER GEARS LTD · NOTTINGHAM · ENGLAND A TI COMPANY

S3C TRICOASTER HUB

STURMEY ARCHER

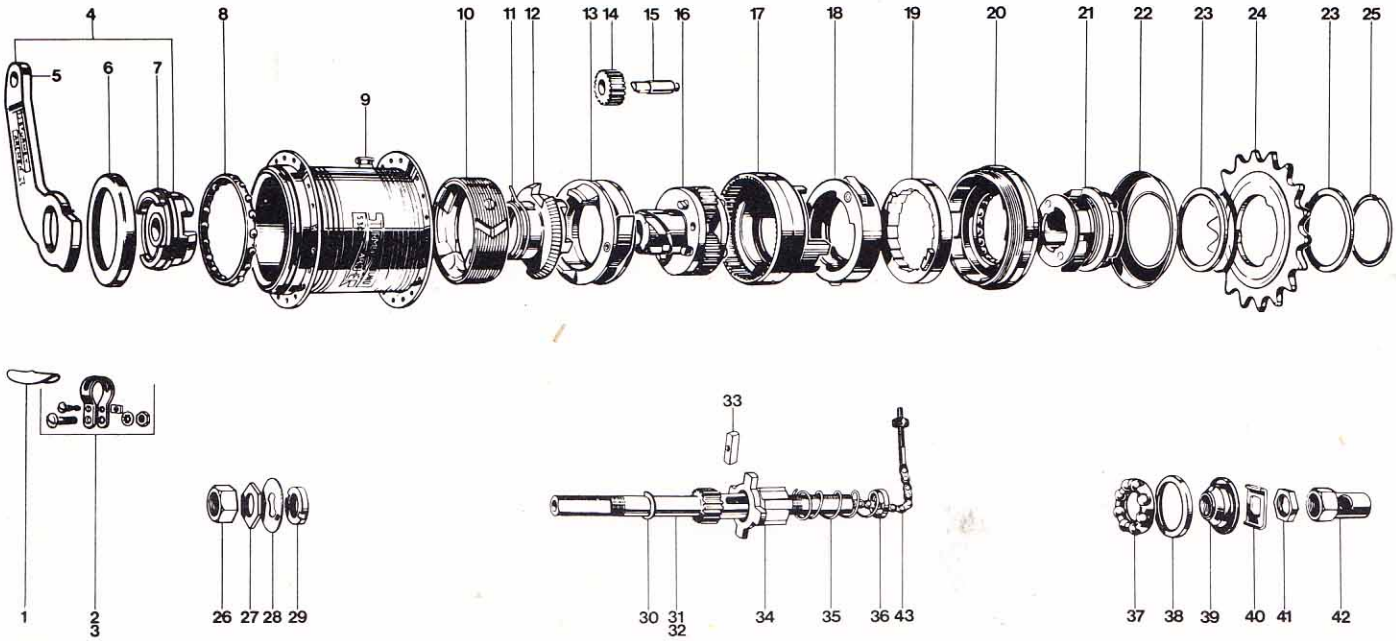


PHOTO No.	SALES No.	DESCRIPTION
1	HSH 401	Strengthening Pad
2	HCB 104	Brake Arm Clip – Sports
3	HCB 103	Brake Arm Clip – Roadster
4	HSH 449	Brake Arm & L.H. Cone Assembly
5	HSH 446	Brake Arm
6	HSH 404	Dust Cap for L.H. Cone
7	HSH 447	Cone – L.H.
8	HSA 164	Ball Retainer L.H.
9	HSA 106	Lubricator
10	HSH 448	Brake Band
11	HSH 407	Brake Actuating Spring
12	HSH 408	Brake Thrust Plate
13	HSA 168	Pawl Ring Assembly – for Planet Cage
13A	HSA 111	Pawl } See Assembly 13
13B	HSA 133	Pin } See Assembly 13
13C	HSA 120	Spring } See Assembly 13
14	HSA 292	Planet Pinion
15	HSA 293	Pinion Pin
16	HSA 291	Planet Cage
17	HSA 296	Gear Ring
18	HSA 307	Pawl Ring Assembly – for Gear Ring
18A	HSA 119	Pawl } see Assembly 18
18B	HSA 133	Pin } see Assembly 18
18C	HSA 253	Spring } see Assembly 18
19	HSA 304	Ratchet Ring
20	HSA 308	Ball Ring Assembly with Dust Cap – 24 ($\frac{3}{16}$″ diam.) Ball Bearings
21	HSA 311	Driver and Brake Operating Pawls

PHOTO No.	SALES No.	DESCRIPTION
21A	HSA 300	Pawl
21B	HSA 301	Pin } see Assembly 21
21C	HSA 302	Spring } see Assembly 21
21D	HSA 303	Circlip } see Assembly 21
22	HSA 102	Dust Cap – Sprocket
23	HMW 127	Spacing Washer – for Sprocket
24	HSL714-722	Sprocket Range 14T to 20T & 22T
25	HSL 721	Circlip for Sprocket
26	HMN 128	Axle Nut – L.H. side
27	HMN 335	Lock Nut
28	HMN 156	Lock Washer
29	HMN 334	Adjuster Nut
30	HSL 725	Circlip – for Securing Planet Cage
31	HSA 313	Axle 6″ (152 mm)
33	HSA 295	Key for Axle
34	HSA 294	Clutch
35	HSA 128	Clutch Spring
36	HSA 129	Spring Cap
37	HSA 284	Ball Retainer – for Driver – ($\frac{1}{4}$″ Diam.) Ball Bearings
38	HSA 102	Dustcap – for Driver Ball Retainer
39	HSA 257	Cone – R.H.
40	HMW 147	Lockwasher for Cone
41	HMN 132	Locknut – for R.H. Cone
42	HMN 129	Axle Nut R.H.
43	HSA 126	Gear Indicator Coupling – 6″ Axle (152 mm)

STURMEY ARCHER

S3C TRICOASTER HUB

GENERAL NOTES.

1. **GEAR RATIOS:–** The S3C hub provides three gears – (1) Low Gear – decrease of 25%. (2) Normal Gear, i.e. direct drive. (3) High Gear – increase of 33⅓%.
2. **SPROCKETS:–** A range of sprockets from 14T to 20T, and also 22T, is available for this hub.
3. **LUBRICATION:–** A NEW HUB MUST BE OILED BEFORE USE through the lubricator on the hub shell. Afterwards add a few drops of oil every month. USE ONLY STURMEY-ARCHER OIL – DO NOT use thick oil or grease.
4. It is important that the axle should be prevented from rotating in the chainstay slots and the flats on the axle are provided for this purpose. If the chainstay ends are too wide for the axle special lock washers are supplied.

GEAR CHANGING

The gear change is quick and easy and should be made smartly. *Continue pedalling, but ease pressure on pedals whilst changing gear.*

TO DIS-ASSEMBLE THE S3C HUB (See exploded view)

1. Place sprocket end of axle in a vice. Remove left-hand locknuts 26 and 27, lockwasher 28 and adjuster nut 29. Lift off brake arm and cone assembly 4. Take out ball retainer 8 and brake band 10 from hub shell.
2. Unscrew right hand ball ring 20 (use hammer and punch). Remove unit from vice and withdraw gear from hub shell.
3. Remove the brake thrust plate 12 and planet cage pawl ring 13.
4. Place left hand end of axle in a vice and remove right hand wheel nut 42, wheel washer, cone locknut 41. Unscrew cone 39.
5. Lift off clutch spring cap 36, spring 35, driver assembly 21, ball ring 20, ratchet ring 19, gear ring pawl ring 18 and gear ring 17.
6. Unscrew gear indicator coupling 43, lift off clutch 34 and remove axle key 33.
7. Take out planet pinion pins 15 and remove planet pinions 14.
8. Remove axle from vice, push off circlip 30 from left end of axle and lift off planet cage 16.

POINTS TO CHECK

1. Axle for straightness.
2. All gear teeth for wear.
3. All races for wear.
4. All pawls and ratchets for wear.
5. Pinion pins, sliding clutch, driver and gear ring splines, planet cage dogs and cam surfaces – for wear.
6. Check engagement areas of brake thrust plate and gear ring and ratchet ring.
7. Eliminate all movement of brake arm in its recess in left hand cone – if either component is damaged (i.e. chipped) replace with new part.
   NOTE – The brake arm is a press-in fit and must remain tight in cone recess.
8. All dust caps for damage in – left and right hand cones – right hand ball ring and driver.

S3C TRICOASTER HUB

STURMEY ARCHER

TO ASSEMBLE THE S3C HUB

Prepare in advance the following sub-assemblies:–

GEAR RING ASSEMBLY See Fig. 18. – Fit gear ring pawls, pins and springs. Rivet the pawl pins securely in position.

DRIVER ASSEMBLY See Fig. 21. – Assemble brake operating pawls, springs, pins and circlip in driver. Assemble sprocket dust cap, spacing washers and sprocket in arrangement noted when dismantling the hub, and add circlip. Fit the ball retainer 37 into the driver 21 – (The ring of retainer facing outwards) and fit dust cap 38 – fill dust cap with Shell Alvania No. 3 grease.

PLANET CAGE ASSEMBLY See Fig. 13. – Fit planet cage pawls, pins and springs. Rivet the pawl pins securely in position.

BALL RING ASSEMBLY – Fit 24 ($\frac{3}{16}$" diam) ball bearings in ball race of right hand ball ring 20. Fill the ball track with Shell Alvania No. 3 grease and press in the inner dust cap. Make sure the bearings revolve freely after dust cap has been fitted.

BRAKE ARM AND CONE ASSEMBLY

Place dust cap 6 over left hand cone 7, and press brake arm 5, tightly into cone slots.
NOTE – "Sturmey-Archer" name must face outwards.

Smear grease – use Shell Alvania No. 3 – in the ball track of the left hand cone – (inside the hub shell).

Fig 13

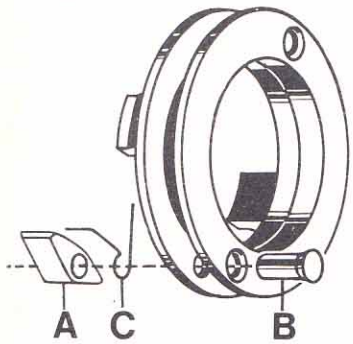


Fig 18

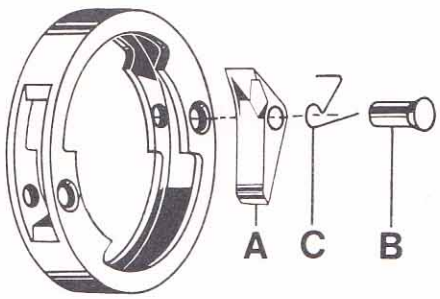
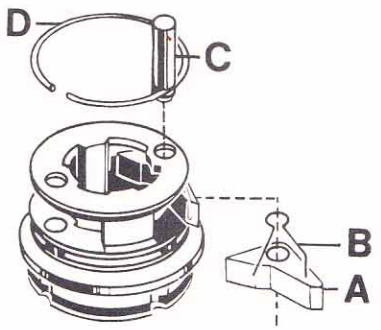


Fig 21



1. Hold the right-hand end of the axle in a vice – the slot for the axle key below the sun pinion – and fit the planet cage 16 – actuator thread uppermost – and push circlip 30 into axle groove. Reverse axle in vice, add the planet pinions 14, and pins 15, making sure that the D shape ends of the pins are facing downwards.
2. Fit axle key 33 into axle slot (with the hole of the key facing upwards), slide clutch 34 over axle and key, and screw gear indicator rod 43 into key.
3. Fit the gear ring 17 and the previously prepared gear ring pawl ring (sub-assembly 18). Ensure that the heads of the pawl pins are facing upwards.
4. Insert the ratchet ring 19 into the right hand ball ring 20 and place these over the gear ring assembly. (Ratchet ring dogs MUST engage gear ring).
5. Fit the previously prepared driver (sub-assembly 21).
6. Slide the clutch spring 35 over the axle and fit spring cap 36.
7. Screw the right-hand cone 39 on to axle (finger tight), then slacken half a turn (180°) and lock in position with the washer 40 and locknut 41.
   N.B. Do not unscrew cone more than $\frac{5}{8}$ of a turn, as that would throw the gear mechanism out of adjustment.

STURMEY ARCHER

S3C TRICOASTER HUB

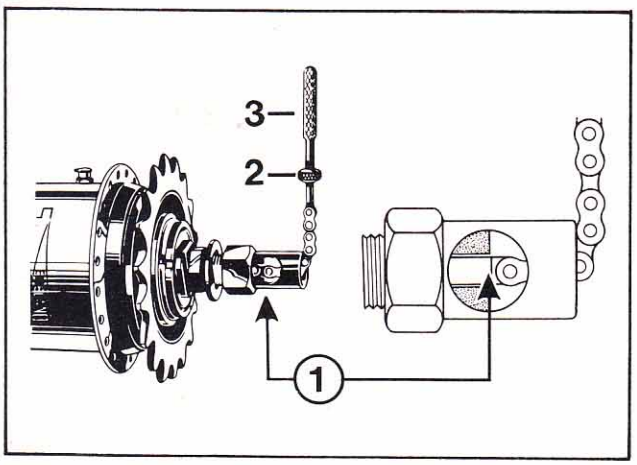
ASSEMBLY CONTINUED

8. Reverse the assembled mechanism in the vice. Locate planet cage pawl-ring (sub-assembly 13) over the flats on the pinion pins.
9. Fit the brake thrust plate 12 – IMPORTANT – ensure leg of brake actuating spring faces outwards, also the thrust plate must ENGAGE FULLY the dogs on planet cage pawl ring 13.
10. Fit the brake band 10 – (the inner band projections must face uppermost) over brake thrust plate 12.
11. Remove the assembled mechanism from the vice. Hold the cycle wheel horizontally – insert the assembled mechanism into hub shell from below and screw in the right hand ball ring 20. (Use hammer and punch to tighten ball ring).
12. Fit ball retainer (with balls down) in left hand ball race. Fit the left-hand cone and brake arm assembly 4. *NOTE* – Make sure that the brake band projections and actuating spring leg fit into their respective slots in the cone – i.e. spring leg in narrow slot at 90° to large slot.
13. Screw the adjuster nut 29 on to axle (finger tight). Fit the lockwasher 28 and locknut 27 – (Adjust the hub bearing).
    A correctly adjusted wheel has a trace of side-play at the rim – none at the hub.
    N.B. Secure adjuster nut 29 after adjustment – centre punch lockwasher 28 over the slot in adjuster nut 29. Tighten locknut 27.
14. Replace the wheel in the cycle frame. Secure FIRMLY, the brake arm clip 2 on left-hand chainstay of cycle. (*N.B.* Strengthening Pad 1 is fitted on top of chainstay – Sports Machines). Do not twist the brake arm sideways when tightening clip. Adjust the gears.

GEAR ADJUSTMENT

Place the gear control in No. 2 position. Screw the cable connection 3, until the end of the indicator rod is exactly level with the extreme end of the axle. This can be seen through 'window' in the right-hand nut (see 1). Now tighten locknut 2. ALL GEARS ARE NOW SET.

NOTE – When the brake is applied in No. 3 (High) gear only – the gear indicator coupling will move outwards – slightly. This is caused by the clutch – to which the indicator is keyed – sliding backwards over the ramps on the planet cage. Immediately the brake is released, the clutch moves down the ramp again to drive forward.



BRAKE CORRECTION GUIDE

SYMPTON	FAULT	REMEDY
Noisy or juddering brake.	1. Loose brake arm clip.	1. Tighten clip nuts.
Brake snatching or too fierce,	1. LACK OF OIL.	1. LUBRICATE HUB through oiler in Hub Shell – use Sturmey-Archer Oil – or SAE 20.

S3C TRICOASTER HUB

STURMEY ARCHER

GEAR CORRECTION GUIDE

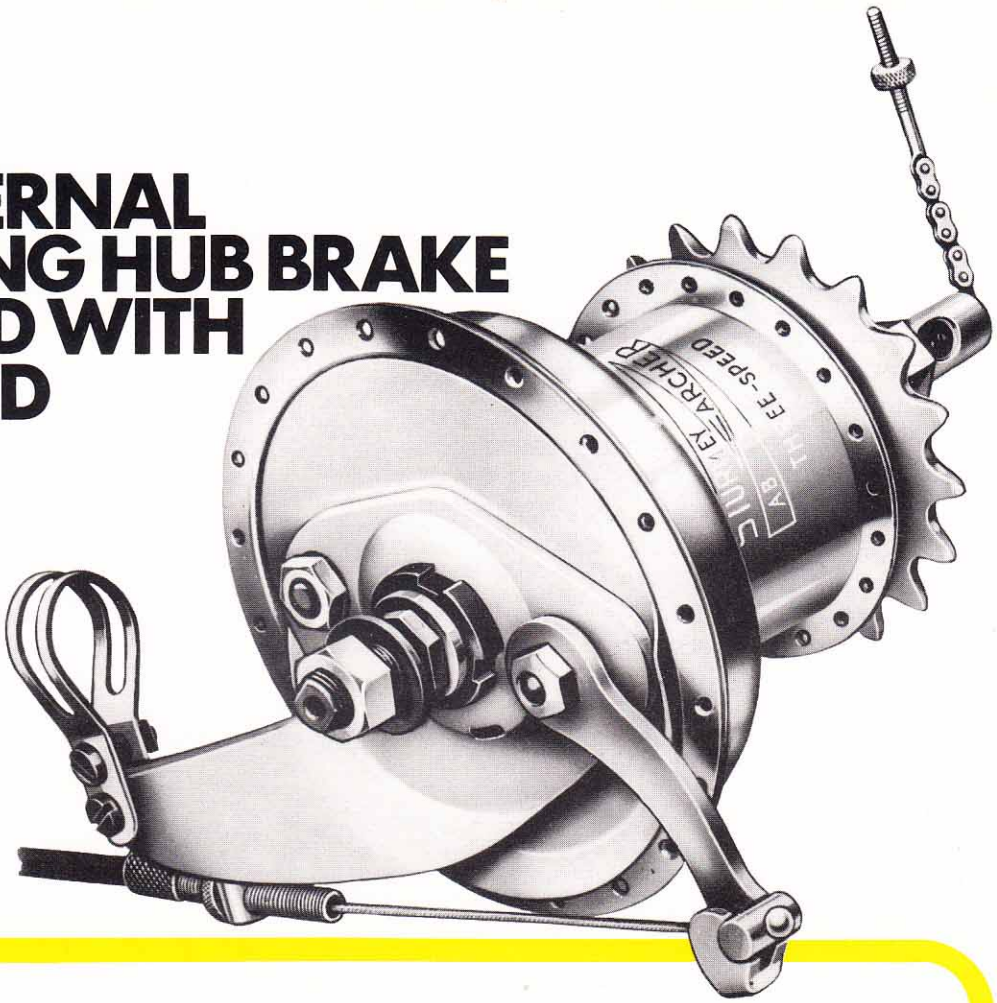
NOTE – The major cause of trouble is faulty gear adjustment. Check to see that the end of the indicator rod is level with the end of the right hand end of the axle when gear control lever is in No. 2 gear position. If the complaint is sluggish gear change or stiffness, this may point to LACK OF OIL. Hub and control should be oiled and re-tested before going further. If the fault persists, the following chart should locate the trouble.

SYMPTOM	FAULT	REMEDY
No low gear (1st)	1. Low gear pawls upside down or pointing in wrong direction.	1. Re-assemble pawls correctly.
	2. Distorted axle spring.	2. Fit new axle spring.
Slipping in low gear (1st)	1. Sliding clutch, worn or chipped at corners.	1. Fit new sliding clutch.
	2. Indicator not screwed in fully in axle key.	2. Screw in indicator fully.
	3. R.H. cone wrongly adjusted.	3. Re-adjust R.H. cone.
	4. Kinks in gear control wire.	4. Fit new control cable.
	5. Gear indicator coupling twisted by over-tightening.	5. Replace or refit as required.
Fluctuating between low gear (1st) and normal gear (2nd)	1. Faulty or worn gear ring pawls.	1. Change both gear ring pawls.
Slipping in normal gear (2nd)	1. Gear ring dogs and/or sliding clutch chipped, due to incorrect gear adjustment or gear changing.	1. Fit new gear ring and/or sliding clutch.
	2. Indicator not screwed in fully in axle key.	2. Screw in indicator fully.
Slipping in top gear (3rd)	1. Pinion pins or sliding clutch badly worn due to bad adjustment.	1. Fit new parts.
	2. Weak or distorted axle spring.	2. Fit new spring.
	3. Incorrect R.H. cone adjustment.	3. Re-adjust.
Hub runs stiffly. Drag on pedals when free wheeling.	1. Too many balls in ball ring.	1. 24 balls only should be fitted.
	2. Cones excessively tight.	2. Re-adjust cones.
	3. Chainstay ends not parallel.	3. Correct chainstay ends. It is essential that the ends are parallel, otherwise the axle will be strained when the nuts are tightened and gear internals may be seriously affected.
	4. Corrosion due to inferior oil or LACK OF LUBRICATION.	4. Clean hub thoroughly and oil. Use Sturmey-Archer oil – or SAE20.
	5. Distorted dust caps.	5. Check dust caps and replace damaged caps.
Sluggish gear change.	1. Distorted clutch spring.	1. Replace spring.
	2. Bent axle.	2. Replace axle.
	3. Worn chain links in gear indicator coupling.	3. Replace indicator and chain.
	4. Cable guide pulley out of line.	4. Correct alignment of cable and pulley on cycle frame.
	5. Lack of lubrication of gear cable.	5. Lubricate, or replace cable.

STURMEY ARCHER

AB/C 3 SPEED HUB BRAKES

REAR INTERNAL EXPANDING HUB BRAKE COMBINED WITH AW 3 SPEED GEAR



An ideal combination – braking power plus speed with ease by Sturmey-Archer. Internal expanding brake and the world famous AW 3 speed wide ratio gear in one compact unit – saves weight and cost.

The AB/C hub – chosen by leading Cycle manufacturers in world markets – offers the advantages of speed with ease and stopping power to spare – completely enclosed in one clean-line chromium plated shell to provide entire protection from weather – positive braking under all conditions.

Suitable for Sports and Roadster Cycles with a choice of brake and gear controls:–

BRAKE CONTROL
*ABC – light flexible, power tested cable – black or white.
*AB – strong steel rod transmission – chromium plated
– both with full chrome brake lever – braking power at your finger tip!

GEAR CONTROL
*Trigger Control – quick 'flick' action handlebar fitting.
*Auto-Twist Grip – automatically ensures correct gear adjustment at all times.
*Sportshift – racy shift through the gears – frame mounted for 'fun-bikes'.

THE STURMEY-ARCHER AB/C HUB PROVIDES BRAKING & GEAR CHANGE AT THEIR BEST

AB/C 3 SPEED HUB BRAKES

STURMEY ARCHER

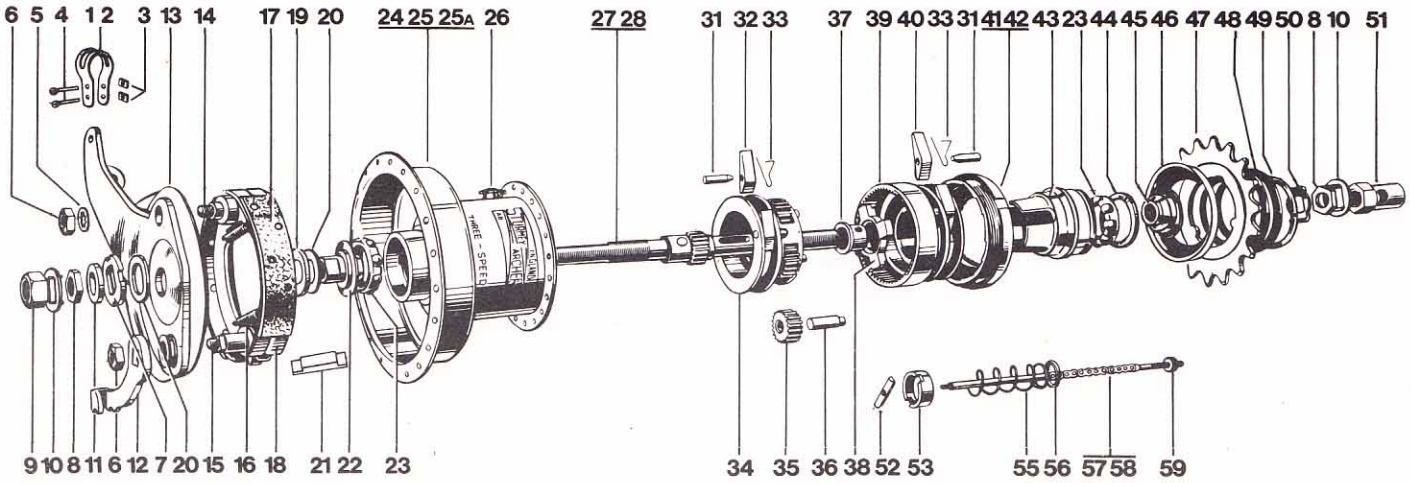


PHOTO No.	SALES No.	DESCRIPTION
1	HSL 708	Brake Arm Clip complete (large)
2	HSL 707	Brake Arm Clip complete
3	HMN 136	Clip Nut
4	HMB 102	Clip Screw
5	HMW 157	Shakeproof Washer
6	HMN 139	Nut
7	HMW 151	Cone Adjuster
8	HMN 132	Cone Locknut
9	HMN 128	L.H. Axle Nut
10	HMW 145	Axle Washer
11	HMW 129	Spacing Washer – zinc
12	HSB 220	Cam Lever
13	HSB 219	Brake Plate
14	HSB 207	Fulcrum Pin
15	HSB 209	Brake Operating Cam
16	HSB 208	Brake Spring
17	HSB 212	Brake Linings (pair) with Rivets
18	HSB 211	Brake Shoe Assembly
19	HMW 154	Thin Spacing Washer
20	HMW 153	Spacing Washer $\frac{1}{16}''$
21	HSB 213	Brake Shoe End Cap
22	HSA 150	L.H. Cone with Dust Cap
23	HSA 103	Ball Cage with $\frac{1}{4}''$ diameter Balls
24	HSA 154	Shell combined with Ball Cup – 40 hole
25	HSA 155	Shell combined with Ball Cup – 36 hole
25A	HSA 155	Shell combined with Ball Cup – 28 hole
26	HSA 106	Lubricator
27	HSA 107	Axle – $5\frac{3}{4}''$ (146 mm)
28	HSA 108	Axle – $6\frac{1}{4}''$ (149 mm)

PHOTO No.	SALES No.	DESCRIPTION
31	HSA 112	Low Gear Pawl Pin
32	HSA 111	Low Gear Pawl
33	HSA 120	Pawl Spring
34	HSA 153	Planet Cage
35	HSA 115	Planet Pinion
36	HSA 114	Pinion Pin
37	HSA 116	Clutch Sleeve
38	HSA 117	Clutch
39	HSA 118	Gear Ring
40	HSA 119	Gear Ring Pawl
41	HSA 121	R.H. Ball Ring
42	HSA 122	Inner Dust Cap
43	HSA 123	Driver
44	HSA 102	Outer Dust Cap
45	HSA 101	R.H. Cone with Dust Cap
46	HSL 701	Sprocket Dust Cap
47	HSL714-722	Sprocket. 14-20T and 22T
48	HMW 127	Sprocket Spacing Washer – $\frac{1}{16}''$
49	HSL 721	Circlip
50	HMW 147	Lockwasher to R.H. Cone
51	HMN 129	R.H. Axle Nut
52	HSA 124	Axle Key
53	HSA 127	Thrust Ring
55	HSA 128	Clutch Spring
56	HSA 129	Clutch Spring Cap
57	HSA 125	Indicator Coupling $5\frac{3}{4}''$ (146mm) Axle
58	HSA 126	Indicator Coupling $6\frac{1}{4}''$ (149mm) Axle
59	HMN 134	Connection Lock-Nut

GENERAL NOTES

1. **GEAR RATIOS**:– The AB hub provides three gears. The direct drive is in Normal Gear. Top Gear provides an increase of 33·33% and Low Gear a decrease of 25% from Normal.
2. **SPROCKETS**:– A range of sprockets from 14T to 22T is available for this hub.
3. It is important that the axle should be prevented from rotating in the chainstay slots and the flats on the axle are provided for this purpose. If the chainstay ends are too wide for the axle, special washers are supplied.
4. **LUBRICATION**:– A NEW HUB MUST BE OILED BEFORE USE. Lubrication of the bearings is made through lubricator in hub shell. USE ONLY STURMEY-ARCHER OIL (SAE 20), applying a few drops once a month. The brakes are designed to run dry. No oil must be allowed to reach the brake linings.

STURMEY ARCHER

AB/C 3 SPEED HUB BRAKES

TO DIS-ASSEMBLE THE HUB. (See exploded view).

1. Remove axle nuts 9, and 51, and lockwashers 10.
2. Remove left-hand locknut 8, washer 11, notched adjusting washer 7 and spacing washer 20.
3. Lift off the brake unit – care should be taken not to lose the inner spacing washers 19 and 20, on the left-hand cone.
4. Unscrew left-hand cone 22.
5. Unscrew right-hand ball ring 41, (use hammer and punch) from shell and withdraw gear unit.
6. Remove from the planet cage the low gear pawls 32, pins 31 and springs 33.
7. Place the left-hand end of the axle in a vice and remove the right-hand cone locknut 8, washers if any, cone lock washer 50, and cone 45.
8. Lift off, in the following order – the clutch spring 55, cap 56, driver assembly 43, right-hand ball-ring 41, and the gear ring 39.
9. Push out the gear ring pawl pins 31, from the gear ring 39, to release the pawls 40 and springs 33.
10. Remove the thrust ring 53, and unscrew the indicator coupling 57 or 58.
11. Push out the axle key 52, and remove the sliding clutch 38, and sleeve 37.
12. Lift off the planet cage complete 34.
13. Take out the pinion pins 36, and remove the pinions 35, from the planet cage 34.
14. If it is necessary to remove the brake shoes 18, and linings 17, from the brake plate 13, unscrew the cam lever nut 6, and pull the cam lever 12 from the squared end of the cam. Then remove the nut 6, and shakeproof washer 5, securing the fulcrum pin 14, and lift off the brake shoes 18.

POINTS TO CHECK.

GEAR

1. Freedom of clutch in driver. This should slide up and down easily.
2. Axle between centres for straightness.
3. All gear-teeth for wear or chipping.
4. All races for wear or pitting.
5. Pinion pins, clutch and gear ring dogs for rounding of engagement points.
6. Pawls and pawl ratchets for wear.

BRAKE

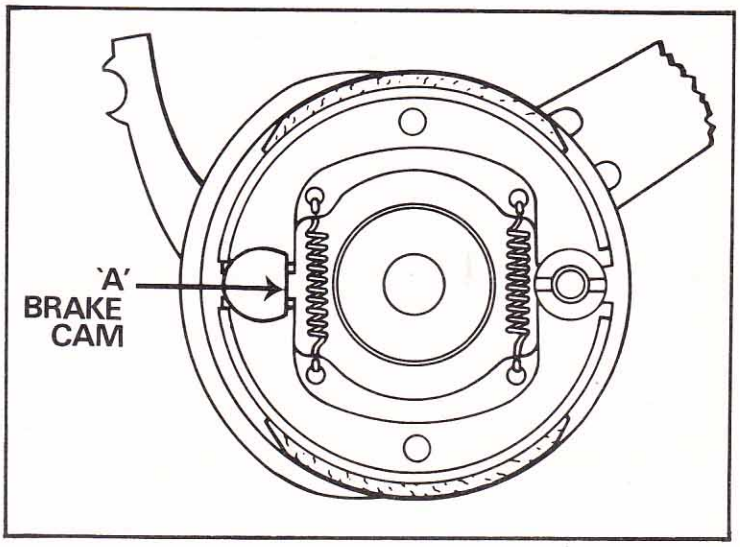
1. Make sure the leading edge of each brake lining is tapered off for the first quarter of an inch. (If they are not, the ends may lift and cause a squealing noise).
2. All rivets must be below the surface of the brake linings 17.
3. The linings for signs of wear or oil.

BRAKE SHOE ASSEMBLY

The diagram on the right illustrates the correct assembling of the brake shoes, but the following points should be specially noted:–

It is important that brake shoes are re-assembled with the side of the brake cam with the largest flat area on the inside – towards the axle. (See letter 'A').

To allow both brake shoes to be applied evenly the cam is slightly offset, and if not fitted correctly will allow one shoe only to operate with consequent loss of braking efficiency. It is also important to ensure that the flange which carries the brake springs fits next to the brake arm plate.



AB/C 3 SPEED HUB BRAKES

STURMEY ARCHER

TO ASSEMBLE THE HUB.

1. Prepare the following sub-assemblies:–
   a. Fit the ball-cage 23 into the driver 43, with the ring of the ball-cage facing outwards and press in the dust cap 44, with the recess facing outwards (see Fig. A). If a new ball cage is fitted, the dust-cap should also be new. If the sprocket has been removed, fit the dust-cap 46, washers 48, and sprocket 47 – in the same order noted on dismantling – and fix in position with circlip 49.
   b. Fit the balls (24 only) and the inner dust-cap 42, into the right-hand ball-ring 41, making sure that the balls can revolve freely with the dust cap in position.
   c. Fit the gear-ring pawls 40, pins 31, and springs 33, into the gear-ring 39. (see Fig. B).
   d. Smear grease in the channel of the dust-cap 46. *Do not use grease inside the Hub.*
2. Hold the axle 27/28, in a vice (with slot for axle key 52, above the sun pinion) and fit the planet cage 34.
3. Add the planet pinions 35, and pins 36, (the small ends of the pins protrude).
4. Fit the clutch sleeve 37, (flange first), clutch 38, with the recess over the flange of the sleeve, axle key 52, with the flats facing upwards and screw in the indicator coupling 57 or 58.
5. Locate thrust-ring 53, over flats of axle key 52.
6. Fit gear-ring 39, (sub-assembly B) over planet cage 34.
7. Position right-hand ball-ring 41, on the gear-ring 39.
8. Add the driver 43, complete with fittings (sub-assembly A).
9. Slide clutch spring 55, and cap 56, over the axle.
10. Screw on the right-hand cone 45, *finger tight,* then slacken (180°) – half a turn – and lock in this position with the lock washer 50, and lock nut 8.
    NOTE – CONE MUST NOT BE UNSCREWED MORE THAN HALF A TURN AS THAT WOULD THROW THE GEAR MECHANISM OUT OF ADJUSTMENT.
11. Fit the low gear pawls 32, pins 31, and springs 33, into planet-cage 34, (see Fig. C).
12. Screw the gear unit into the hub shell 24, or 25, and tighten ball-ring 41.
13. Screw on left-hand cone 22, and fit spacing washers 19 and 20.
14. Replace the brake plate, 13, complete with shoes 18.
    Note – If the brake shoes have been removed, make sure that they are replaced as described.
15. Fit spacing washer 20, notched cone adjusting washer 7, spacing washer 11, and left-hand cone locknut 8, (loosely). ADJUST THE HUB BEARING TO ENSURE NO PLAY AT THE HUB BUT A TRACE OF SIDE PLAY AT THE RIM, then lock the cone in position with locknut 8.
16. Fit wheel in bicycle frame and add axle washers 10, and axle nuts 9 and 51 – Adjust gear.

Fig.A

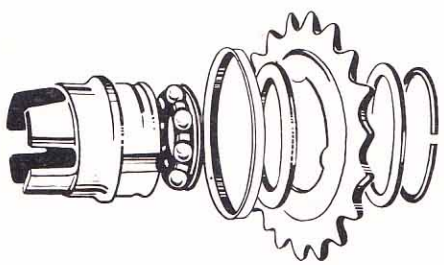


Fig.B

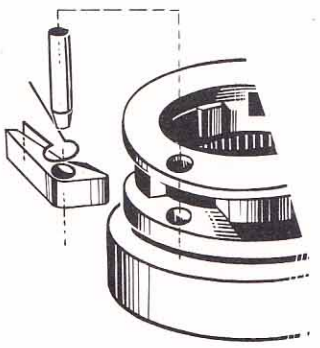
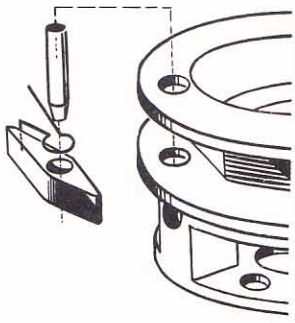


Fig.C



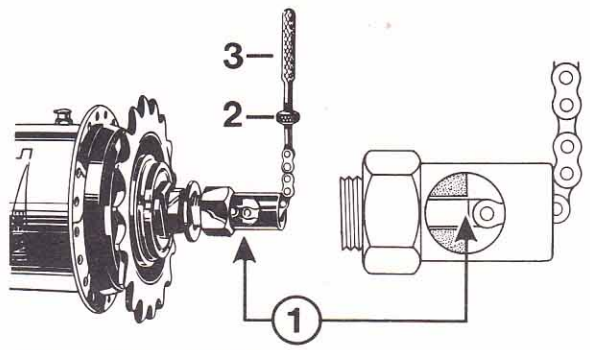
STURMEY ARCHER

AB/C 3 SPEED HUB BRAKES

GEAR ADJUSTMENT. (See Fig. 'D').

First place the gear control in No. 2 position. Then screw the cable connector (3) until the end of the indicator rod is exactly level with the extreme end of the axle. This can be seen through 'window' in the right-hand nut, see (1) – Now tighten locknut (2). All Gears are now set.

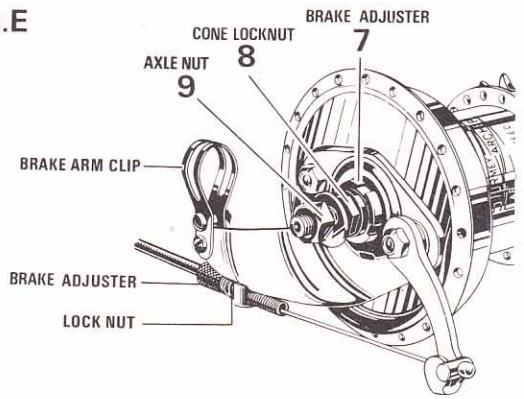
Fig. D



BEARING ADJUSTMENT. (See Fig. 'E').

Adjustment is made by left hand cone 22, which projects through the brake plate. Loosen Axle nut 9 and cone locknut 8, and slotted adjusting washer 7. Screw in cone "Finger Tight" – then *adjust the hub bearing until there is no play at the hub, but a trace of side-play at the wheel rim.* The right hand cone 45, is set at the factory and should not be altered. However, if the hub has been dismantled, re-set this cone as follows – (before adjusting the left hand cone.) Screw in cone "Finger Tight" only, then unscrew it counter clockwise (180°) – half a turn – and lock in this position with lock washer 50, and locknut 8.

Fig.E



ADJUSTMENT OF CABLE OPERATED BRAKES. (See Fig. 'E').

To adjust, slacken locknut and tighten adjuster so that the brake linings are just in contact with the brake drum, then slacken adjuster until the wheel spins freely. Tighten locknut. Occasionally check brake arm clip for tightness.

ADJUSTMENT OF ROD OPERATED BRAKES.

The principle of adjustment is exactly as described for cable brakes. The adjustment is controlled by special knurled adjuster nut at end of brake rod.

AB/C 3 SPEED HUB BRAKES

STURMEY ARCHER

GEAR CORRECTION GUIDE

NOTE – The major cause of trouble is faulty gear adjustment. Check to see that the end of the indicator rod is level with the end of axle when gear control is in No. 2 position. If the complaint is sluggish gear change or stiffness, this may point to lack of oil.

SYMPTOM	FAULT	REMEDY
Slipping in low gear (1st)	1. Sliding clutch worn. 2. Indicator not screwed in fully. 3. R.H. cone wrongly adjusted. 4. Kinks in control wire. 5. Twisted indicator chain.	1. Replace. 2. Re-adjust. 3. Re-adjust. 4. Replace. 5. Replace.
Self-changing gear action between 1st gear and 2nd gear.	1. Worn gear ring pawls. 2. Worn ends of clutch.	1. Replace. 2. Replace.
Slipping in normal gear (2nd).	1. Gear ring dogs and/or clutch worn.	1. Replace.
Slipping in top gear (3rd).	1. Pinion pins and/or clutch worn. 2. Weak or distorted axle spring. 3. Incorrect R.H. cone adjustment. 4. Grit between clutch sleeve and axle.	1. Replace. 2. Fit new spring. 3. Re-adjust. 4. Clean.
Hub rins stiffly. Drag on Pedals.	1. Too many ball bearings in ball-ring. 2. Cones too tight. 3. Chainstay ends not parallel. 4. Corrosion. 5. Distorted dust caps.	1. Fit 24 only. 2. Re-adjust. 3. Correct. 4. Clean and use S.A. Oil. 5. Replace.
Sluggish gear change.	1. Distorted axle spring. 2. Bent axle. 3. Worn indicator chain link. 4. Lack of oil, or frayed wire.	1. Replace. 2. Replace. 3. Replace. 4. Oil or replace.

BRAKE CORRECTION GUIDE

SYMPTOM	FAULT	REMEDY
Inefficient brake.	1. Oil-soaked or Greasy linings. 2. Incorrect adjustment. 3. Worn linings – rivet heads, protruding and contacting drum surface.	1. Fit new linings. 2. Re-adjust. 3. Fit new linings.
Squealing brake.	1. Loose brake-arm clip. 2. Linings not tapered off at front edge causing vibration. 3. Loose rivets in linings.	1. Secure clip. 2. Fit linings correctly. 3. Secure rivets firmly.
Brake action irregular.	1. Hub drum pulled out of shape, during wheel building.	1. Re-true wheel or rebuild as necessary.
Knocking or clicking noise.	1. Loose hub shell rivets. 2. Scored brake drum surface.	1. Fit new hub shell. 2. Fit new hub shell.

STURMEY ARCHER

BF/C HUB BRAKES

FRONT INTERNAL EXPANDING HUB BRAKE

Sturmey-Archer Internal Expanding Hub Brakes are designed to provide positive braking under all weather conditions.

The precision engineered brake shoe mechanism is enclosed in a full chromium plated shell to give complete protection against mud, rain and damage – thus ensuring maximum efficiency at all times.

A choice of either Rod Brake Controls (BF) or Cable Controls (BFC) is available to suit all bicycles.

FOR SAFER CYCLING–
CHOOSE STURMEY-ARCHER

STURMEY-ARCHER GEARS LTD · NOTTINGHAM · ENGLAND A TI COMPANY

BF/C HUB BRAKES

STURMEY ARCHER

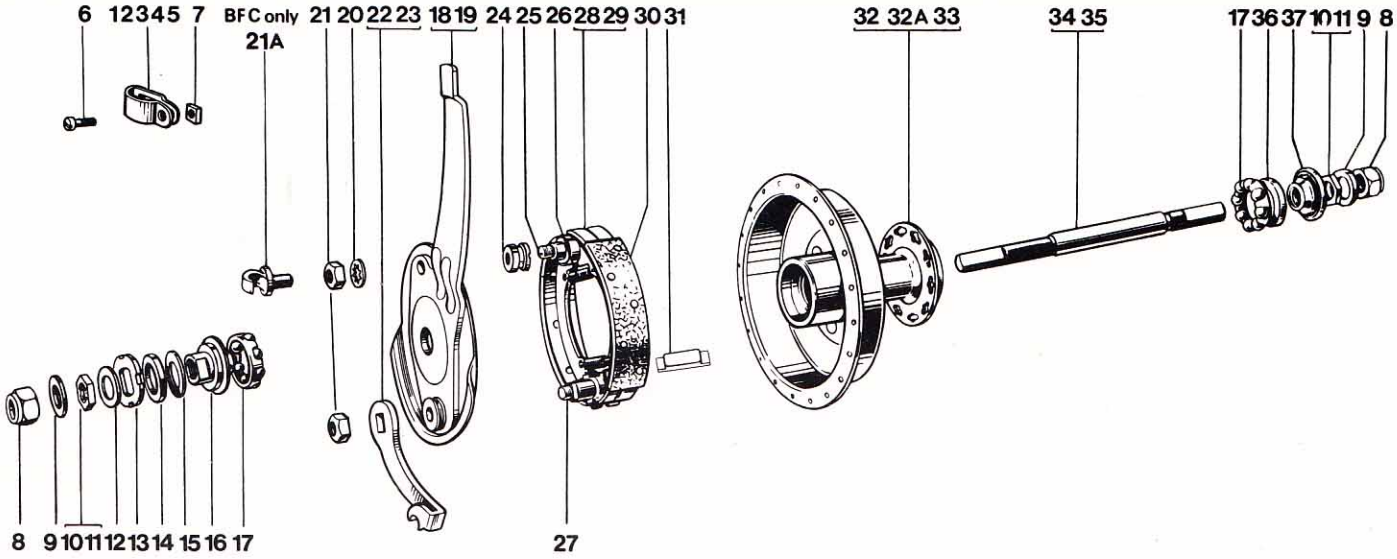


PHOTO No.	SALES No.	DESCRIPTION
1	HSL 702	Brake Arm Clip, round
2	HSL 703	Brake Arm Clip, oval
3	HSL 704	Brake Arm Clip, D-shaped
4	HSL 705	Brake Arm Clip, Duplex
5	HSL 706	Brake Arm Clip, Raleigh Roadster
6	HMB 102	Clip Screw
7	HMN 136	Nut for Clip Screw
8	HMN 118	L.H. Axle Nut
9	HMW 129	Axle Washer – $\frac{1}{8}$″ thick
10	HMN 137	Cone Locknut
11	HMN 138	Cone Locknut with Spigot
12	HMW 146	Axle Washer – $\frac{1}{16}$″ thick
13	HMW 151	Notched Cone Adjusting Washer
14	HMW 152	Spacing Washer
15	HMW 154	Spacing Washer
16	HSB 201	L.H. Cone
17	HSA 103	Ball Cage
18	HSB 202	Brake Plate and Arm for rod operation – BF
19	HSB 203	Brake Plate and Arm for cable operation – BFC

PHOTO No.	SALES No.	DESCRIPTION
20	HMW 157	Shakeproof Washer for rod operation
21	HMN 139	Cam Lever Nut for rod operation
21A	HSB 226	Cable Guide
22	HSB 204	Cam Lever for rod operation
23	HSB 205	Cam Lever for cable operation
24	HSB 206	Fulcrum Sleeve for cable operation
25	HSB 207	Fulcrum Pin for rod operation
26	HSB 208	Brake Shoe Spring
27	HSB 209	Brake Operating Cam
28	HSB 210	Brake Shoes, complete sleeve type for cable operation
29	HSB 211	Brake Shoes, complete pin type, for rod operation
30	HSB 212	Brake Linings (pair) with Rivets
31	HSB 244	Shoe End Cap
32	HSB 214	Shell – 32 hole
32A	HSD 395	Shell – 28 hole
33	HSB 215	Shell – 36 hole
34	HSB 216	Axle – 5″ (127mm)
35	HSB 217	Axle – 4$\frac{3}{4}$″ (121mm)
36	HSA 102	Outer Dustcap
37	HSB 218	R.H. Cone

GENERAL NOTES

BEARING ADJUSTMENT.

First loosen left-hand cone, then turn the notched washer (which fits over the adjusting cone) in the required direction until there is *perceptible movement at the wheel rim but no play at the hub* – tighten the locknut. This adjusts both bearings simultaneously.

BRAKE ADJUSTMENT.

CABLE OPERATED BRAKES:- To adjust, slacken locknut, and tighten adjuster so that the brake linings are just in contact with the brake drums, then slacken adjuster until the wheel spins freely. Tighten locknut. Occasionally check brake arm clip for tightness.

ROD OPERATED BRAKES:- The principle of adjustment is exactly as described for cable brakes. The adjustment is controlled by special knurled adjuster nut at the end of brake rod.

LUBRICATION.

The hub bearings are packed with grease – Shell Alvania No. 3. Under normal riding conditions no further lubrication should be necessary. If the hub has been dismantled, re-pack the bearings with Shell Alvania No. 3 grease, or an equivalent good quality ball-race grease.

STURMEY ARCHER

BF/C HUB BRAKES

TO DIS-ASSEMBLE THE BF.BF/C HUB. (See exploded view).

1. Remove axle nuts (8), unscrew the left-hand locknut (10 or 11) take off washer (12), the notched cone adjusting washer (13) and washer (14 or 15).
2. Remove the brake plate and lever complete with shoes (18).
3. Remove the (left-hand) cone (16).
4. Lift out the ball cage (17).
5. The axle may now be pulled out from the other side. If the right-hand cone bearing surface is in good condition and the axle threads are sound, there is no need to remove the right-hand locknut and cone.
6. The channel-section dust cap in the right-hand hub cup is a pressed-in fit and can be prised out with a wide screwdriver. The ball-cage (17) may be lifted out for examination of the hub bearing surface. If a new ball retainer and balls have to be fitted, also fit a new dust cap. Both hub cups are part of the hub shell, and if either is worn a new hub shell must be fitted.
7. If the brake shoes (28) have to be removed from the brake arm, unscrew the nut (21) which secures the cam lever and pull off lever from the cam (27). Then remove the fulcrum nut (21) and lock washer (20). The shoes, complete with the fulcrum pin or sleeve and the cam can now be lifted off.

POINTS TO CHECK

When the hub has been dismantled and the parts cleaned, check the following details:–

1. That the leading edge of each brake lining is tapered off for the first quarter of an inch. If not, the ends may lift and cause a squealing noise.
2. That all rivets are below the lining surface and cannot touch the hub drum.
3. If the linings show signs of wear or they are oil impregnated – new linings will be required.
4. Examine cone and hub shell cup races for rust, wear or pitting. Also the ball cages and balls.
5. Examine axle threads for wear. Also inside axle nuts and cones.

TO ASSEMBLE THE BF.BF/C HUB.

1. Fit the ball-cage (17) into the right hand hub cup with the ring of the ball-retainer facing outwards.
2. Press in the channel-section dust cap, (36) with the recess facing outwards and gently hammer it home.
3. If the right-hand cone (37) has been removed, replace and screw it up tightly against the shoulder of the axle.
4. Fit the right-hand spacing washers (9) and cone locknut (10 or 11).
5. Pass the axle through the hub shell (33) from the right-hand side.
6. Fit the ball-cage (17) into the left-hand hub cup, with the ring of the ball-retainer facing outwards.
7. Fit the (left-hand) cone (16) and spacing washers (15 & 14).
8. Replace the brake plate and lever (18 or 19) complete with shoes, over the end of the left-hand cone. (N.B. If the brake shoes have been removed, make sure – when replacing them – that the side of the cam with the largest flat area faces towards the hub axle, otherwise one brake shoe only will be brought into action when the brake is operated).
9. Fit the notched cone-adjusting washer (13) over the flat sides of the left-hand cone (16) and screw the washer up "Finger Tight" then slacken half a turn. (180°).
10. Fit the washer (12) and the left-hand cone locknut (10 or 11).

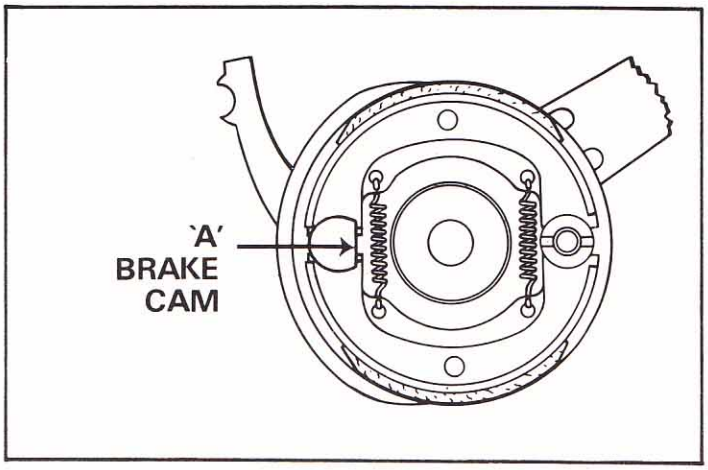
NOTE – Front brake arm must be a tight fit in its clip. Also the clip must be tight on the Front fork blade.

BF/C HUB BRAKES

STURMEY ARCHER

BRAKE SHOE ASSEMBLY.

The diagram illustrates the correct assembling of the brake shoes, but the following points should be specially noted:– It is important that brake shoes are re-assembled with the side of the brake cam with the largest flat area on the inside – towards the axle. See letter 'A'.
To allow both brake shoes to be applied evenly the cam is slightly offset and if not fitted correctly will allow one shoe only to operate, with consequent loss of braking efficiency. It is also important to ensure that the flange which carries the brake springs fits next to the brake arm plate.

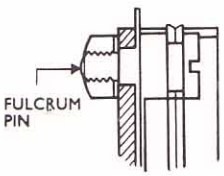


Brake shoe assemblies consist of the shoes with fulcrum and springs. As two different types of fulcrum are in use, a Sales number for each assembly is provided to ensure that they are correctly supplied.

1. HSB 211. Brake shoe assembly with pin-type fulcrum. For all brake hubs (except BFC). (See Fig. 'B').
2. HSB 210. Brake shoe assembly with sleeve-type fulcrum threaded internally. For BFC hubs only. (See Fig. 'C').

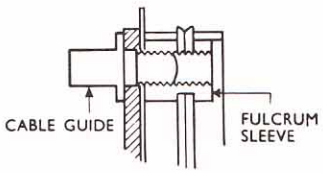
The appropriate sales number must be quoted when ordering.

Fig.B



(1) FOR BF ONLY

Fig.C



(2) FOR BFC ONLY

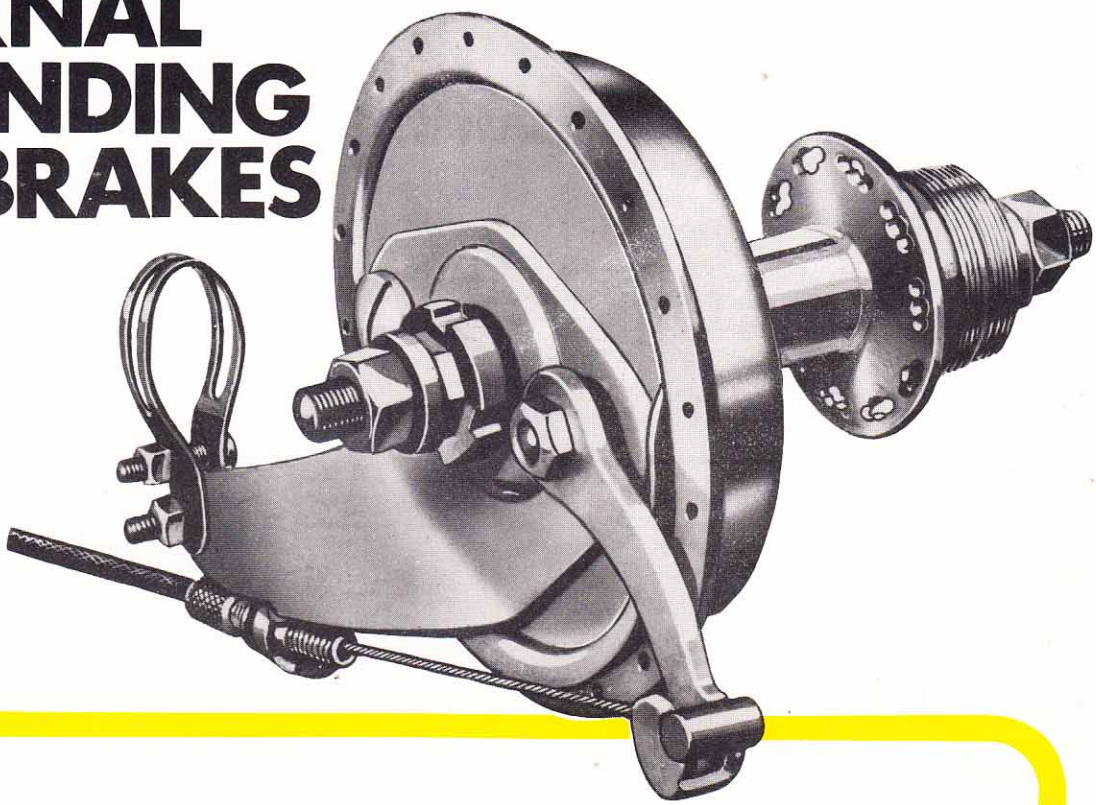
BRAKE CORRECTION GUIDE.

SYMPTOM	FAULT	REMEDY
Inefficient brake.	1. Oil-soaked or Greasy linings. 2. Incorrect adjustment. 3. Worn linings – rivet heads protruding and contacting drum surface.	1. Fit new linings. 2. Re-adjust. 3. Fit new linings.
Squealing brake.	1. Loose brake-arm clip. 2. Linings not tapered off at front edge causing vibration. 3. Loose rivets in linings.	1. Secure clip properly. 2. Fit linings correctly. 3. Secure rivets firmly.
Brake action irregular.	1. Hub drum pulled out of shape during wheel building.	1. Re-true wheel or rebuild as necessary.
Knocking or clicking noise.	1. Loose hub shell rivets. 2. Scored brake drum surface.	1. Fit new hub shell. 2. Fit new hub shell.

STURMEY ARCHER

BR/C HUB BRAKES

REAR INTERNAL EXPANDING HUB BRAKES



Sturmey-Archer Rear Hub Brakes are available to suit all makes of Bicycles.

Screw threaded to take standard free wheel drive rear sprockets, they are complementary to the popular BF & BFC Front Brake Hubs.

All are designed and built to give years of reliable and trouble-free service under the severest cycling conditions.

A choice of either Rod Brake Controls (BR) or Cable Controls (BRC).

CYCLE SAFELY–
WITH STURMEY-ARCHER

STURMEY-ARCHER GEARS LTD · NOTTINGHAM · ENGLAND A TI COMPANY

BR/C HUB BRAKES

STURMEY ARCHER

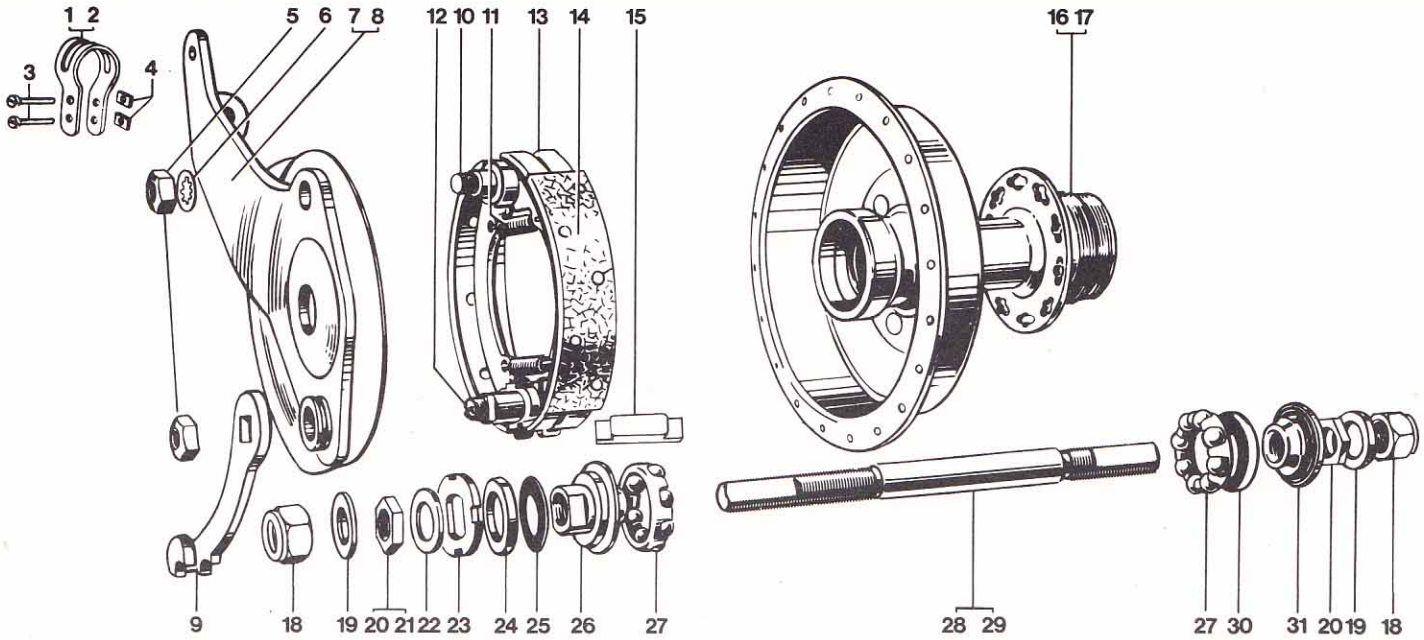


PHOTO No.	SALES No.	DESCRIPTION
1	HSL 707	Brake Arm Clip – small, BRC
2	HSL 708	Brake Arm Clip – large, BR
3	HMB 102	Clip Bolt (2 off)
4	HMN 136	Clip Bolt Nut (2 off)
5	HMW 157	Shakeproof Washer
6	HMN 139	Locknut
7	HSB 219	Brake Plate and Arm, rod operation – BR
8	HSB 219	Brake Plate and Arm, cable operation – BRC
9	HSB 220	Cam Lever
10	HSB 207	Fulcrum Pin
11	HSB 208	Brake Shoe Spring
12	HSB 209	Brake Operating Cam
13	HSB 211	Brake Shoe complete
14	HSB 212	Brake Linings (pair) with rivets
15	HSB 244	Brake Shoe End Cap

PHOTO No.	SALES No.	DESCRIPTION
16	HSB 221	Shell – 40 hole
17	HSB 222	Shell – 36 hole
18	HMN 118	Axle Nut
19	HMN 129	Axle Washer, $\frac{1}{8}$"
20	HMN 137	Cone Locknut
21	HMN 138	Cone Locknut with Spigot
22	HMW 146	Axle Washer, $\frac{1}{16}$"
23	HMW 151	Notched Cone Adjusting Washer
24	HMW 152	Spacing Washer
25	HMW 154	Packing Washer
26	HSB 201	L.H. Cone
27	HSA 103	Ball Cage
28	HSB 223	Axle – $5\frac{3}{4}$" (146mm)
29	HSB 224	Axle – $6\frac{1}{4}$" (159mm)
30	HSA 102	Outer Dust Cap
31	HSB 218	R.H. Cone with Dust Cap

GENERAL NOTES

BEARING ADJUSTMENT.

First loosen left-hand cone, then turn the notched washer (which fits over the adjusting cone) in the required direction until there is *perceptible movement at the wheel rim but no play at the hub* – tighten the locknut. This adjusts both bearings simultaneously.

BRAKE ADJUSTMENT.

CABLE OPERATED BRAKES:- To adjust, slacken locknut, and tighten adjuster so that the brake linings are just in contact with the brake drums, then slacken adjuster until the wheel spins freely. Tighten locknut. Occasionally check brake arm clip for tightness.

ROD OPERATED BRAKES:- The principle of adjustment is exactly as described for cable brakes. The adjustment is controlled by special knurled adjuster nut at the end of brake rod.

LUBRICATION.

The hub bearings are packed with grease – Shell Alvania No. 3. Under normal riding conditions no further lubrication should be necessary. If the hub has been dismantled, re-pack the bearings with Shell Alvania No. 3 grease, or an equivalent good quality ball-race grease.

STURMEY ARCHER

BR/C HUB BRAKES

TO DIS-ASSEMBLE THE BR.BR/C HUB. (See exploded view).

1. Remove axle nuts (18), washer (19), unscrew the left-hand locknut (20 or 21), take off washer (22), the notched cone adjusting washer (23) and plain washer (24).
2. Remove the brake plate and arm complete with shoes (7 or 8).
3. Remove the inner spacing washer (25) and the (left-hand) cone (26).
4. Lift out the ball cage (27).
5. The axle may now be pulled out from the other side. If the right-hand cone bearing surface is in good condition and the axle threads are sound, there is no need to remove the right-hand locknut and cone.
6. The channel-section dust cap in the right-hand hub cup is a pressed-in fit and can be prised out with a wide screwdriver. The ball cage (27) may be lifted out for examination of the hub bearing surface. If a new ball retainer and balls have to be fitted, also fit a new dust cap. Both hub cups are part of the hub shell, and if either is worn a new hub shell must be fitted.
7. If the shoes (13) have to be removed from the brake arm, unscrew the nut (6) which secures the cam lever and pull off lever from the cam. Then remove the fulcrum nut (6) and lock washer (5). The shoes, complete with the fulcrum pin and the cam can now be lifted off.

POINTS TO CHECK

When the hub has been dismantled and the parts cleaned, check the following details:–

1. That the leading edge of each brake lining is tapered off for the first quarter of an inch. If not, the ends may lift and cause a squealing noise.
2. That all rivets are below the lining surface and cannot touch the hub drum.
3. If the linings show signs of wear or they are oil impregnated – new linings will be required.
4. Examine cone and hub shell cup races for rust, wear or pitting. Also the ball cages and balls.
5. Examine axle threads for wear. Also inside axle nuts and cones.

TO ASSEMBLE THE BR. BR/C. HUB.

1. Fit the ball cage (27) into the right-hand cup with the ring of the ball-retainer facing outwards.
2. Press in the channel-section dust cap (30), with the recess facing outwards, and gently hammer it home.
3. If the right-hand cone (31) has been removed, replace and screw it up tightly against the shoulder of the axle.
4. Fit the right-hand spacing washer(s) (19) and cone locknut (20 or 21).
5. Pass the axle through the hub shell (16) from the right-hand side.
6. Fit the ball cage (27) into the left-hand hub cup, with the ring of the ball-retainer facing outwards.
7. Fit the (left-hand) cone (26) and spacing washers (25 and 24).
8. Replace the brake plate and lever (7 or 8) complete with shoes, over the end of the left-hand cone. (N.B. If the brake shoes have been removed, make sure – when replacing them – that the side of the cam with the largest flat area faces towards the hub axle, otherwise one shoe only will be brought into action when the brake is operated).
9. Fit the notched cone-adjusting washer (23) over the flats of the left-hand cone (26). Screw it up "Finger-tight' and then slacken half a turn. (180°).
10. Fit the washer (22) and the left-hand cone locknut (20 or 21).

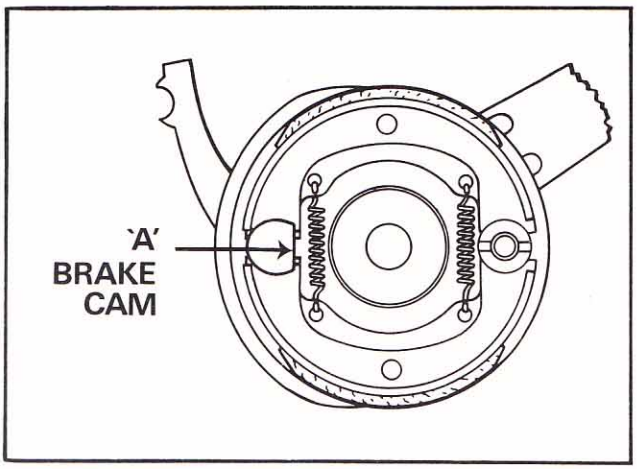
NOTE – Rear brake arm must be a good fit in its clip. Also the clip must be tight on the chainstay.

BR/C HUB BRAKES

STURMEY ARCHER

BRAKE SHOE ASSEMBLY.

The diagram illustrates the correct assembling of the brake shoes, but the following points should be specially noted:– It is important that brake shoes are re-assembled with the side of the brake cam with the largest flat area on the inside – towards the axle. See letter 'A'.
To allow both brake shoes to be applied evenly the cam is slightly offset and if not fitted correctly will allow one shoe only to operate, with consequent loss of braking efficiency. It is also important to ensure that the flange which carries the brake springs fits next to the brake arm plate.



BRAKE CORRECTION GUIDE.

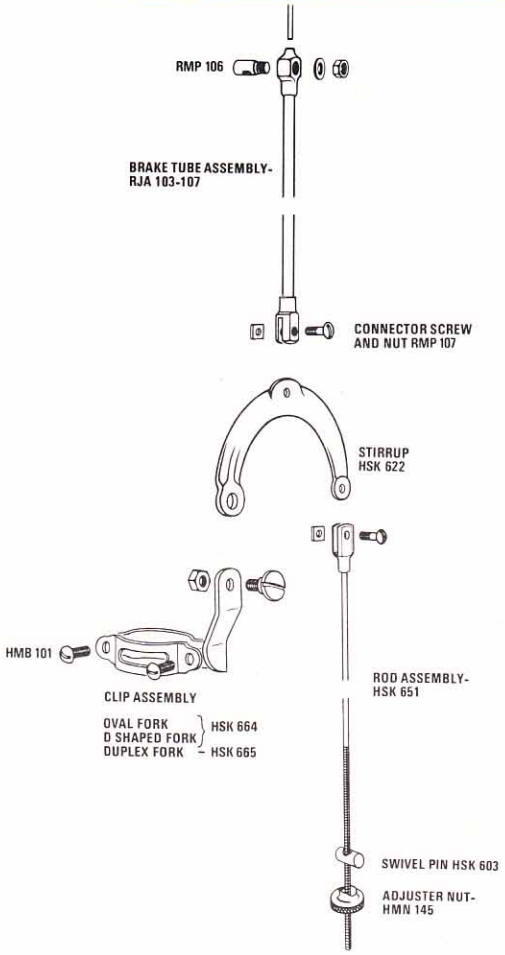
SYMPTOM	FAULT	REMEDY
Inefficient brake.	1. Oil-soaked or Greasy linings. 2. Incorrect adjustment. 3. Worn linings – rivet heads protruding and contacting drum surface.	1. Fit new linings. 2. Re-adjust. 3. Fit new linings.
Squealing brake.	1. Loose brake-arm clip. 2. Linings not tapered off at front edge causing vibration. 3. Loose rivets in linings.	1. Secure clip properly. 2. Fit linings correctly. 3. Secure rivets firmly.
Brake action irregular.	1. Hub drum pulled out of shape during wheel building.	1. Re-true wheel or rebuild as necessary.
Knocking or clicking noise.	1. Loose hub shell rivets. 2. Scored brake drum surface.	1. Fit new hub shell. 2. Fit new hub shell.

STURMEY ARCHER

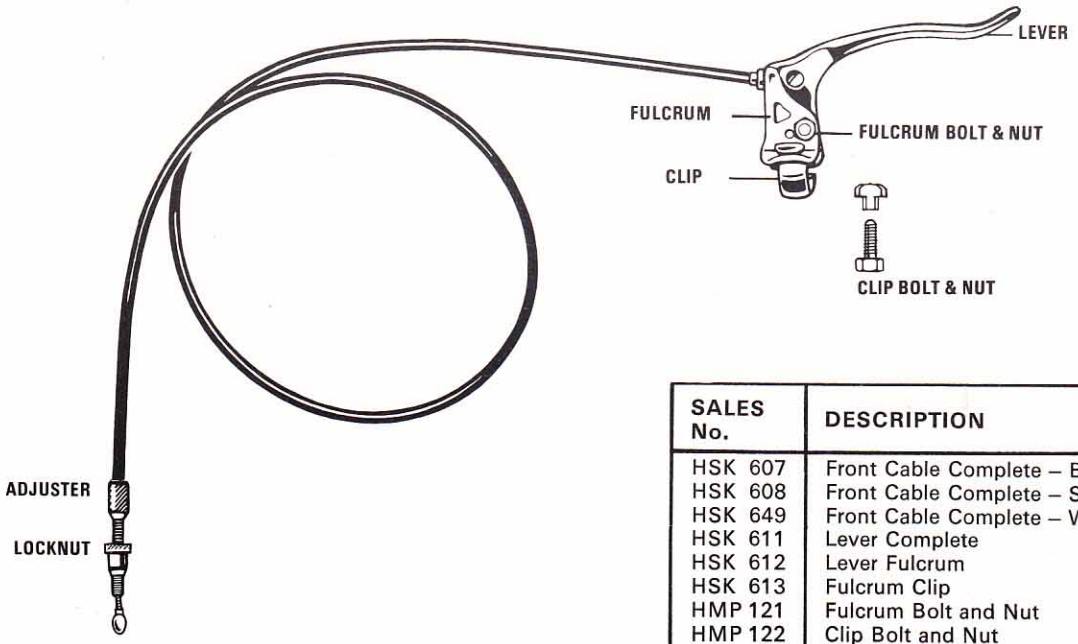
HUB BRAKE CONTROLS

BF FRONT ROD BRAKE CONTROL

SALES No.	DESCRIPTION	(LENGTH BETWEEN CENTRES)
RJA 103	Brake Tube Assembly	$3\frac{3}{8}$″ (85.7 mm.)
RJA 104	Brake Tube Assembly	$4\frac{3}{8}$″ (111.1 mm.)
RJA 105	Brake Tube Assembly	$5\frac{3}{8}$″ (136.5 mm.)
RJA 106	Brake Tube Assembly	$6\frac{3}{8}$″ (161.9 mm.)
RJA 107	Brake Tube Assembly	$8\frac{3}{8}$″ (212.7 mm.)
HSK 622	Stirrup	
HSK 664	Clip Assembly (For Oval and 'D' Fork Blade)	
HSK 665	Clip Assembly (For Duplex Fork Blade)	
HSK 651	Rod Assembly	
HMP 107	Connector Screw Complete	
HSK 603	Swivel Pin	
HMN145	Adjuster Nut	



BFC FRONT CABLE BRAKE CONTROL



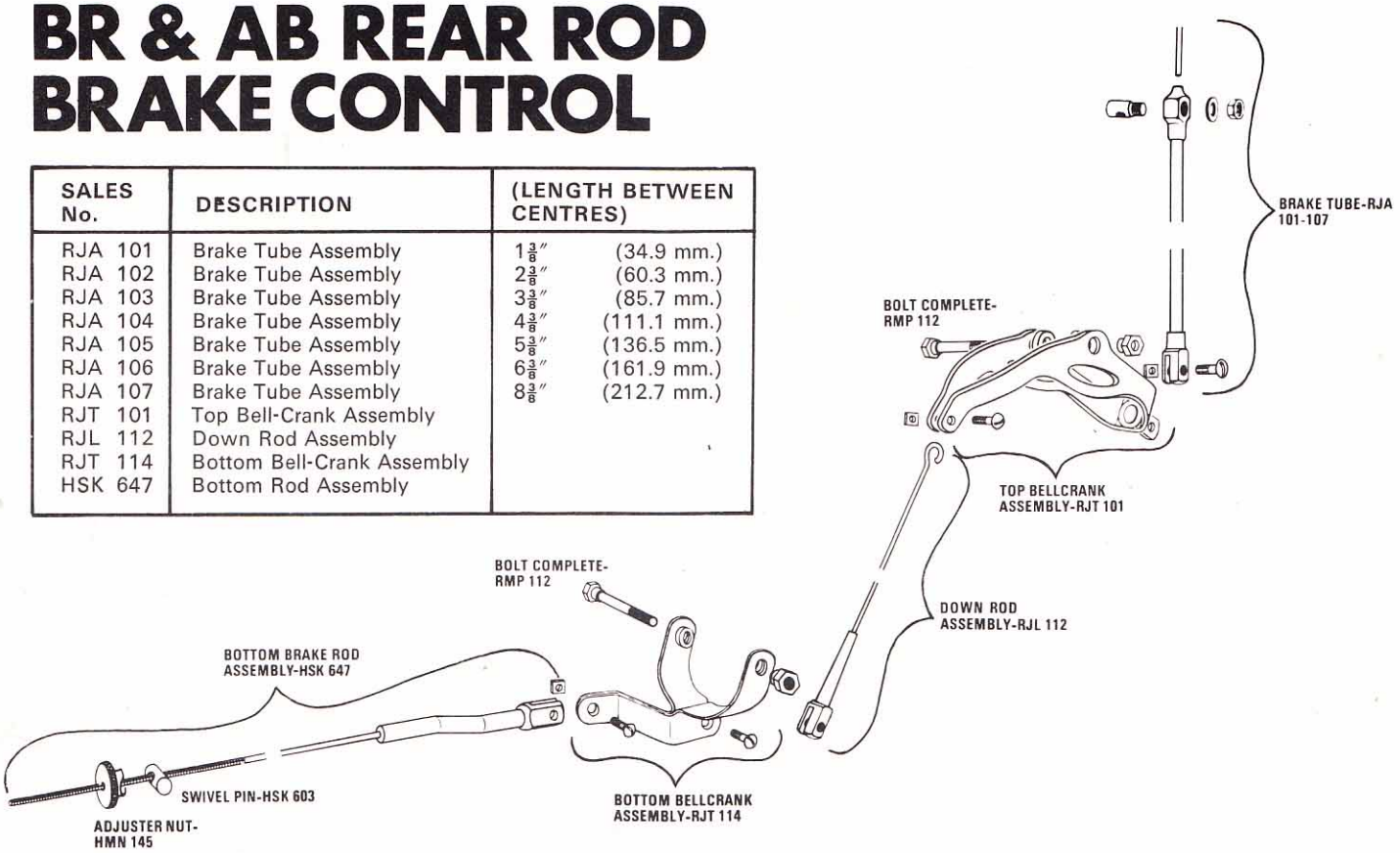
SALES No.	DESCRIPTION
HSK 607	Front Cable Complete – Black
HSK 608	Front Cable Complete – Silver
HSK 649	Front Cable Complete – White
HSK 611	Lever Complete
HSK 612	Lever Fulcrum
HSK 613	Fulcrum Clip
HMP 121	Fulcrum Bolt and Nut
HMP 122	Clip Bolt and Nut

HUB BRAKE CONTROLS

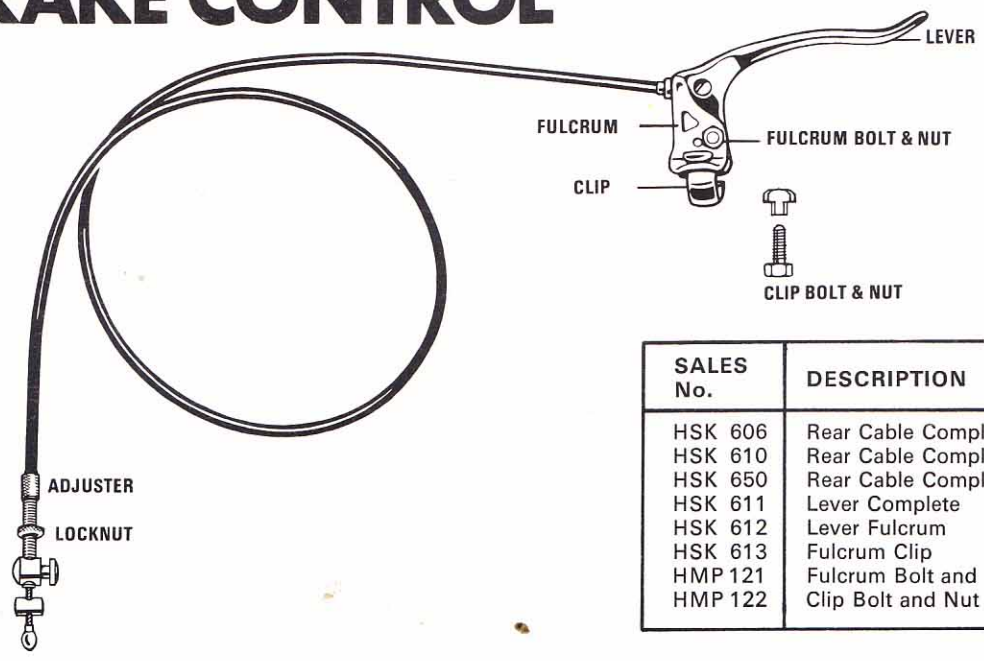
STURMEY ARCHER

BR & AB REAR ROD BRAKE CONTROL

SALES No.	DESCRIPTION	(LENGTH BETWEEN CENTRES)
RJA 101	Brake Tube Assembly	1 3/8" (34.9 mm.)
RJA 102	Brake Tube Assembly	2 3/8" (60.3 mm.)
RJA 103	Brake Tube Assembly	3 3/8" (85.7 mm.)
RJA 104	Brake Tube Assembly	4 3/8" (111.1 mm.)
RJA 105	Brake Tube Assembly	5 3/8" (136.5 mm.)
RJA 106	Brake Tube Assembly	6 3/8" (161.9 mm.)
RJA 107	Brake Tube Assembly	8 3/8" (212.7 mm.)
RJT 101	Top Bell-Crank Assembly	
RJL 112	Down Rod Assembly	
RJT 114	Bottom Bell-Crank Assembly	
HSK 647	Bottom Rod Assembly	



BRC & ABC REAR CABLE BRAKE CONTROL

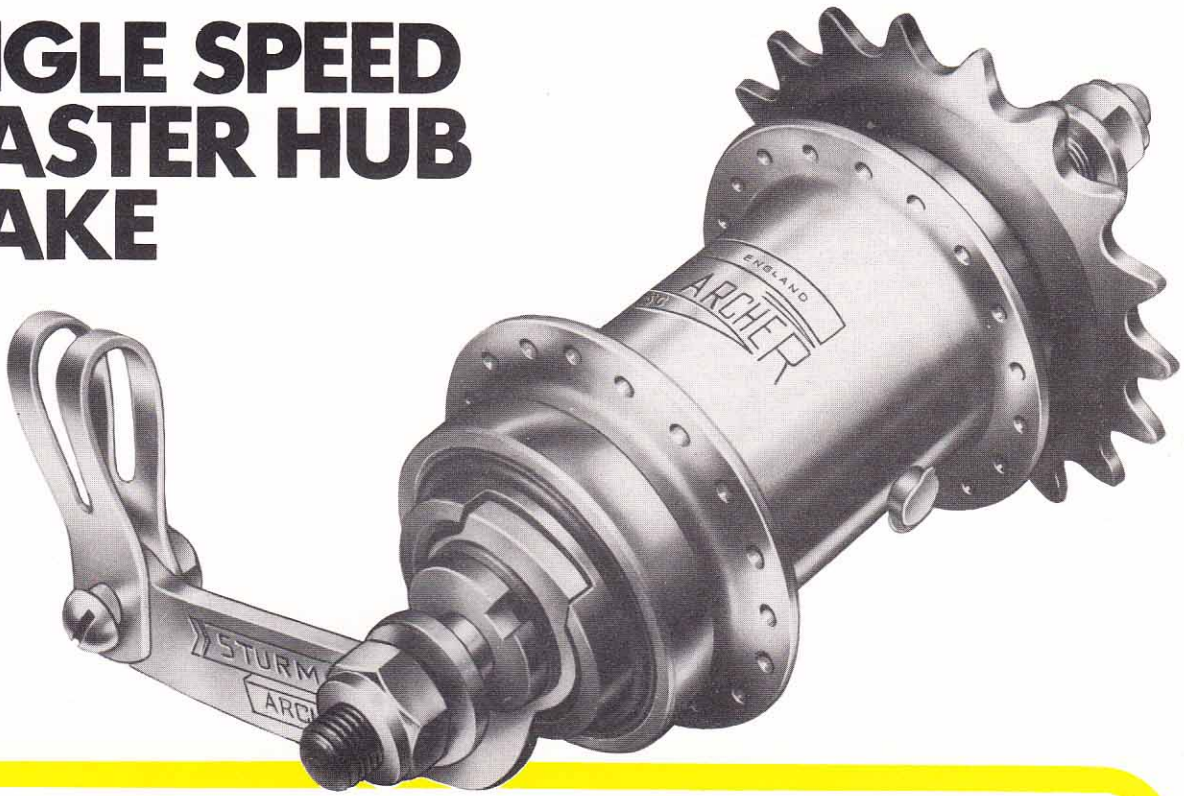


SALES No.	DESCRIPTION
HSK 606	Rear Cable Complete – Black
HSK 610	Rear Cable Complete – Silver
HSK 650	Rear Cable Complete – White
HSK 611	Lever Complete
HSK 612	Lever Fulcrum
HSK 613	Fulcrum Clip
HMP 121	Fulcrum Bolt and Nut
HMP 122	Clip Bolt and Nut

STURMEY ARCHER

SC COASTER HUB

SINGLE SPEED COASTER HUB BRAKE



The STURMEY-ARCHER S.C. Coaster Hub offers the advantages of a positive single speed drive with a built-in, robust and highly efficient brake in a small compact unit.

No extra brake controls – Instant braking smoothly applied by a slight reverse turn of the pedals!

This rugged hub – expertly engineered by STURMEY-ARCHER – with 70 years of skill and experience in quality manufacture – is adaptable to both Junior and Adult models in the Sports and Roadster ranges of bicycles produced by the world's leading manufacturers.

Around town or across country – the STURMEY-ARCHER S.C. Single Speed Coaster is positively at your service for a lifetime of use.

FOR SAFER CYCLING–CHOOSE STURMEY-ARCHER

STURMEY-ARCHER GEARS LTD · NOTTINGHAM · ENGLAND A TI COMPANY

SC COASTER HUB

STURMEY ARCHER

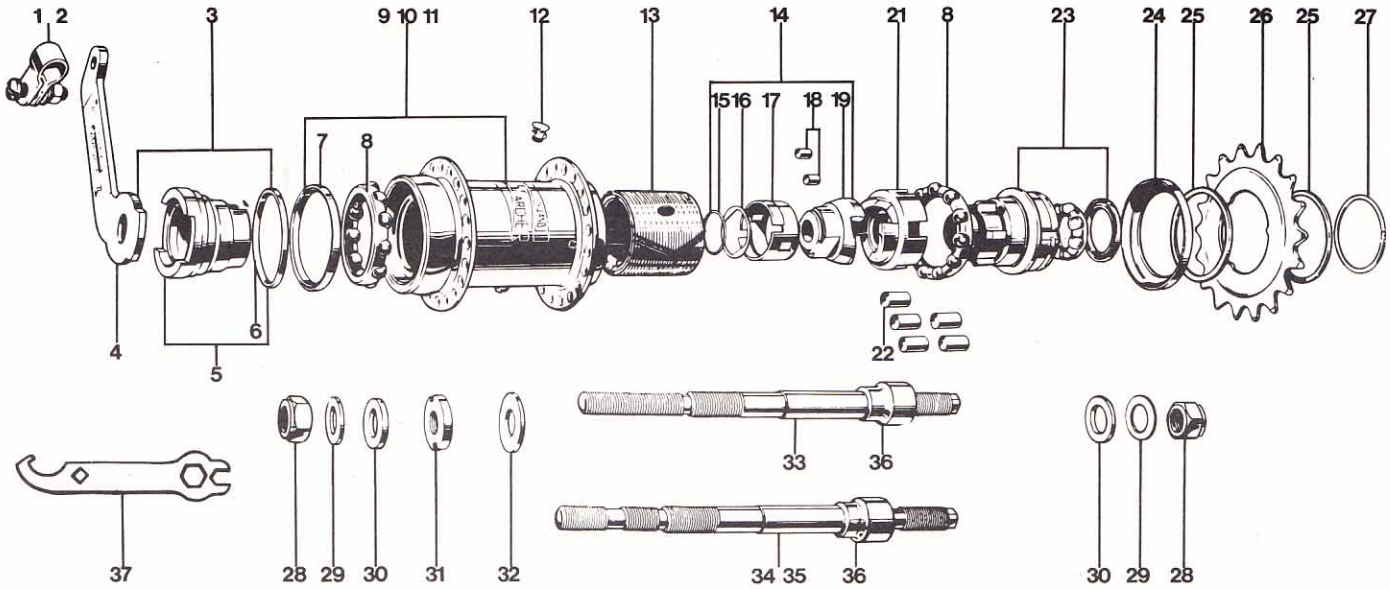


PHOTO No.	SALES No.	DESCRIPTION
1	HSL 733	Chainstay clip complete – Sports
2	HSL 732	Chainstay clip complete – Roadster
3	HSH 426	Torque Arm Assembly
4	HSH 424	Torque Arm
5	HSH 438	Brake Cone Assembly
6	HSH 429	Cone Dust Cover
7	HSH 439	Shell Dust Cover
8	HSH 427	Ball Cage complete
9	HSH 421	Hub Shell complete 40H
10	HSH 422	Hub Shell complete 36H
11	HSH 423	Hub Shell complete 28H
12	HSA 106	Lubricator
13	HSH 436	Brake Band complete
14	HSH 440	Actuator Assembly
15	HSH 435	Actuator Circlip
16	HMW 365	Roller Retainer Washer
17	HSH 434	Actuator Roller Retainer
18	HSH 433	Actuator Rollers (2 off)
19	HSH 432	Actuator
21	HSH 430	Roller Retainer, Driver

PHOTO No.	SALES No.	DESCRIPTION
22	HSH 428	Driver Rollers (5 off)
23	HSH 425	Driver complete
23A	HSA 284	Ball cage
24	HSL 735	Sprocket Dust Cover
25	HMW 127	Sprocket Washers (2 off)
26	HSL 714	14T – 20T and 22T
27	HSL 721	Circlip
28	HMN 118	Axle Nut (2 off)
29	HMW 146	Axle Washer $\frac{1}{16}$″ (2 off)
30	HMW 129	Axle Washer $\frac{1}{8}$″ (2 off)
31	HMN 257	L.H. Brake Arm Nut
32	HMW 366	Plain Washer
33	HSH 419	$6\frac{1}{4}$″ (159 mm) Axle complete wifh fixed cone.
34	HSH 420	$6\frac{1}{2}$″ (165 mm) Axle complete with fixed cone
35	HSH 418	$6\frac{7}{8}$″ (175 mm) Axle complete with fixed cone
36	HSH 441	R.H. Fixed Cone
37	HSL 734	Spanner

GENERAL NOTES.

1. **SPROCKETS:-** A range of sprockets from 14T – 20T and 22T is available for this hub.
2. **ADJUSTMENT:-** The hub bearings can be adjusted without removing the wheel from the bicycle:
   1. Loosen the two axle nuts.
   2. Loosen the locknut on the left-hand side of the wheel.
   3. Place the special spanner on the square end of the axle; turn it clockwise to tighten the bearings or anti-clockwise to loosen them.
   4. Re-tighten the locknut and axle nuts leaving the wheel with just a trace of side-play at the rim.

   If for any reason it is necessary to remove the rear wheel from the bicycle it is most important that the brake arm clip is TIGHTENED SECURELY when the wheel is refitted.
3. **LUBRICATION:-** *A new hub should be oiled liberally before use* with the specially prepared STURMEY-ARCHER OIL or S.A.E. 20 Mineral Oil. Recommended lubrication every 14 days.

STURMEY ARCHER

SC COASTER HUB

TO DIS-ASSEMBLE THE HUB.

1. Remove axle nuts 28, and washers 29 and 30 from both ends of axle.
2. Hold axle in a vice at fixed cone 36 end.
3. Unscrew brake arm nut 31 and remove lockwasher 32.
4. Lift off torque arm assembly 3.
5. Withdraw hub shell from remaining brake assembly.
6. Take off brake band 13, actuator assembly 14, roller retainer 21, driver rollers 22, ball cage 8 and driver 23.
7. Remove from driver 23, the circlip 27, washers 25, sprocket 26, dustcover 24, small dust cover and ball cage.

POINTS TO CHECK.

1. All ball races – if rusty or pitted – replace.
2. Actuator and driver roller retainer cam surfaces for wear and chipping – if worn or damaged – replace.
3. Axle threads for damage and axle for straightness—if necessary–replace.
4. Brake band for wear – if smooth – replace.
5. The open ends of actuator roller retainer protrude slightly from main circumference.

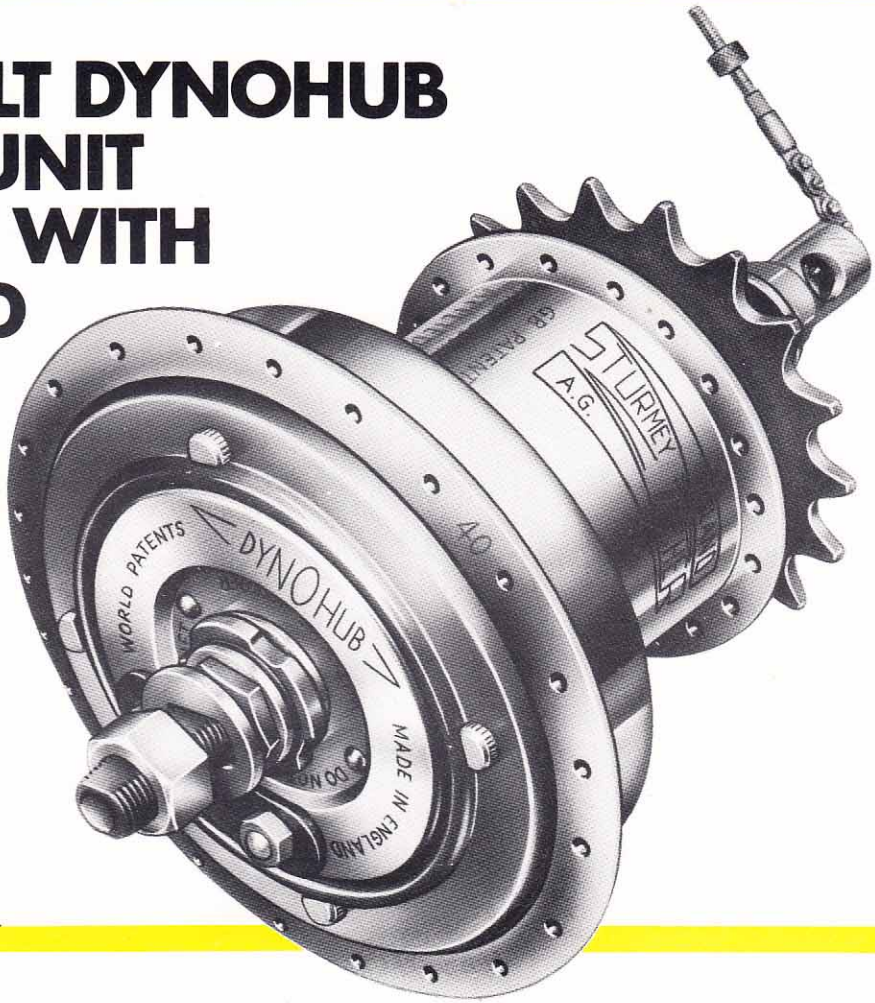
TO ASSEMBLE THE HUB.

1. First build sub-assemblies:–
   (a) Fit (large) ball cage 8 into hub shell and press in dust cover 7.
   (b) Assemble torque arm 4, to cone 5, and press into dust cover 6.
   (c) Assemble – in order – dust cover 24, spacers 25 and sprocket 26 to driver 23 and fix with circlip 27. Insert (small) ball cage into driver and press in dust cover.
2. Hold axle 33 in vice (at fixed cone end) and fit driver assembly (sub-assembly (c) above) on to cone 36.
3. Fit large ball cage 8 over driver (balls must face uppermost).
4. Add driver rollers 22 to driver – (use good quality grease to hold rollers in position).
5. Place driver roller retainer 21 over the rollers 22.
6. Fit actutor assembly (14) on to axle.
7. Fit brake band 13 – lugs upwards over actuator.
8. Place hub shell (sub-assembly (a) above) over internal parts.
9. Screw on to axle, torque arm assembly (sub-assembly (b) above) engaging cone slots over the brake band lugs.
10. Fit plain washer 32 and screw on locknut 31, – adjust brake using spanner 37 – before tightening locknut fully.
11. Fit wheel in bicycle frame and add washers 30 and 29 and axle nuts 28.

STURMEY ARCHER

AG 3 SPEED 'DYNOHUB'

REAR 6 VOLT DYNOHUB LIGHTING UNIT COMBINED WITH AW 3 SPEED GEAR



The AG lighting unit combines the unique features of the GH6 'Dynohub' with the world famous AW 3-speed wide ratio gear – in a compact weight saving rear hub.

The dynamo and gear are protected, within the hub shell, from adverse weather conditions. Electric power is always available at a 'flick' of the headlamp switch.

High grade plastic head and tail lamps of modern design are supplied complete with wiring.

Gear controls – trigger, twist grip and sportshift – are available to suit all types of bicycles.

STREAMLINED DYNAMO LIGHTING

AG 3 SPEED 'DYNOHUB'

STURMEY ARCHER

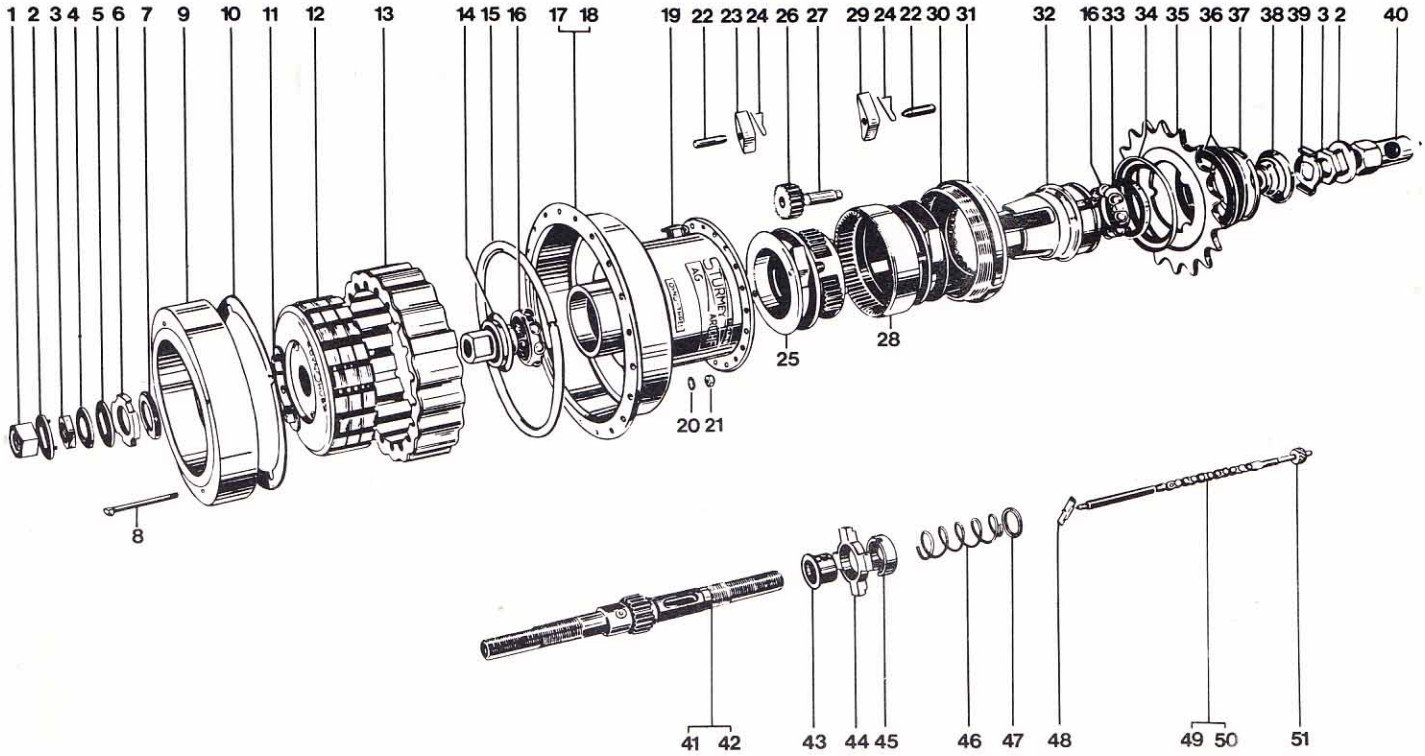


PHOTO No.	SALES No.	DESCRIPTION
1	HMN 128	L.H. Axle Nut
2	HMW 145	Axle (Lock) Washer)
3	HMN 132	Lock Nut
4	HMW 146	Spacing Washer ($\frac{1}{16}$")
5	HMW 150	Lock Washer
6	HMW 151	Cone Adjuster
7	HMW 152	Spacing Washer
8	HMB 135	Magnet Fixing Screw
9	HSD 302	Magnet Cover Plate
10	HSD 303	Card Disc
11	HMN 140	Terminal Nut – 2 BA
12	HSD 304	Armature
13	HSD 425	Magnet with Armature Unit
14	HSA 150	L/H Cone
15	HSD 306	Magnet Spacing Ring
16	HSA 103	Ball Cage
17	HSA 151	Shell 40 hole
18	HSA 152	Shell 36 hole
19	HSA 106	Lubricator
20	HMW 158	Lock Washer } For Magnet
21	HMN 141	Nut – 6 BA } Fixing Screw
22	HSA 112	Pawl Pin
23	HSA 111	Low Gear Pawl
24	HSA 120	Pawl Spring
25	HSA 153	Planet Cage
26	HSA 115	Planet Pinion

PHOTO No.	SALES No.	DESCRIPTION
27	HSA 114	Pinion Pin
28	HSA 118	Gear Ring
29	HSA 119	Gear Ring Pawl
30	HSA 121	R/H Ball Ring
31	HSA 122	Inner Dust Cap-Ball Ring
32	HSA 123	Driver
33	HSA 102	Outer Dust Cap
34	HSL 701	Sprocket Dust Cap
35	HSL714-720 & 722	Sprocket, 14T -20T and 22T
36	HMW 127	Sprocket Spacing Washer
37	HSL 721	Circlip
38	HSA 101	R/H Cone
39	HMW 147	R/H Cone Lockwasher
40	HMN 129	R/H Nut
41	HSA 107	Axle – 5$\frac{3}{4}$"
42	HSA 108	Axle – 6$\frac{1}{4}$"
43	HSA 116	Clutch Sleeve
44	HSA 117	Clutch
45	HSA 127	Thrust Ring
46	HSA 128	Clutch Spring
47	HSA 129	Spring Cap
48	HSA 124	Axle Key
49	HSA 125	Indicator Coupling – (5$\frac{3}{4}$" Axle 146mm)
50	HSA 126	Indicator Coupling – (6$\frac{1}{4}$" Axle 159mm)
51	HMN 134	Connection Lock Nut

STURMEY ARCHER

AG 3 SPEED 'DYNOHUB'

TO DIS-ASSEMBLE THE HUB (See exploded view)

1. Unscrew the gear indicator coupling 49 from the axle 41.
2. Remove axle nuts 1 and 40, also washers 2 from each side of hub.
3. From the dynamo side – unscrew cone locknut 3 and take off washers 4 and 5 also cone adjuster 6 and spacing washer 7.
4. TO REMOVE DYNAMO UNIT:–Unscrew magnet fixing nuts 21, detach lockwashers 20 and magnet fixing screws 8. Hold the wheel, (with the dynamo downwards) above the workbench. A few light taps with a mallet on the end of the axle will release the dynamo unit from the hub.
5. Lift out the magnet spacing ring 15 from the hub shell 17.
6. Unscrew left-hand (adjusting) cone 14 and lift out ball cage 16.
7. Unscrew right-hand ball ring 30 from hub shell (use hammer and punch) and withdraw gear unit.
8. Remove the low gear pawls 23, pins 22 and springs 24.
9. Place the left-hand end of the axle in a vice and remove the right-hand locknut 3, cone lock-washer 39 and cone 38.
10. Lift off clutch spring 46 and cap 47, the driver 32 complete with fittings, right hand ball ring 30 and the gear ring 28.
11. Remove the gear ring pawls 29, pins 22 and springs 24.
12. Pull off the thrust-ring 45.
13. Push out the axle key 48 and remove the sliding clutch 44 and sleeve 43.
14. Lift off the planet cage assembly 25 and take out the pinion pins 27 and remove the pinions 26.

POINTS TO CHECK

GEAR

1. Freedom of clutch in driver. This should slide up and down easily.
2. Axle between centres for straightness, also threads for wear.
3. All gear teeth for wear or chipping.
4. All races for wear (6 in all).
5. Pinion pins, sliding clutch and gear ring dogs for rounding off on engagement points.
6. Pawls and pawl ratchets for wear.

DYNAMO

7. Magnet cover plate, armature and magnet segments for grit and rust.
8. Continuity of armature winding.

NOTE – Unless it is essential, the armature and magnet should never be separated. If they are to be separated, a keeper ring is absolutely necessary, (an old armature will serve as a keeper ring). The magnet will lose its magnetism without a keeper. A moment's separation will cause loss of magnetism. (A spanner placed across the magnet is useless as a substitute for a keeper ring).

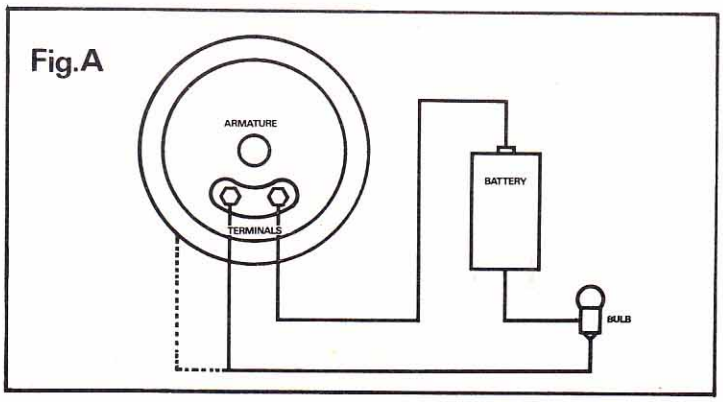
TO SEPARATE ARMATURE FROM MAGNET AND COVER PLATE

Hold the dynamo unit (terminal plate down) in the palm of the hand. Place a keeper over the armature – grip the edge of magnet with fingers and tap the keeper lightly – the magnet cover will slide off the magnet at the same time as the keeper replaces the armature.

ARMATURE CONTINUITY TEST

A battery and bulb should be connected as shown in the diagram 'A'. If the bulb does not light, a break in the armature winding is indicated.
A second test is to disconnect the lead from one of the armature terminals and touch the outer edges of the armature with a bare lead. If the bulb lights, this indicates a short circuit, and a new armature must be fitted.

Fig.A



TO REPLACE THE ARMATURE IN MAGNET AND FIT MAGNET COVER PLATE

Hold the magnet and keeper unit in the palm of the hand, place armature – terminals down – over the keeper and press the armature into the magnet. The keeper ring will slide out easily. Fit the card disc inside the cover plate – locate the notches in disc opposite grooves in magnet. Push magnet unit inside cover plate – chamfered edge of the magnet *inside* the cover plate.

AG 3 SPEED 'DYNOHUB'

STURMEY ARCHER

TO ASSEMBLE THE HUB

Prepare the following sub-assemblies:-

SEE FIG. A

Fit the ball cage 16 into the driver 12 with the ring of the ball-cage facing outwards and press in the dust cap 33, with the recess facing outwards. (If a new ball cage is fitted, the dust cap should also be new). If the sprocket has been removed, fit the dust-cap 34, washers 36 and sprocket 35 (in the same order noted on dis-assembling) and fix in position with circlip 37.

SEE FIG. B

Fit the gear-ring pawls 29, pins 22 and springs 24, into the gear ring 28. Fit the balls (24 only) and the inner dust-cap 31 into the right-hand ball-ring 30 (ensure that the balls revolve freely with the dust cap in position).

1. Hold the axle 41 in a vice (with slot for axle key 48, above the sun pinion) and fit the planet cage 25.
2. Add the planet pinions 26 and pins 27 (the small ends of the pins protrude).
3. Fit the clutch sleeve 43 (flange first), clutch 44, (with the recess over the flange of the sleeve) axle key 48 (with the flats facing upwards) and screw in the indicator coupling 49.
5. Fit gear-ring 28 (sub-assembly B) over planet cage 25.
6. Position right-hand ball-ring 30 on the gear-ring 28.
7. Add the driver 32 complete with fittings (sub-assembly A).
8. Slide clutch spring 46 and cap 47 over the axle.
9. Screw on the right-hand cone 38, finger tight, then slacken 180° – half a turn – and lock in this position with the lock washer 39, and lock nut 3.
   NOTE – CONE MUST NOT BE UNSCREWED MORE THAN HALF A TURN AS THAT WOULD THROW THE GEAR MECHANISM OUT OF ADJUSTMENT.
10. Fit the low gear pawls 23, pins 22 and springs 24 into planet cage 25 (See Fig. C).
11. Screw the gear unit into the hub shell 17 and tighten ball-ring 30.
12. Invert the assembly in the vice and screw up the left hand cone 14 (finger tight).
13. Fit the card disc 10 inside the cover plate 9.
14. Fit the cover plate 9 over the magnet 13 (chamfer inwards), making sure that the four holes in the cover plate are in line with the notches in the card and the magnet.
15. Fit the metal spacing ring 15 into the hub shell 17.
16. Push the complete dynamo unit into the hub shell, making sure that the holes in the cover plate are in line with those in the hub shell.
17. Fit the magnet fixing screws 8, washers 20 and nuts 21.
18. Fit spacing washer 7, cone adjuster 6, washers 5 and 4, locknut 3.
19. Adjust wheel until there is slight play at the wheel rim – no play at the hub.
20. Replace wheel nut washer 2 and nut 1. Adjust gear.

Fig. A

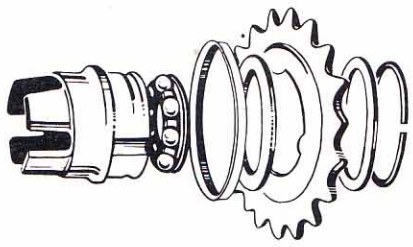


Fig. B

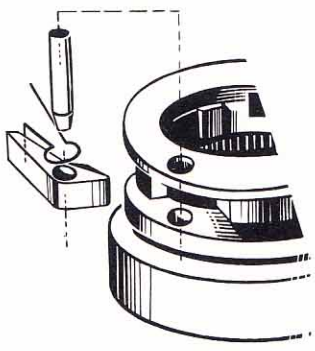
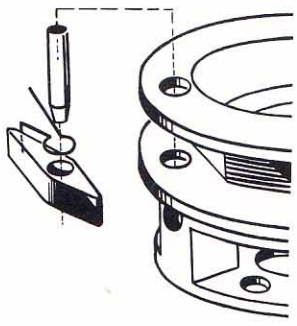


Fig. C



STURMEY ARCHER

AG 3 SPEED 'DYNOHUB'

GEAR CORRECTION GUIDE

NOTE. The major cause of trouble is faulty gear adjustment. Check to see that the end of the gear indicator rod is level with end of axle when gear control is in No. 2 position.
If the complaint is sluggish gear change or stiffness this may point to lack of oil.

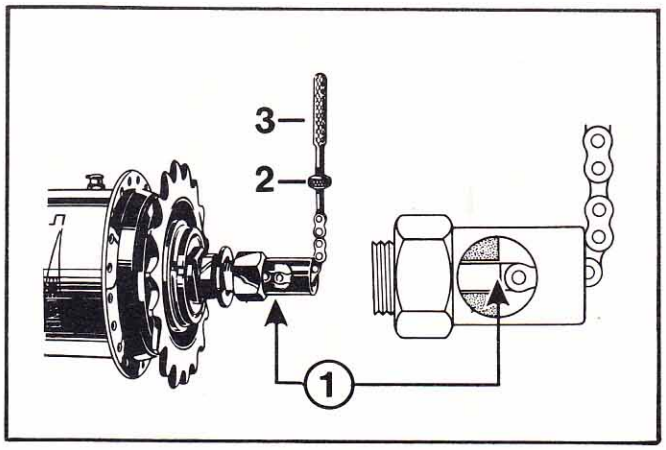
SYMPTOM	FAULT	REMEDY
Slipping in low gear (1st)	1. Sliding clutch worn. 2. Indicator not screwed in fully. 3. R.H. cone wrongly adjusted. 4. Kinks in control wire. 5. Twisted indicator chain.	1. Replace. 2. Re-adjust. 3. Re-adjust. 4. Replace. 5. Replace.
Self-changing gear action between 1st gear and 2nd gear.	1. Worn gear ring pawls.	1. Replace.
Slipping in normal gear (2nd).	1. Gear ring dogs and/or clutch worn.	1. Replace.
Slipping in top gear (3rd).	1. Pinion pins and/or clutch worn. 2. Weak or distorted axle spring. 3. Incorrect R.H. cone adjustment. 4. Grit between clutch sleeve and axle.	1. Replace. 2. Fit new spring. 3. Re-adjust. 4. Clean.
Hub rins stiffly. Drag on Pedals.	1. Too many ball bearings in ball-ring. 2. Cones too tight. 3. Chainstay ends not parallel. 4. Corrosion. 5. Distorted dust caps.	1. Fit 24 only. 2. Re-adjust. 3. Correct. 4. Clean and use S.A. Oil. 5. Replace.
Sluggish gear change.	1. Distorted axle spring. 2. Bent axle. 3. Damaged gear indicator chain. 4. Lack of oil, or frayed or rusty control wire.	1. Replace. 2. Replace. 3. Replace. 4. Oil or replace.

BEARING ADJUSTMENT

Right side cone adjustment. Screw cone down finger-tight, then slacken half a turn and lock in this position. *NOTE.* Turning it back more than this will affect the gear engagement.
On the left (Dynamo) – side loosen locknut and adjust the cone suitably then re-tighten locknut. A CORRECTLY ADJUSTED WHEEL HAS A TRACE OF SIDE PLAY AT THE RIM. NO PLAY AT THE HUB.

GEAR ADJUSTMENT

First place the gear control in No. 2 position. Then screw the cable connector (3) until the end of the indicator rod is exactly level with the extreme end of the axle. This can be seen through 'window' in the right-hand nut, see (1) – Now tighten locknut (2). All Gears are now set.



AG 3 SPEED 'DYNOHUB'

STURMEY ARCHER

'DYNOHUB' CORRECTION GUIDE

To test if 'Dynohub' is generating, remove wires from armature terminals, re-tighten terminal nuts and connect a bulb (known to be in good condition) across the armature terminals. Spin wheel smartly, – if bulb does not light satisfactorily, the armature may be faulty.

ELECTRICAL

SYMPTOM	CAUSE	REMEDY
Total failure	1. Faulty armature	1. Replace armature
	2. Broken wire in twin flex	2. Test each wire for continuity
	3. Burnt out bulb or broken filament	3. Test each bulb for continuity
	4. Incorrect wiring	4. Check wiring against appropriate diagrams
Low output (dim lights)	1. Magnet de-magnetised	1. Replace magnet/armature
	2. Bulbs which have been in use for a long time may not be 100% efficient	2. Test bulbs (with battery) against new ones
	3. Incorrect bulbs	3. Check bulb ratings (they must be correct).
	4. Incorrect wiring connections	4. Check wriing against appropriate diagram
	5. Corroded connections	5. Inspect all terminal and wire tags
Partial failure	1. Loose bulb or bulbs	1. Check if bulbs are fitted firmly
	2. Frayed ends of twin flex	2. Check each terminal point
	3. Terminal nuts loose	3. Check nuts for tightness (be careful not to use force)
Frequent burning out of bulbs	1. Loose contacts	1. Check all terminals in headlamp and rear lamp for tightness – bulbs must be firmly fitted in their sockets

MECHANICAL

SYMPTOM	CAUSE	REMEDY
Rubbing Noise	1. Usually caused by grit between cover plate and inner dust cap	1. The groove should be cleaned and greased.
	2. Loose cones may permit armature and magnet to rub	2. Correct adjustment of cones
	3. Dirt between armature and magnet	3. The hub should be dis-assembled and cleaned
	4. The omission of the card packing disc which must be fitted between magnet and cover plate	4. Fit card disc

GENERAL NOTES

1. **GEAR RATIOS:–** The AG hub provides three gears – (1) Low Gear – decrease of 25%. (2) Normal Gear, i.e. direct drive. (3) High Gear – increase of 33⅓%.
2. **SPROCKETS:–** A range of sprockets from 14T to 20T, and also 22T, is available for this hub.
3. **LUBRICATION:–** A NEW HUB MUST BE OILED BEFORE USE through the lubricator on the hub shell. Afterwards add a few drops of oil at least once a month. USE ONLY STURMEY-ARCHER OIL (or SAE 20 Mineral Oil). DO NOT use thick oil or grease.
4. It is important that the axle should be prevented from rotating in the chainstay slots and the flats on the axle are provided for this purpose. If the chainstay ends are too wide for the axle, special lock washers are supplied.

STURMEY ARCHER

GH6 'DYNOHUB'

FRONT 6 VOLT LIGHTING UNIT

'Dynohub' lighting is bicycle lighting at its best.

Each lighting set consists of a hub generator, headlamp, rear lamp and connecting flexes.

The generator has no mechanical loss and electrically is highly efficient.

Other than the normal wheel bearings it is entirely without mechanical friction or wearing parts and the effort to propel is negligible.

It is silent and its position within the hub protects it completely from damage.

Attractive durable head and tail lamps provide high lighting efficiency.

CYCLE LIGHTING WITH A DIFFERENCE!

STURMEY-ARCHER GEARS LTD · NOTTINGHAM · ENGLAND A TI COMPANY

GH6 'DYNOHUB'

STURMEY ARCHER

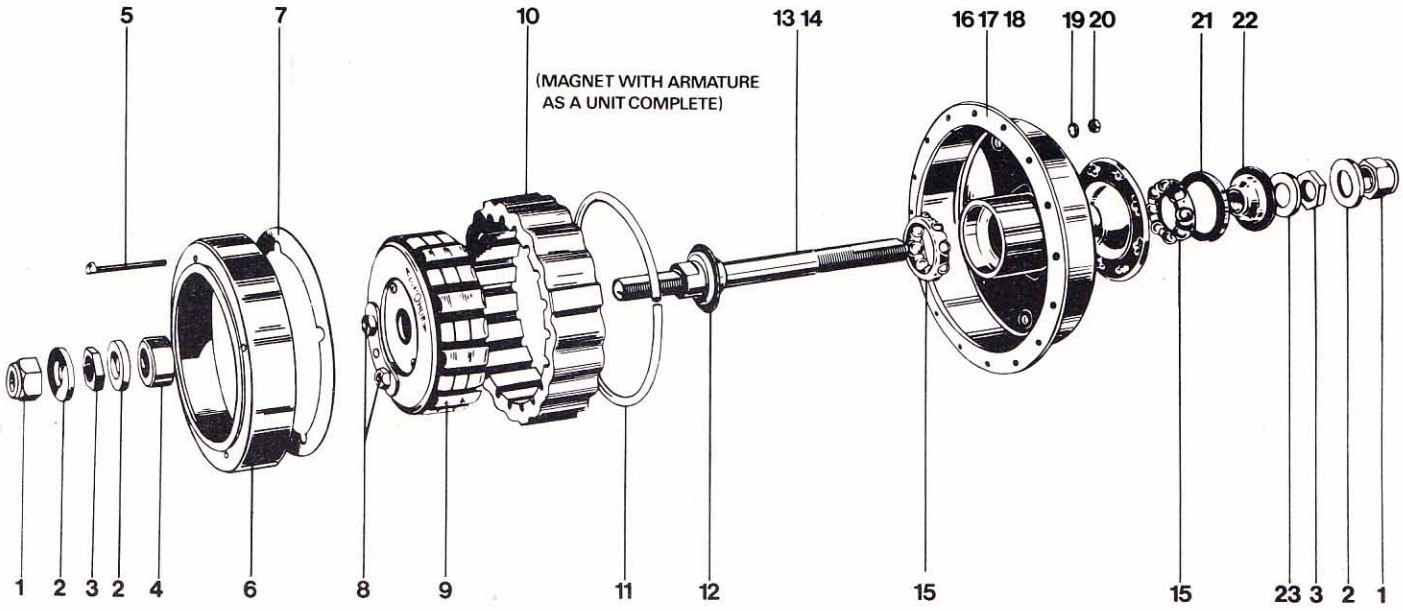


PHOTO No.	SALES No.	DESCRIPTION
1	HMN 118	Axle Nut
2	HMW 129	Spacing Washer – $\frac{1}{8}$"
3	HMN 137	Cone Locknut
4	HSD 301	Spacing Cup
5	HMB 135	Magnet Fixing Screw
6	HSD 302	Magnet Cover Plate
7	HSD 303	Card Disc
8	HMN 140	Terminal Nut – 2 BA
9	HSD 304	Armature, complete
10	HSD 425	Magnet with Armature Unit
11	HSD 306	Magnet Spacing Ring

PHOTO No.	SALES No.	DESCRIPTION
12	HSB 201	R.H. Cone
13	HSD 307	Axle – 5" long (127 mm.)
14	HSD 308	Axle – 4$\frac{3}{4}$" long (121 mm.)
15	HSA 103	Ball Cage
16	HSD 392	Shell – 28 Hole
17	HSD 309	Shell – 32 Hole
18	HSD 310	Shell – 36 Hole
19	HMW 158	Lockwasher } For magnet
20	HMN 141	Nut – 6 BA } fixing screw
21	HSA 102	Outer Dust Cap
22	HSD 379	L.H. Cone
23	HMW 146	Spacing Washer – $\frac{1}{16}$"

TO DIS-ASSEMBLE THE HUB

1. First remove axle nuts 1 and washers 2 from both ends of axle then unscrew right-hand (dynamo) side locknut 3, and take off washers 2, and spacing cup 4.
2. Unscrew (magnet-fixing) nuts 20, detach lock washers 19 and the magnet-fixing screws 5.
3. Hold the wheel, with the dynamo downwards (above the workbench). A few light taps with a mallet on the end of the axle will release the dynamo unit from the hub.
4. Lift out the magnet spacing ring 11 and ball cage 15 from the hub shell 16.
5. Remove the left-hand (adjusting) cone locknut 3, and unscrew the adjusting cone 22. Ease out (from the hub shell) the channel-section dust cap 21 (use a wide screw-driver). Lift out the ball cage 15.
6. Pull out the axle 13, (from the dynamo side) together with the right hand cone 12.

STURMEY ARCHER

GH6 'DYNOHUB'

POINTS TO CHECK

1. Bearing races and cones – for pitting and signs of wear.
2. Axle for straightness and damage to threads.
3. Magnet cover plate and between armature and magnet segments for grit and rust.
4. Continuity of armature winding.

NOTE – Unless it is essential, the armature and magnet should never be separated. If they are to be separated, a keeper ring is absolutely necessary, (an old armature will serve as a keeper ring). The magnet will lose its magnetism without a keeper. A moment's separation will cause loss of magnetism. (A spanner placed across the magnet is useless as a substitute for a keeper ring).

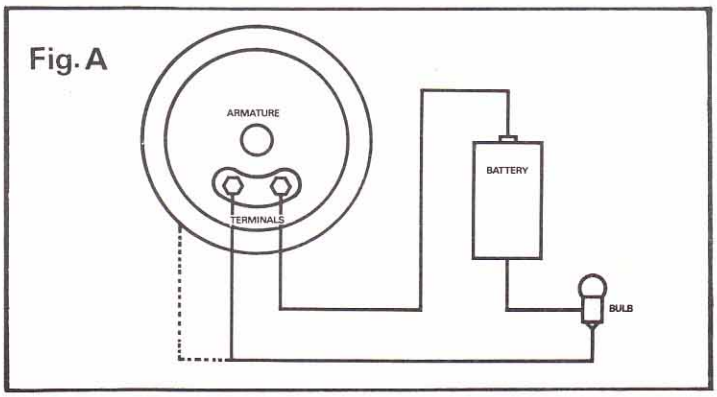
TO SEPARATE ARMATURE FROM MAGNET AND COVER PLATE

Hold the dynamo unit (terminal plate down) in the palm of the hand. Place a keeper over the armature – grip the edge of magnet with fingers and tap the keeper lightly – the magnet cover will slide off the magnet at the same time as the keeper replaces the armature.

ARMATURE CONTINUITY TEST

A battery and bulb should be connected as shown in the diagram 'A'. If the bulb does not light, a break in the armature winding is indicated.
A second test is to disconnect the lead from one of the armature terminals and touch the outer edges of the armature with a bare lead. If the bulb lights, this indicates a short circuit, and a new armature must be fitted.

Fig. A



TO REPLACE THE ARMATURE IN MAGNET AND FIT MAGNET COVER PLATE

Hold the magnet and keeper unit in the palm of the hand, place armature – terminals down – over the keeper and press the armature into the magnet. The keeper ring will slide out easily. Fit the card disc inside the cover plate – locate the notches in disc opposite grooves in magnet. Push magnet unit inside cover plate – chamfered edge of the magnet *inside* the cover plate.

TO ASSEMBLE THE HUB

1. Fit the ball cage 15 (with the ball-retainer ring facing outwards) into the left-hand (the smaller) end of the hub shell 16. Press the dust cap 21 (channel facing outwards) into hub shell. (If a new ball cage is fitted, the dust cap also should be new).
2. Fit the ball cage 15 (with the ball-retainer ring facing outwards) into the cup inside the hub shell. If the right-hand cone 12 (on the dynamo side) has been removed from the axle 13, replace cone and screw it TIGHTLY against the shoulder on the axle.
3. Insert the axle 13 into the hub shell from the dynamo-side.
4. Screw on the left-hand (adjusting) cone 22 and adjust the hub bearings. (A correctly adjusted wheel must have slight play at the rim – No play at the hub).
   Fit washer 23 and cone locknut 3 and screw it tightly against the left-hand cone 22.
5. Fit the card disc 7 inside the cover plate 6. Locate notches in card over holes in hub shell.
6. Fit the cover plate 6 over the magnet 10 (chamfer inwards), making sure that the four holes in the cover plate are in line with the notches in the card and the magnet.
7. Fit the metal spacing ring 11 into the hub shell 16.
8. Push the complete dynamo unit into the hub shell, making sure that the holes in the cover plate are in line with those in the hub shell.
9. Fit the magnet fixing screws 5, washers 19 and nuts 20.
10. Fit the spacing cup 4, washer 2 and dynamo cone locknut 3. Fit axle washers 2 and nuts 1

GH6 'DYNOHUB'

STURMEY ARCHER

'DYNOHUB' CORRECTION GUIDE

To test if 'Dynohub' is generating, remove wires from armature terminals, re-tighten terminal nuts and connect a bulb (known to be in good condition) across the armature terminals. Spin wheel smartly, – if bulb does not light satisfactorily, the armature may be faulty.

ELECTRICAL

SYMPTOM	CAUSE	REMEDY
Total failure	1. Faulty armature	1. Replace armature
	2. Broken wire in twin flex	2. Test each wire for continuity
	3. Burnt out bulb or broken filament	3. Test each bulb for continuity
	4. Incorrect wiring	4. Check wiring against appropriate diagrams
Low output (dim lights)	1. Magnet de-magnetised	1. Replace magnet/armature
	2. Bulbs which have been in use for a long time may not be 100% efficient	2. Test bulbs (with battery) against new ones
	3. Incorrect bulbs	3. Check bulb ratings (they must be correct).
	4. Incorrect wiring connections	4. Check wriing against appropriate diagram
	5. Corroded connections	5. Inspect all terminals and wire tags
Partial failure	1. Loose bulb or bulbs	1. Check if bulbs are fitted firmly
	2. Frayed ends of twin flex	2. Check each terminal point
	3. Terminal nuts loose	3. Check nuts for tightness (be careful not to use force)
Frequent burning out of bulbs	1. Loose contacts	1. Check all terminals in headlamp and rear lamp for tightness – bulbs must be firmly fitted in their sockets

MECHANICAL

SYMPTOM	CAUSE	REMEDY
Rubbing Noise	1. Usually caused by grit between cover plate and terminal plate	1. The groove should be cleaned and greased.
	2. Loose cones may permit armature and magnet to rub	2. Correct adjustment of cones
	3. Dirt between armature and magnet	3. The hub should be dis-assembled and cleaned
	4. The omission of the card packing disc which must be fitted between magnet and cover plate	4. Fit card disc

LUBRICATION

GH6 bearings are packed with grease – Shell Alvania No. 3.
Under normal riding conditions no further lubrication should be necessary.
When hub has been dis-assembled re-pack the bearings with Shell Alvania No. 3 grease or an equivalent good quality ball-race grease.

BEARING ADJUSTMENT

Left hand side (smaller end) of hub: loosen cone locknut and adjust cone suitably and tighten locknut.
A CORRECTLY ADJUSTED WHEEL HAS A TRACE OF SIDE PLAY AT THE WHEEL RIM – NO PLAY AT THE HUB

STURMEY ARCHER

DYNOHUB ACCESSORIES

HEAD LAMP

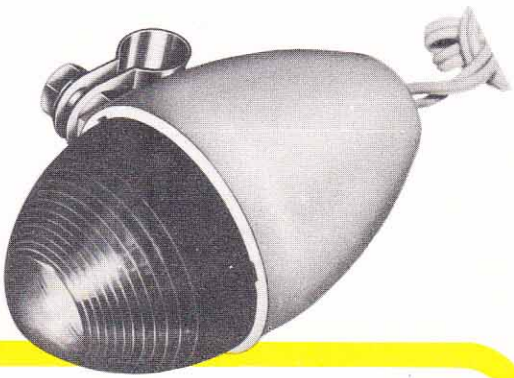
Modern, clean line, sharp styled.
Lamp body manufactured from durable resilient plastic to withstand impact and vibration, body top in high quality chromium plated finish.
Strong clear lens, Alluminised high efficiency plastic reflector, positive contact terminals, crimped-on wires, pre-focus 'capless' bulb with simple push-in fit.

HSD 443 – Head Lamp with Bracket – 6v ·2 amp Bulb.
Suitable for large wheel models i.e. 24″ and over.

HSD 397 – Head Lamp less Bracket – 6v ·25 amp Bulb.
Suitable for small wheel models.

BULBS Pre-focus 'Capless' Type:
HSD 439 Headlamp 6v ·2 amp.
HSD 400 Headlamp 6v ·25 amp.
HSD 410 Rear Lamp 6v ·1 amp.

REAR LAMP



Produced to British Standard 3648.
Moisture and dust resistant, body in hardwearing silver-grey plastic, safe steel clamp, pre-focus 'capless' bulb, no separate earthing required, supplied complete with wires.

HSD 441 – Rear Lamp ($\frac{1}{2}$″ Diam. Round Clip) with twin flex wires 57″ silver – 6v ·1 amp Bulb.

HSD 442 – Rear Lamp ($\frac{5}{8}$″ Diam. Oval Clip) with twin flex wires 57″ silver – 6v ·1 amp Bulb.

DYNOHUB ACCESSORIES

STURMEY ARCHER

DRY BATTERY UNIT (D.B.U.)

A neat 'stand-by' battery unit wired into the circuit of the 'Dynohub' lighting system – provides light for both lamps when the bicycle is stationary or at walking pace – operated from the headlamp switch.

HSD 312 – Dry Battery Unit (with Clips)

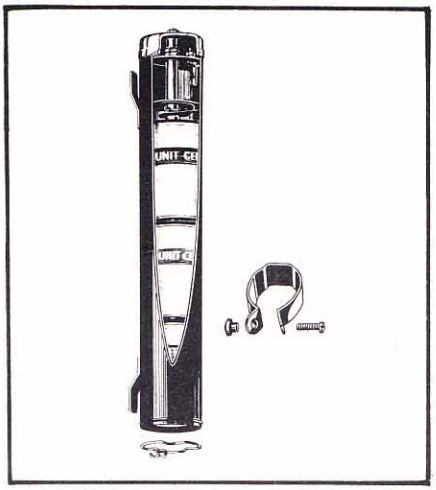
HSD 315 – Clip Assembly.

AUTOMATIC FILTER SWITCH (F.S.U.)

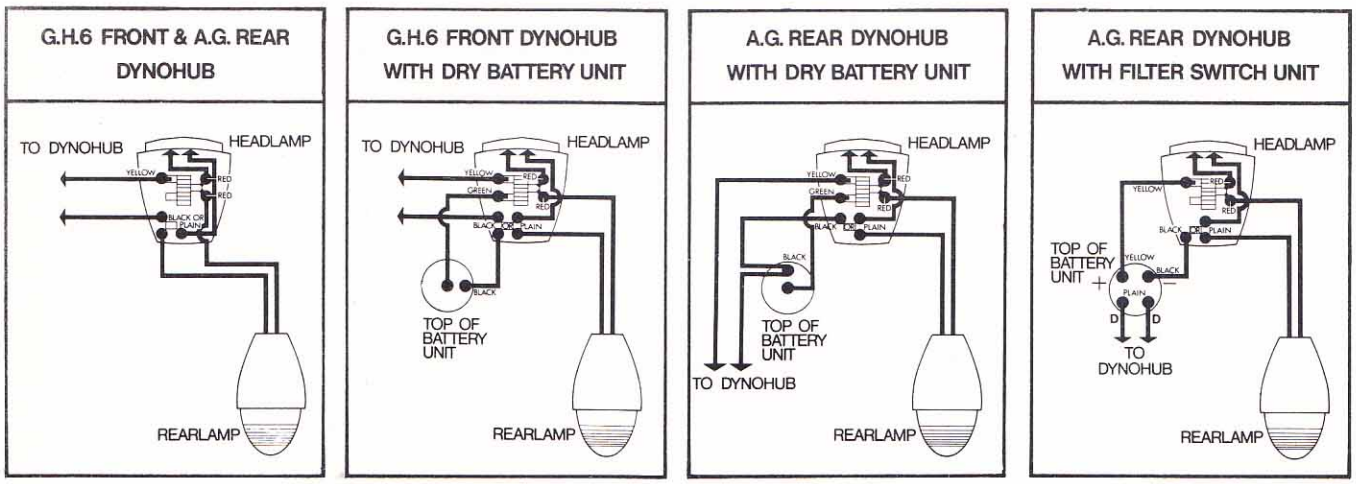
Similar to the standard dry battery unit plus the unique advantage of a built-in automatic switch to ensure constant light output at all speeds – also when stationary.

HSD 365 – Automatic Filter Switch Unit (with Clips)

HSD 315 – Clip Assembly.



WIRING DIAGRAMS



SWITCH POSITIONS

For ALL sets – the 'Dynamo' is ON with switch in the forward position. The battery is ON with switch in the backward position. The central position is OFF.
With FILTER SWITCH UNIT the Battery and 'Dynohub' are switched on together in the forward position. The battery operates until the dynamo takes over when the bicycle is in motion.

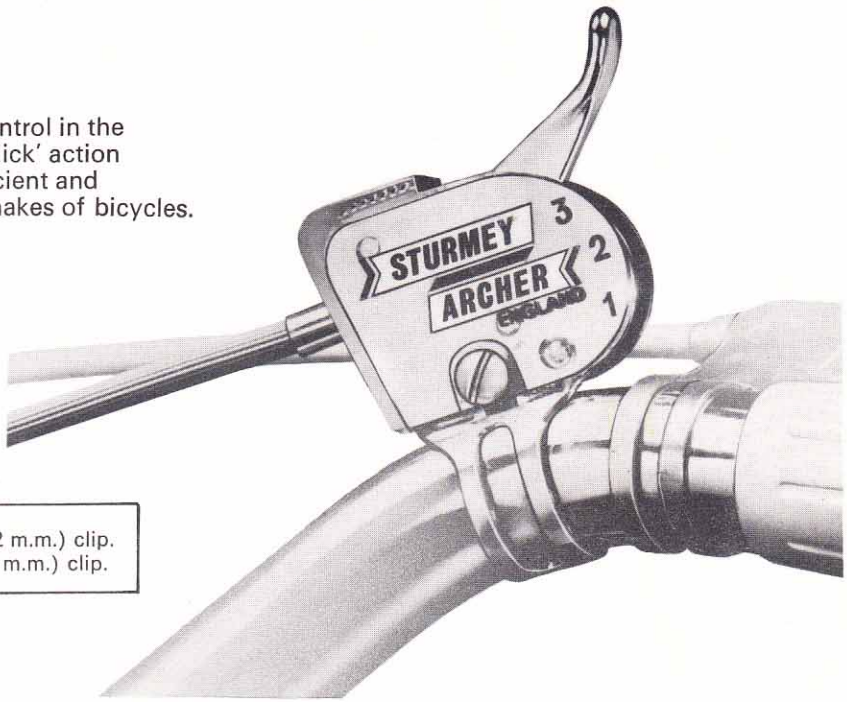
IMPORTANT! REMEMBER TO SWITCH OFF WHEN NOT IN USE TO SAVE YOUR BATTERIES – PARTICULARLY WITH FILTER SWITCH UNIT.

STURMEY ARCHER

GEAR CONTROLS

TRIGGER CONTROL

The most widely used **3 speed** hub gear control in the world – of long proven reliability. A quick 'flick' action handlebar fitting control – neat, simple, efficient and trouble free. Universally acceptable for all makes of bicycles.



HSJ.505	Trigger unit complete with $\frac{7}{8}$" (22.2 m.m.) clip.
HSJ.507	Trigger unit complete with $\frac{15}{16}$" (24 m.m.) clip.

TO FIT TRIGGER CONTROL

1. Open clip and place control approximately 2" from end of handlebar grip and secure fixing screw.
2. Pass cable inner wire through fulcrum clip and into clip slot – (then over pulley wheel, if fitted).
3. Push outer cable up to fulcrum slot. Fit cable anchorage – at hub end – Push gear lever forward, tighten inner wire and secure anchorage nut firmly.
4. Connect control cable to gear indicator coupling at hub.
5. Slide fulcrum clip to take up any slackness in cable and tighten clip screw.
6. Adjust gears.

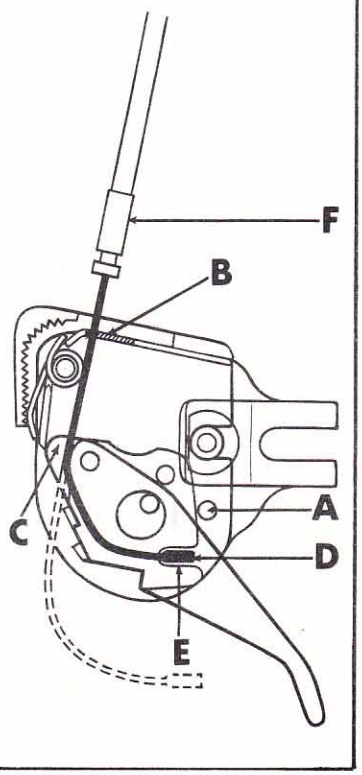
TO REMOVE THE CONTROL WIRE

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 the inner wire from indicator chain at hub, and outer casing from fulcrum clip. Pull cable ferrule (F) downward to remove from slot (B). Pull lever right back beyond bottom gear position to stop (A), push inner wire through to detach nipple (D) from ratchet plate then pull wire out between pawl and ratchet at (C) and finally through slotted hole (B).

TO FIT CONTROL WIRE

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

TO REMOVE THE CONTROL WIRE



GEAR CONTROLS

STURMEY ARCHER

AUTO-TWIST GRIP

The only **3 speed** Twist Grip control with patent auto adjustment. Provides positive gear change and automatically ensures correct gear adjustment at all times. Supplied with matching handlebar grip.

HSJ.583	Auto-twist grip complete with left-hand grip 60″ x 54″ (1,524 x 1,372 m.m.) cable with anchorage.

TO FIT TWIST GRIP CONTROL

IMPORTANT – THE GRIP MUST NOT BE TWISTED UNTIL FITTED TO THE BICYCLE AND THE CABLE CONNECTED TO THE GEAR INDICATOR ROD AT THE HUB.

1. Slide control on to handlebar as far as possible, adjust grip to required position. Tighten – EVENLY – fixing screws.
2. Pass cable inner wire through fulcrum clip and into clip slot – (then over pulley wheel, if fitted).
3. Push outer cable up to fulcrum slot. Fit cable anchorage at hub end – Twist the grip forward to tighten inner wire and secure anchorage nut firmly.
4. Connect control cable to gear indicator coupling at hub.
5. Slide fulcrum clip to take up any slackness in cable and tighten clip screw.
6. Adjust gears.

TO SET GEARS AUTOMATICALLY IN ADJUSTMENT

Twist the grip until bottom gear (No. 1) is indicated (i.e.) the blue coloured section can be seen through top of casing aperture) – Continue to turn grip until no furthur movement can be obtained. ALL THREE GEARS ARE NOW AUTOMATICALLY IN ADJUSTMENT.

NOTE – When all the cable adjustment has been taken up the twist grip must be dismantled and the gear locating spring refitted: See Assembly Notes.

TO RESET GEAR LOCATING SPRING AND ASSEMBLE TWIST GRIP MECHANISM

1. First fit detent spring and the $\frac{3}{16}$″ dia. ball into recess in operating sleeve – (use grease to hold spring and ball in position).
2. Fit cable nipple into slotted recess of operating sleeve.
3. Fit cable inner wire into slot of gear locating spring, and position spring over operating sleeve. (Check $\frac{3}{16}$″ dia. ball is positioned in elongated hole of locating spring).
4. Keeping thumb of right hand over ball and spring feed inner wire into cable slot of bottom half of casing. Now press locating spring into casing – until spring is **right down** into its grove.
5. Fit top half of casing over operating sleeve. Holding two halves of casing together, fit clamp screws.
6. Refit Twist Grip on to Handlebar, and take up all slackness in Control Cable. Set gears as described.

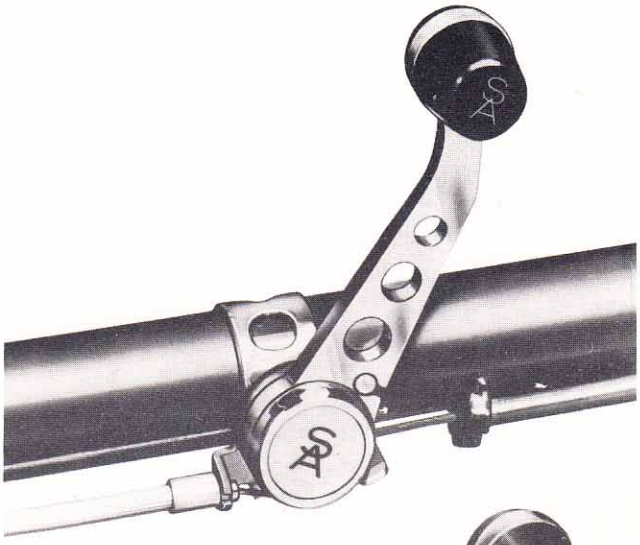
STURMEY ARCHER

GEAR CONTROLS

MINI-SPORTSHIFT (MODEL 70A)

an exciting newcomer to the 3 speed range – of elegant design with 'fine blanked' lever in high quality chrome – positive gear action – designed for safety. Standard model No. 70A – suitable for single top-tube bicycles.

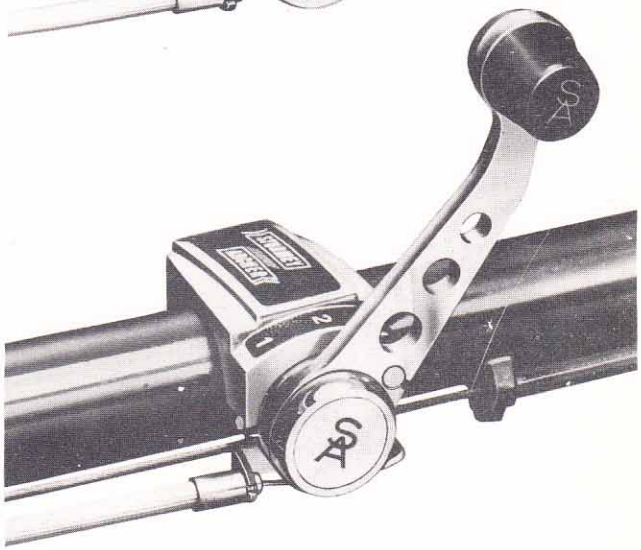
HSJ.705	Mini-Sportshift complete with 36″ x 30″ (914 x 762 m.m.) cable with anchorage (clip for $\frac{7}{8}$″/1″) (22.2/25.4 m.m.) dia. tube.



MINI-SPORTSHIFT DE-LUXE (MODEL 70B)

– the choice of the discerning cyclist – a top quality 3 speed gear change with beautifully styled chrome housing – for fitting to single top-tube bicycles. Combination of the world famous AW 3 speed gear and the Mini-Sportshift De-Luxe means quality cycling.

HSJ.706	Mini-Sportshift de luxe complete with 36″ x 30″ (914 x 762 m.m.) cable with anchorage (clip for $\frac{7}{8}$″/1″) (22.2/25.4 m.m.) dia. tube.



TO FIT CONTROL

1. Open control clip and place control on top tube of bicycle approximately 5″ from steering column – secure clamp bolt.
2. Push outer cable up to fulcrum stop and fit cable anchorage – at hub end.
3. Push control lever forward – tighten inner wire and secure anchorage nut firmly.
4. Adjust gears.

TO REMOVE CABLE

1. Loosen cable anchorage nut – push inner wire forward to form a loop at lever.
2. Push out cable ferrule from lever – ease cable from groove at base of lever and lift out cable nipple and detach complete cable.

TO FIT CABLE

1. Insert cable ferrule into its housing at rear of control lever and slot inner wire into groove in base of lever.
2. Push wire forward to form a loop and insert nipple into its slot. Push outer cable up to ferrule and fit cable anchorage at hub end – push gear lever forward. Tighten cable and secure anchorage nut.
3. Adjust gears.

GEAR CONTROLS

STURMEY ARCHER

CONSOLE SPORTSHIFT (STANDARD MODEL 70D)

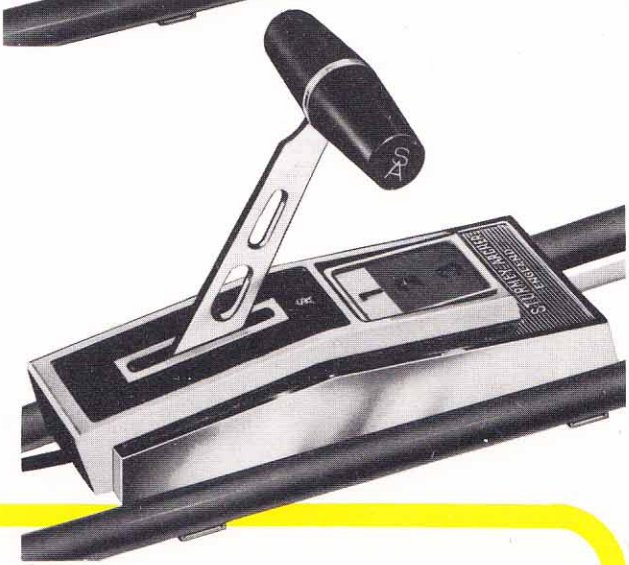
A 'new look' at gear change console design. Elegant, practical, robust, positive, built for safety. Chrome plated console and T bar lever. Suitable for conventional and high rise 3 speed bicycles – single or twin top-tubes.

HSJ.707	Console Sportshift complete with 36″ x 30″ (914 x 762 m.m.) cable with anchorage (clip for $\frac{7}{8}$″/1″) (22.2/25.4 m.m.) dia. tube.
HSJ.708	As above but with twin tube clips.

DE-LUXE CONSOLE SPORTSHIFT (MODEL 70E)

Acclaimed the most outstanding Console Sportshift of the year – a leap forward in space age design. No other console unit offers all these outstanding features – ultra-modern design – superb quality chrome plated finish – 'fine blanked' lever – mechanical 'window' gear indication – precision die-cast mechanism – positive 'click' gear change – safety gear selection – universal frame fitment. Without doubt – a significant de-luxe feature for Sturmey-Archer equipped 3 speed bicycles.

HSJ.709	Console Sportshift de luxe complete with 36″ x 30″ (914 x 762 m.m.) cable with anchorage (clip for $\frac{7}{8}$″/1″) (22.2/25.4 m.m.) dia. tube.
HSJ.710	As above but with twin tube clips.



TO FIT SPORTSHIFT GEAR CONTROL

SINGLE CLIP MODEL

1. Place control on top tube of bicycle frame (approximately 5″ from steering column).
2. Locate undrilled end of each half clip in slots in base of unit.
   Fit half clips to each side of frame tube and secure with fixing bolt and nut.

TWO CLIP MODEL

NOTE: When two clips are used, ensure that the 'U' shaped captive nuts are fitted over the holes at each end of control unit – then fit self tapping screws through universal clips and tighten.

3. Fit fulcrum clip to bicycle frame backstay.
4. Pass cable inner wire through fulcrum clip and fit wire into clip slot. Push outer cable up to fulcrum slot and tighten clip screw. Fit cable anchorage. Push gear lever forward and tighten inner wire then secure anchorage nut firmly.
5. Screw cable connector to gear indicator coupling.
6. Set gears.

TO REMOVE CABLE

1. Detach control unit from bicycle. Unscrew cable connector from gear indicator coupling – at hub end.
2. Remove cover fixing screws. Lift up plastic cover of control and prise cable ferrule from its recess. From underside of base plate, use a small screwdriver to push cable nipple from recess.

TO FIT NEW CABLE

3. Fit inner wire nipple and outer cable ferrule into its housing. (Note: The domed end of inner wire nipple must face upwards).
4. Replace plastic cover and secure fixing screws – Refit unit to bicycle.

STURMEY ARCHER

GEAR CONTROLS

DUAL LEVERS

To supplement the already famous S.5 five speed hub gear – the first in the world – Sturmey-Archer now offer a dual lever control of outstanding design. Top class cyclists will welcome this classical addition to the sporting range. Suitable for top or down-tube attachment.

HSJ.711	Dual levers complete with 36″ x 30″ (914 x 762 m.m.) cables with anchorage (clip for 1″/1⅛″) (25.4/28.6 m.m.) dia. tube.

TO FIT CONTROL

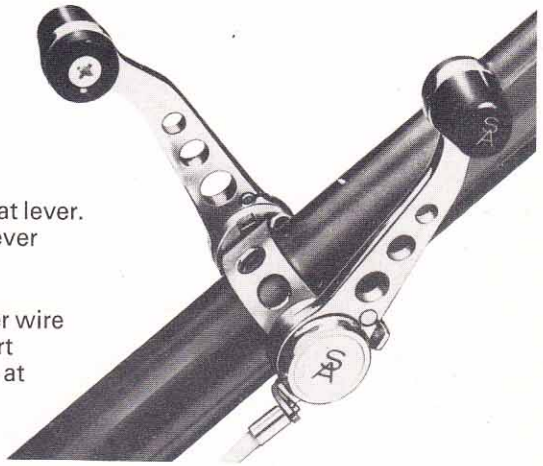
1. Open control clip and place control on top tube of bicycle approximately 5″ from steering column – secure clamp bolt. 2. Push outer cable up to fulcrum stop and fit cable anchorage – at hub end. 3. Push control lever forward – tighten inner wire and secure anchorage nut firmly. 4. Adjust gears.

TO REMOVE CABLE

1. Loosen cable anchorage nut – push inner wire forward to form a loop at lever. 2. Push out cable ferrule from lever – ease cable from groove at base of lever and lift out cable nipple and detach complete cable.

TO FIT CABLE

1. Insert cable ferrule into its housing at rear of control lever and slot inner wire into groove in base of lever. 2. Push wire forward to form a loop and insert nipple into its slot. Push outer cable up to ferrule and fit cable anchorage at hub end – push lever forward. Tighten cable and secure anchorage nut. 3. Adjust gears.



TWINSHIFT

Already a popular 5 speed control with the young rider. A space age console unit with T bar levers and window gear-change indication. Specially suitable for single or twin tube high rise bicycles.

HSJ.686	Twinshift complete with 36″ x 30″ (914 x 761 m.m.) cables with anchorage (clip for 1″/1⅛″) (25.4/28.6 m.m.) dia. tube.
HSJ.712	As above but with twin tube clips.

TO FIT TWINSHIFT GEAR CONTROL.

SINGLE CLIP MODEL

1. Place control on top tube of bicycle frame (approximately 5″ from steering column) and lift up control cover. 2. Fit clip to underside of frame tube – locate undrilled end of clip in slot at right side of unit and screw in fixing bolt on opposite side.

TWO CLIP MODEL

NOTE: When two clips are used, ensure that the 'U' shaped captive nuts are fitted over the holes at each end of control unit then fit self tapping screws through universal clips and tighten. 3. Fit fulcrum clips to bicycle frame backstays. 4. Pass cable inner wires through fulcrum clips and fit wires into clip slots. Push outer cables up to fulcrum slots and tighten clip screws. Fit cable anchorages. Push gear lever to forward position and secure each anchorage nut. 5. Screw cable connectors to gear indicator couplings. 6. Set gears.

TO REMOVE CABLE

1. Detach control unit from bicycle. Unscrew cable connector from gear indicator coupling – at hub end. 2. Remove cover fixing screws. Lift up plastic cover of control and prise cable ferrule from its recess. From underside of base plate use a small screwdriver to push cable nipple from recess.

TO FIT NEW CABLE

3. Fit inner wire nipple and outer cable ferrule into its housing. (Note: The domed end of inner wire nipple must face upwards). 4. Replace plastic cover and secure fixing screws – Refit unit to bicycle. 5. Pass inner wire through fulcrum clip and fit wire in clip slot. 6. Screw cable connector to gear indicator coupling. 7. Set gears.

FIVE SPEED GEAR LEVER POSITIONS

	LEVER POSITION	
	LEFT	RIGHT
1st GEAR SUPER LOW	Backward	Backward
2nd GEAR LOW	Forward	Backward
3rd GEAR NORMAL - i.e. (Direct Drive)	Forward	Central
4th GEAR HIGH	Forward	Forward
5th GEAR SUPER HIGH	Backward	Forward

GEAR CONTROLS

STURMEY ARCHER

CABLES WITH ANCHORAGE (Black, white or silver)

SALES No.	DESCRIPTION
HSJ 101	Trigger Control 60″ × 21″ (1,524 × 533 mm.)
HSJ 102	Trigger Control 60″ × 54″ (1,524 × 1,372 mm.)
HSJ 105	Automatic Twist Grip 60″ × 21″ (1,526 × 533 mm.)
HSJ 106	Automatic Twist Grip 60″ × 54″ (1,524 × 1,372 mm.)
HSJ 720	Sportshift (Models 70A & 70B) 36″ × 30″ (914 × 762 mm.)
HSJ 115	Sportshift (Models 70D & 70E) 36″ × 30″ (914 × 762 mm.)
HSJ 720	Dual Levers 36″ × 30″ (914 × 762 mm.)
HSJ 115	Twinshift 36″ × 30″ (914 × 762 mm.)
HSJ 759	Cable Anchorage

FULCRUMS

SALES No.	DESCRIPTION
HSJ 607	$\frac{1}{2}$″ (12·7 mm.) Backstay
HSJ 547	$\frac{5}{8}$″ (15·8 mm.) Chainstay
HSJ 513	$\frac{7}{8}$″ (22·2 mm.) Top tube
HSJ 512	1″ (25·4 mm.) Top tube

PULLEY ASSEMBLIES

SALES No.	DESCRIPTION
HSJ 520	1″ (25·4 mm.) Top tube
HSJ 521	$1\frac{1}{8}$″ (28·6 mm.) Down tube

CABLE CLIPS

SALES No.	SIZE	DESCRIPTION
RMM 160	1″ (25·4 mm.)	Round, top tube (Gear/brake)
HSL 743	$1\frac{1}{8}$″ (28·6 mm.)	Round, top tube (Twin gear – S.5)
RMM 184	$1\frac{1}{8}$″ (28·6 mm.)	Round, down tube (Gear/brake)
RMM 191	$\frac{1}{2}$″ (12·7 mm.)	Round, backstay (Gear)
RMM 206	$\frac{5}{8}$″ (15·9 mm.)	Round, backstay (Gear)
RMM 181	$\frac{5}{8}$″ (15·9 mm.)	Oval, backstay (Gear)
RMM 173	$\frac{7}{8}$″ (22·2 mm.)	Round, chainstay (Gear/brake)

COVERS - FOR CONTROL UNITS

SALES No.	DESCRIPTION
HSJ 718	Mini Sportshift Model 70B
HSJ 717	Console Sportshift Model 70D
HSJ 716	Console Sportshift Model 70E
HSJ 693	Console Twinshift

KNOB ASSEMBLIES - FOR CONTROL UNITS

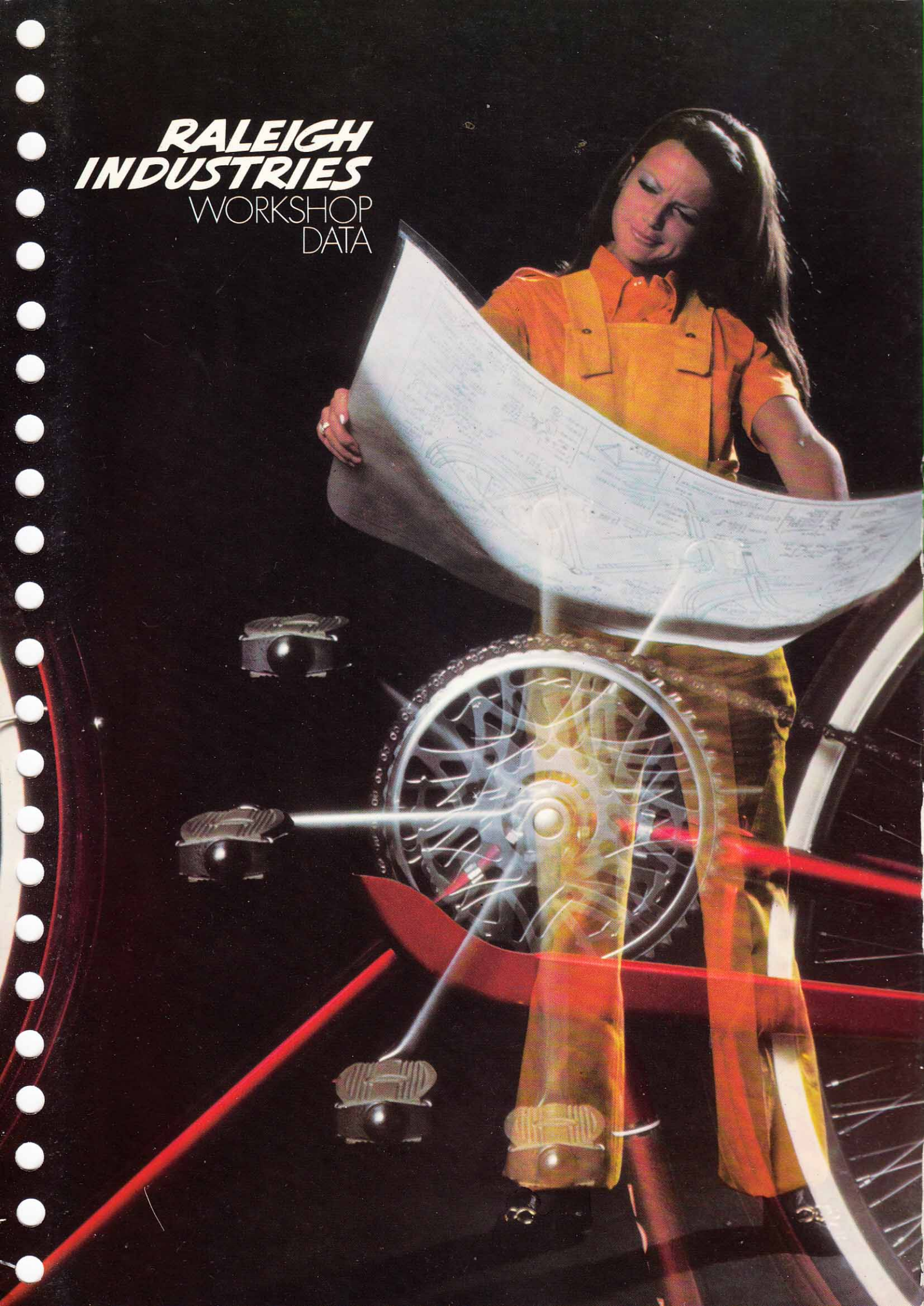
SALES No.	DESCRIPTION
HSJ 675	Sportshift
HSJ 676	Twinshift
HSJ 740	Single & Dual Lever

FRAME CLIP - FOR CONTROL UNITS

SALES No.	DESCRIPTION
HSJ 668	Twinshift $\frac{7}{8}$″/1″ (22·2 mm./25·4 mm.) – Single tube
RMM 239	Sportshift Models D. & E. $\frac{7}{8}$″/1″ (22·2 mm./25·4 mm.) – Single tube
HSJ 737	$2\frac{1}{4}$″ (57·1 mm.)
HSJ 738	$1\frac{7}{8}$″ (47·6 mm.) Sportshift & Twinshift – Twin tubes
HSJ 739	$1\frac{1}{2}$″ (38·1 mm.)

RALEIGH INDUSTRIES

WORKSHOP DATA



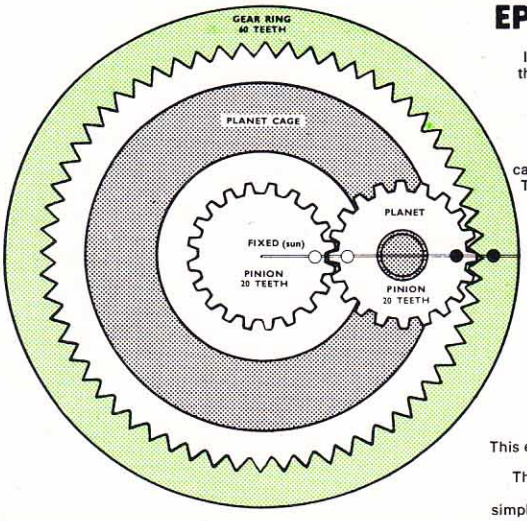
WORKSHOP DATA

The technical data in this section is provided to assist dealers in the maintenance and repair of R.I. products. Additionally, our Technical Services Department is available to advise on all service aspects.

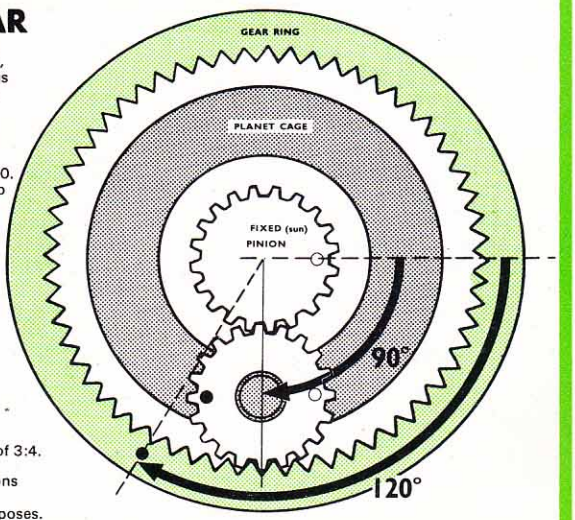
RALEIGH INDUSTRIES LTD

WORKSHOP DATA

EPICYCLIC GEAR



If planet cage is turned 90°, this moves gear ring 90° plus an extra 5 teeth due to the rotation of planet pinion: gear ring rotates 120°. That is, gear ring always rotates faster than planet cage in the proportion 120:90. This is known as a gear ratio of 120:90 or 4:3.



This example gives a gear ratio of 3:4.

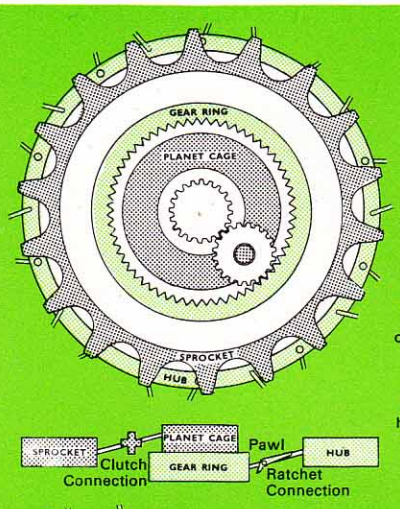
The tooth formations of pinions and gear rings have been simplified for diagrammatic purposes.

APPLICATION TO BICYCLE HUB GEAR

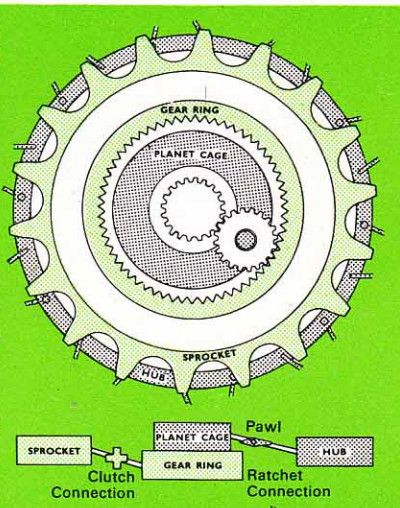
In the bicycle hub gear the sprocket is connected by a clutch to either planet cage or gear ring, one or the other being connected to the hub through pawls and ratchets.

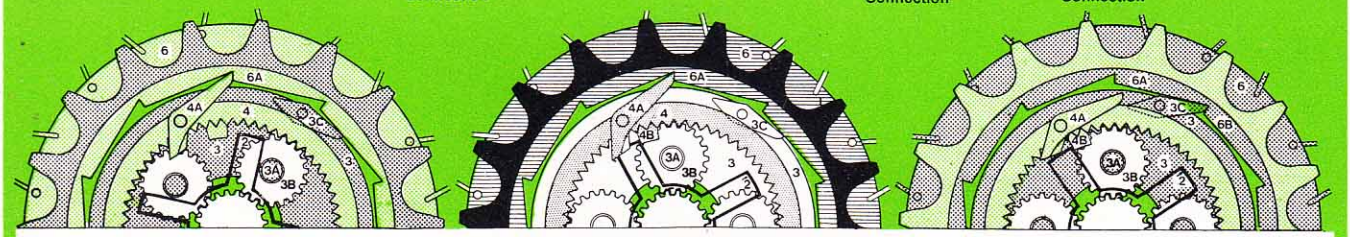
Sprocket, driver and clutch are linked to rotate together. Clutch, housed inside driver, slides axially and can be set to one of three different positions by the gear control lever

HIGH GEAR



LOW GEAR





VIEWED FROM SPROCKET SIDE OF HUB

HIGH GEAR

Gear lever at HIGH. Clutch (2) is at its inner position

In this position clutch arms engage pinion pins (3A) thus connecting sprocket to planet cage (3).

As planet cage (3) turns, rotation of pinions (3B) turns gear ring (4) faster as shown at top of chart.

Gear ring, pawls (4A) engaging ratchet teeth (6A), drives hub (6) from the right side.
Planet cage pawls (3C) are overrun because hub (6) is turning more quickly than planet cage (3).

NORMAL GEAR (DIRECT DRIVE)

Gear lever at NORMAL pulls clutch (2) to an intermediate position

Clutch arms being now clear of planet pinion pins (3A) engage gear ring splines (4B), thus connecting sprocket direct to gear ring (4).

Gear ring, pawls (4A) engaging ratchet teeth (6A) drives hub (6) from the right side.
Planet cage pawls (3C) are overrun because hub (6) is turning more quickly than planet cage (3).

LOW GEAR

Gear lever at LOW pulls clutch (2) to its outer position

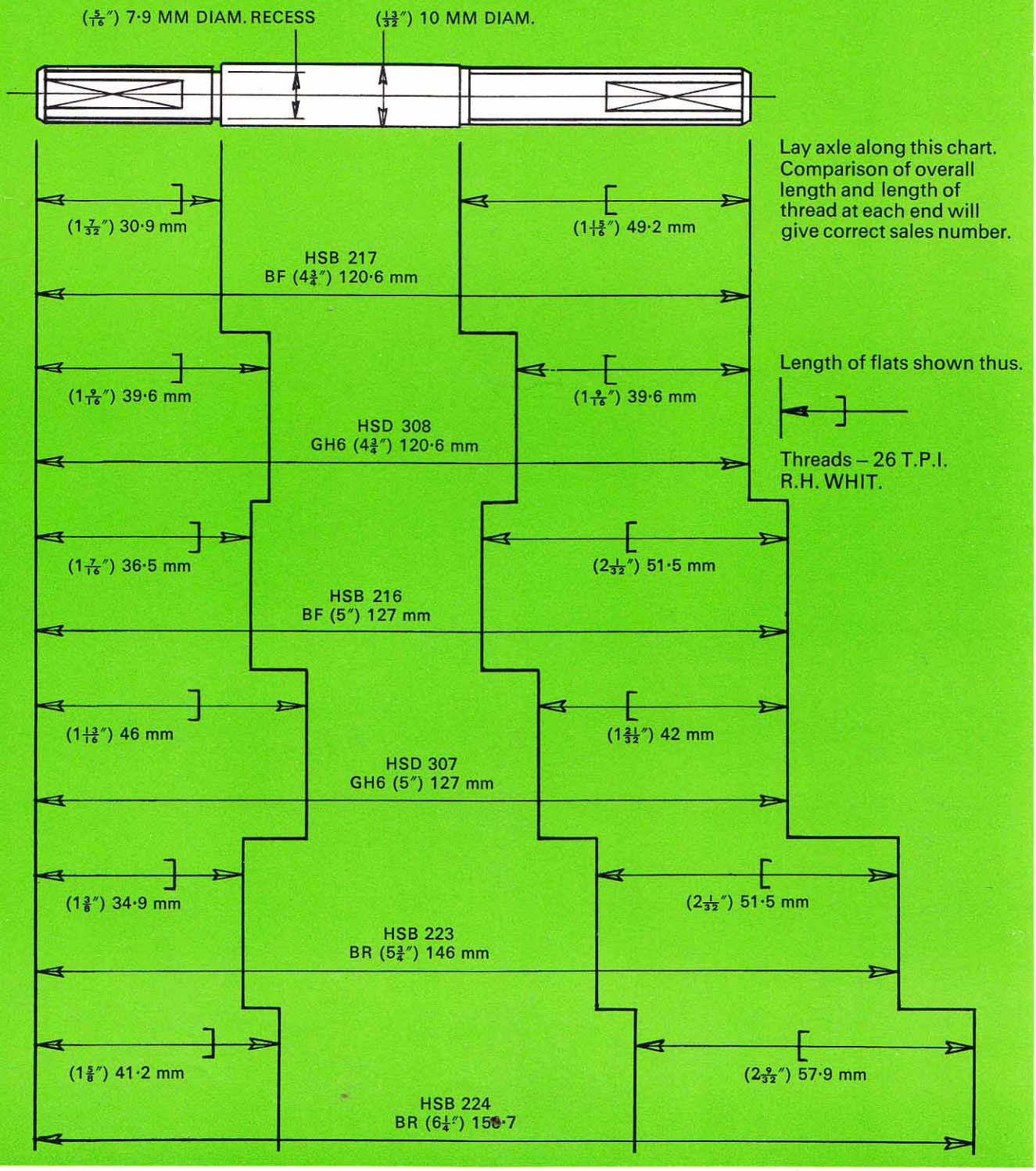
Clutch arms engage gear ring splines (4B) thus connecting sprocket to gear ring as for normal gear, but also deflect gear ring pawls (4A) out of ratchet teeth (6A), on right side of hub.

As gear ring turns, rotation of pinions (3B) turns planet cage (3) slower as shown at top of chart.

Planet cage, pawls (3C) engaging ratchet teeth (6B) on the left side drives hub (6).

RALEIGH INDUSTRIES LTD

STURMEY-ARCHER AXLE CHART FOR BRAKES & DYNOHUBS–TYPE BF, BR & GH6–Actual Size

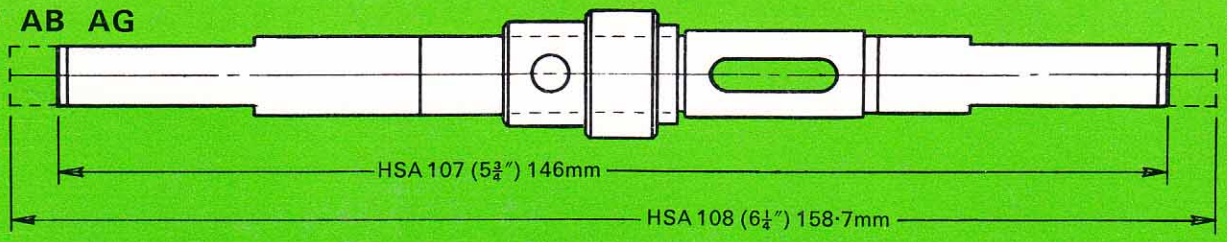


RALEIGH INDUSTRIES LTD

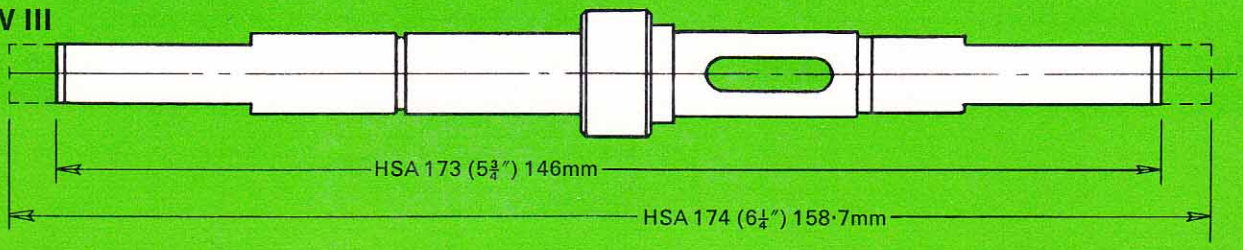
WORKSHOP DATA

STURMEY-ARCHER AXLE CHART FOR 2-,3-& 5-SPEED HUBS-Actual Size

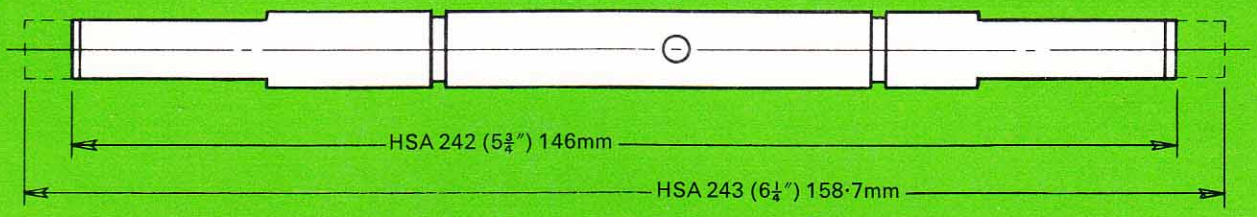
AW AB AG



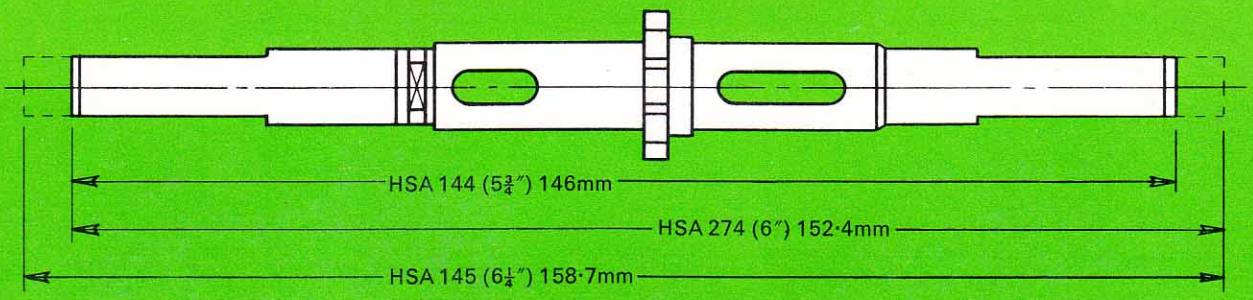
TCW III



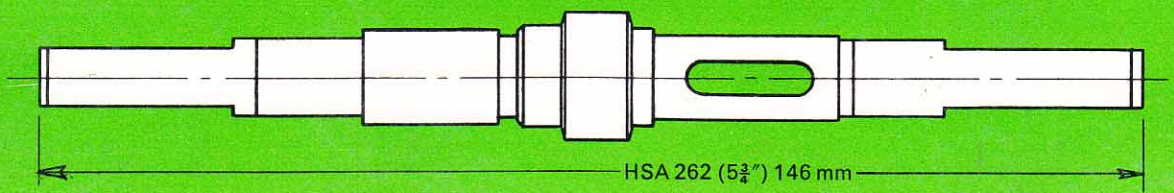
S2



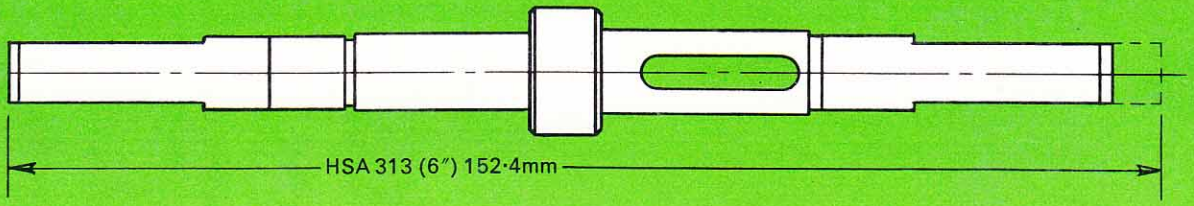
S5



S3B



S3C

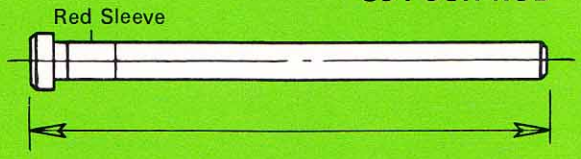


WORKSHOP DATA

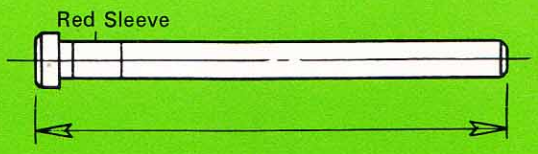
RALEIGH INDUSTRIES LTD

STURMEY-ARCHER-GEAR INDICATOR RODS AND COUPLINGS-Actual Size

LEFT HAND SIDE
S5 PUSH ROD



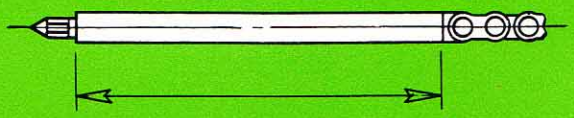
HSA 288 ($2\frac{11}{16}$″) 68·2 mm For ($6\frac{1}{4}$″) 158·7 mm Axle



HSA 287 ($2\frac{7}{16}$″) 61·9 mm For ($5\frac{3}{4}$″) 146 mm Axle

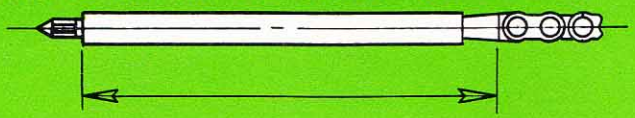
RIGHT HAND SIDE
3 & 5-SPEED GEAR INDICATOR COUPLINGS

FOR GEAR TYPES AW – AB – AG – TCW III – S3B – S5.



HSA 125 ($1\frac{29}{32}$″) 48·4 mm For ($5\frac{3}{4}$″) 146 mm Axle

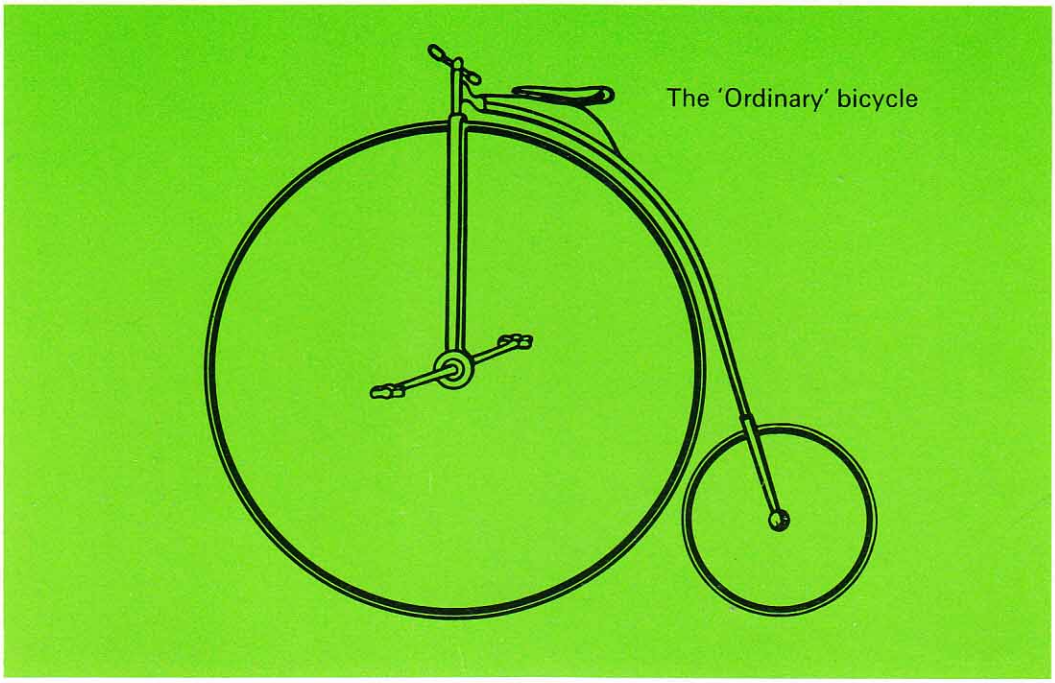
FOR GEAR TYPES AW – AB – AG – TCW III – S3B – S3C – S5.



HSA 126 ($2\frac{5}{32}$″) 54·7 mm For (6″) 152·4 mm,
($6\frac{1}{4}$″) 158·7 mm Axle

The Calculation and Meaning of GEAR RATIOS

Cycle gears are given in 'inches'. This dates to the time of the 'Ordinary' or 'Pennyfarthing' bicycle and refers to the **diameter** of the big wheel. In the present chain driven bicycle the term 'inches' is still used but it now refers to the size of an 'Ordinary' wheel which would be required to move the same distance forward for one pedal revolution.



The 'Ordinary' bicycle

The gear in inches is obtained by multiplying the wheel diameter by the number of teeth in the chainwheel and dividing the answer by the number of teeth in the sprocket.

This procedure can be varied as shown in the table.

	To Find:	Multiply:	By:	& Divide by:
I	GEAR	Wheel Size	Chainwheel	Sprocket
II	SPROCKET	Wheel Size	Chainwheel	Gear
III	CHAINWHEEL	Sprocket	Gear	Wheel Size

Example: "What sprocket is required with 26" wheels and a 46 tooth chainwheel to give a gear of 70"?

From column II, $26 \times 46 \div 70 = 17.1$. The nearest is an 17 tooth sprocket and from column I this gives a gear of $26 \times 46 \div 17 = 70.3$ inches.

In Sturmey-Archer hub gears this is the 'normal' gear. For the other gears add or subtract the percentage increase or decrease from this figure.

NOTE: To calculate the distance travelled for one revolution of the pedals multiply the gear in inches by π i.e. $\frac{22}{7}$

WORKSHOP DATA

RALEIGH INDUSTRIES LTD

GEAR CHART
for Single Speed Machines

No. of teeth on sprocket	No. of Teeth on Chain Wheel 40	42	44	46	48	50	52
For 26 in. Wheels 14	74·2	78·0	81·7	85·4	89·1	92·8	96·5
15	69·3	72·8	76·2	79·7	83·2	86·6	90·1
16	65·0	68·2	71·5	74·7	78·0	81·2	84·5
17	61·2	64·2	67·3	70·3	73·4	76·5	79·5
18	57·8	60·7	63·6	66·4	69·3	72·2	75·1
19	54·7	57·5	60·2	62·9	65·7	68·4	71·1
20	52·0	54·6	57·2	59·8	62·4	65·0	67·6
21	49·0	52·0	54·4	56·9	59·4	61·9	64·3
22	47·2	49·6	52·0	54·3	56·7	59·0	61·4

No. of teeth on sprocket	No. of Teeth on Chain Wheel 40	42	44	46	48	50	52
For 27 in. Wheels 14	77·1	81·0	84·8	88·7	92·5	96·4	100·2
15	72·0	75·6	79·2	82·1	86·4	90·0	93·6
16	67·5	70·8	74·2	77·6	81·0	84·3	87·7
17	63·5	66·7	69·8	73·0	76·2	79·4	82·5
18	60·0	63·0	66·0	69·0	72·0	75·0	78·0
19	56·8	59·6	62·5	65·3	68·2	71·0	73·9
20	54·0	56·7	59·4	62·1	64·8	67·5	70·2
21	51·4	54·0	56·5	59·1	61·7	64·2	66·8
22	49·1	51·5	54·0	56·4	58·9	61·4	63·8

No. of teeth on sprocket	No. of Teeth on Chain Wheel 40	42	44	46	48	50	52
For 28 in. Wheels 14	80·0	84·0	88·0	92·0	96·0	100·0	104·0
15	74·6	78·4	82·1	85·8	89·6	93·3	97·0
16	70·0	73·5	77·0	80·5	84·0	87·5	91·0
17	65·9	69·2	72·5	75·8	79·1	82·4	85·6
18	62·2	65·3	68·4	71·5	74·7	77·8	80·8
19	58·9	61·9	64·8	67·8	73·7	73·7	76·6
20	56·0	58·8	61·6	64·4	67·2	70·0	72·8
21	53·3	56·0	58·6	61·3	64·0	66·6	69·3
22	50·9	53·4	56·0	58·5	61·0	63·6	66·1

GEAR RATIO CHART

Sturmey-Archer wide ratio 2-speed hub gear Type S2

2-Speed Hub (S-2) Gear Ratio

2nd Gear	Direct Drive
1st Gear	28·6% Decrease

Number of teeth		16" Wheel		20" Wheel		26" Wheel	
Chain Wheel	Sprocket	1st Gear	2nd Gear	1st Gear	2nd Gear	1st Gear	2nd Gear
40	13	34·4	49·2	44·0	61·6		
	14	32·6	45·7	40·7	57·2		
	15	30·6	42·7	38·1	53·4		
	16			35·7	50·0	47·0	65·0
	17			33·6	47·1	43·6	61·2
	18			31·7	44·4	41·2	57·8
	19					39·0	54·7
	20					37·1	52·0
	22					33·7	47·3

Number of teeth		16" Wheel		20" Wheel		26" Wheel	
Chain Wheel	Sprocket	1st Gear	2nd Gear	1st Gear	2nd Gear	1st Gear	2nd Gear
42	13	36·9	51·7	46·2	64·6		
	14	34·3	48·0	42·8	60·0		
	15	32·0	44·8	40·0	56·0		
	16			37·4	52·5	48·6	68·2
	17			35·2	49·4	45·8	64·2
	18			33·3	46·6	43·4	60·7
	19					41·0	57·5
	20					39·0	54·6
	22					34·8	49·7

Number of teeth		16" Wheel		20" Wheel		26" Wheel	
Chain Wheel	Sprocket	1st Gear	2nd Gear	1st Gear	2nd Gear	1st Gear	2nd Gear
44	13	38·7	54·2	48·4	67·7		
	14	35·9	50·3	44·8	62·8		
	15	33·5	46·9	41·9	58·7		
	16			39·2	55·0	51·0	71·5
	17			37·0	51·8	48·1	67·3
	18			34·2	49·0	45·5	63·6
	19					43·0	60·2
	20					40·8	57·2
	22					37·2	52·0

Number of teeth		16" Wheel		20" Wheel		26" Wheel	
Chain Wheel	Sprocket	1st Gear	2nd Gear	1st Gear	2nd Gear	1st Gear	2nd Gear
46	13	40·4	56·6	50·6	70·8		
	14	37·6	52·6	46·9	65·7		
	15	35·1	49·1	43·8	61·3		
	16			41·1	57·5	53·4	74·7
	17			38·6	54·1	50·2	70·3
	18			36·5	51·1	47·4	66·4
	19					44·9	62·9
	20					42·7	59·8
	22					38·8	54·4

Number of teeth		16" Wheel		20" Wheel		26" Wheel	
Chain Wheel	Sprocket	1st Gear	2nd Gear	1st Gear	2nd Gear	1st Gear	2nd Gear
48	13	42·1	59·1	52·6	73·8		
	14	39·2	54·9	49·0	68·6		
	15	36·4	51·2	45·6	64·0		
	16			42·8	60·0	55·6	78·0
	17			40·2	56·4	52·5	73·5
	18			38·0	53·3	49·4	69·3
	19					46·9	65·7
	20					44·5	62·4
	22					40·5	56·7

Number of teeth		16" Wheel		20" Wheel		26" Wheel	
Chain Wheel	Sprocket	1st Gear	2nd Gear	1st Gear	2nd Gear	1st Gear	2nd Gear
50	13	43·9	61·5	55·0	77·0		
	14	40·8	57·2	51·0	71·4		
	15	38·2	53·4	47·6	66·7		
	16			44·7	62·6	57·0	81·3
	17			42·0	58·8	54·6	76·5
	18			39·8	55·6	51·5	72·2
	19					48·8	68·4
	20					46·4	65·0
	22					42·2	59·1

GEAR RATIOS CHART

Sturmey-Archer wide ratio 3 speed hub gears - Type AW, AB, S3B, AG, TCW, S3C

3-Speed Gear Ratios	
1 (Low)	25% Reduction
2 (Normal)	Direct Drive
3 (High)	33·3% Increase

Number of teeth		16″ Wheel			20″ Wheel			26″ Wheel			27″ Wheel			28″ Wheel		
Chain Wheel	Sprocket	1 Low	2	3 High	1 Low	2	3 High	1 Low	2	3 High	1 Low	2	3 High	1 Low	2	3 High
40	13	36·9	49·2	65·4	46·2	61·6	81·9									
	14	34·3	45·7	60·8	42·9	57·2	76·1									
	15	32·0	42·7	56·8	40·1	53·4	71·0									
	16				37·5	50·0	66·5	48·8	65·0	86·7	50·6	67·5	89·0	52·5	70·0	93·3
	17				35·3	47·1	62·6	45·9	61·2	81·6	47·6	63·5	84·6	49·4	65·9	87·9
	18				33·3	44·4	59·1	43·4	57·8	77·1	45·0	60·0	80·0	46·6	62·2	82·9
	19							41·0	54·7	72·9	42·6	56·8	75·7	44·2	58·9	78·5
	20							39·0	52·0	69·3	40·5	54·0	72·0	42·0	56·0	74·7
	22							35·4	47·3	63·1	36·8	49·1	65·5	38·2	50·9	67·9
42	13	38·8	51·7	68·8	48·5	64·6	85·9									
	14	36·0	48·0	63·8	45·0	60·0	79·8									
	15	33·6	44·8	59·6	42·0	56·0	74·5									
	16				39·4	52·5	69·8	51·2	68·2	90·9	52·2	70·9	94·4	55·1	73·5	98·0
	17				37·1	49·4	65·7	48·2	64·2	85·6	50·0	66·7	88·9	51·9	69·2	92·3
	18				35·0	46·6	62·0	45·5	60·7	80·9	47·5	63·0	84·0	49·0	65·3	87·1
	19							43·1	57·5	76·7	44·7	59·7	79·4	46·4	61·9	82·5
	20							41·0	54·6	72·8	42·5	56·7	75·6	44·1	58·8	78·4
	22							37·3	49·7	66·3	38·6	51·5	68·6	40·1	53·5	71·3
44	13	40·7	54·2	72·1	50·8	67·7	90·0									
	14	37·7	50·3	66·9	47·1	62·8	83·5									
	15	35·2	46·9	62·4	44·0	58·7	78·1									
	16				41·3	55·0	73·1	53·6	71·5	95·3	55·6	74·2	99·0	57·8	77·0	102·7
	17				38·9	51·8	69·0	50·5	67·3	89·8	52·1	69·9	93·0	54·4	72·5	96·7
	18				36·8	49·0	65·2	47·7	63·6	84·8	49·5	66·0	88·0	51·3	68·4	91·2
	19							45·2	60·2	80·3	46·8	62·5	83·3	48·6	64·7	86·4
	20							42·9	57·2	76·3	44·5	59·5	79·2	46·2	61·6	82·1
	22							39·0	52·0	69·3	40·5	54·0	72·0	42·0	56·0	74·7
46	13	42·5	56·6	75·3	53·1	70·8	94·2									
	14	39·3	52·6	70·0	49·3	65·7	87·4									
	15	36·8	49·1	65·3	46·0	61·3	81·5									
	16				43·1	57·5	76·5	56·0	74·7	99·6	58·2	77·6	103·2	60·4	80·5	107·3
	17				40·6	54·1	72·0	52·7	70·3	93·7	54·6	73·0	97·0	56·9	75·8	101·1
	18				38·3	51·1	68·0	49·8	66·4	88·5	51·7	69·0	92·0	53·6	71·5	95·3
	19							47·2	62·9	83·9	48·9	65·4	86·9	50·9	67·8	90·4
	20							44·9	59·8	79·7	46·5	62·1	82·8	48·3	64·4	85·9
	22							40·9	54·4	72·7	42·4	56·5	75·3	43·9	58·6	78·1
48	13	44·3	59·1	78·6	55·4	73·8	98·1									
	14	41·2	54·9	73·0	51·4	68·6	91·2									
	15	38·4	51·2	68·1	48·0	64·0	85·1									
	16				45·0	60·0	79·8	58·5	78·0	104·4	60·0	81·0	108·0	63·0	84·0	112·0
	17				42·3	56·4	75·0	55·1	73·5	98·0	57·1	76·2	101·6	59·3	79·1	105·5
	18				40·0	53·3	71·0	52·0	69·3	92·4	54·0	72·0	96·0	56·0	74·7	99·6
	19							49·3	65·7	87·6	51·1	68·2	90·9	53·0	70·7	94·3
	20							46·8	62·4	83·2	48·6	64·8	86·4	50·4	67·2	89·6
	22							42·5	56·7	75·6	44·2	58·9	78·5	45·8	61·0	81·5
50	13	46·1	61·5	81·8	57·8	77·0	102·4									
	14	42·9	57·2	76·1	53·6	71·4	95·0									
	15	40·1	53·4	71·0	50·0	66·7	88·7									
	16				47·0	62·6	83·3	61·0	81·3	108·4	63·2	84·4	112·4	65·6	87·5	116·7
	17				44·1	58·8	78·2	57·4	76·5	102·0	59·5	79·4	105·8	61·8	82·4	109·9
	18				41·7	55·6	73·9	54·2	72·2	96·3	56·2	75·0	100·0	58·4	77·8	103·7
	19							51·3	68·4	91·2	53·2	71·1	94·7	55·3	73·7	98·3
	20							48·8	65·0	86·7	50·6	67·5	90·0	52·5	70·0	93·3
	22							44·3	59·1	78·8	46·0	61·4	81·9	47·7	63·6	84·8

RALEIGH INDUSTRIES LTD

GEAR RATIOS CHART

Sturmey-Archer wide ratio 5-speed hub gear Type S5

5 Speed Hub (S-5) Gear Ratio	
1 Super Low Gear	33·3% Reduction
2 Low Gear	21·0% Reduction
3 Normal Gear	Direct Drive
4 High Gear	26·66% Increase
5 Super High Gear	50·0% Increase

Number of teeth		26″ Wheel					27″ Wheel					28″ Wheel				
Chain Wheel	Sprocket	1 Super Low	2 Low	3 Normal	4 High	5 Super High	1 Super Low	2 Low	3 Normal	4 High	5 Super High	1 Super Low	2 Low	3 Normal	4 High	5 Super High
40	14	49·5	58·7	74·3	94·1	111·5	51·4	61·0	77·1	97·7	115·7	53·3	63·2	80·0	101·3	120·0
	15	46·2	54·7	69·3	87·7	104·0	48·0	56·9	72·0	91·2	108·0	49·8	59·0	74·7	94·6	112·1
	16	43·3	51·3	65·0	82·3	97·5	45·0	53·3	67·5	85·4	101·3	46·7	55·3	70·0	88·6	105·0
	17	40·8	48·3	61·2	77·5	91·8	42·3	50·2	63·5	80·4	95·3	43·9	52·1	65·9	83·4	98·9
	18	38·5	45·7	57·8	73·2	86·7	40·0	47·4	60·0	76·0	90·0	41·5	49·1	62·2	78·7	93·3
	19	36·5	43·2	54·7	69·2	82·1	37·9	44·9	56·8	71·9	85·2	39·3	46·5	58·9	74·6	88·4
	20	34·7	41·1	52·0	65·8	78·0	36·0	42·7	54·0	68·4	81·0	37·3	44·2	56·0	70·9	84·0
	22	31·5	37·4	47·3	59·9	71·0	32·7	38·8	49·1	62·2	73·7	33·9	40·2	50·9	64·4	76·4
42	14	52·0	61·6	78·0	98·8	117·0	54·0	64·0	81·0	102·6	121·5	56·0	66·4	84·0	106·4	126·0
	15	48·5	57·5	72·8	92·2	109·2	50·4	59·7	75·6	95·7	113·4	52·2	61·9	78·4	99·3	117·6
	16	45·5	53·9	68·2	86·3	102·3	47·3	56·0	70·9	89·7	106·4	49·0	58·1	73·5	93·0	110·3
	17	42·4	50·7	64·2	81·3	96·3	44·5	52·7	66·7	84·4	100·1	46·1	54·6	69·2	87·6	103·8
	18	40·5	47·9	60·7	76·8	91·1	42·0	49·8	63·0	79·7	94·5	43·5	51·6	65·3	82·6	98·0
	19	38·3	45·4	57·5	72·8	86·3	39·8	47·2	59·7	75·6	89·8	41·3	48·9	61·9	78·3	92·9
	20	36·4	43·1	54·6	69·1	81·9	37·8	44·8	56·7	71·8	85·1	39·2	46·4	58·8	74·4	88·2
	22	33·1	39·4	49·7	62·9	74·6	34·3	40·6	51·5	65·2	77·3	35·7	42·3	53·5	67·7	80·3
44	14	54·4	64·5	81·7	103·5	122·6	56·5	66·1	84·9	107·5	127·4	58·6	69·5	88·0	111·4	132·0
	15	50·8	60·3	76·3	96·6	114·5	52·7	62·6	79·2	100·2	118·8	54·7	64·9	82·1	104·0	123·2
	16	47·7	56·5	71·5	90·5	107·3	49·5	58·6	74·2	93·9	111·3	51·3	60·8	77·0	97·5	115·5
	17	44·9	53·2	67·3	85·2	100·6	46·6	55·2	69·9	88·4	104·9	48·3	57·3	72·5	91·8	108·8
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	19	40·1	47·6	60·2	76·2	90·3	41·7	49·4	62·5	79·1	93·8	43·2	51·2	64·8	82·0	97·2
	20	38·1	45·2	57·2	72·4	85·8	39·6	46·9	59·4	75·2	89·1	41·1	48·6	61·6	78·0	92·4
	22	34·7	41·1	52·0	65·8	78·0	36·0	42·7	54·0	68·4	81·0	37·3	44·2	56·0	70·9	84·0
46	14	56·9	67·5	85·4	108·1	128·1	59·1	70·1	88·7	112·3	133·1	61·3	72·7	92·0	116·5	138·0
	15	53·1	63·0	79·7	100·9	119·6	55·1	65·4	82·8	104·8	124·2	57·2	67·9	85·9	108·7	128·9
	16	49·8	59·0	74·4	94·5	112·1	51·7	61·3	77·6	98·2	116·4	53·7	63·6	80·5	101·9	120·8
	17	46·9	55·5	70·3	89·0	105·5	48·7	57·7	73·0	92·4	109·5	50·5	59·9	75·8	95·9	113·7
	18	44·3	52·5	66·4	84·0	99·6	46·0	54·5	69·0	87·3	103·5	47·7	56·5	71·5	90·5	107·3
	19	41·9	49·7	62·9	79·6	94·4	43·6	51·7	65·4	82·8	98·1	45·2	53·6	67·8	85·8	101·7
	20	39·9	47·2	59·8	75·7	89·7	41·4	49·1	62·1	78·6	93·2	42·9	50·9	64·4	81·5	96·6
	22	36·3	43·1	54·5	69·0	81·8	37·7	44·6	56·5	71·5	84·6	39·1	46·3	58·6	74·2	87·9
48	14	59·3	70·4	89·1	112·8	133·7	61·7	73·1	92·6	117·2	139·0	64·0	75·8	96·0	121·5	144·0
	15	55·4	65·7	83·2	105·3	124·8	57·5	68·3	86·4	109·4	129·6	59·7	70·8	89·6	113·4	134·4
	16	52·0	61·6	78·0	98·7	117·0	54·0	64·0	81·0	102·5	121·5	56·0	66·4	84·0	106·3	126·0
	17	49·0	58·0	73·5	93·0	110·3	50·8	60·2	76·2	96·4	114·3	52·7	62·5	79·1	100·2	118·7
	18	46·2	54·7	69·3	87·7	104·0	48·0	56·9	72·0	91·1	108·0	49·8	59·0	74·7	94·6	112·1
	19	43·8	51·9	65·7	83·2	98·6	45·5	53·9	68·2	86·3	102·5	47·1	55·8	70·7	89·5	106·1
	20	41·6	49·3	62·4	79·0	93·6	43·2	51·2	64·8	82·0	97·2	44·8	53·1	67·2	85·0	100·8
	22	37·8	44·8	56·7	71·8	85·1	39·3	46·6	58·9	74·5	88·4	40·7	48·3	61·1	77·3	91·7
50	14	61·9	73·4	92·9	117·6	139·4	64·2	76·2	96·4	122·1	144·6	66·6	79·0	100·0	126·6	150·0
	15	57·8	68·5	86·7	109·7	130·1	59·9	71·1	90·0	114·0	135·0	62·2	73·7	93·3	118·1	140·0
	16	54·2	64·2	81·3	103·0	122·0	56·3	66·7	84·4	106·9	126·6	58·3	69·1	87·5	110·8	131·3
	17	51·0	60·4	76·5	96·8	114·8	52·9	62·7	79·4	100·5	119·1	54·9	65·1	82·4	104·3	123·6
	18	48·1	57·0	72·2	91·4	108·3	50·0	59·3	75·0	94·9	112·5	51·9	61·5	77·8	98·5	116·7
	19	45·6	54·0	68·4	86·6	102·6	47·4	56·2	71·1	90·0	106·7	49·1	58·2	73·7	93·3	110·6
	20	43·3	51·3	65·0	82·3	97·5	45·0	53·3	67·5	85·4	101·3	46·7	55·3	70·0	88·6	105·0
	22	39·4	46·7	59·1	74·8	88·7	40·9	48·5	61·4	77·7	92·1	42·4	50·2	63·6	80·5	95·4

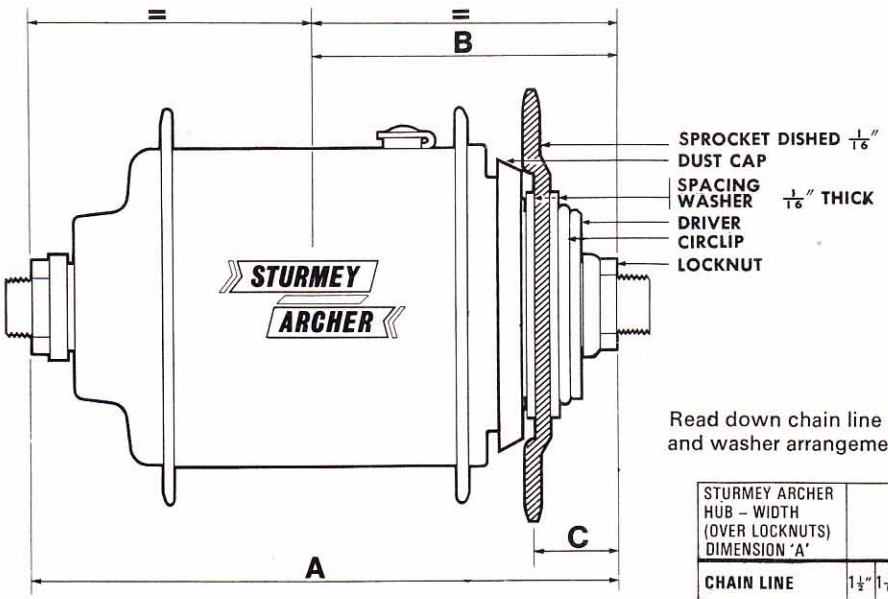
BICYCLE CHAIN LINE

Correct chain line is an essential to the easy running of any type of bicycle and will prevent excessive wear and 'drag' on the chain, rear wheel sprocket – and chainwheel.
The rear wheel sprocket MUST be in strict alignment with the chainwheel and this 'chain line' must also be in parallel with the centre-line through the bicycle – front to rear.
Note For chain line on a bicycle with a five speed derailleur gear – (with single chainwheel) – the chainwheel must be in line with middle sprocket of the gear unit. For a ten speed bicycle (with a double chainwheel) the chain line is obtained from the centre point between the two chainwheels and middle sprocket of the gear unit.

To adjust chain alignment –
1. Front A bottom bracket axle of different length can be fitted to vary the distance of the chainwheel from the centre-line of bicycle.
2. Rear Remove or add packing washer(s) behind the sprocket or freewheel block.

NB. Check that the rear hub is fitted with the necessary spacing washers and locknuts required to give the correct width to fit the bicycle rear fork ends. Any alteration of the axle spacing washers or locknuts on either side of the hub will affect the chain line, unless the same amount is added or removed from both sides.

To obtain chain line of any rear hub sprocket –
Measure distance over locknuts = A (see diagram)
Divide this distance by two = B (see diagram)
Measure the distance from the outside of R.H. locknut to the centre of the sprocket teeth = C (see diagram)
Deducting C from B gives the chain line.



Read down chain line column for order of sprocket and washer arrangement from sprocket dust cap outwards.

STURMEY ARCHER HUB – WIDTH (OVER LOCKNUTS) DIMENSION 'A'	4 5/16"					4 7/16"					4 1/16"	
CHAIN LINE	1 1/2"	1 9/16"	1 5/8"	1 3/4"	1 11/16"	1 1/2"	1 5/8"	1 9/16"	1 23/32"	1 5/8"	1 5/8"	1 11/16"
HMW 127 SPROCKET SPACING WASHER		X		X	X	X	X	X	X	X		X
HMW 127 SPROCKET SPACING WASHER				X				X	X	X		X
SPROCKET TURNED IN	X	X				X						
SPROCKET TURNED OUT			X	X	X		X				X	
SPROCKET FLAT (14T & 15T)								X	X	X		X
HMW 127 SPROCKET SPACING WASHER	X	X	X		X	X	X				X	
HMW 127 SPROCKET SPACING WASHER	X		X								X	

On Sturmey-Archer Gear Hubs the chain line can be varied up to 1/4" by interchanging the positions of the sprocket and sprocket spacing washers – See chart.

DERAILLEUR GEAR-Maintenance

Trouble free working of any derailleur gear depends upon the correct FITTING of the unit followed by exact ADJUSTMENT of the two screws which control the inwards and outwards (lateral) movement of the gear. MAINTENANCE is easy – Clean off grit, and OIL THE GEAR REGULARLY, – occasionally oil the control cables and Control lever friction nuts. Use R.I. "All Purpose" oil.

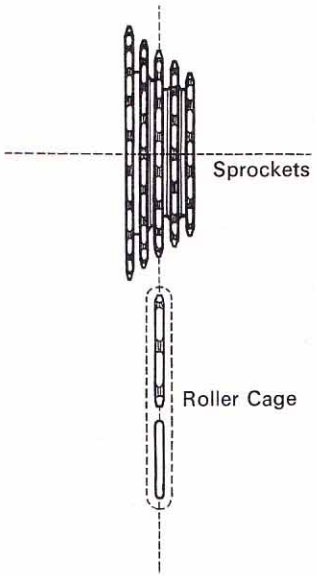
If damage has occurred the following general instructions will assist in locating the trouble.

CHECK POINTS.

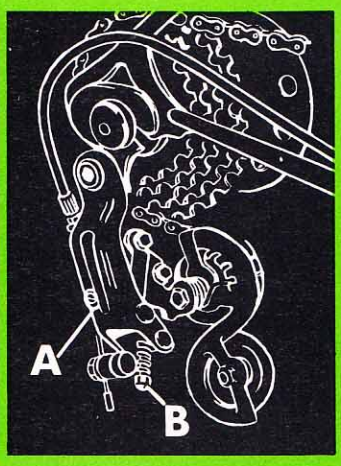
Correct Chain alignment is of first importance.

1 **THE REAR WHEEL RIM** must be central over hub cone locknuts – check this with wheel rim alignment gauge.
2 **BICYCLE REAR FORKS** must be at an EQUAL DISTANCE from centre-line (front to rear) of the frame – Rear Fork ends must also be PARALLEL TO this same centre-line.
3 **GEAR UNIT** roller cage must be vertical and parallel to the sprockets – Viewed from rear of bicycle – see diagram 'A'.
4 **CHAINWHEEL** must run true – Examine chain ring for damaged (bent) teeth – a common cause of chain derailment.
5 **CHAIN** must be rivetted together – No stiff links – another common cause of chain derailment. A short chain will cause stiff gear change – chain should be long enough to allow free movement on to largest chainwheel and sprocket.
6 **GEAR LEVER** should be tightened by its friction nut to overcome gear return spring. A loose gear lever will cause loss of required gear.

DIAGRAM 'A'
VIEW OF GEAR UNIT IN MIDDLE GEAR POSITION



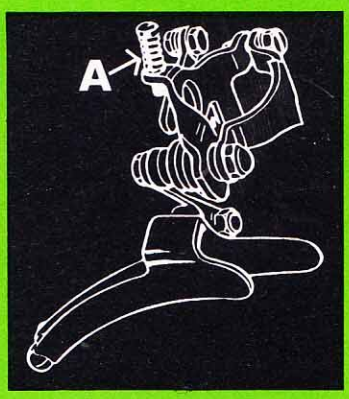
As seen from the rear of Bicycle



DERAILLEUR GEAR ADJUSTMENT

If chain falls out of correct alignment – re-adjust as follows:-

DERAILLEUR GEAR
With chain on small (top gear) sprocket adjust OUTWARD movement of the gear mechanism by screw (A).
The INWARD movement of gear mechanism is adjusted by stop screw (B) to prevent chain riding over large (bottom gear) sprocket into the wheel spokes.



FRONT DERAILLEUR CAGE (10 speed only)
Turn stop screw (A) to move derailleur cage to a central position over each chain wheel with control lever in appropriate position.

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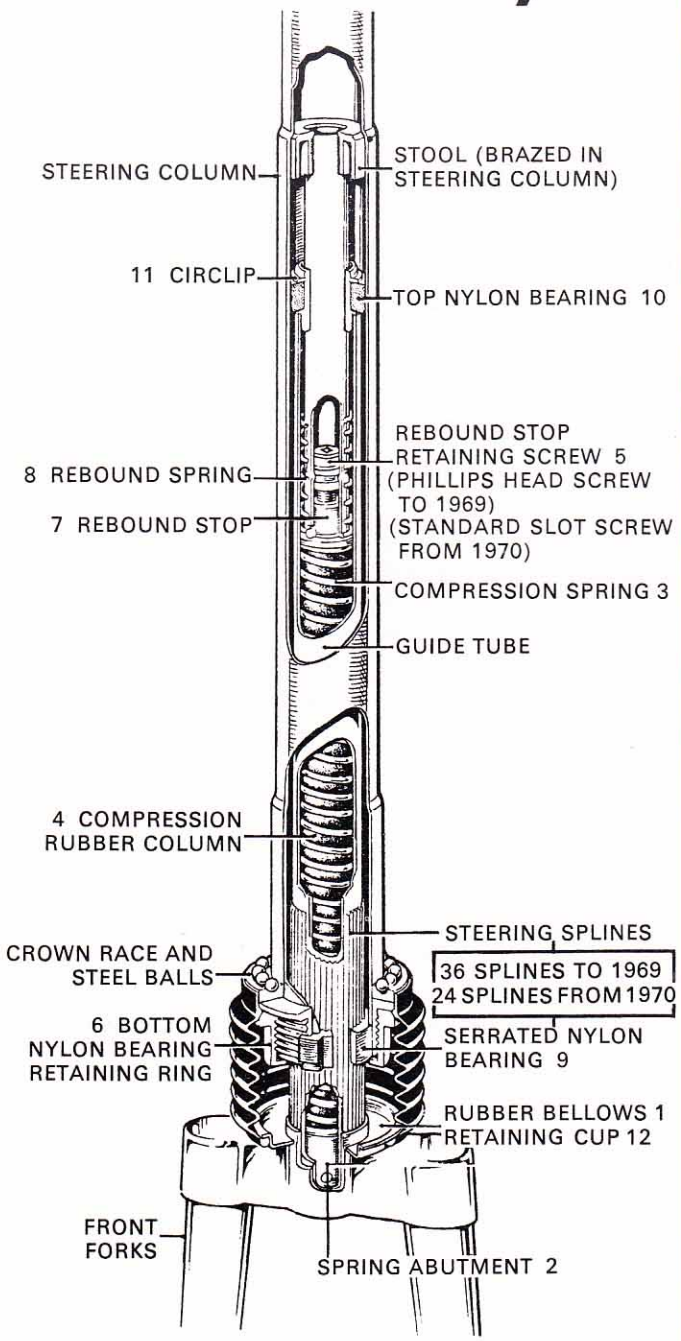
WORKSHOP DATA

MOULTON BICYCLE Fork Removal and Assembly



TO DISMANTLE

1. Remove fork – with front brake stirrup attached – from machine in usual manner.
2. Push off, top end of rubber bellows (1) from fork crown race and slide bellows up fork column to remove.
3. Remove brake bolt from fork crown, and drop out spring abutment (2), together with compression spring (3) and compression rubber column (4) – from inside the guide tube through opening under fork crown.
4. Unscrew rebound stop retaining screw (5) – [use long blade screw-driver (Phillips type) – inserted in top of steering column]. The rebound stop (7) and rebound spring will now drop through opening under fork crown.
5. Unscrew bottom nylon bearing retaining ring (6) and separate steering column from forks and guide tube. (by a strong pull).
6. Remove circlip (11) from top of guide tube – pull off, top nylon bearing (10) serrated nylon bearing (9) retaining ring (6) and bellows retaining cup (12).

POINTS TO CHECK

(a) Fork steering splines – clean off rust and grit – use wire brush.

(b) Play in front suspension – tighten bottom nylon bearing retaining ring – if play cannot be eliminated, fit new nylon bearings at top and bottom.

(c) Squeaks in suspension unit – grease splines, spring abutment and rubber column.

TO ASSEMBLE

1. Slide bellows retaining Cup (12) – with lugs down – over guide tube. Fit bottom nylon bearing retaining ring (6) over the steering splines then slide serrated nylon bearing (9) on to the splines with the step uppermost – check that bearing slides smoothly on the splines.
2. Fit top nylon bearing (10) and circlip (11) to guide tube. Grease both bearings with a molyslip grease – insert guide tube in to steering column – check that the bottom nylon bearing is correctly located in steering column slots.
3. Screw up bottom nylon bearing retaining ring (6) – make sure steering splines slide easily into bearing.

Fit the following parts – through hole under Fork Crown.

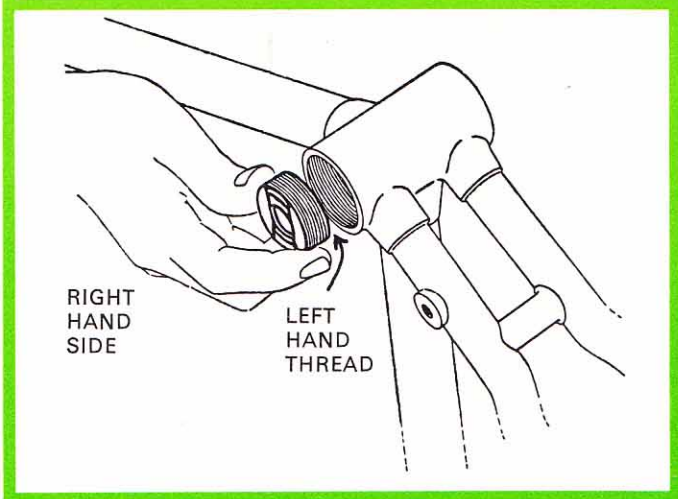
4. Grease Rebound Spring (8) and insert spring into guide tube. Next fit rebound stop (7) and locate this in internal stool in steering column.
5. Grease combined compression rubber column (4) and main spring (3). Push in the assembly fully to hold the rebound stop in position while retaining screw (5) is fitted. (Use a heavy grease to assist in holding screw head on to screwdriver end.)
6. Fit spring abutment (2) – push against the rubber column to locate hole in retaining cup (12) and hole in spring abutment (2) with brake bolt hole in fork crown – to slide in front brake bolt with brake stirrup attached.
7. Fit the rubber bellows (1) over steering splines – lipped end up to the shoulder on nylon bearing retaining ring – plain end on bellows retaining cup.

WORKSHOP DATA

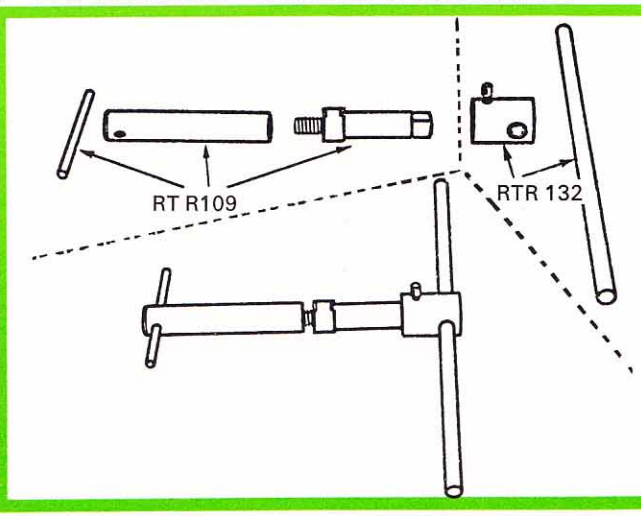
RALEIGH INDUSTRIES LTD

BOTTOM BRACKET - FIXED CUP - TOOL

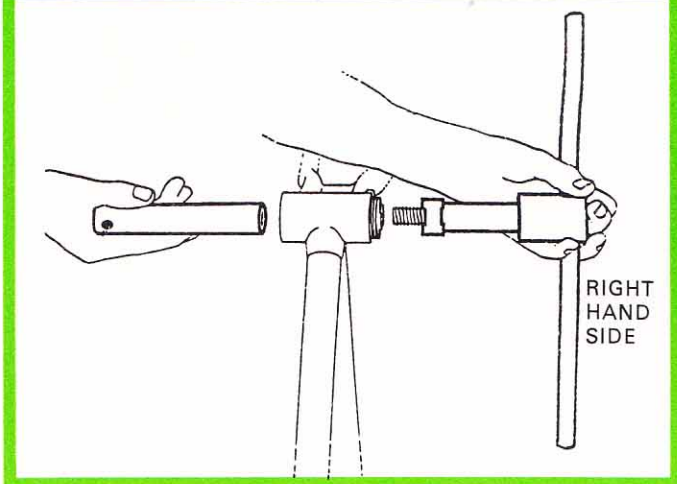
TO ASSEMBLE: FOLLOW INSTRUCTIONS TO REMOVE: REVERSE PROCEDURE



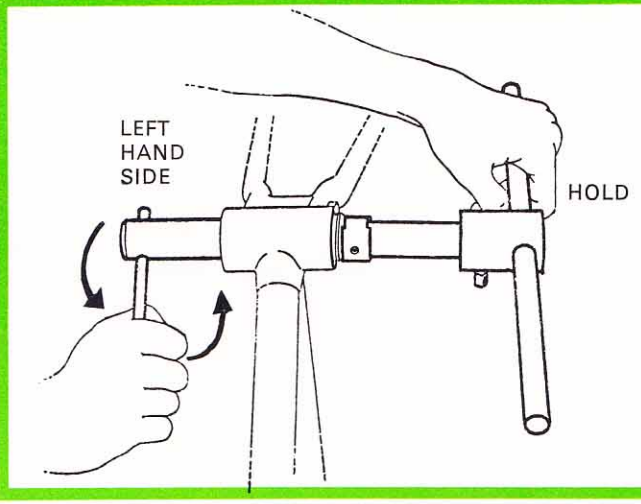
1. Assembly of Bottom Bracket Fixed Cup (Fixed Cup can be recognised by colour i.e. Black)



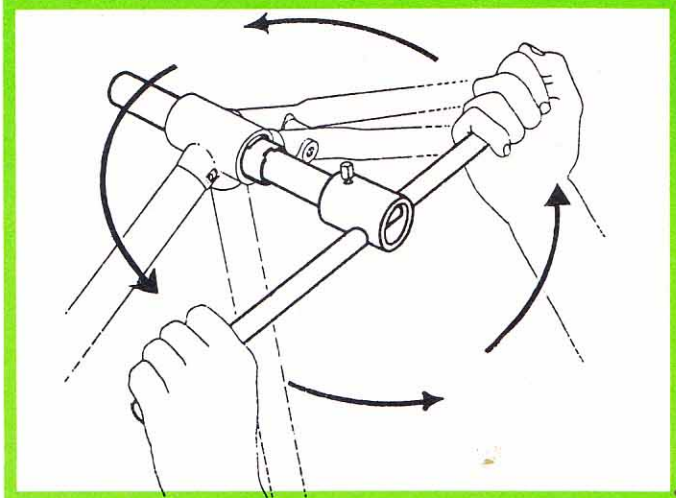
2. Service Tools No. RTR 132 (Tommy Bar and Socket) & RTR 109 (Mandrel)



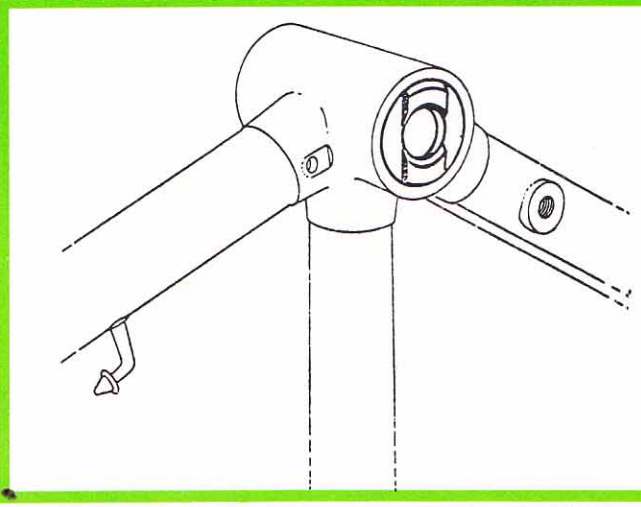
3. Insert Mandrel through Fixed Cone



4. Tighten with small Tommy Bar to lock Mandrel to Fixed Cup



5. To tighten Fixed Cup turn the Mandrel (anti-clock.)



6. Face of Cup should be flush with face of Bottom Bracket

PROPSTAND-Service Notes

Chopper

The sketch illustrates components of Raleigh Propstand, – The assembly is held in position by the anti-rotation pin (RMK 130).

To Remove Pin

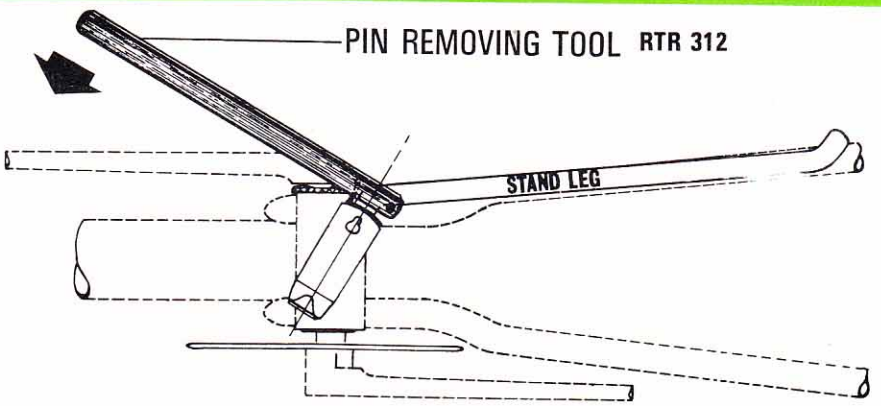
1. First turn cycle upside down and move stand leg to horizontal position (i.e. foot of stand towards rear of bicycle).
2. Next slide tool (RTR 312) on to propstand leg as shown (metal tongue inwards). – To release anti-rotation pin (RMK 130) – press tool **firmly** against collar (RMK 133) until recess in collar comes into line with hole in propstand housing – **maintain** this position to ease out pin.
   Withdraw propstand assembly from its housing. (also cam if loose)
3. To remove spring retaining pin (RMK 134) compress spring retaining washer (RMW 457) against the side of a vice and push out pin and slide off washer (RMW 457), Spring (RMK 131) and Collar (RMK 133). **Replace worn or damaged parts.**

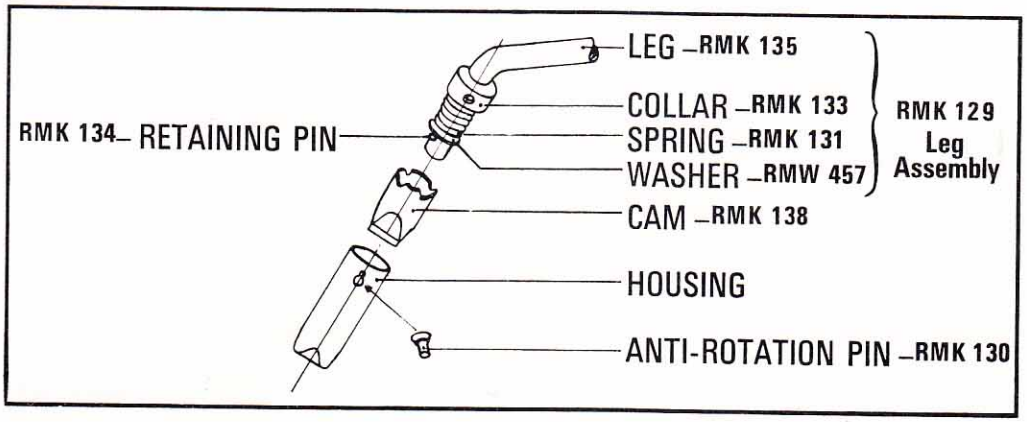
To Assemble Propstand

1. Fit Collar (RMK 133), Spring (RMK 131) and washer (RMW 457) on to stand leg (RMK 138). Compress washer (RMW 457) and Spring (RMK 131) against the side of a vice and insert spring retaining pin (RMK 134) through stand leg. (push cam into housing if loose)
2. Apply grease to assembly and insert unit into frame lug (the stand leg must be in horizontal position).
3. Slide propstand tool on to stand leg. Press tool **firmly** against Collar (RMK 133) until recess in collar comes into line with hole in propstand housing – **maintain** this position to fit anti-rotation pin (RMK 130) (flange down) into recess in collar (RMK 133).

Propstand Assembly - RSW & Twenty

1. Grease spring, slide it into prop stand lug.
2. Fit bush into frame lug and push flattened end of prop stand leg through bush.
3. Pushing on prop stand leg, compress spring – then push a thin rod (or nail) through hole in prop stand leg to hold leg and spring in position whilst fitting securing pin. Use hammer and punch to centre securing pin into position. Check action of prop stand.





WORKSHOP DATA

RALEIGH INDUSTRIES LTD

COLOUR RANGE FOR R.I. BICYLES 1971

No.	Colours
C01	BLACK
C04	FOREST GREEN
C06	RALEIGH GREEN
C07	BRIGHT RED
C09	ROYAL BLUE
C011	CALYPSO COFFEE
C012	SPACE BLUE
C013	WHITE
C015	SILVER
C016	TROPIC BLUE
C020	FLAMBOYANT ELECTRIC BLUE
C021	SATIN BLACK
C023	FLAMBOYANT RICH BURGUNDY
C024	FLAMBOYANT ROYAL CARMINE
C028	TANGERINE
C031	GOLDEN YELLOW
C032	FLAMBOYANT SUNSET YELLOW
C033	BRILLIANT ORANGE
C034	FLAME ORANGE
C036	APPLE GREEN
C037	TAGA MUSTARD
C038	HORIZON BLUE
C040	BURNT GOLD
C067	FLAMBOYANT TURQUOISE BLUE
C068	FLAMBOYANT SKY BLUE
C069	POWDER BLUE
C074	FLAMBOYANT LIME
C075	FLAMBOYANT GREEN
C080	FLAMBOYANT FUCHSIA
C083	BRONZE GREEN
C089	FLAMENCO RED

C0905	SMOKED YELLOW
C0907	SMOKED BRIGHT RED
C0933	SMOKED BRILLIANT ORANGE
C0970	SMOKED LIGHT BLUE
C0975	SMOKED FLAMBOYANT GREEN

INSTRUCTIONS FOR 'TOUCHING-UP'

The Brush must be absolutely clean before use and the enamel thoroughly mixed. Note particularly that these enamels are supplied for 'touching up' scratches and small grazes only. They are not satisfactory for covering large areas and no attempt should be made to use them for this purpose.

POLYCHROMATIC and PLAIN COLOURS

Apply carefully, **spotting** the enamel on lightly; do not attempt to **brush** on. Apply two thin coats, allowing one hour for the first coat to dry in a dust-free atmosphere. After application of the second coat, leave in a dust-free atmosphere for at least two hours.

LUSTRE COLOURS

Firstly, apply one coat of undercoat (in the manner explained above) and leave for one hour. Then apply one coat of the appropriate enamel, spotting it on **lightly.** Leave in a dust-free atmosphere for at least two hours.

Always clean the brush with 'thinners' after use; once the bristles have become hard, they can never be restored to good condition.

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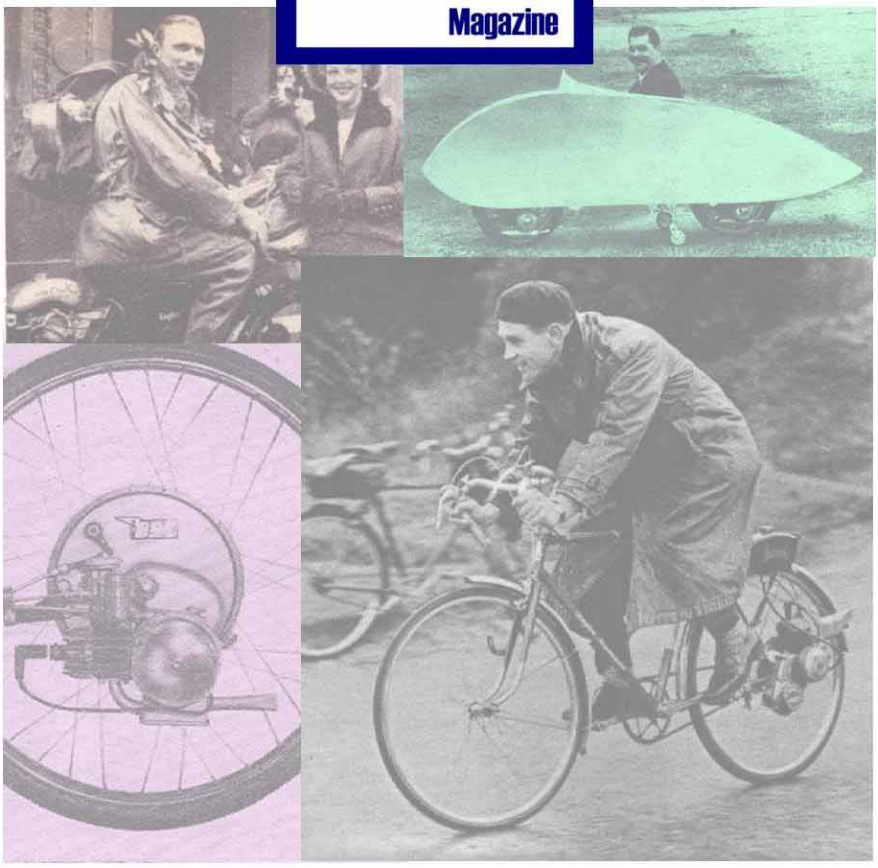

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