STURMEY ARCHER

S5 HUB GEAR

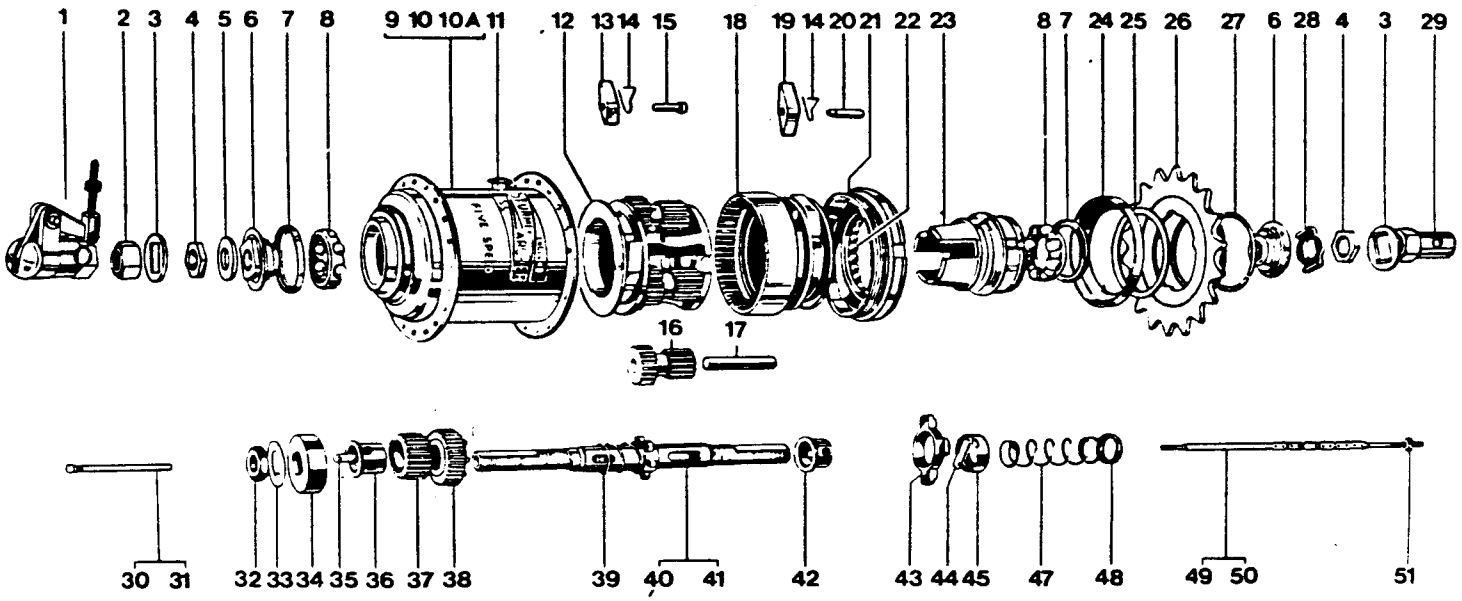

PHOTO No.	SALES No.	DESCRIPTION
1	HSJ 679	Bellcrank
2	HMN 128	Left-hand Axle Nut
3	HMW 145	Axle Washer
4	HMN 132	Locknut
5	HMW 129	Axle Spacing Washer $\frac{1}{8}$" (3.2 mm)
6	HSA 101	Cone
7	HSA 102	Outer Dust Cap
8	HSA 103	Ball Cage
9	HSA 271	Shell–40 hole–and Ball Cup Combined
10	HSA 270	Shell–36 hole–and Ball Cup Combined
10A	HSA 290	Shell-28 hole-and Ball Cup Combined.
11	HSA 106	Lubricator (Plastic)
12	HSA 132	Planet Cage
13	HSA 111	Low Gear Pawl
14	HSA 120	Pawl Spring
15	HSA 133	Pawl Pin – Planet Cage
16	HSA 134	Planet Pinion
17	HSA 135	Pinion Pin
18	HSA 118	Gear Ring
19	HSA 119	Gear Ring Pawl
20	HSA 112	Pawl Pin – Gear Ring
21	HSA 121	Right-hand Ball Ring
22	HSA 122	Inner Dust Cap
23	HSA 123	Driver
24	HSL 701	Sprocket Dust Cap
25	HMW 127	Sprocket Spring Washer
26	HSL714-722	Sprocket-14T-20T & 22T

PHOTO No.	SALES No.	DESCRIPTION
27	HSL 721	Sprocket Circlip
28	HMW 147	Cone Lockwasher
29	HMN 129	Right-hand Axle Nut
30	HSA 287	Gear Push Rod 5$\frac{3}{4}$" Axle (140mm)
31	HSA 288	Gear Push Rod 6$\frac{1}{4}$" Axle (159 mm)
32	HMN 133	Locknut for Dog-Ring
33	HMW 149	Lockwasher for Dog-Ring
34	HSA 138	Dog-Ring
35	HSA 268	Low Gear Axle Key
36	HSA 140	Pinion Sleeve
37	HSA 141	Secondary Sun Pinion
38	HSA 269	Primary Sun Pinion
39	HSA 273	Low Gear Spring
40	HSA 274	Axle – 6" (152 mm)
40A	HSA 144	Axle-5$\frac{3}{4}$" (140mm)
41	HSA 145	Axle – 6$\frac{1}{4}$" (159 mm)
42	HSA 116	Clutch Sleeve
43	HSA 117	Clutch
44	HSA 124	Axle Key
45	HSA 127	Thrust Ring
47	HSA 128	Clutch Spring
48	HSA 129	Spring Cap
49	HSA 125	Gear Indicator 5$\frac{3}{4}$" Axle (140mm)
50	HSA 126	Gear Indicator 6" Axle (152mm) 6$\frac{1}{4}$" Axle (159mm)
51	HMN 134	Connector Locknut

GENERAL NOTES

1. GEAR RATIOS:- The S5 Hub provides five gears –

1. Super Low Gear – decrease of 33$\frac{1}{3}$%
2. Low Gear – – decrease of 21.1%
3. Normal Gear, i.e. Direct Drive.
4. High Gear – – increase of 26.6%
5. Super High Gear – increase of 50%

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.

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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.

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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

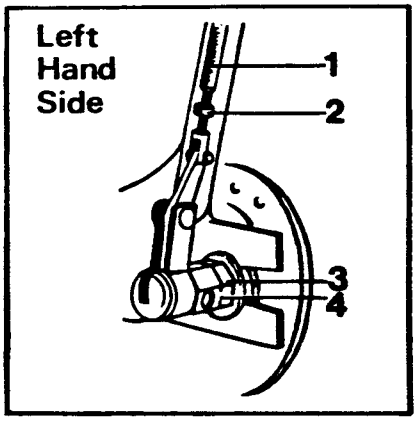
The gear change is quick and easy and should be made smartly. *Continue pedalling, but ease pressure on pedals whilst changing gear.*

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.



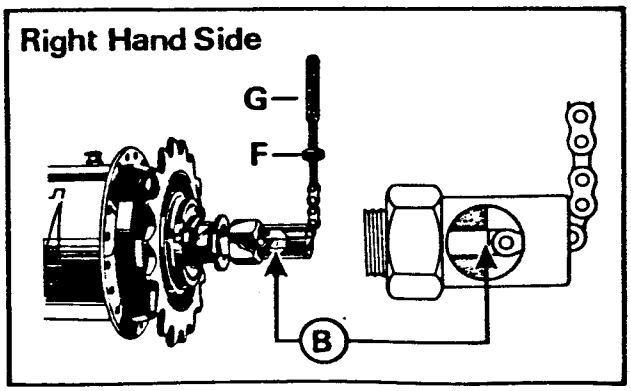
Note–The S5 hub has a visual indication of correct left-hand side adjustment by means of a circular hole in the bellcrank (4) and a red band on the push rod. Adjustment is carried out as described above, but a visual check can also be made that the Drive Mechanism is fully engaged since the red band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



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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

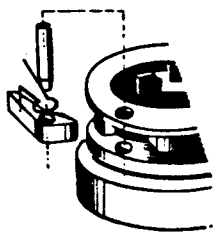

Fig.B

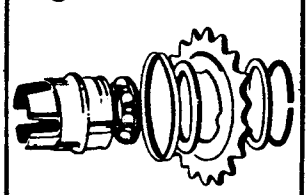

Fig.C

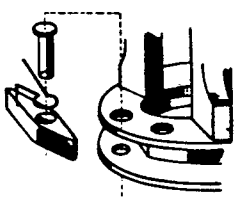

Fig.D