

# S3B 3-speed wide-ratio Hub combined with internal expanding brake

by **STURMEY ARCHER**

SPARE PARTS LIST AND SERVICE INSTRUCTIONS

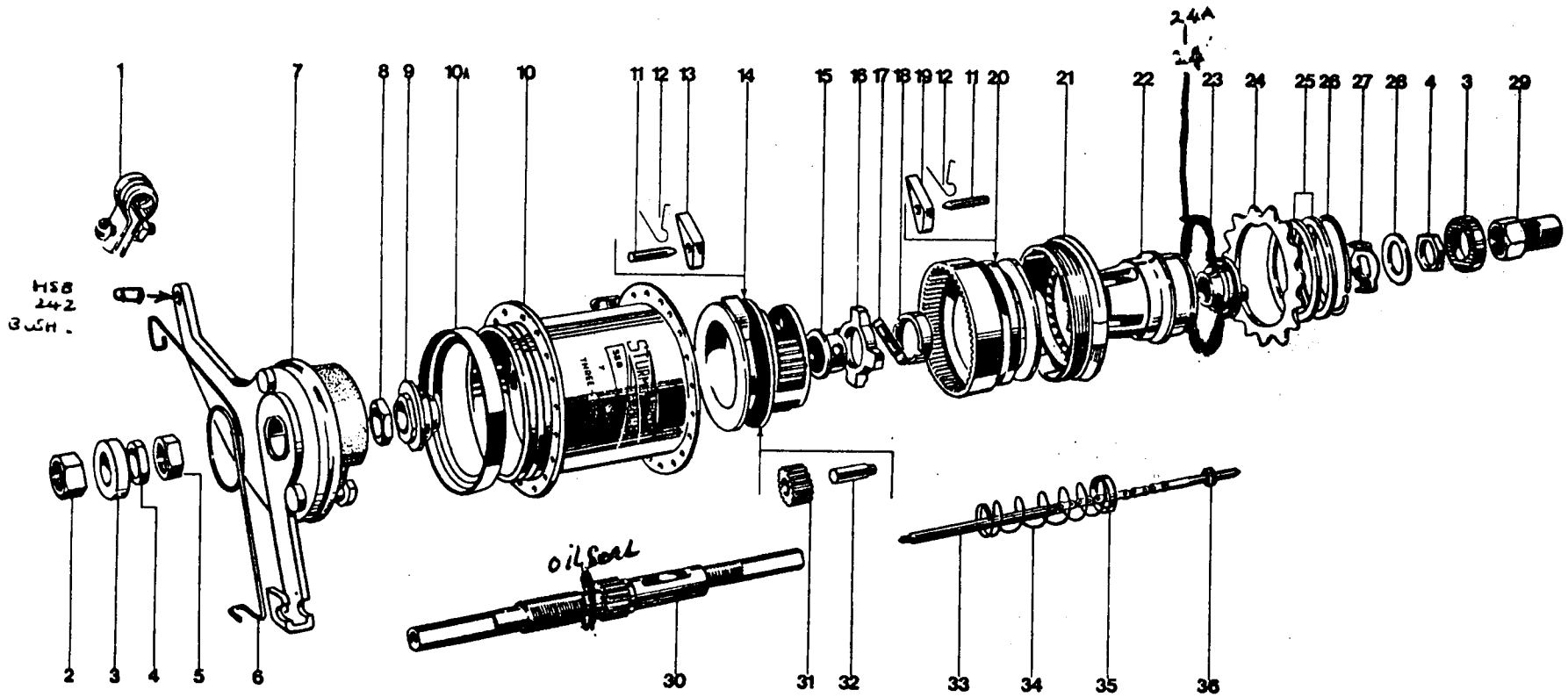


PHOTO No.	SALES No.	DESCRIPTION
1	HSL 710	Brake Arm Clip complete
2	HMN 128	Left-hand Axle Nut
3	RMW 137	Axle Washer
4	HMN 132	Locknut
5	HMN 323	Nut for Brake Arm adjustment
6	HSB 237	Brake Return Spring
7	HSB 239	Rear Brake
8	HMN 314	Left-hand Cone Locknut
9	HSA 276	Left-hand Cone and Dust Cap
10	HSA 277	28H Shell
10A	HSA 282	Water Shield—plastic
11	HSA 112	Pawl Pin
12	HSA 120	Pawl Spring
13	HSA 111	Planet Cage Pawl
14	HSA 153	Planet Cage
15	HSA 116	Clutch Sleeve
16	HSA 117	Sliding Clutch
17	HSA 124	Axle Key
18	HSA 283	Thrust Ring

PHOTO No.	SALES No.	DESCRIPTION
19	HSA 119	Gear Ring Pawl
20	HSA 118	Gear Ring
21	HSA 280	Ball Ring
22	HSA 281	Driver Assembly
23	HSA 101	Right-hand Cone and Dust Cap
24	HSL 713	Sprocket 13T
24A	HSL 704	Sprocket Spacing Washer
25	HMW 127	Sprocket Circlip
26	HSL 721	Cone Lockwasher
27	HMW 147	Spacing Washer $\frac{1}{8}$ " Thick
28	HMW 146	Right-hand Axle Nut
29	HMN 129	Axle $5\frac{1}{2}$ "
30	HSA 262	Planet Pinion
31	HSA 115	Pinion Pin
32	HSA 114	Indicator complete ( $5\frac{1}{2}$ " Axle)
33	HSA 125	Clutch Spring
34	HSA 128	Clutch Spring Cap
35	HSA 129	Indicator Locknut
36	HMN 134	

HMN 128

24A HSL 704 SPROCKET DWTCAP

Axle = seal?

3610997 oil seal for Axle.

## TO DISMANTLE THE S3B HUB

1. Remove left-hand locknut and brake adjuster nut. Lift out brake assembly.
2. Remove cone locknut and cone.
3. Unscrew right-hand ball ring from hub shell, using hammer and punch and withdraw internals as a complete unit. One notch of the right-hand ball ring should be marked and a piece of string or adhesive tape attached to spoke adjacent to the marked notch.  
The reason for this is that the right-hand ball ring has a two-start thread and must be replaced in the same position to avoid having to retrue wheel after re-assembly.
4. Remove the low gear pawls, pins and springs. The pawl pins are easily pushed out of the planet cage to release the pawls and springs.
5. Place the left-hand end of the axle in a vice and remove the right-hand locknut, washers if any, cone lock washer and cone, making a note of their arrangement so that they can be replaced in their original positions.
6. Lift off, in the following order, the clutch spring and its cap, the driver, the right-hand ball ring and the gear ring.
7. Remove the gear ring pawls, pins and springs. The pawl pins are easily pushed out of the gear ring to release the pawls and springs.
8. Remove thrust ring and unscrew the indicator rod.
9. Push out the axle key and remove the sliding clutch and sleeve.
10. Lift off the planet cage complete.
11. Take out the pinion pins and remove the pinions from the planet cage.

## POINTS TO CHECK

1. Slide the clutch up and down the driver prongs and check that the movement is free.
2. See that there are exactly 24 balls (3/16" diameter) in the right-hand ball ring.
3. Examine the gear ring for cracks, chipping, or signs of wear on the internal splines and teeth. Check also gear ring pawls for wear.
4. Check the truth of the axle between centres.
5. Examine all ball races for pitting or signs of wear.
6. Examine the sliding clutch for signs of wear (rounding off at the points of engagement).
7. Examine all pinion teeth for signs of wear or chipping.
8. Examine the pinion pin ends for wear.
9. Examine the brake linings for signs of wear or oil.
10. Check that brake drum is free from oil.

## TO RE-ASSEMBLE THE S3B HUB

1. Prepare the following preliminary sub-assemblies:

a. Fit the ball cage into the driver, with the ring of the ball-retainer facing outwards and the recess in the dust cap also facing outwards. If a new ball-retainer is being fitted, the dust cap also should be new. Replace the

sprocket and spacing washers in the arrangement noted when dismantling, and add the circlip.

- b. Fit the balls (only 24) and the inner dust cap to the right-hand ball ring, making sure that the balls can revolve freely with the dust cap in place.
  - c. Fit the pawls, pins and springs into the gear ring. Place the gear ring, with the teeth downwards, on a flat surface. Place a pawl spring along the side of a pawl so that the loop is over the pin hole and the foot is under the long nose of the pawl. While holding a pawl pin ready in the left-hand, grip the nose of the pawl and the foot of the spring between the thumb and forefinger of the right-hand and slide the pawl, tail first, between the flanges of the gear ring. When the hole in the pawl and the loop in the spring coincide with the holes in the flanges, push the pawl pin into position.
  - d. Smear grease in the channels of the dust caps of the driver and in the recess of the right-hand ball ring. Do not use grease anywhere else.
2. Hold the left-hand end of the axle in a vice, so that the slot for the axle key is above the sun pinion, and fit the planet cage.
  3. Add the planet pinions and pins. (Small ends of the pins protrude).
  4. Fit the sleeve (flange first), the sliding clutch (with the recess over the flange of the sleeve), and the axle key (with the flat of the key facing upwards), and screw in the indicator rod to hold them in that position.
  5. Fit the thrust ring making sure that the flattened ends of the key engage properly in the slots of the thrust ring.
  6. Fit the previously prepared gear-ring sub-assembly.
  7. Fit the previously prepared right-hand ball-ring sub-assembly.
  8. Fit the previously prepared driver sub-assembly.
  9. Drop the clutch spring over the axle.
  10. Screw up the right-hand cone finger-tight. Then slacken it back half a turn and lock it in that position with the special washer and locknut. On no account must the cone be unscrewed more than half a turn, as that would throw the gear mechanism out of adjustment.
  11. Invert the assembly in the vice and fit the planet-cage pawls. Place a pawl between the flanges, with the flat top surface pointing towards the right, and insert a pawl pin through the outside flange and half-way through the pawl. With tweezers grip the bent leg of the pawl spring in the right-hand and pass the spring along the side of the pawl until the loop of the spring is in line with the hole through the pawl and both legs of the spring are between the pawl and the planet cage. The pawl pin can now be pushed right in.
  12. Remove the assembled mechanism from the vice and, while holding it with the planet cage uppermost, pour about two teaspoonsfuls of Sturmey-Archer oil into the cage.
  13. Hold the cycle wheel in the left-hand, with the open (right-hand) end of the hub shell facing downwards, and insert the assembled mechanism from below, screwing up the right-hand ball ring finger-tight only.
  14. Make sure that the ball ring comes into the same position as noted before dismantling and then screw up tightly.
  15. Fit the left-hand cone and locking-nut.
  16. Replace the brake plate complete with shoes.
  17. Fit the brake adjusting nut and the locknut.
  18. Replace the wheel in the cycle frame and adjust the gear.

## MAINTENANCE & GENERAL NOTES.

1. The hub provides three gears. The direct drive is in normal gear, top gear provides a rise of 33.3% and low gear a drop of 25% from normal.
2. Sprockets.—A range of sprockets from 13T to 20T., also 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 fork 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.*

## LUBRICATION

OIL Hub sparingly through the lubricator on hub shell. A few drops every fortnight.—Keep oil from brake arm and linings.

USE ONLY STURMEY-ARCHER OIL—DO NOT use thick oil or grease.

## AUTO TWIST GRIP—SERVICE NOTES

IMPORTANT.—This unit is factory assembled for fitting directly on to the bicycle handlebars.

The Grip must NOT be twisted until fitted to the bicycle and the gear cable connected to the gear indicator rod at the hub as described below.

## TO FIT TWIST GRIP CONTROL TO BICYCLE

1. Slide control on to handlebar as far as possible, adjust grip to required position. Now tighten fixing screws.
2. Fit Fulcrum Clip to cycle frame top tube (or chain stay as required).
3. Pass cable inner wire through Fulcrum Clip and fit wire into clip slot.
4. Push Outer Cable up to Fulcrum Slot.
5. If pulley used, fit inner wire under arm and on to pulley wheel.

## TO SET GEARS

Turn Grip to No. 3 (High Gear) position:

1. Connect control cable to gear indicator chain at hub.
2. Slide Fulcrum Clip to take up any slackness in Cable. Now tighten Clip Screw.
3. Twist the grip until bottom gear (No. 1) is indicated, i.e., the blue coloured section can be seen through top casing aperture. Continue to turn grip until no further movement can be obtained.—

All three gears are now automatically in adjustment.

4. Remember to screw gear indicator locknut up to cable adjuster and lock tightly.

NOTE.—If for any reason the twist grip is turned too far, i.e., no colour can be seen through the aperture of the locating spring — all the cable adjustment will have been taken up. The twist grip must be dismantled and the gear indicator spring refitted: See Assembly Notes.

## FIT NEW CABLE

### RESET GEAR LOCATING SPRING

### ASSEMBLY OF TWIST GRIP MECHANISM

1. First fit detent spring (7) and the 3/16" dia. ball (6) into recess in operating sleeve (5) — (use grease to hold spring and ball into position).
2. Fit cable nipple into slotted recess of operating sleeve.

3. Fit cable inner wire into slot of gear locating spring (3) and position this spring over operating sleeve. Check that 3/16" dia. ball is positioned in elongated hole of gear locating spring.
4. Keeping thumb of right hand over ball and spring, feed inner wire into cable slot of bottom half of casing (2). Now press locating spring into casing — until spring clicks **right down** into its groove.
5. Fit top of casing (4) over operating sleeve, and holding two halves of casing together, fit clamping screws (8).
6. Refit Twist Grip on to Handlebar, and take up any slackness in Control Cable. Set gears as described.

## HUB CONE ADJUSTMENT

The right-hand cone is fixed during factory assembly and should not be touched.

Adjust hub bearings from the left side, Remove brake locknut and brake adjusting nut. Lift off brake arm complete with shoes and linings (handle carefully); do not allow grease to contact brake linings. Using special spanner (HTR 127) hold cone whilst loosening cone locknut. Rotate cone as required — afterwards remember to tighten cone locknut.

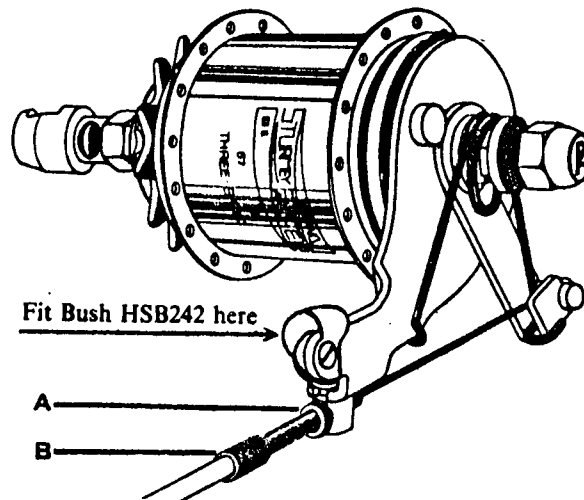
A correctly set wheel should run freely with a trace of side play at the rim. NOTE.—If, for any reason, the rear wheel is removed from the bicycle, remember to fit a bush in the brake arm clip bolt hole and then tighten the brake arm clip when wheel is re-fitted.

## BRAKE ADJUSTMENT

NOTE.—During the first few miles of running, brake linings will "bed down" and the brake will need re-adjustment.

Slacken off locknut (A) and tighten Adjuster (B) so that the brake linings are just in contact with the drum, then slacken adjuster until the wheel spins freely. Tighten locknut.

N.B. Cable Pinch Bolt must be tight.



# GEAR AND BRAKE CORRECTION GUIDE

Note—The major cause of trouble is faulty gear adjustment. Check to see that the outer shoulder of the indicator is level with the end of 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 should be oiled and re-tested before going further. If the fault persists, the following chart should locate the trouble.

<i>Symptom</i>	<i>Fault</i>	<i>Remedy</i>
No low gear (1st).	<ol style="list-style-type: none"> <li>1. Low gear pawls upside down or pointing in wrong direction.</li> <li>2. Sliding clutch thrust collar not seating over axle key.</li> <li>3. Incorrect axle spring.</li> </ol>	<ol style="list-style-type: none"> <li>1. Re-assemble pawls correctly.</li> <li>2. Fit thrust collar correctly.</li> <li>3. Fit correct axle spring.</li> </ol>
Slipping in low gear (1st).	<ol style="list-style-type: none"> <li>1. Sliding clutch 'noosed' off, due to bad adjustment.</li> <li>2. Indicator not screwed home fully.</li> <li>3. Right-hand cone wrongly adjusted.</li> <li>4. Bad cable ends or kinks in wire.</li> <li>5. Twisted gear indicator chain through over-tightening.</li> </ol>	<ol style="list-style-type: none"> <li>1. Fit new sliding clutch and adjust correctly.</li> <li>2. Screw indicator home.</li> <li>3. Re-adjust right-hand cone.</li> <li>4. Fit new control cable.</li> <li>5. Replace or reft as required.</li> </ol>
Fluctuating between low gear (1st) normal gear (2nd).	<ol style="list-style-type: none"> <li>1. Faulty or worn gear ring pawls.</li> </ol>	<ol style="list-style-type: none"> <li>1. Change both gear ring pawls.</li> </ol>
Slipping in normal gear (2nd).	<ol style="list-style-type: none"> <li>1. Gear ring dogs and/or sliding clutch 'noosed' off due to bad adjustment.</li> <li>2. Indicator not screwed home fully.</li> </ol>	<ol style="list-style-type: none"> <li>1. Fit new gear ring and/or sliding clutch.</li> <li>2. Screw indicator home.</li> </ol>
Slipping in top gear (3rd).	<ol style="list-style-type: none"> <li>1. Pinion pins or sliding clutch badly worn due to bad adjustment.</li> <li>2. Very weak or distorted axle spring.</li> <li>3. Incorrect right-hand cone adjustment.</li> <li>4. Grit between clutch sleeve and axle.</li> </ol>	<ol style="list-style-type: none"> <li>1. Fit necessary new parts, and check adjustment.</li> <li>2. Fit new spring.</li> <li>3. Re-adjust.</li> <li>4. Clean away grit.</li> </ol>
Hub runs stiffly. Drag on pedals when free-wheeling.	<ol style="list-style-type: none"> <li>1. Too many balls in ball ring.</li> <li>2. Cones excessively tight.</li> <li>3. Chainstay ends not parallel.</li> <li>4. Corrosion due to inferior oil or lack of lubrication.</li> <li>5. Distorted dust caps.</li> </ol>	<ol style="list-style-type: none"> <li>1. 24 balls only should be fitted.</li> <li>2. Re-adjust cones.</li> <li>3. Correct chainstay ends. It is essential that the ends are parallel, otherwise the axle will be strained when the nuts are tightened and the internals may be seriously affected.</li> <li>4. Clean hub thoroughly and use only Starkey-Archer oil.</li> <li>5. Check dust caps and replace those showing distortion, or signs of binding.</li> </ol>
Sluggish gear change.	<ol style="list-style-type: none"> <li>1. Distorted axle spring.</li> <li>2. Bent axle.</li> <li>3. Worn gear indicator chain link.</li> <li>4. Lack of lubrication of control cable, or frayed control wire.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace spring.</li> <li>2. Replace axle.</li> <li>3. Replace indicator and chain.</li> <li>4. Lubricate control wire or replace.</li> </ol>
Poor Braking.	<ol style="list-style-type: none"> <li>1. Oil on brake linings.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace brake assembly.</li> </ol>
Brake feels spongy.	<ol style="list-style-type: none"> <li>1. Incorrect brake adjustment.</li> <li>2. Loose cable pinch-bolt.</li> </ol>	<ol style="list-style-type: none"> <li>1. Re-adjust Brake—see notes.</li> <li>2. Fully tighten pinch-bolt (use spanner).</li> </ol>
Stiff hand brake lever action.	<ol style="list-style-type: none"> <li>1. Cable inner wire not free.</li> </ol>	<ol style="list-style-type: none"> <li>1. Lubricate full length of inner wire.</li> </ol>
Brake is stiff or sticks in the "on" position.	<ol style="list-style-type: none"> <li>1. Incorrect brake arm adjustment.</li> </ol>	<ol style="list-style-type: none"> <li>1. Ensure that the brake-arm has free-movement — check brake arm adjustment — ensure that brake arm adjusting nut is loosened at least half a turn — then tighten locknut. Also fit metal bush (MSB 242) through clip bolt hole in brake arm. Tighten clip bolt securely.</li> </ol>