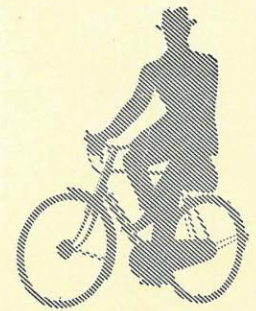
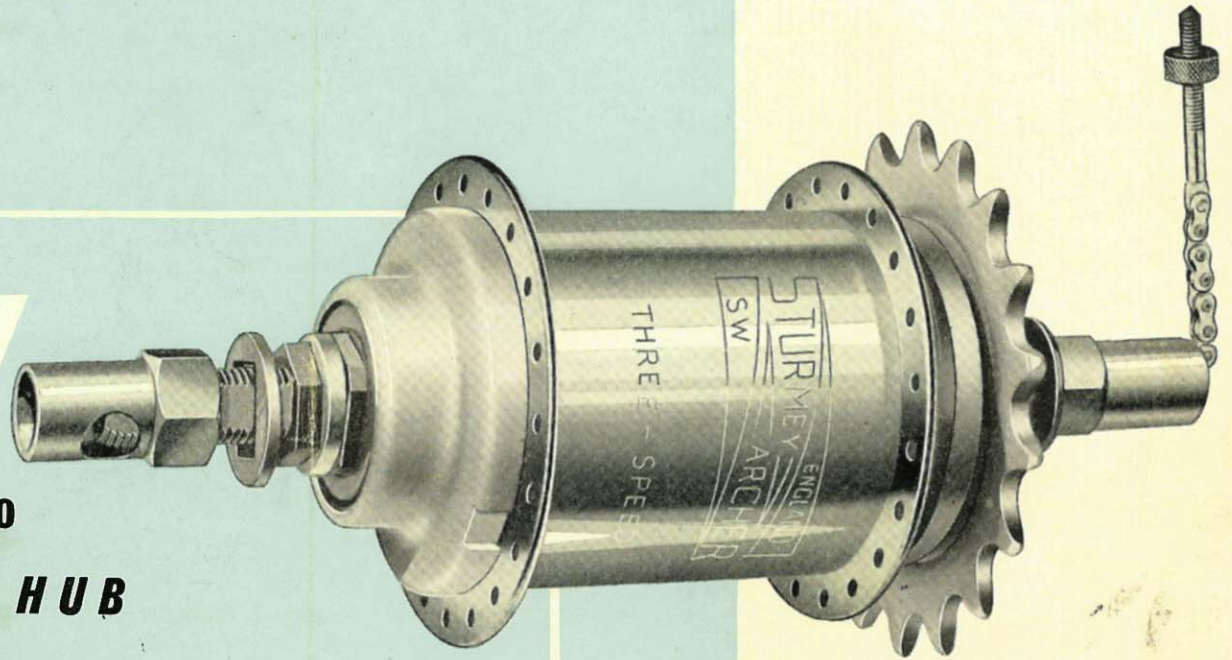


SW

WIDE-RATIO
3-SPEED HUB

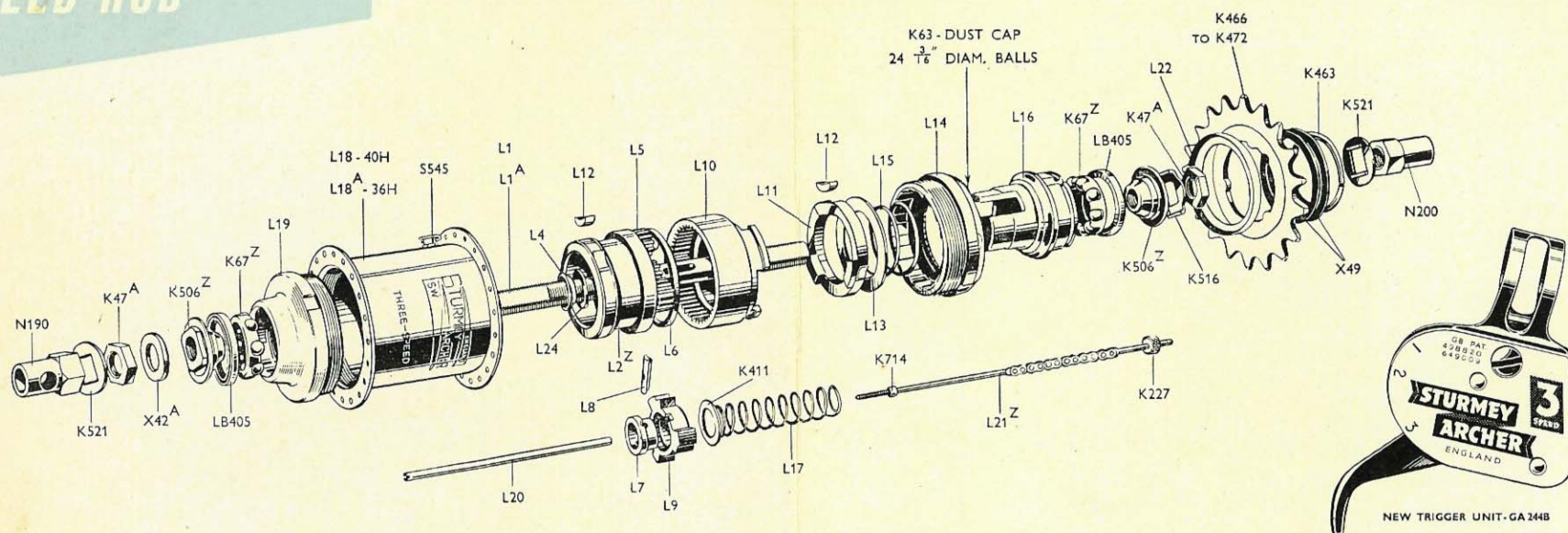
by **STURMEY**
ARCHER



FOR DETAILS OF PARTS SEE OVER

SW Wide-Ratio 3-Speed Hub
Revolutionary! Fewer working parts than
any other wide-ratio 3-Speed Hub. Increase
of 38.4% and a decrease of 27.7% from Normal

SW Wide-Ratio 3-SPEED HUB



CODE No.

DESCRIPTION

L1	Axle, 6" long
L1A	Axle, 6½" long
L2Z	Planet Cage
L4	Planet Cage Fixing Plate
L24	Planet Cage Bearing Plate
L5	Planet Pinion
L6	Pinion Retaining Ring
L7	Clutch Sleeve
L8	Axle Key
L9	Sliding Clutch
K411	Thrust Washer
L10	Gear Ring
L11	Gear Ring Pawl Ring
L12	Pawl
L13	Pawl Retaining Washer
L14	R.H. Ball Ring
329	Ball Bearings, ⅜" diam. (per set of 24)
K63	Inner Dust Cap
L15	Thrust Spring
L16	Driver
K67Z	Ball Cage with 8 (¼" diam. balls)
LB405	Outer Dust Cap
L17	Clutch Spring
K506Z	Axle Cone with Dust Cap
K516	R.H. Cone Locking Washer
L18	Shell, 40 holes

CODE No.

DESCRIPTION

L18A	Shell, 36 holes
S545	Lubricator
L19	L.H. Ball Cup
L20	Indicator—suits both axle lengths
L21Z	Coupling complete
K714	Collar for Coupling
K227	Connection Locknut
X42A	Axle Spacing Washer
K47A	Cone Locknut
K521	Axle Locking Washer
N190	L.H. Axle Nut
N200	R.H. Axle Nut
L22	Sprocket Dust Cap
K466	Sprocket, 16 teeth
K467	Sprocket, 17 teeth
K468	Sprocket, 18 teeth
K469	Sprocket, 19 teeth
K470	Sprocket, 20 teeth
K472	Sprocket, 22 teeth
K468A	Sprocket, 18 teeth for ⅜" wide chain
K469A	Sprocket, 19 teeth for ⅜" wide chain
X49	Sprocket Spacing Washer
K463	Circlip
K48	Lip Washer. <i>Not illustrated.</i> Alternative to K521
X42	Axle Spacing Washer ⅜" thick. <i>Not illustrated</i>

SERVICE NOTES FOR SW HUBS

To dismantle the SW Wide-ratio 3-speed Hub

1. Remove outer axle nuts and washers. A note should be made of the lock-nut and washer arrangement at each end of axle so that they can be replaced in same way. Next remove sprocket circlip, washers, sprocket and dustcap. Note carefully the order of fitting and whether sprocket offset faces in or out, as this governs the chainline.
2. The notches of the L.H. ball cup and R.H. ball ring should be examined for the letters SA and a piece of string or adhesive tape attached to spoke adjacent to marked notches. The reason for this is that both of these parts have a two-start thread and must be replaced in the same position to avoid having to retrue wheel after re-assembly.
3. Hold indicator with small screwdriver, unscrew toggle-chain assembly and remove these parts from axle.
4. Remove L.H. lock nut with any packing washers and unscrew L.H. cone.
5. Loosen R.H. ball ring by using "**C**" **Spanner DD.12418** or hammer and square-ended punch in one of the notches. This has R.H. thread. HOLD VERTICALLY and remove complete gear unit from shell. The three low gear pawls are loose in the planet cage and they should be removed before tilting the internal, to avoid loss.
6. Insert L.H. end of axle in vice and remove R.H. lock nut and any washers. Lift off cone lock washer and unscrew cone.
7. Lift off in order the clutch spring, driver, R.H. ball ring, thrust spring, pawl retaining washer, pawl ring with three pawls, gear ring, axle thrust washer and sliding clutch.
8. Push the axle key out and remove clutch sleeve. The pinion retaining-ring and pinions follow, leaving planet cage attached to axle.
9. If necessary because of worn bearing surface or worn ratchets the L.H. ball cup may be removed from shell in same way as R.H. ball ring, but this has LEFT-HAND thread.

The following sub-assemblies remain but these need not be dismantled unless damage is apparent or suspected.

- (a) Dust caps on Cones. These are pressed on and need not be replaced unless damaged. They face inwards and their back should be level with square on cone.
- (b) Driver and L.H. Ball Cup Dust Caps. These can be prised out with a screwdriver to examine ball tracks and ball cages. If distorted in removal fit new ones.
- (c) R.H. Ball Ring Dust Cap. This can be prised off with a screwdriver to

examine balls and ball track. When replacing there must be only 24 balls fitted (3/16" dia.).

- (d) Planet Cage Pawl Cup. There should be no need to remove this part.
- (e) Planet Cage and Axle. The planet cage together with hardened bearing plate is secured by a special fixing plate fitting in shallow groove in axle. To remove, fit gear ring on planet cage and stand assembly, gear ring down, on partly opened vice. Fix axle nut half-way to protect axle thread. A sharp blow on nut will release washer. A NEW WASHER MUST BE USED WHEN RE-ASSEMBLING, care being taken to remove any metal from axle groove.

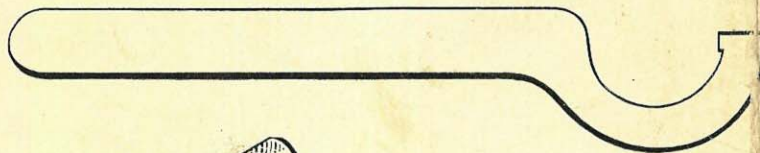
Points to check

1. Freedom of sliding clutch in driver. This should slide up and down easily.
2. Axle between centres for truth.
3. All gear teeth for wear or chipping.
4. All races for wear or pitting (6 in all).
5. Pinion pins, sliding clutch and gear ring splines for rounding off on engagement points, also pawl ring dogs and gear ring dogs.
6. Pawls and Pawl Ratchets for wear. All six pawls are identical and may be reversed if wear is apparent on one end.

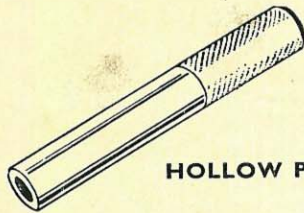
Assembly of the SW Wide-ratio 3-speed Hub

Prepare the following sub-assemblies in advance.

- (a) Fit ball cages to driver and L.H. ball cup with ring of ball retainer facing outwards and press in dust caps with recesses also facing outwards. Fill recess with light grease.
- (b) Fit 24 balls (3/16" dia.) to ball ring and press on dust cap. Balls must be free to rotate without falling out.
- (c) Screw L.H. ball cap into hub shell, on side away from lubricator. This has two-start L.H. thread and notch marked SA must line up with spoke marked before dismantling, otherwise wheel will not run true. If new ball cup is fitted the marking can be ignored as wheel should be retrue.
- (d) Place axle in vice with slotted end downwards. Fit planet cage with pins downwards and fit bearing plate followed by conical fixing plate over axle also pointing downwards. With **hollow punch (DD.12403)** placed over axle, a sharp blow or two with hammer will flatten this plate into axle groove and locate planet cage. Check that planet cage is free to revolve. A cone screwed along R.H. end of axle to the end of the axle flats will protect the threads during this operation.



"C" SPANNER
DD12418



HOLLOW PUNCH DD12403

MAIN ASSEMBLY

1. Fit axle in vice L.H. end down. Fit planet pinions and retaining ring followed by clutch sleeve (flange down), axle key (flats upwards), sliding clutch (recess down—the sliding clutch engages axle key flats) and thrust washer.
2. Fit gear ring and test for freedom of rotation, following with pawl ring (projections downwards), pockets of which should be smeared with light grease before fitting pawls and pawl washer.
3. Fit R.H. ball ring; then fit large thrust spring over driver prongs and make sure that the end of the spring comes to the centre of one of the prongs. Hold the spring on the driver and fit both together holding driver down to keep the spring compressed until operation No. 4 is completed.
4. Drop clutch spring over axle. Then screw on the right-hand cone fast enough to hold the assembly together.
5. **IMPORTANT.** Screw right-hand cone down FINGER-TIGHT (do not use spanner), then slacken back NOT MORE THAN HALF A TURN. Fit cone lock washer, packing washers (if any) and securely fasten lock nut. The gear unit should spin freely on axle and there should be a trace of up and down play on ball ring. The gear unit should be thoroughly oiled using Raleigh Industries "All-Purpose" oil.
6. The planet cage pawl pockets should be smeared with light grease and the three pawls fitted.
7. The gear unit is now inserted vertically upwards into shell and R.H. ball ring screwed in (this has two-start R.H. thread). Note that S.A. mark should line up with marked spoke. Tighten both ends with "C" spanner (DD12418) or square ended punch and hammer, remembering that threads are same hand as end of hub.
8. Lastly, fit L.H. cone, washers (if any) and lock nut. When this cone is correctly adjusted there should be just a trace of side-play at wheel rim. Fit sprocket dust cap, first applying light grease to inside. Fit sprocket two spacing washers and circlip in same order as they were removed.
9. Insert indicator rod in L.H. end of axle and screw toggle assembly FIRMLY into it from R.H. end of axle.

General Maintenance

Lubrication

Gear Changing Exactly as for all other S.A. Hubs.

Bearing Adjustment

Indicator Adjustment: As for AM, AC and ASC Hubs.

Spoke Lengths: There is a slight increase in length (approximately 1/32") from AW due to reduced spoke flange diameter.

Fitting to Cycle: Hub width over Cones, chain line sprockets, etc., similar to AW.

Gear Ratios: Low—27.77% decrease.

Normal—direct drive.

High—38.4% increase.

Possible faults and their remedy.

NOTE.—The major cause of faulty operation is faulty adjustment. Before seeking further, the adjustment should be checked to see that indicator is level with end of axle when gear control is in middle (normal) gear, making sure the indicator rod and toggle are properly screwed together and also the small collar is screwed up to end of coupling thread. If the complaint is sluggish gear change or stiffness, this may point to lack of lubrication. 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
Slipping in low gear.	Planet Cage Pawls and/or L.H. Ball Cup teeth worn	Replace.
Clicking in low gear.	Faulty Indicator adjustment	Re-adjust.
Slipping in normal gear only.	Gear Ring Splines and /or Clutch Dogs rounded off	Replace.
Slipping in high gear only.	Planet Cage Pins and/or Clutch Dogs rounded off	Replace.
Slipping in both normal and high gears.	Gear Ring Pawls and R.H. Ball Ring teeth worn. Pawl Ring and Gear Ring Dogs worn	Replace
Hub runs stiffly ..	L.H. Cone too tight	Adjust.
	R.H. Cone not correctly set. (See Assembly Notes.)	Adjust.
	Chainstays not parallel	Correct.
	Cycle Chain too tight	Adjust.
	Dust Caps rubbing	Replace.
	Corrosion through wrong oil or lack of oil	Clean and re-oil with Raleigh Industries "All-Purpose" oil.
Sluggish Gear Change.	Bent Axle	Replace.
	Worn Toggle Chain	Replace.
	Guide Pulley out of line	Set correctly.
	Frayed or corroded Control Wire	Replace or oil with Raleigh Industries "All-Purpose" oil.

IceniCAM Information Service

