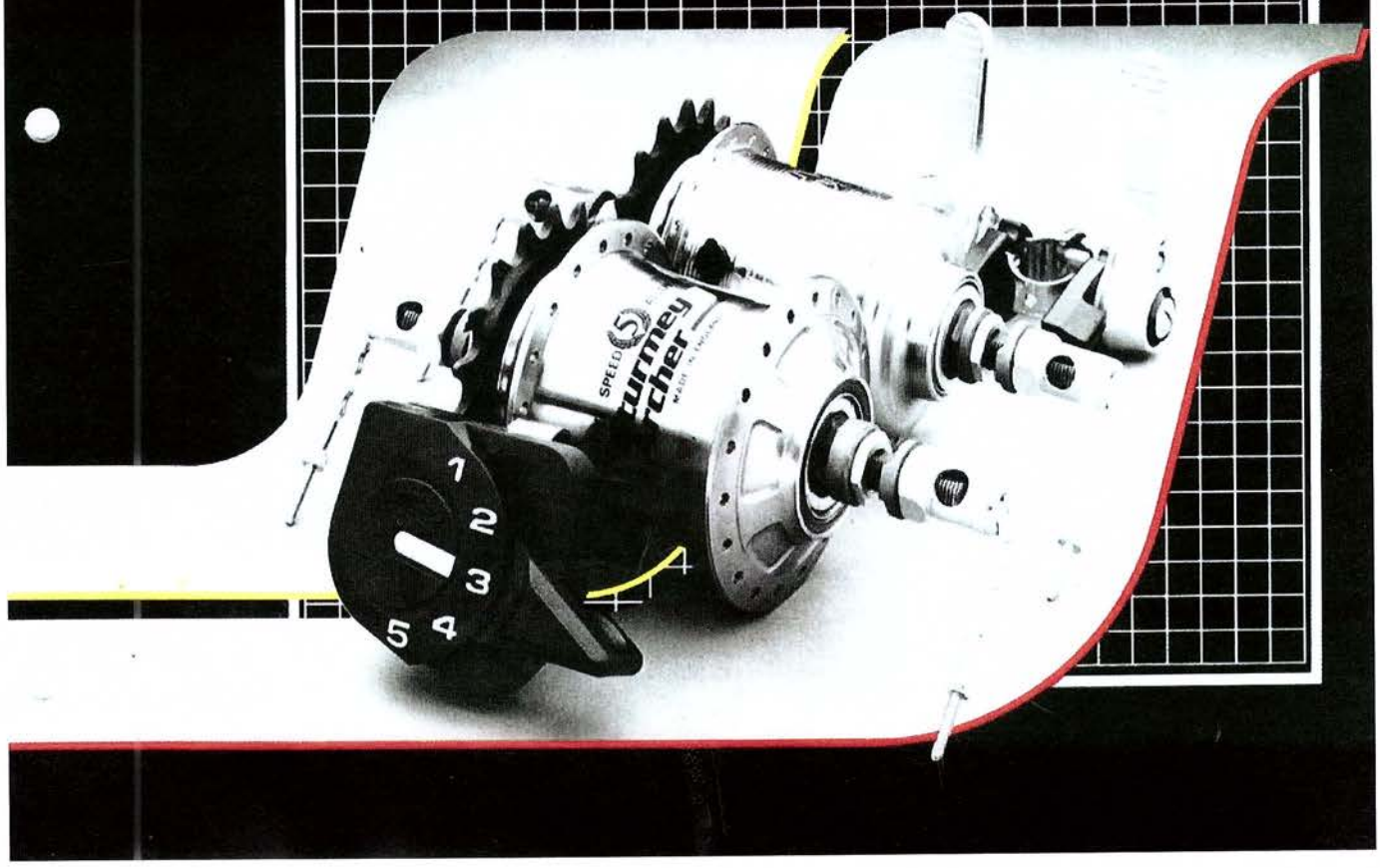
Sturmey Archer

Technical Information and Parts List

Five Speed Hubs and Controls



Sturmey Archer Technical Information - Five Speed Hub

Part 1 GENERAL INFORMATION

The Five Speed Hub is a precision made unit which will give reliable trouble free service for many years provided that the recommended procedures for gear change, gear adjustment and lubrication are carried out at regular intervals. When service problems do occur they usually lie outside the hub and can be corrected by attention to routine maintenance.

1.1 Lubrication

A new hub must be oiled before use through the oiler on the hub shell. Thereafter lubricate once every three months (or as necessary) with a few drops of Sturmey-Archer oil (SAE 30). Do not use thick oil or grease.

1.2 Gear Changing

Continue pedalling, but ease pressure on the pedals when changing. Should it be necessary to change gear whilst stationary, the pedals must be rotated backwards slightly to allow the internal parts to align themselves correctly.

Single Lever Control

To change gear, move the coloured central indicator, so it points to the gear number desired, by moving the lever in the same direction. Each movement of the lever moves the indicator by one gear only, and the lever will return to its central position.

Dual Lever Control

To change gear, follow instructions on the handlebar gear label provided.

1.3 Gear Ratios

The Hub has five gears:

1st gear – Decrease of 33.3%
2nd gear – Decrease of 21.1%
3rd gear – Direct Drive
4th gear – Increase of 26.6%
5th gear – Increase of 50%

1.4 Sprockets

The overall drive ratio can be altered by changing the size of the sprocket. A range of sprockets from 14 to 22 teeth is available suitable for ½" × ⅛" chain.

Part 2 ROUTINE MAINTENANCE

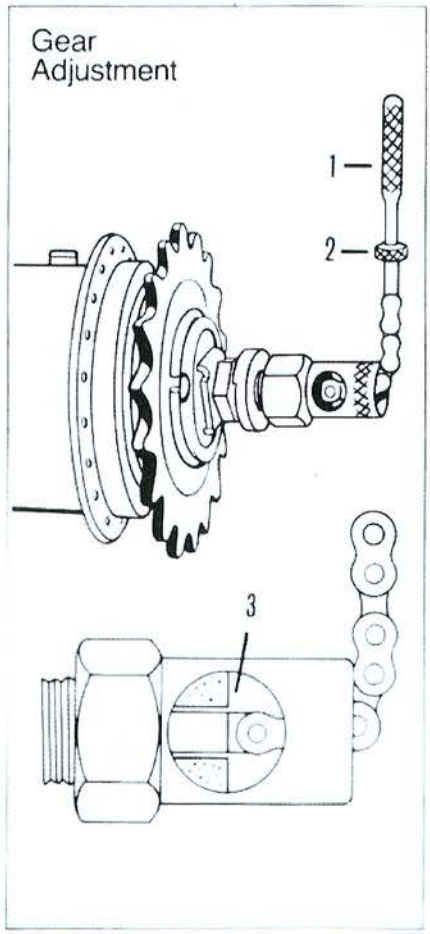
When service problems arise they usually occur outside the hub, and the following checks must be made before removing the wheel from the bicycle.

2.1 Gear Adjustment

1. Set the fulcrum clips at least 125mm from the hub and ensure the indicator rods are firmly screwed into the axle ends.
2. Select fifth gear and loosely connect the cable adjusters (1) to the indicator couplings. Tighten the fulcrum clips.
3. Select third gear. Looking through the 'window' in each axle nut, turn the cable adjusters until the ends of the indicator are exactly level with the ends of the axle (3).
4. Tighten the locknuts (2) against the adjusters.
5. If the gear cannot be correctly adjusted, the fulcrum clips must be moved in the appropriate direction before re-adjustment.

2.2 Hub Bearing Adjustment

If for any reason the bearing adjustment is altered, the cones must be reset correctly before using the hub. The right hand cone is pre-set at the factory and should only be disturbed at major service intervals. The left hand cone is used to adjust the bearings in the hub.



Right Hand Cone:

1. Loosen the left hand cone locknut and cone.
2. Screw down the right hand cone finger tight.
3. Unscrew the right hand cone by half a turn.
4. Fit the cone lockwasher. If the washer will not engage with the cone, unscrew the cone slightly.

NB Under no circumstances must the right hand cone be unscrewed more than ⅛ of a turn.

5. Fit the cone locknut to secure the lockwasher and cone in position.

Left Hand Cone:

1. Loosen the cone locknut.
2. Adjust the left hand cone until very slight side play can be felt at the wheel rim, and none at the hub.
3. Tighten the cone locknut.

Part 3 CONTROL FITMENT

3.1 Control Fitment

1. Single Lever Control

Attach to the right-hand side of the handlebar. If a different control position is required to suit individual needs, it can be altered by loosening both clip nuts and moving the serrated locator under the control. Select fifth gear. Pass the right and left-hand cables (marked R and L on the control) to their respective sides of the handlebar stem. (**NB** R is chain side). By means of cable clips or bands, attach both cables to the top and bottom of the down tube. Leave enough cable (400mm minimum) to enable the handlebars to turn freely. Pass the cables over the bottom bracket and fix to the chainstays. Adjust the gears as in Section 2.1.

2. Dual Lever Control

Attach to the handlebar stem with the cable housings pointing forwards. Attach the cables to the frame as described in 3.1.

3.2 Cable Replacement

1. Single Lever Control

For both controls, first select fifth gear. Disconnect the cables from the hub and then remove from the frame.

Slide the outer casing outwards until the inner wires are visible. Pull each inner wire firmly towards the nipple slot on the underside of the control. Remove both cables through the base of the control taking care not to disturb the white cable nipple retainers. To fit new cables, reverse this procedure. If the cable housings cannot be seen, tap the cable end of the control until they are visible. Ensure the cable nipple retainers are in line and press each nipple securely home before pulling the inner wire through the slots.

Note that the single lever control should not be opened under any circumstances, and in the event of damage through accident or abuse the whole control should be replaced.

2. Dual Lever Control

Slide the outer casing out of the cable housings. Pull the inner wire sideways out of the housings then upwards until vertical. Remove the nipple. To load new cables, reverse this procedure. Attach the cables to the frame and readjust the gears.

Part 4 ASSEMBLY/DISASSEMBLY INSTRUCTIONS

When service problems occur which cannot be corrected by attention to external maintenance, a close inspection of the working parts inside the hub will be necessary. Refer to the Fault Diagnosis chart before commencing disassembly.

4.1 Disassembly

Fig. 1

1. Remove the indicator rods, axle nuts and spacing washers from both ends of the axle.
2. Use a screwdriver to release the sprocket circlip from the driver, then remove the spacing washers, sprocket and outer dustcap (note the order of these parts).
3. Unscrew the left hand cone locknut and cone. Note the position of spacing washers (if any) between cone and locknut.

Fig. 2

Loosen the right hand ball ring with a C-spanner or hammer and punch and unscrew the ball ring to release the internal assembly from the hub shell.

Sturmey Archer Technical Information - Five Speed Hub

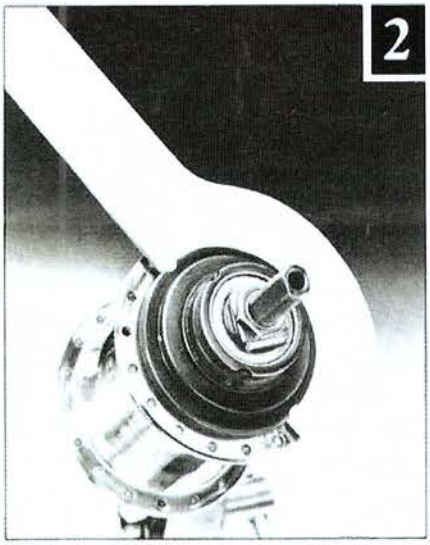


Fig. 3
Clamp the left hand end of the axle in a vice, and remove the right hand cone locknut, lockwasher, cone, spring cap and clutch spring.

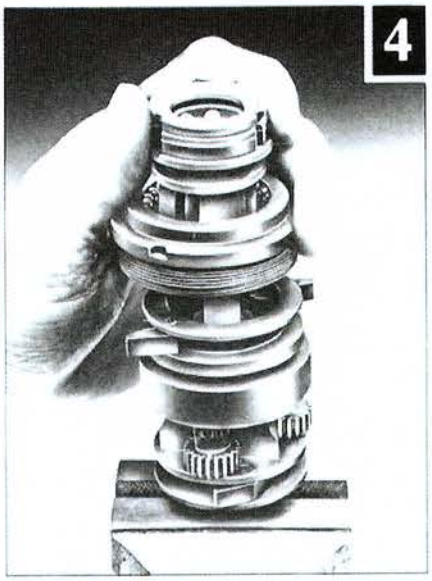


Fig. 4
1. Lift off the driver, ball ring and gear ring.
2. Remove the gear ring pawls, pawl pins and springs.

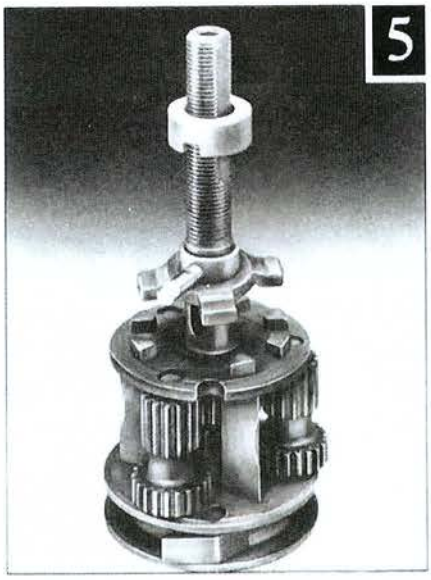
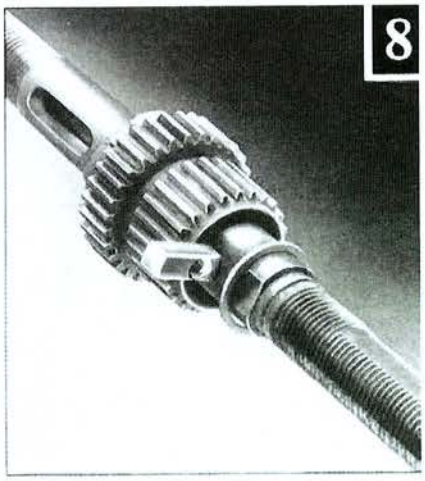


Fig. 5
Lift off the thrust ring, axle key, clutch and clutch sleeve.

Fig. 6
1. Take the axle from the vice and remove the planet pinion pins and planet pinions.
2. Remove the planet cage from the axle.

Fig. 7
1. Using circlip pliers, remove and discard the circlip.
2. Lift off the dog ring and sun pinion return spring.

Fig. 8
1. Pull the sun pinions back into mesh with the axle dogs, and tap the axle to release the return spring washer and low gear axle key from the secondary sun pinion.
2. Remove the two sun pinions and low gear spring from the axle.



Sturmey Archer Technical Information - Five Speed Hub

4.2 Inspection of the Internal Parts

Thoroughly clean all the internal parts, and replace any which are damaged or worn.

In particular, check the following:

1. The clutch must slide easily in the driver. It's corners must not be rounded, and the splines in the driver should be free from damage.
2. Check the axle for straightness and the axle threads for damage. Examine the axle dogs for signs of roundness or chipping.
3. Check all gear teeth for signs of wear or chipping, and inspect the primary sun pinion dogs for roundness.
4. Check all bearing surfaces for wear and pitting.
5. Check the edges of the planet cage dogs and gear ring splines for chipping and roundness.
6. Check pawls, pawl pins and ratchets for wear. Always replace pawl springs on re-assembly.
7. Check the condition of the indicator threads, chains and axle keys.

4.3 Assembly

Fig. 8

1. Take the axle by its right hand end (circlip groove uppermost) and fit the low gear spring, primary and secondary sun pinions.
2. Compress the spring to engage the axle dogs with the primary sun pinion and locate the low gear axle key in the axle slot.
3. Fit the pinion return washer.

Fig. 7

1. Fit the sun pinion return spring and locate the dog ring on the axle flats.
2. Take a new circlip, and locate it in the circlip groove.

NB Ensure that the circlip is fitted in the groove adjacent to the dog ring flats, and not in the undercut behind the axle threads.

Fig. 6

1. Take the planet cage and fit new pawl springs as indicated in Diagram A.
2. Locate the planet cage on the axle and fit the planet pinions with their timing marks pointing radially outwards.

IMPORTANT See Diagram B for pinion timing. Each pinion has a timing mark stamped on one of its bigger diameter pinion teeth.

Fig. 5

Clamp the left hand axle end in the vice and fit the clutch sleeve, clutch, axle key (with flats uppermost) and thrust ring. Ensure the the axle key flats engage in the thrust ring grooves.

Fig. 4

1. Take the gear ring and fit the pawls, pawl pins and springs as indicated in Diagram C.
2. Locate the gear ring over the planet cage.
3. Fit the right hand ball ring complete with inner dust cap and 24 ball bearings only - 4.8mm (3/16")ø.
4. Fit the driver complete with ball cage and outer dust cap. Ensure that the driver splines engage with the clutch.

NB Lubricate the bearings with high quality lithium based grease.

Fig. 3

1. Slide the clutch spring and clutch spring cap (with its flat face uppermost) over the axle.
2. Screw down the right hand cone finger tight. Slacken the cone off by half a turn and lock it in this position with the lockwasher and locknut.

NB Under no circumstances must the cone be unscrewed by more than 5/8 of a turn as this could adversely affect gear alignment.

Fig. 2

1. Remove the assembly from the vice and liberally oil the working parts - particularly the planet pinions, pinion pins, sun pinions and gear ring.
2. Insert the assembly in the hub shell and tighten the ball ring.

Fig. 1

1. Fit the left hand cone, spacing washer(s) and locknut, and adjust the bearing as instructed in Section 2.2.
2. Assemble the sprocket with its dust cap and spacers as indicated in Diagram D.

NB Fit the spacing washers in their original position if different from the diagram.

3. Fit the axle nuts and spacing washers and screw in the indicator rods.
4. Assemble the wheel into the bicycle and adjust the gears as instructed in Section 2.1.

PART 5 ELITE AT5 ALLOY HUB BRAKE

The internal gear mechanism of the Elite AT5 is essentially similar to other Sturmey-Archer Five Speed Hub Gears. There are however certain technical differences and when servicing the gears of the AT5 the instructions below should be carefully followed.

5.1 Disassembly

Follow the instructions in Section **4.1** noting the following changes and additions.

1. **Fig.1 Point 3.** - Unscrew the left hand locknut and remove the locknut, washer and cone adjuster. Lift out the brake plate assembly. Unscrew the left hand cone.
2. **Fig.6 Point 3.** - Remove the planet cage pawls and pawl springs by gently tapping the opposite end of the planet cage.

5.2 Inspection of the Internal Parts

Follow the instructions in Section **4.2** noting the following changes.

1. **Point 4.** - When checking the bearing surfaces, pay particular attention to cone ball tracks.
2. **Point 6.** - Check gear ring pawls, pawl pins and ratchets for wear. Always replace pawl springs on re-assembly. Check planet cage pawls for wear which could cause sticking. Check pawl pockets in left hand ball cup for chipping.

5.3 Assembly

Follow the instructions in Section **4.3** noting the following changes.

1. **Fig.7 Point 2.** - When fitting the new circlip ensure the rounded edges are against the dog ring.
2. **Fig.6 Point 1.** - Deleted.
3. **Fig.6 Point 2.** - Note that the timing marks are stamped on the inside edge of the bigger diameter teeth.
4. **Fig.2 Point 1.** - Remove the assembly from the vice and invert. Insert the planet cage pawl springs and pawls into the planet cage. Liberally oil the working parts particularly the planet pinions, pinion pins, sun pinions, gear ring and planet cage pawls.
5. **Fig.1 Point 1.** - Fit the left hand cone brake plate assembly, cone adjuster, washer and locknut. Adjust the bearings as instructed in Section 2.2.

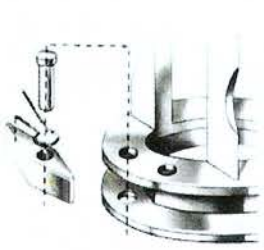


Diagram A

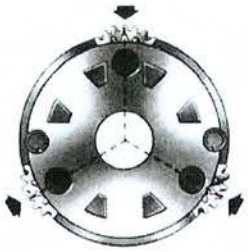


Diagram B

Diagram C

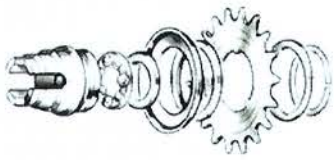
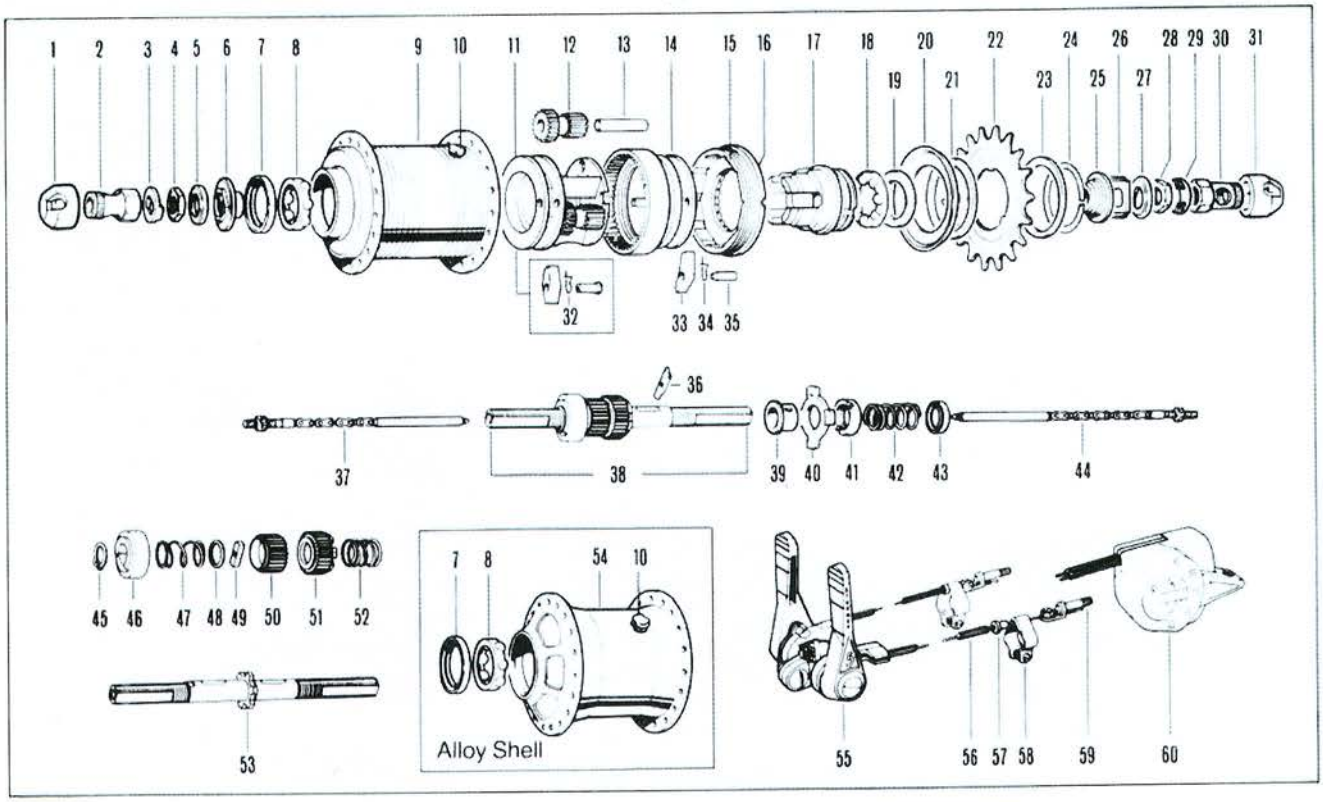


Diagram D

Sturmey Archer Parts List - S5/2 & Five Speed Alloy



Item No.	Sales No.	Description
1	*HSL 711	Indicator Guard
2	HMN 129	Axle Nut
3	*HMW 155	Serrated Lockwasher 7.9 mm Slot (5/16")
	*HMW 494	Serrated Lockwasher 9.5 mm Slot (3/8")
4	HMN 132	Cone Locknut
5	*HMW 129	Spacing Washer 3.2 mm (1/8")
	*HMW 146	Spacing Washer 1.6 mm (1/16")
	*HMW 483	Spacing Washer 4.8 mm (3/16")
	*HMW 484	Spacing Washer 6.4 mm (1/4")
6	HSA 101	Cone with Dust Cap L.H.
7	HSA 102	Outer Dust Cap
8	HSA 284	Ball Cage (with ball bearings 6.4 mm (1/4"))
9	*HSA 333	Hub Shell Assembly – 28 hole (Chrome)
	*HSA 334	Hub Shell Assembly – 36 hole (Chrome)
		NB Hub Shell Assemblies include items 7, 8 and 10
10	HSA 106	Lubricator
11	HSA 354	Planet Cage with Pawls, Pawl Pins and Springs
12	HSA 134	Planet Pinion
13	HSA 135	Pinion Pin
14	HSA 118	Gear Ring
15	HSA 121	Ball Ring R.H.
16	HSA 122	Inner Dust Cap
17	HSA 123	Driver
18	HSA 284	Ball Cage (with ball bearings 6.4 mm (1/4"))
19	HSA 102	Outer Dust Cap
20	HSL 701	Sprocket Dust Cap
21	HMW 127	Sprocket Spacing Washer 1.6 mm (1/16")
22	*HSL 714	Sprocket 14 Teeth
	*HSL 715	Sprocket 15 Teeth
	*HSL 716	Sprocket 16 Teeth
22	*HSL 717	Sprocket 17 Teeth
	*HSL 718	Sprocket 18 Teeth
	*HSL 719	Sprocket 19 Teeth
	*HSL 720	Sprocket 20 Teeth
	*HSL 747	Sprocket 21 Teeth
	*HSL 722	Sprocket 22 Teeth
23	HMW 127	Sprocket Spacing Washer 1.6 mm (1/16")
24	HSL 721	Sprocket Circlip
25	HSA 101	Cone with Dust Cap R.H.
26	HMW 147	Cone Lockwasher
27	*HMW 129	Spacing Washer 3.2 mm (1/8")
	*HMW 146	Spacing Washer 1.6 mm (1/16")
	*HMW 483	Spacing Washer 4.8 mm (3/16")
	*HMW 484	Spacing Washer 6.4 mm (1/4")
28	HMN 132	Cone Locknut
29	*HMW 155	Serrated Lockwasher 7.9 mm Slot (5/16")
	*HMW 494	Serrated Lockwasher 9.5 mm Slot (3/8")
30	HMN 129	Axle Nut
31	*HSL 711	Indicator Guard
32	HSA 120	Pawl Spring
33	HSA 119	Pawl for Gear Ring
34	HSA 120	Pawl Spring
35	HSA 112	Pawl Pin for Gear Ring
36	HSA 124	Axle Key
37	*HSA 126	Gear Indicator L.H. for 149.2 mm Axle (5 7/8") and 155.6 mm Axle (6 1/8")
	*HSA 316	Gear Indicator R.H. for 155.6 mm Axle (6 1/8") and 161.9 mm Axle (6 3/8") Gear Indicator L.H. for 161.9 mm Axle (6 3/8")
38	*HSA 329	Axle Assembly 149.2 mm (5 7/8")
	*HSA 330	Axle Assembly 155.6 mm (6 1/8")
	*HSA 331	Axle Assembly 161.9 mm (6 3/8")
39	HSA 116	Clutch Sleeve
40	HSA 117	Clutch
41	HSA 283	Thrust Ring
42	HSA 128	Clutch Spring
43	HSA 129	Cap for Clutch Spring
44	*HSA 125	Gear Indicator R.H. for 149.2 mm Axle (5 7/8")
	*HSA 126	Gear Indicator R.H. for 155.6 mm Axle (6 1/8") and 161.9 mm Axle (6 3/8") Gear Indicator L.H. for 149.2 mm Axle (5 7/8") and 155.6 mm Axle (6 1/8")
45	HSL 729	Circlip Retainer
46	HSA 343	Dog Ring
47	HSA 346	Pinion Return Spring
48	HMW 488	Washer for Pinion Return Spring
49	HSA 342	Low Gear Axle Key
50	HSA 344	Secondary Sun Pinion
51	HSA 345	Primary Sun Pinion
52	HSA 347	Low Gear Spring
53	*HSA 339	Axle 149.2 mm (5 7/8")
	*HSA 340	Axle 155.6 mm (6 1/8")
	*HSA 341	Axle 161.9 mm (6 3/8")
54	HSA 337	Hub Shell Assembly – 36 hole (Alloy) with items 7, 8 and 10
55	*HSJ 776	Dual Lever – Alloy – Stem fitting with cables
56	HSJ 777	Cable complete with Anchorage – 1346 × 1194 mm (53" × 47") for Stem Fitting Alloy Levers
57	HSJ 515	Fulcrum Sleeve
58	HSJ 775	Universal Fulcrum Clip 15.9 mm (5/8") Chainstay (5/8")
59	HSL 759	Cable Anchorage
60	*HSJ 794	Single lever control with cables (22.2mm clip)
	*HSJ 795	Single lever control with cables (23.8mm clip)

*Optional Fitment

Sturmey Archer Technical Information-Five Speed Hub

Five Speed Hub Gear Indicators (Actual Size)

Axle Length	Marking	Sales No.
149.2 mm (5⅞")	SA 1	(Right side) HSA 125
	SA 11	(Left side) HSA 126
155.6 mm (6⅛")	SA 11	(Right side) HSA 126
	SA 11	(Left side) HSA 126
161.9 mm (6⅜")	SA 11	(Right side) HSA 126
	SA 1111	(Left side) HSA 316

Part 6 FAULT DIAGNOSIS CHART

Use this chart only if a fault persists after attention to gear adjustment, bearing adjustment and lubrication. (See Parts 1 and 2).

SYMPTOM	FAULT	REMEDY
Slipping in 1st gear	1. Worn clutch 2. Kinked or stiff gear cables 3. Worn primary sun pinion or axle dogs 4. Worn low gear pawls 5. Weak low gear pawl springs 6. Twisted indicator chains 7. Indicators not screwed in fully	1. Replace clutch 2. Replace or lubricate cables 3. Replace sun pinion or axle 4. Fit new planet cage assembly 5. Fit new springs 6. Replace indicators 7. Screw in fully
Self changing between 1st or 2nd and 3rd gear	1. Worn clutch 2. Worn gear ring pawls	1. Replace clutch 2. Fit new pawls and springs
Slipping in 2nd, 3rd and 4th gears	1. Dog ring circlip loose 2. Worn dog ring teeth 3. Worn secondary sun pinion	1. Refit dog ring with a new circlip 2. Replace dog ring and circlip 3. Replace secondary sun pinion
Slipping in 3rd gear	1. Worn clutch 2. Worn gear ring splines	1. Fit new clutch 2. Replace gear ring
Slipping in 3rd, 4th and 5th gears	1. Worn gear ring pawls 2. Weak or sticking gear ring pawl springs 3. Worn right hand ball ring ratchet teeth	1. Replace pawls and springs 2. Clean the hub, lubricate and/or replace pawl springs 3. Replace ball ring
Slipping in 4th and 5th gears	1. Worn clutch 2. Worn planet cage dogs 3. Tight or weak clutch spring 4. Incorrect right hand cone adjustment	1. Fit new clutch 2. Replace planet cage 3. Clean the hub and fit new spring 4. Re-adjust the hub. (See Part 2)
Hub runs stiffly, drag on pedals when free-wheeling	1. Planet pinions are not timed correctly 2. Too many balls in the ball ring 3. Incorrect cone adjustment 4. Chainstay ends not parallel 5. Corrosion due to lack of lubrication 6. Distorted dust caps	1. Check and re-time the pinions. (See Diagram B.) 2. Fit 24 balls only – 4.8 mm (3/16") Ø 3. Re-adjust both cones. (See Section 2.2) 4. Re-align chainstay ends (unparallel chainstay ends can cause axle bending) 5. Clean hub thoroughly and oil. Ensure planet pinions and pins are adequately lubricated 6. Check dust caps and replace if distorted
No gears at all	1. Pawls stuck	1. Lubricate with S.A. oil (SAE 30)
Sluggish gear change	1. Distorted axle spring 2. Bent axle 3. Worn gear indicator chain(s) 4. Rusty or frayed gear cables	1. Replace spring 2. Fit new axle 3. Replace indicator coupling(s) 4. Replace cables

TI Sturmey-Archer Ltd.
Nottingham, England NG7 2DD.
U.K. Trade Tel. (0602) 700171.
Telex 37681 RALIND G (PARTS).
Head Office Tel. (0602) 705705.
Telex 378221 TISAL G.

TI Sturmey-Archer of America Inc.
1014 Carolina Drive, West Chicago, IL60185.
Tel. 312/231-5150
Toll Free Order Line 1–800–323–9194.
Telex 9102303297 TISA WC GO.

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