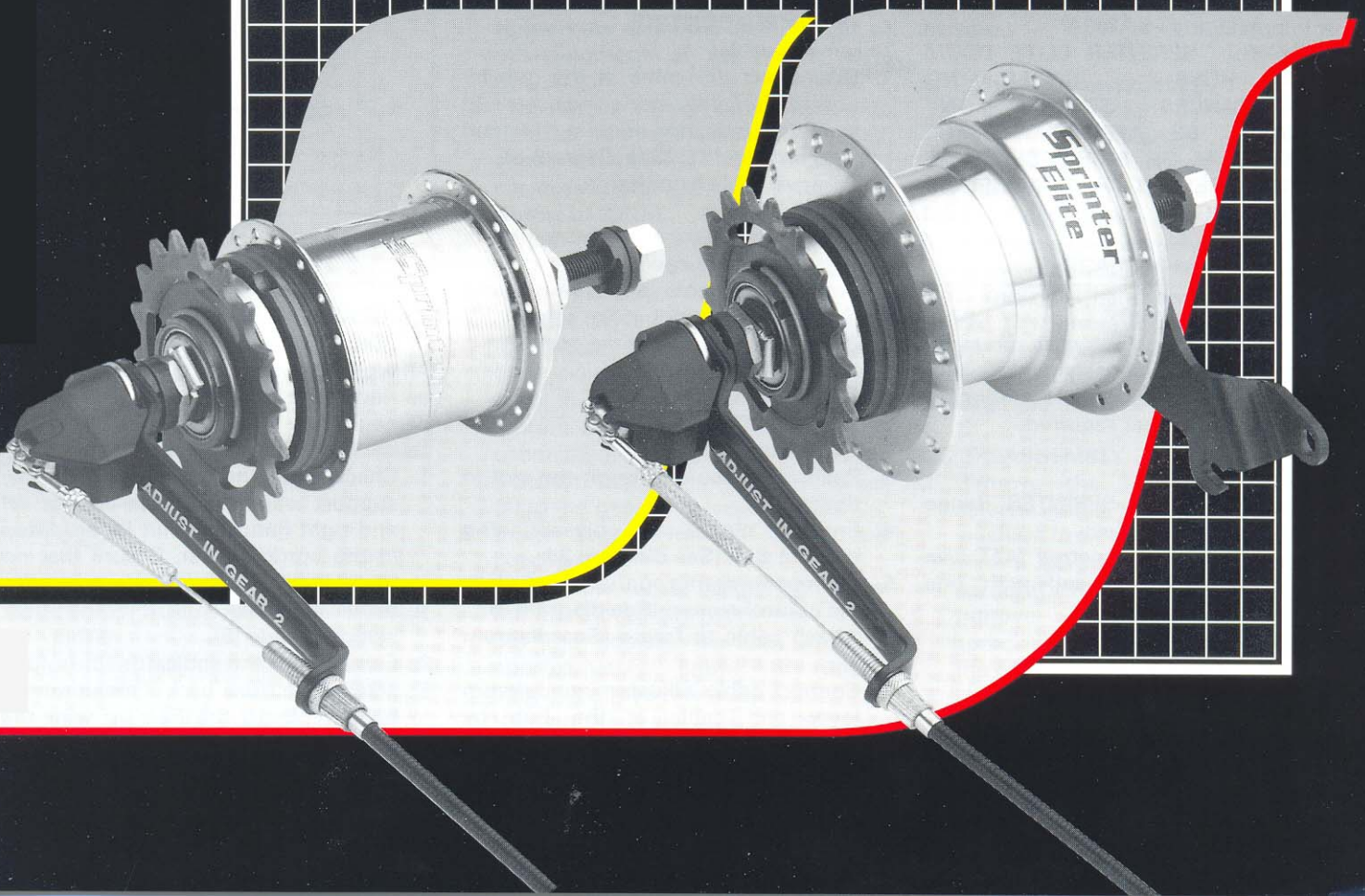


# ***Sturmey*** ***Archer***

Technical Information  
and Parts List

Sprinter and Sprinter Elite  
Five Speed Hubs





### Part 1 GENERAL INFORMATION

#### 1.1 SCOPE OF THIS LEAFLET

Congratulations upon your purchase of a Sturmey-Archer SPRINTER 5-SPEED HUB. To enjoy this hub at its best please follow these few simple instructions. Remember, during the first few miles the cable system will "bed-in" which may necessitate adjustment to ensure the hub is working to its maximum potential and to prevent possible hub damage (See Section 2.).

This leaflet refers to the SPRINTER family of 5-SPEED HUB GEARS. The SPRINTER is the 5-SPEED HUB GEAR; SPRINTER ELITE is the 5-SPEED with combined 70mm diameter DRUM BRAKES for progressive braking. The hub model can be identified from the marking on the hub shell.

Please contact your local approved dealer if any problems are experienced with the product.

#### 1.2 LUBRICATION

No routine lubrication is required. During a major service the greases should be replenished to prolong the life of the gearbox. Please contact your approved dealer who is equipped to carry this out.

The following types of greases meeting Sturmey-Archer Technical Standards should be used.

For Bearings - SA103B

For Internal Parts - SA103A

**WARNING:- SPRINTER ELITE DRUM BRAKE HUBS - UNDER NO CIRCUMSTANCES SHOULD ANY LUBRICANT BE APPLIED TO THE BRAKE DRUM OR BRAKE SHOE, AS THIS MAY PREVENT THE BRAKE FROM FUNCTIONING.**

### Part 2 GEARS

#### 2.1 GEAR CHANGING

Continue pedalling, but ease pressure on the pedals and select the gear required. If the bicycle is stationary simply select the gear required.

#### 2.2 GEAR RATIOS

The Sturmey-Archer SPRINTER Range have the following ratios:-

Distance travelled in metres (44T c/w. 22T Sprocket, 27" Wheel) with one revolution of the pedal.

1st Gear - 2.88 metres

2nd Gear - 3.42 metres

3rd Gear - 4.34 metres

4th Gear - 5.48 metres

5th Gear - 6.5 metres

The overall distance travelled can be altered by changing the size of the rear

sprocket. A range of sprockets from 14 to 22 tooth are available suitable for 1/2" pitch x 1/8" Chain.

#### 2.3 SPRINTER CONTROL FITMENT

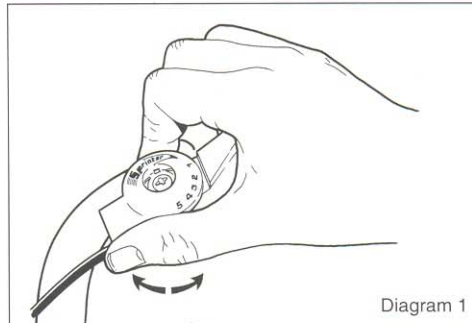


Diagram 1

Attach to the right-hand side of the handlebar. The control orientation can be altered to suit individual needs by removing the plastic screw cover at the control centre, and loosening the cross head screw. Rotate the control to the desired position before tightening the screw and replacing the cover (See diagram 1). Select 5th Gear. Attach the cable to the down tube using cable ties or clips, do not over-tighten as this will prevent the inner cable moving within the outer, ensure the handle bars turn freely (400mm loop minimum). Pass the cable over the bottom bracket and fix to the fulcrum lever.

Adjust the gears as in Section 3.

#### 2.4 CABLE REPLACEMENT SPRINTER CONTROL

To remove cable:

1. Disconnect the cable at the hub by unscrewing the cable adjuster (2) from the indicator coupling (4) and Fulcrum lever (1) (See diagram 5).
2. Remove cable from frame.
3. Select 1st gear.
4. Pull outer casing away from control to expose inner cable.
5. Push inner cable and remove the nipple from the slot in the control.
6. Pull inner cable out of the control.

#### 2.5 TO FIT NEW CABLES:

1. Select 1st Gear.
2. Expose inner cable.
3. Push inner cable through the slot in the control.
4. Engage nipple in corresponding internal slot. (See diagram 2).
5. Push outer casing so that it locks into the control recess. (See diagram 3).
6. Attach cable to frame (See diagram 4).
7. Connect cable adjuster into fulcrum lever and cable at the hub by screwing the cable connector (7) on to the indicator coupling (8).
8. Adjust the gears (See Section 3).

**NOTE:-** In the event of damage to the control, it is recommended that the whole unit be replaced.

**NOTE:-** See Controls leaflet for Orion and Twistgrip Controls fitment.

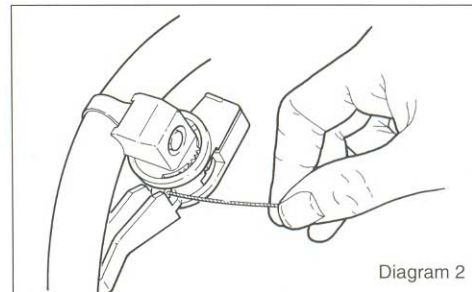


Diagram 2

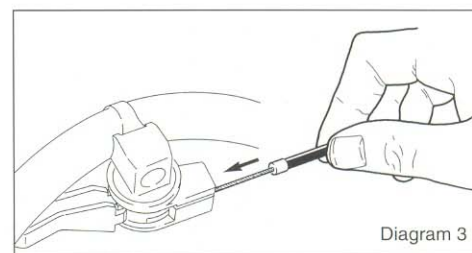


Diagram 3

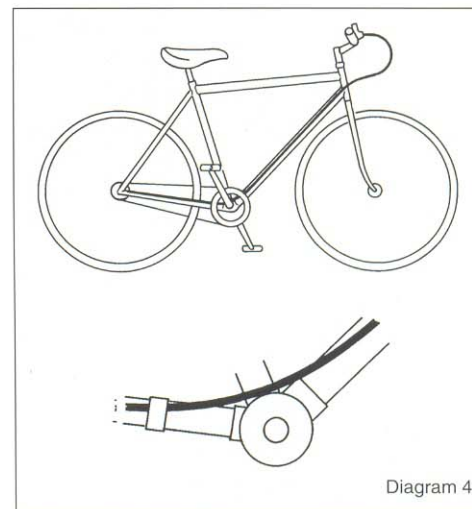


Diagram 4

### Part 3 ADJUSTMENT

#### 3.1 GEAR ADJUSTMENT

See Diagram 5.

All types of cycle gear systems must not be ridden out of adjustment as this may damage the gear components and cause the gear to malfunction.

1. Check that the fulcrum lever (1), support washer (2), lock washer (3) and right hand axle nut (4) are fitted in the correct order. Ensure that no more than 2.5mm of axle protrudes from the axle nut. Fit the gear selector guide (5).
2. Ensure that the indicator (6) is fully screwed in, turn back a maximum of half a turn to the line up with the selector guide (5) and fulcrum lever (1).
3. Check that the indicator chain (6)



- runs freely over the selector guide system (5).
- Select 5th gear on the control and connect the cable connector (7) until half way down the indicator coupling (8) and tighten locknut (9).
  - Select SECOND GEAR on the gear control and rotate the pedal crank to ensure the gear is engaged. Turn the cable adjuster (10) until the centre of the red section at the end of the indicator rod (6) is level with the end of the axle (11).
  - Tighten the locknut (12) against the adjuster (10).
  - Select 5th gear, rotate the pedal crank, change back to SECOND GEAR and check adjustment.

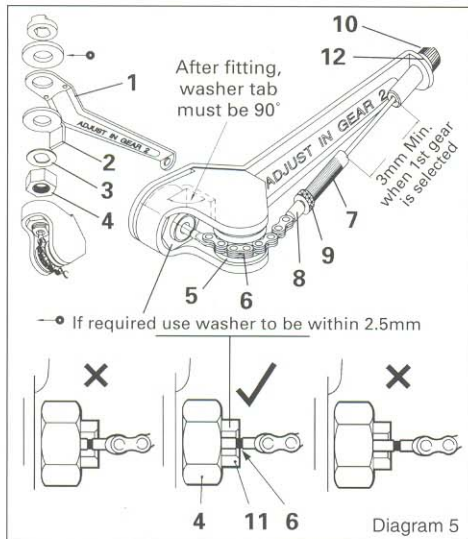


Diagram 5

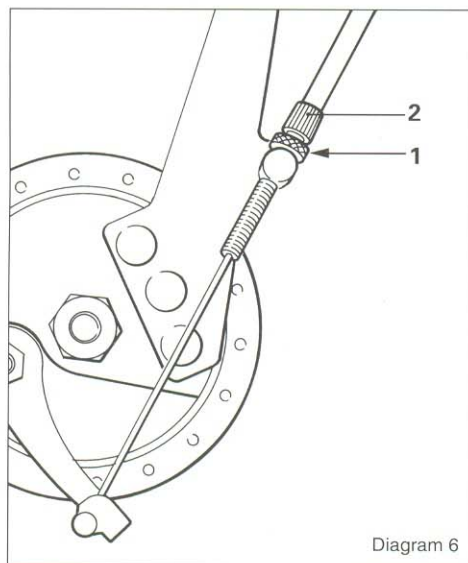


Diagram 6

### 3.2 BRAKE ADJUSTMENT SPRINTER ELITE

If the wheel will not rotate freely, or cannot be locked by a full application of the lever then adjustment is necessary. (See diagram 6).

- Slacken the brake adjuster locknut (1).

- Turn the adjuster (2) until the brake is applied.
- Slacken the adjuster until the wheel just spins freely.
- Tighten the locknut.

**NB: During the first few miles brake linings "bed-in" and may require adjustment. Should braking efficiency become impaired beyond adjustment, contact your local approved dealer who is equipped to replace the brake plate and shoe assembly.**

### Part 4 WHEEL FITTING

The Sturmey-Archer SPRINTER Hub can be fitted into rear chainstay widths between 120mm - 126mm using the appropriate spacers. **NB: These products are not designed for bicycles with vertical rear dropouts as chain tensioning cannot be achieved. If the wheel is removed, these instructions should be followed during re-assembly:-**

#### 4.1 SPRINTER ELITE

- With the chain on the sprocket place the hub axle into the chainstay ends.
- Fit washers and axle nuts. Ensure that the serrations on the anti-rotation lockwashers face into the frame with the lugs located into the chainstay slots. **NB: Ensure the correct size anti-rotation washer (to match the chainstay slot width 9.5mm or 7.9mm) is fitted. DO NOT tighten the axle nuts at this stage or mis-alignment of the brake plate may occur.**

- Insert brake arm on hub loosely into the clip. With the wheel centralised, chain tensioned and aligned correctly, tighten the axle nuts to a torque of 25NM.

- Tighten the brake arm clip nut firmly to 7NM. Max. Ensuring brake arm remains in line.

- Control Cable** - Ensure the indicator (8) is screwed firmly into the axle. Unscrew the indicator by up to half a turn if necessary to ensure easy fitment over the selector guide and connection to the gear cable. Connect the indicator coupling (4) to the gear cable adjuster (2).

- Brake Cable Fitting** - Pinch Bolt specification:-

- Locate the brake adjusting spigot into the slot on the brake arm.
- Set the adjuster so that there is approximately 5mm. of thread showing above the locknut.
- Holding the brake lever on the brake plate in the 'on' position, pull the inner cable taught, fit the pinch bolt and tighten the pinch bolt

screw.

#### Cable Fitting - Closed End Cables

- Locate the brake adjusting spigot in the slot in the brake arm.
- Fit cable nipple into position on the brake lever assembly ensuring that the recess mates with the larger diameter nipple.

**NB: To maintain maximum braking efficiency avoid sharp bends and kinks in the cable.**

- Replace chainguard/gear case (if fitted).

**NB: Before use check and make necessary adjustments to brakes (See Section 3) and re-adjust gears (See Section 2).**

#### 4.2 SPRINTER HUB

See Section 4.1

Replace Instruction 2 by:-

- Fit washers and axle nuts. With the wheel centralised, chain tensioned and aligned correctly, tighten the axle nuts to a torque of 25NM. Instructions 3, 4 and 7 are not applicable.

### Part 5 SERVICE - DEALER INSTRUCTIONS - ASSEMBLY/DISASSEMBLY

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

**5.2** 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 which can be done without the use of special tools.

**NB: The right hand end of the axle is where the sprocket and indicator are fitted. The axle should be clamped across the flats taking care not to damage the threads.**

#### 5.3 DISASSEMBLY

- Remove the indicator rod, gear selector guide, axle nuts and spacing washers from both ends of the axle.
- Use a screwdriver to release the sprocket circlip from the driver, then remove the spacing washer, sprocket, and outer dustcap (Note the order of these parts).
- Unscrew left hand cone locknut (Remove cone adjuster and brake assembly - ELITE). Note position of any washers fitted.
- Unscrew the right hand ball ring with



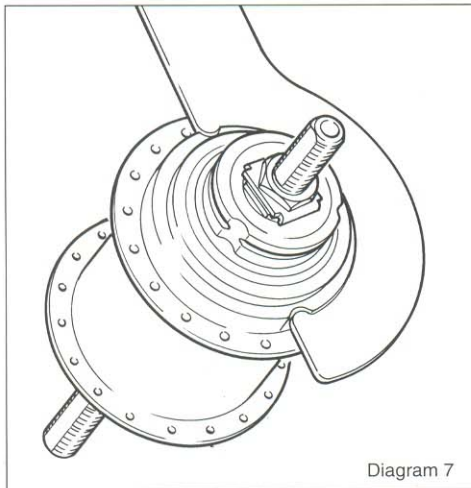


Diagram 7

a 'C' spanner or hammer and suitable punch, and unscrew the ball ring to release the internal assembly from the hub shell (See diagram 7).

### 5.4

1. Clamp the left hand end of the axle in a vice and remove the right hand cone locknut, lockwasher, cone, clutch spring cap and clutch spring (See diagram 8).
2. Remove driver assembly, ball cup and gear ring assembly (See diagram 9).
3. Remove clutch from axle and remove washer from inside clutch
4. Remove spring and clutch sleeve.
5. Remove pinion pins and planet pinions.
6. Remove axle and planet cage from vice and clamp right hand end of axle.
7. Using circlip pliers remove circlip and discard. Remove planet cage, planet cage spring, sun pinion cap, secondary sun pinion and primary sun pinion. (See diagrams 10 & 11).

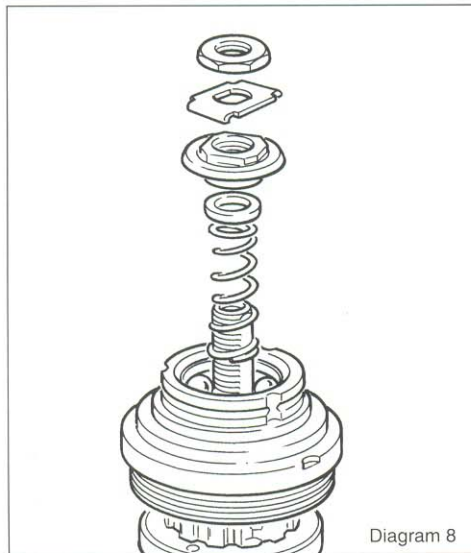


Diagram 8

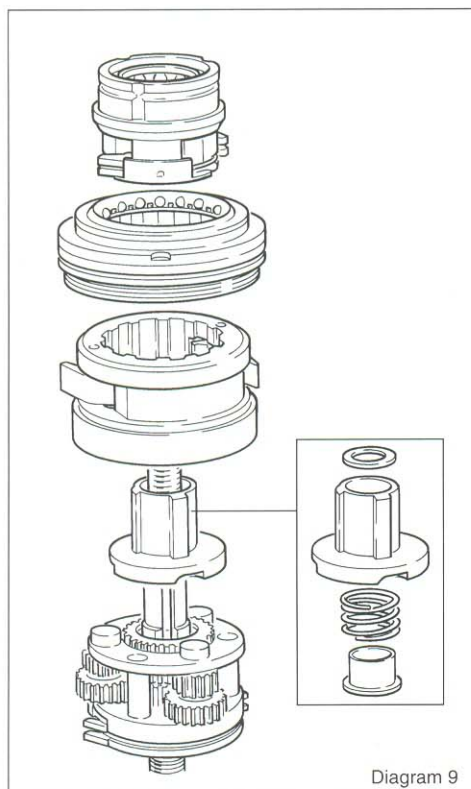


Diagram 9

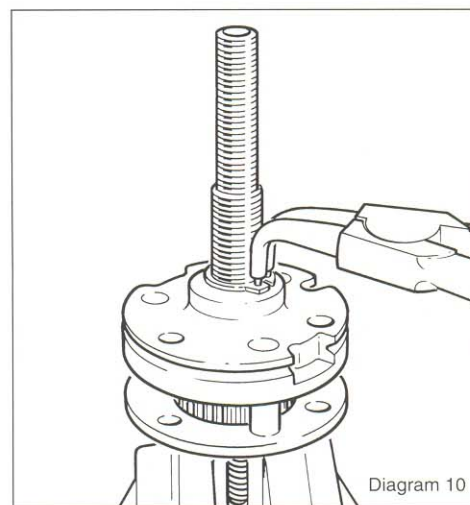


Diagram 10

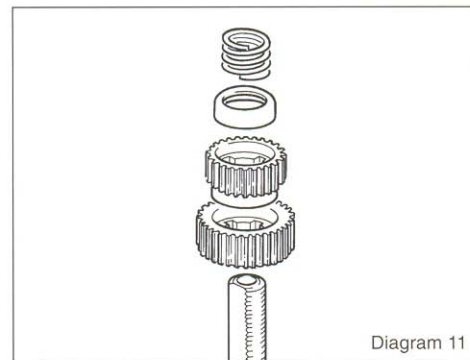


Diagram 11

8. To remove gear selector key compress indicator spring towards vice using suitable screwdriver. Remove axle key assembly.
9. Release pressure on spring and remove axle from vice.

### Part 6 INSPECTION AND REPAIR OF INTERNALS

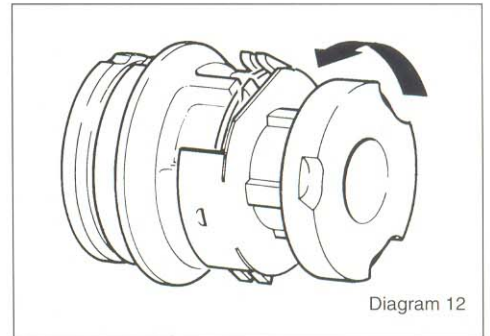


Diagram 12

Thoroughly clean all the internal parts and replace those worn or damaged. Specific items to be checked are:-

1. Axle - straightness, condition of thread and slots.
2. Condition of all pawls, springs, ball, ball tracks, pinions and gear ring teeth and drive slots.
3. Check free movement of driver actuator and pawl action by inserting clutch and turn (See diagram 12).

**NB: It is recommended that this assembly is not dismantled but if necessary replace with a new assembly.**

4. **Gear selector key** - Check threads for wear and free movement in axle slot.
5. **Clutch** - squareness of drive corners.

### Part 7 ASSEMBLY

#### 7.1 (See diagram 13).

1. Clamp the drilled end of axle horizontally in vice with slot uppermost.
2. Using a small screwdriver compress indicator spring towards vice and insert gear selector key assembly.
3. Release indicator spring and remove from vice.
4. Test by screwing indicator into axle finger tight and test movement of gear selector key by pulling on the indicator.

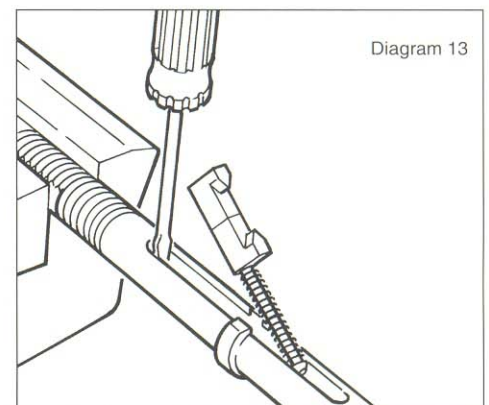
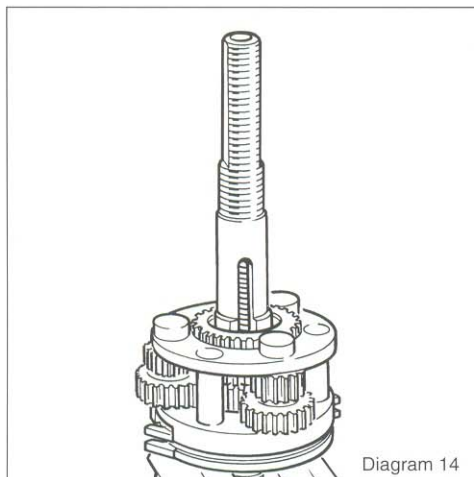


Diagram 13





### 7.2 PINION FITMENT

1. Reclamp axle in vice in the vertical position, circlip slot uppermost
2. Fit primary sun pinion such that it engages with the gear selector key, recess uppermost.
3. Fit secondary sun pinion, bore protrusion downwards locating into primary sun pinion (See Diagram 11).
4. Fit cap over gear selector key - domed side uppermost.
5. Fit planet cage spring and planet cage ensuring pawl end uppermost.
6. Take new circlip and locate it in the circlip groove, ensuring that circlip sharp corners are uppermost.

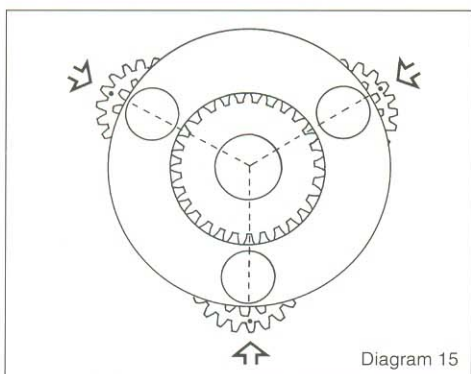
**NB: TAKE CARE NOT TO OVERSTRESS CIRCLIP.**

### 7.3 CLUTCH FITMENT

1. Remove axle from vice. Reclamp left hand end of the axle in vice (See diagram 14).
2. Lubricate pinion pins with grease.
3. Fit planet/pinions and pins with their timing marks pointing radially outwards.

**NB: SEE DIAGRAM 15. FOR PINION TIMING, EACH PINION HAS A TIMING MARK STAMPED ON ONE OF THE LARGE DIAMETER PINION TEETH.**

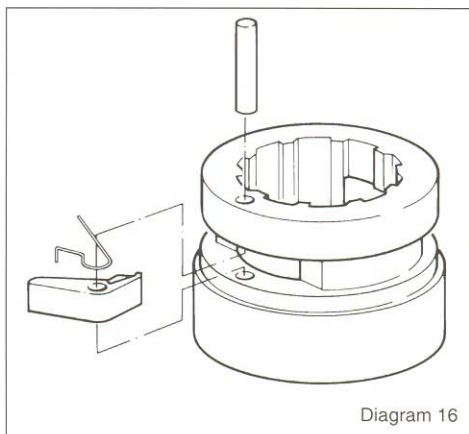
4. Fit clutch sleeve and clutch sleeve spring.



5. Fit clutch ensuring it meshes with the top of the pinion pins.
6. Fit washer into clutch. (See diagram 9).

### 7.4 GEAR RING, BALL RING, DRIVER ASSEMBLY

1. Take gear ring and fit the pawls, pawl pins and springs if required as indicated (See diagram 16).
2. Lubricate with grease pinions and gear ring teeth.
3. Locate the gear ring assembly over the planet cage, then fit ball ring.
4. Lubricate the right hand ball cage assembly with grease.
5. Place the ball cage assembly on the ball ring ensuring that the balls are positioned downwards.
6. Rotate the actuator anti-clockwise to compress pawls (See diagram 12).



7. With actuator in this position fit driver assembly, rotating anti-clockwise to ensure that driver engages with the clutch splines.

### 7.5 R.H. CONE ADJUSTMENT

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

**NB: UNDER NO CIRCUMSTANCES MUST THE CONE BE UNSCREWED MORE THAN 5/8" OF A TURN, AS THIS COULD ADVERSELY EFFECT GEAR ADJUSTMENT.**

### 7.6 INTERNAL ASSEMBLY FITMENT

1. Remove the assembly from the vice. Apply grease to the working parts.
2. Insert the assembly in the hub shell and tighten the ball ring, turning anti-clockwise first to prevent cross threading. Tighten clockwise using 'C' spanner (or suitable punch) to

torque of 150Nm.

### 7.7 SPRINTER LEFT HAND CONE ADJUSTMENT

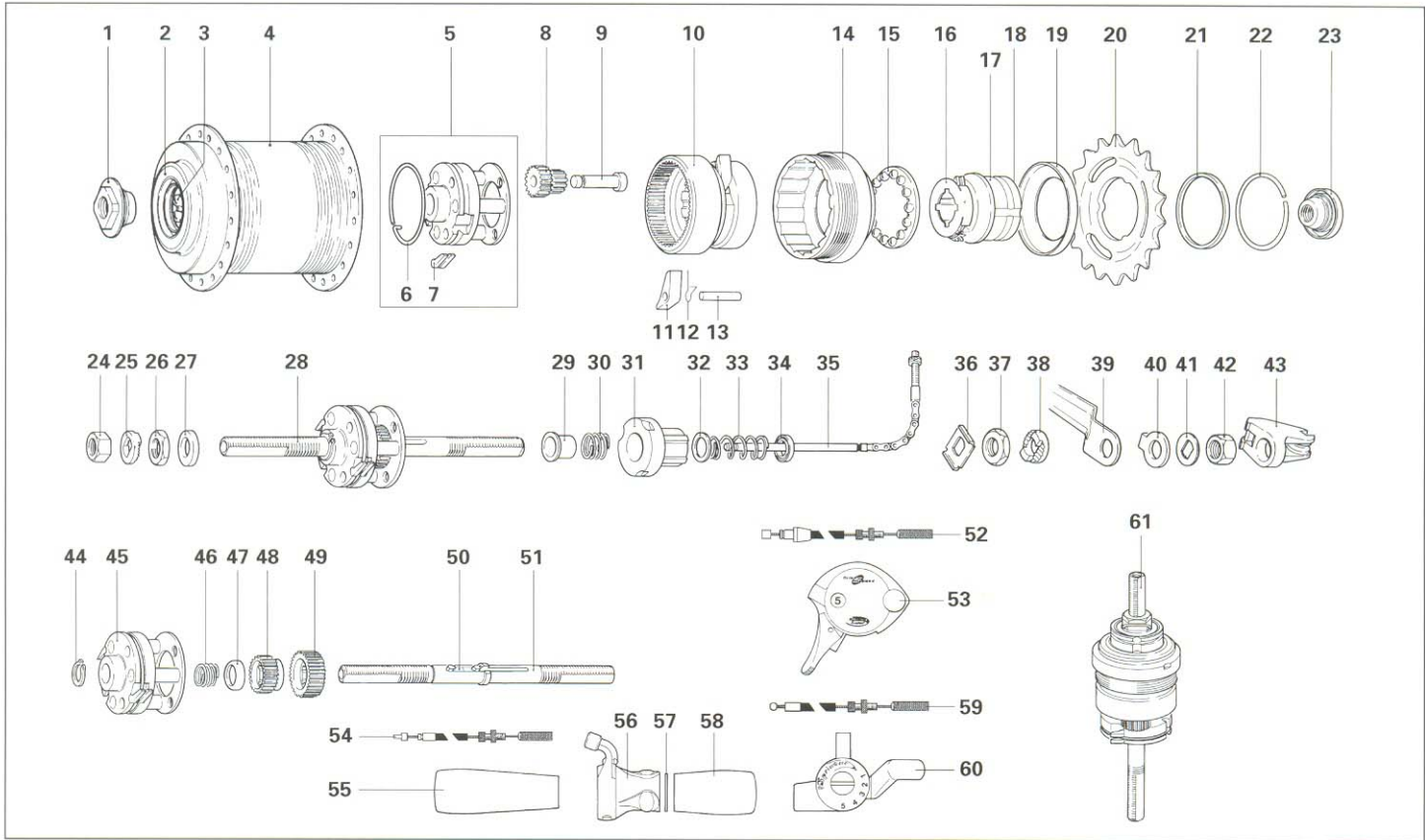
1. Fit the left hand cone, spacing washer(s) and locknut.
2. Adjust the left hand cone until minimum movement is felt at the wheel rim, ensuring free running of hub. Then tighten locknut.

### 7.8. SPRINTER ELITE BRAKE ASSEMBLY FITMENT AND LEFT HAND CONE ADJUSTMENT.

1. Fit left hand cone
2. Clean brake drum using a cloth ensuring all dirt/grease is removed.
3. Make sure brake linings are clean. (Brake shoes should be replaced if contaminated with grease).
4. Fit brake assembly into brake drum. Fit cone adjuster over cone, fit washers and locknut.
5. Adjust left hand cone until minimum play is felt at the wheel rim, ensuring hub runs free. Apply brake ensuring brake shoes are centralised. Tighten locknut.

## Part 8 SPROCKET FITTING

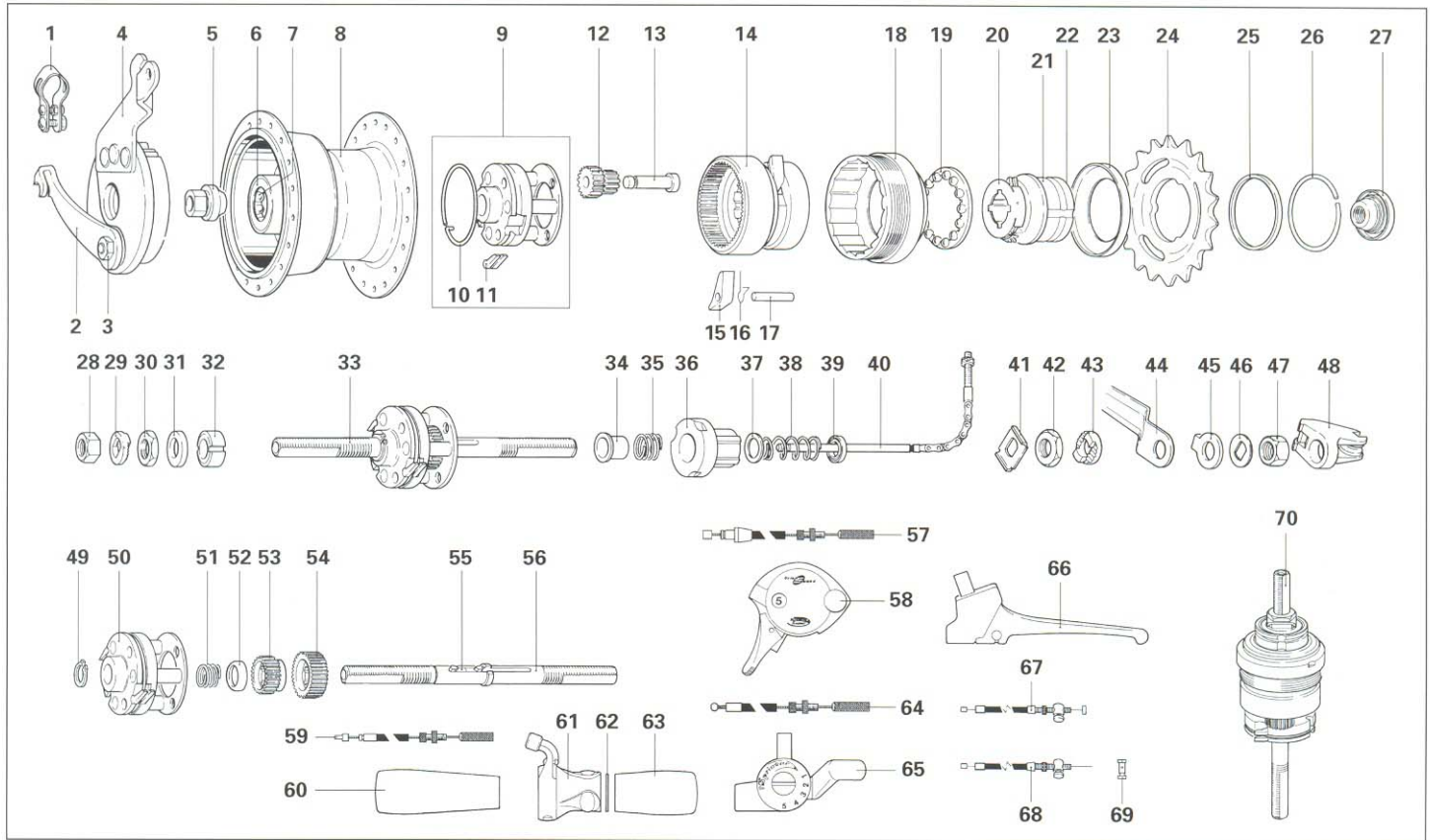
1. Assemble the dustcap, spacer washer, sprocket and circlip to obtain the desired chainline.
2. Assemble the wheel into the bicycle (See Section 4).
3. Reconnect cables and adjust gear/brake as previously described and test fully before using the cycle. (See Section 2.5, 3.1, 3.2).



Item No.	Sales No.	Description	Item No.	Sales No.	Description	Item No.	Sales No.	Description
1	HSA 101	Cone and Dustcap Assembly	21	HMW 127	Sprocket Spacing Washer 1.6 mm	48	HSA 494	Secondary Sun Pinion
2	HSA 102	Cone Dustcover	22	HSL 721	Sprocket Circlip	49	HSA 493	Primary Sun Pinion
3	HSA 284	L.H. Ball Cage Assembly - 6.4mm Ball	23	HSA 101	R.H. Cone	50	HSA 483	Gear Selector Key Assembly
4	HSA 486	Hub Shell Assembly 36 holes N.B. - Hub Shell Assemblies include 1 off Items 2 and 3	24	HMN 128	Axle Nut	51	HSA 484	Axle Assembly.- includes 1 off Item 49
5	HSA 477	Planet Cage Assembly (includes 1 off Item 6, 2 off Item 7)	25	*HMW 155	Serrated Lockwasher 7.9 mm Slot	52	HSJ 867	Orion Control Cable Complete
6	HSA 450	Circlip		*HMW 494	Serrated Lockwasher 9.5 mm Slot	53	HSJ 866	Orion Control
7	HSH 482	Pawl for Planet Cage		*HMW 515	K48 Lipwasher 9.5mm Slot	54	HSJ 873	Twistgrip Control Cable Complete
8	HSA 451	Planet Pinion	26	HMN 132	Cone Locknut	55	HSJ 864	Left Hand Grip
9	HSA 495	Pinion Pin	27	*HMW 146	Spacing Washer 1.6 mm	56	HSJ 875	Twistgrip Control
10	HSA 496	Gear Ring Assembly (includes 2 off Items 11, 12, 13)		*HMW 129	Spacing Washer 3.2 mm	57	HMW 516	Washer (2 off)
11	HSA 497	Pawl for Gear Ring		*HMW 483	Spacing Washer 4.8mm	58	HSJ 863	Right Hand Grip
12	HSA 120	Pawl Spring	28	-	Spacing Washer 6.4 mm	59	HSJ 886	Trigger Control Cable Complete
13	HSA 415	Pawl Pin	29	HSA 479	Axle Assembly (See Item 51)	60	HSJ 839	Standard Trigger Control
14	HSA 492	Ball Ring	30	HSA 478	Clutch Sleeve	61	*HSX 125	Gear Internal Assembly Complete
15	HSA 438	Ball Cage Assembly	31	HSA 485	Clutch			
16	HSA 439	Driver Assembly Complete (includes 1 off Items 17 and 18)	32	HMW 327	Clutch Washer			
17	HSA 284	Ball Cage Assembly - R.H. 6.4 mm Ball	33	HSA 128	Clutch Spring			
18	HSA 102	Outer Dust Cap	34	HSA 129	Cap for Clutch Spring			
19	HSL 701	Sprocket Dust Cap	35	HSA 490	Gear Indicator			
20	*HSL 714	Sprocket 14 Teeth	36	HMW 147	Cone Lockwasher			
	*HSL 715	Sprocket 15 Teeth	37	HMN 132	Cone Locknut			
	*HSL 716	Sprocket 16 Teeth	38	*HMW 155	Serrated Lockwasher 7.9 mm Slot			
	*HSL 717	Sprocket 17 Teeth		*HMW 494	Serrated Lockwasher 9.5 mm Slot			
	*HSL 718	Sprocket 18 Teeth		*HMW 515	K48 Lipwasher 9.5mm Slot			
	*HSL 719	Sprocket 19 Teeth	39	HSJ 842	Fulcrum Lever			
	*HSL 720	Sprocket 20 Teeth	40	HSA 480	Gear Selector Guide Support Washer			
	*HSL 747	Sprocket 21 Teeth	41	HMW 150	Lockwasher			
	*HSL 722	Sprocket 22 Teeth	42	HMN 128	Axle Nut			
			43	HSA 488	Gear Selector Guide			
			44	HSL 729	Circlip			
			45	-	Planet Cage (See Item 5)			
			46	HSA 482	Planet Cage Spring			
			47	HSA 481	Sun Pinion Cup			

\* Optional Fitment





Item No.	Sales No.	Description	Item No.	Sales No.	Description	Item No.	Sales No.	Description
1	*HCB 101	Brake Arm Clip Assembly 15.9mm				51	HSA 482	Planet Cage Spring
	*HCB 103	Brake Arm Clip Assembly 18.3mm				52	HSA 481	Sun Pinion Cup
	*HSL 767	Brake Arm Clip Assembly 15.5mm with integral pad				53	HSA 494	Secondary Sun Pinion
2	HSB 406	Brake Lever				54	HSA 493	Primary Sun Pinion
3	HMN 139	Brake Nut				55	HSA 483	Gear Selector Key Assembly
4	HSB 432	Brake Replacement Unit NB. Brake Replacement Unit includes 1 off Items 2 and 3	25	HMW 127	Sprocket Spacing Washer 1.6 mm	56	HSA 484	Axle - includes 1 off Item 54
5	HSA 379	L.H. Cone	26	HSL 721	Sprocket Circlip	57	HSJ 867	Orion Control Cable Complete
6	HSA 241	Cone Dustcover	27	HSA 101	R.H. Cone	58	HSJ 866	Orion Control
7	HSA 284	L.H. Ball Cage Assembly - 6.4mm Ball	28	HMN 128	Axle Nut	59	HSJ 873	Twistgrip Control Cable Complete
8	HSA 498	Hub Shell Assembly 36 holes N.B. - Hub Shell Assemblies include 1 off Items 6 and 7	29	*HMW 155	Serrated Lockwasher 7.9 mm Slot	60	HSJ 864	Left Hand Grip
9	HSA 477	Planet Cage Assembly (includes 1 off Item 10, 2 off Item 11)	30	*HMW 494	Serrated Lockwasher 9.5 mm Slot	61	HSJ 875	Twistgrip Control
10	HSA 450	Circlip	31	*HMW 515	K48 Lipwasher 9.5mm Slot	62	HSJ 516	Washer (2 off)
11	HSB 482	Pawl for Planet Cage	32	HMN 132	Cone Locknut	63	HSJ 863	Right Hand Grip
12	HSA 451	Planet Pinion	33	*HMW 146	Spacing Washer 1.6 mm	64	HSJ 886	Trigger Control Cable Complete
13	HSA 495	Pinion Pin	34	*HMW 129	Spacing Washer 3.2 mm	65	HSJ 839	Standard Trigger Control
14	HSA 496	Gear Ring Assembly (includes 2 off Items 15, 16, 17)	35	*HMW 483	Spacing Washer 4.8mm	66	*PKL 205	DELTRIN Brake Lever Assembly RH/LH 22.2mm Clip
15	HSA 497	Pawl for Gear Ring	36	*HMW 484	Spacing Washer 6.4 mm		*PKL 206	DELTRIN Brake Lever Assembly RH/LH 23.8mm Clip
16	HSA 120	Pawl Spring	37	HSA 371	Cone Adjuster	67	*HSK 713	Cable Complete Black - 1570mm c/end
17	HSA 415	Pawl Pin	38	HSA 479	Axle Assembly (See Item 56)	68	*HSK 714	Cable Complete Black - 1600mm/1820mm o/end
18	HSA 492	Ball Ring	39	HSA 478	Clutch Sleeve	69	HSK 715	Pinch Bolt
19	HSA 438	Ball Cage Assembly	40	HSA 478	Clutch Sleeve Spring	70	*HSX 125	Gear Internal Assembly Complete
20	HSA 439	Driver Assembly Complete (includes 1 off Items 21 and 22)	41	HSA 485	Clutch			
21	HSA 284	Ball Cage Assembly - R.H. 6.4 mm Ball	42	HMW 327	Clutch Washer			
22	HSA 102	Outer Dust Cap	43	HSA 128	Clutch Spring			
23	HSL 701	Sprocket Dust Cap	44	HSA 129	Cap for Clutch Spring			
24	*HSL 714	Sprocket 14 Teeth	45	HSA 490	Gear Indicator			
	*HSL 715	Sprocket 15 Teeth	46	HMW 147	Cone Lockwasher			
	*HSL 716	Sprocket 16 Teeth	47	HMN 132	Cone Locknut			
	*HSL 717	Sprocket 17 Teeth	48	*HMW 155	Serrated Lockwasher 7.9 mm Slot			
			49	*HMW 494	Serrated Lockwasher 9.5 mm Slot			
			50	*HMW 515	K48 Lipwasher 9.5mm Slot			
				44	HSJ 842	Fulcrum Lever		
				45	HSA 480	Gear selector guide support washer		
				46	HMW 150	Lock washer		
				47	HMN 128	Axle Nut		
				48	HSA 488	Gear Selector Guide		
				49	HSL 729	Circlip		
				50	-	Planet Cage (See Item 9)		

\* Optional Fitment

## Part 9 FAULT DIAGNOSIS CHART

### A. JUMPING AND SELF-CHANGING GEARS

**Table 1 - Symptoms**

Refer to the relevant faults and remedies in Table 2 for each of the following symptoms.

Symptom	Possible Faults and Remedies (See Table 2)
Jumping in first gear	a,b,c,d,e,f,i,j,k,l,o,p.
Jumping second gear	a,b,c,d,e,f,j,k,l,o,p,q,s.
Jumping in thlrd gear	f,g,h,l,m,p
Jumping in fourth gear	a,b,c,f,g,h,j,k,l,m,n,o,p,r.
Jumping in fifth gear	a,b,c,f,g,h,i,j,k,l,m,n,o,p,r,t.
Self changing between 1st and 2nd gear	a,b,c,k,s.
Self changing between 1st and 3rd gear	g.
Self changing between 4th and 5th gear	a,b,c,k,s,q.
Self changing between high and low gears	g.
Self changing between 2nd and 3rd gear	a,b,c,q.
Self changing between 3rd and 4th gear	a,b,c,d,q.

**Table 2 - Faults and Remedies**

Refer to Table 1 for the symptoms that will be caused by each of the following faults.

Ref. Fault	Remedy
a. Kinked or stiff gear cable.	Replace or lubricate cable.
b. Twisted indicator chain/catching gear selector pulley.	Replace indicators/Re-align gear selector pulley.
c. Indicators not screwed in fully.	Screw in fully.
d. Deformed or weak planet cage circlip.	Fit new circlip.
e. Worn planet cage pawls.	Replace pawls.
f. Worn gear ring splines.	Replace gear ring.
g. Worn gear ring pawls.	Replace pawls and springs.
h. Weak or sticking gear ring pawl springs.	Clean the hub, lubricate and/or replace pawl springs.
i. Worn primary sun pinion.	Replace primary sun pinion.
j. Worn secondary sun pinion.	Replace secondary sun pinion.
k. Worn or ineffective gear selector key.	Replace gear selector key.
l. Worn driver pawls.	Replace pawls.
m. Worn right hand ball ring ratchet teeth.	Replace ball ring.
n. Tight or weak clutch spring.	Clean the hub and fit new spring.
o. Incorrect right hand cone adjustment.	Re-adjust the hub (see PART 2).
p. Worn clutch washer.	Replace.
q. Ineffective clutch sleeve spring.	Replace.
r. Worn clutch.	Replace.
s. Worn sun pinion spring.	Replace.
t. Worn/ineffective indicator spring.	Replace axle assembly.

### B. OTHER FAULTS

Symptom	Fault	Remedy
Hub runs stiffly, drags on pedals when free-wheeling.	<ol style="list-style-type: none"> <li>1. Chainstay ends not parallel.</li> <li>2. Incorrect cone adjustment.</li> <li>3. Distorted dust caps.</li> <li>4. Corrosion due to lack of lubrication.</li> <li>5. Planet pinlons are not timed correctly.</li> <li>6. Brake rubbing (Sprinter Elite hub only).</li> </ol>	<ol style="list-style-type: none"> <li>1. Re-align free-wheeling (un-parallel chainstay ends can cause axle bending).</li> <li>2. Re-adjust both cones (see Section 5).</li> <li>3. Replace dust caps.</li> <li>4. Disassemble hub, clean and re-grease (see Part 5).</li> <li>5. Check and re-time the pinions (see Diagram 15).</li> <li>6. Re-adjust brakes (see Section 3.2).</li> </ol>
No gears at all	<ol style="list-style-type: none"> <li>1. Pawls stuck.</li> <li>2. Broken gear selector key.</li> </ol>	<ol style="list-style-type: none"> <li>1. Clean and re-grease.</li> <li>2. Replace gear selector key.</li> </ol>
Sluggish gear change.	<ol style="list-style-type: none"> <li>1. Rusty or frayed gear cable.</li> <li>2. Worn gear indicator coupling.</li> <li>3. Bent axle.</li> <li>4. Damaged axle slots.</li> <li>5. Distorted axle spring.</li> <li>6. Damaged gear selector key assembly.</li> <li>7. Ineffective cable run.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace cable.</li> <li>2. Replace indicator coupling.</li> <li>3. Fit new axle.</li> <li>4. Fit new axle assembly.</li> <li>5. Replace axle assembly.</li> <li>6. Replace gear selector key assembly.</li> <li>7. Re-align cable.</li> </ol>

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