Vertical line between numbers indicates parts are not interchangeable.
Parts are interchangeable only if they are on the same line and they do not have a vertical line between them.

Parts have one-way interchangeability only.

} Parts are interchangeable as a unit.
STURMEY-ARCHER 4- and 5-SPEED HUBS
PARTS INTERCHANGEABILITY

<table>
<thead>
<tr>
<th>Part</th>
<th>HUBS 4-speed</th>
<th>HUBS 5-speed</th>
<th>AW 4-speed</th>
<th>AW 5-speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. RH Axle Nut</td>
<td>HMN 129*</td>
<td>HMN 129*</td>
<td>HMN 129*</td>
<td>HMN 131</td>
</tr>
<tr>
<td>2. Axle Lockwasher (serrated)</td>
<td>HMN 155</td>
<td>HMW 155</td>
<td>HJM 145*</td>
<td>HJM 145*</td>
</tr>
<tr>
<td>3. Hub Shell† 36 holes</td>
<td>HSA 334</td>
<td>HSA 271</td>
<td>HSA 270</td>
<td>HSA 130</td>
</tr>
<tr>
<td>4. Hub Shell 28 holes</td>
<td>HSA 333</td>
<td>HSA 271</td>
<td>HSA 270</td>
<td>HSA 130</td>
</tr>
<tr>
<td>5. Hub Shell 36 holes</td>
<td>HSA 337</td>
<td></td>
<td>HSA 290</td>
<td></td>
</tr>
<tr>
<td>6. Planet Cage</td>
<td>HSA 354</td>
<td>HSA 132</td>
<td>HSA 132</td>
<td>HSA 132</td>
</tr>
<tr>
<td>7. Planet Pin</td>
<td>HSA 134</td>
<td>HSA 134</td>
<td>HSA 134</td>
<td>HSA 134</td>
</tr>
<tr>
<td>8. Pinion</td>
<td>HSA 135</td>
<td>HSA 135</td>
<td>HSA 135</td>
<td>HSA 135</td>
</tr>
<tr>
<td>9. Pinion Return Spring</td>
<td>HSA 135</td>
<td>HSA 135</td>
<td>HSA 135</td>
<td>HSA 135</td>
</tr>
<tr>
<td>10. Lockwasher for Dog Ring</td>
<td>HSA 343</td>
<td>HSA 138</td>
<td>HSA 138</td>
<td>HSA 138</td>
</tr>
<tr>
<td>11. Dog Ring</td>
<td>HSA 346</td>
<td>HSA 319</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Pinion Return Spring</td>
<td>HSA 346</td>
<td>HSA 319</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Washer for Pinion Return Spring</td>
<td>HMW 488</td>
<td>HMW 488</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. Secondary Sun Pinion</td>
<td>HSA 344</td>
<td>HSA 318</td>
<td>HSA 141</td>
<td>HSA 141</td>
</tr>
<tr>
<td>15. Primary Sun Pinion</td>
<td>HSA 345</td>
<td>HSA 317</td>
<td>HSA 269</td>
<td>HSA 142</td>
</tr>
<tr>
<td>16. Low Gear Axle Key</td>
<td>HSA 342</td>
<td>HSA 295</td>
<td>HSA 268</td>
<td>HSA 139</td>
</tr>
<tr>
<td>17. Low 85.1/2 Speed Gear</td>
<td>HSA 347</td>
<td>HSA 273</td>
<td>HSA 140</td>
<td>HSA 139</td>
</tr>
<tr>
<td>18. Low Gear Spring</td>
<td>HSA 138</td>
<td>HSA 138</td>
<td>HSA 138</td>
<td>HSA 138</td>
</tr>
<tr>
<td>19. LH Axle Nut</td>
<td>HSA 346</td>
<td>HSA 319</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gear Indicator LH for short axles</td>
<td>HSA 126*</td>
<td>HSA 126*</td>
<td>HSA 126*</td>
<td>HSA 126*</td>
</tr>
<tr>
<td>Gear Indicator LH for medium axles</td>
<td>HSA 126*</td>
<td>HSA 126*</td>
<td>HSA 126*</td>
<td>HSA 126*</td>
</tr>
<tr>
<td>Gear Indicator LH for long axles</td>
<td>HSA 316</td>
<td>HSA 316</td>
<td>HSA 126*</td>
<td>HSA 126*</td>
</tr>
</tbody>
</table>

*Same parts as for AW, p. 4-17.
†The S5 cartridge will fit into any AW 3-speed hub shell. The AW cartridge will fit S5 or FW hub shells but may not work properly without changing the left ball cup. A planet cage centering flange in the AW left ball cup keeps the pawls aligned and prevents the hub from slipping in low gear. Not all S5 ball cups lack this flange. Compare it to an AW left ball cup.
‡HSA 163 for 4-speed is drilled through and not threaded. HSA 124 is threaded.
1. **DISASSEMBLY**

   Remove left-hand locknut, washer and cone.

Next Step

2. **DISASSEMBLY**

   The right-hand ball ring may have a double start thread. If the ball ring is replaced in the opposite position, the wheel may need retruing. To facilitate proper reassembly, mark the ball ring at the point nearest lubricator.

   Place a drift punch as shown and loosen the ball ring by rapping the punch firmly with a hammer.

Next Step

3. **DISASSEMBLY**

   Unscrew right-hand ball ring completely and remove the cartridge from the hub shell.

Next Step

4. **ASSEMBLY**

   Thread cartridge finger tight into hub. If the mark made during disassembly is not next to the lubricator, remove and restart.

ASSEMBLY

5. **ASSEMBLY**

   When correctly oriented, tighten with a hammer and drift punch.

ASSEMBLY

6. **ASSEMBLY**

   Install cone, lockwasher and locknut. Adjust bearing.
4 DISASSEMBLY

Remove right-hand locknut, lockwasher and cone. Remove clutch spring, spring cap and driver.1 Remove ball ring and gear ring.

Next Step

5 DISASSEMBLY

Remove thrust ring.2 Push out axle key, remove clutch sleeve and sliding clutch. Remove pinion pins and pinions. Lift off planet cage.

Next Step

Next Page

1 Old model spring caps are too large to fit through the driver. On these hubs, the spring and cap are removed after and installed before the driver. Otherwise the spring cap will be compressed between the cone and the bearing with damage to both. Upon installation the driver must be held in place against the spring until the cone is installed.

2 If thrust ring has top and bottom openings of equal diameter it must have a thrust washer on top of it.
DISASSEMBLY

Position axle as shown. Flatten dog ring lockwasher. Remove dog ring locknut, lockwasher and dog ring. Remove pinion return spring and washer. Invert axle and tap gently to dislodge washer. With axle still inverted push the two sun pinions up until the larger one engages the axle dogs. The low-gear axle key should be visible in the bottom of its slot. Push out axle key. Remove the two sun pinions and low-gear spring.

If pawls are to be removed, springs are best removed at that time. Riveted pawl pins can be removed only by drilling. Hollow pawl pins can be driven out with the correct size drift punch.

Slide light gauge low-gear spring over short-slot end of axle. Install primary sun pinion smooth face up and secondary sun pinion smooth face down. Push the two sun pinions along the axle so the larger engages axle dogs; invert assembly and slide in square low-gear axle key. Release the two sun pinions. If the hole in the axle key is not visible through the hollow axle, the key is not properly seated; remove and reseat. Insert washer and pinion return spring. Install dog ring. Install lock washer with key in axle keyway. Install unplated locknut rounded side up. Incorrect installation will cause shifting problems as this locknut has the threads relieved on one side. Push dog ring against spring until it seats over square-section part of axle and tighten locknut with a wrench. Bend up lockwasher to prevent nut from turning.

ASSEMBLY

Gear Ring and Planet Cage

If only pawl springs have been removed, springs may be fitted with pawls in place. Holding spring by hooked end, hook straight end around pawl pin beside pawl. Ease hooked end over the side or long end of pawl. Straight end must come to bear on piece body and hooked end on pawl slightly behind driving edge.

If pawls were removed, fit pawl, pawl spring and pin together. Make sure pawls are oriented as shown.

Gear ring pawl pins are slip fit, held in place by ball ring. Solid planet cage pawl pins must be lightly riveted over. Hollow planet cage pawl pins are driven in with a soft hammer.
STURMEY-ARCHER S5.1 5-SPEED HUB
DISASSEMBLY AND ASSEMBLY (cont.)
SUBASSEMBLIES

DISASSEMBLY

Driver, Hub Shell and Ball Ring

Remove dust cover with a thin-bladed screwdriver. Work slowly around cover to avoid deforming it. Lift out ball retainer.

Remove left-hand ball cup only if necessary. Cups with wrench flats are left-threaded, all others press fit. Support hub flange on two blocks of wood and pound out press fit cup with a third block and a hammer.

CLEANING

Clean all parts, including outside of hub shell and axle bore, in a suitable solvent. Be very careful not to introduce dirt or grit after cleaning.

POINTS TO CHECK

Part numbers followed by * refer to AW parts chart, others to S5 parts chart.

1. Clutch† (18*), gear ring dogs† (20*), planet cage (15) dogs, axle (13) dogs and primary sun pinion (10) dogs for rounding or chipping

2. Pawls (12*) (21*), ball ring (22*) and left-hand ball cup (3) for worn or chipped corners

3. Sun pinions (9) (10), planet pinions (16), dog ring (6) and gear ring (20*) for worn or chipped links or bent rod

4. Axle keys (11) (14) and indicators (19) for stripped threads, bent or damaged links or bent rod

† Rounding to a radius of so little as 1/64" at the corners can cause hub to slip out of gear

5. Clutch spring (32*), pinion return spring (7) and low-gear spring (12) for length and tension (compare with new spring)

6. All threaded parts for stripped or damaged threads

7. Dustcaps and ball retainers for straightness

8. Axle (9) for straightness

9. Bearing surfaces of left ball cup (3), ball ring (22*), driver (25*), cones (5*) and pinion pins (17) for wear and pitting

10. Replace ball retainers, loose balls and pawl springs at overhaul

LUBRICATION

Lubricate ball bearings by filling the spaces between balls with grease. Be careful not to grease pawls. Lightly oil other parts with a good cycle oil. (WD-40 is too light for lasting lubrication, 3-in-1 Oil gums up with age.) Add about two teaspoons (8 ml) of oil when assembled.