

FAULT-FINDING CHARTS

If a Sturmey-Archer variable gear hub is not working satisfactorily, first of all check the indicator adjustment, as explained in the chapter on 'The Fitting and Adjustment of Sturmey-Archer Hubs'.

If the trouble is sluggishness or stiffness in the gear-change, the cause may be lack of lubrication, so oil the hub and the control mechanism before continuing with the investigation.

If the hub is correctly adjusted and adequately lubricated but still does not work properly, look for the trouble in the following tables, where you will also find the cause and cure. If the cure is re-adjustment of the hub, refer to the chapter on 'The Fitting and Adjustment of Sturmey-Archer Hubs'. If new parts have to be fitted, consult the lists of spare parts and prices.

FAULT-FINDING CHART FOR SW, SB and SG HUBS

<i>Symptom</i>	<i>Fault</i>	<i>Remedy</i>
Slipping in low gear.	1. Planet Cage Pawls and or L.H. Ball Cup teeth worn.	1. Replace.
Clicking in low gear.	1. Faulty Indicator adjustment.	1. Re-adjust.
Slipping in normal gear only.	1. Gear Ring Splines and or Clutch Dogs rounded off.	1. Replace.
Slipping in high gear.	1. Planet Cage Pins and or Clutch Dogs rounded off.	1. Replace.
Slipping in both normal and high gears.	1. Gear Ring Pawls and R.H. Ball Ring teeth worn. 2. Pawl Ring and Gear Ring Dogs worn.	1. Replace. 2. Replace.
Hub runs stiffly.	1. L.H. Cone too tight. 2. R.H. Cone not correctly set. (See Assembly Notes.) 3. Chainstays not parallel. 4. Cycle Chain too tight. 5. Dust Caps rubbing. 6. Corrosion through wrong oil or lack of oil. 7. Too many balls in Ball Ring.	1. Adjust. 2. Adjust. 3. Correct. 4. Adjust 5. Replace. 6. Clean and re-oil. 7. Reduce to only 24 balls.
Sluggish Gear Change.	1. Bent Axle. 2. Worn Toggle Chain. 3. Guide Pulley out of line. 4. Frayed or corroded Control Wire. 5. Flick Trigger Unit not oiled.	1. Replace. 2. Replace. 3. Set correctly. 4. Replace. 5. Oil working parts.

FAULT-FINDING CHART FOR AW, AB, TCW and AG HUBS

<i>Symptom</i>	<i>Fault</i>	<i>Remedy</i>
No low gear (1st).	<ol style="list-style-type: none"> 1. Low gear pawls upside down or pointing in wrong direction. 2. Sliding clutch thrust collar not seating over axle key. 3. Incorrect axle spring. 	<ol style="list-style-type: none"> 1. Re-assemble pawls correctly. 2. Fit thrust collar correctly. 3. Fit correct axle spring.
Slipping in low gear (1st).	<ol style="list-style-type: none"> 1. Sliding clutch 'nosed' off, due to bad adjustment. 2. Indicator not screwed home fully. 3. R.H. cone wrongly adjusted. 4. Bad trigger cable ends or kinks in trigger wire. 5. Twisted indicator chain through over-tightening. 	<ol style="list-style-type: none"> 1. Fit new sliding clutch and adjust correctly. 2. Screw indicator home. 3. Re-adjust R.H. cone. 4. Fit new control cable. 5. Replace or refit as required.
Fluctuating between low gear (1st) and normal gear (2nd).	<ol style="list-style-type: none"> 1. Faulty or worn gear ring pawls. 	<ol style="list-style-type: none"> 1. Change both gear ring pawls.
Slipping in normal gear (2nd).	<ol style="list-style-type: none"> 1. Gear ring dogs and/or sliding clutch 'nosed' off due to bad adjustment. 2. Indicator not screwed home fully. 	<ol style="list-style-type: none"> 1. Fit new gear ring and/or sliding clutch. 2. Screw indicator home.
Slipping in top gear (3rd).	<ol style="list-style-type: none"> 1. Pinion pins or sliding clutch badly worn due to bad adjustment. 2. Very weak or distorted axle spring. 3. Incorrect R.H. cone adjustment. 4. Grit between clutch sleeve and axle. 	<ol style="list-style-type: none"> 1. Fit necessary new parts, and check adjustment. 2. Fit new spring. 3. Re-adjust. 4. Clean away grit.
Hub runs stiffly. Drag on pedals when free-wheeling.	<ol style="list-style-type: none"> 1. Too many balls in ball ring. 2. Cones excessively tight. 3. Chainstay ends not parallel. 4. Corrosion due to inferior oil or lack of lubrication. 5. Distorted dust caps. 	<ol style="list-style-type: none"> 1. 24 balls only should be fitted. 2. Re-adjust cones. 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. 4. Clean hub thoroughly and use only a good quality thin oil. 5. Check dust caps and replace those showing distortion, or signs of binding.
Sluggish gear change.	<ol style="list-style-type: none"> 1. Distorted axle spring. 2. Bent axle. 3. Worn toggle chain link. 4. Guide pulley out of line so that wire tends to ride up side of pulley flange. 5. Lack of lubrication of 'Flick' control, or frayed control wire. 	<ol style="list-style-type: none"> 1. Replace spring. 2. Replace axle. 3. Replace indicator and chain. 4. Correct alignment of pulley on frame. 5. Lubricate control or replace wire.

FAULT-FINDING CHART FOR FW, FC, FM, FG, ASC, AC and AM HUBS

<i>Symptom</i>	<i>Fault</i>	<i>Remedy</i>
No bottom gear.	<ol style="list-style-type: none"> 1. Thrust collar not seated correctly on axle key. 2. Low gear pawls upside down or reversed. 3. Bottom gear pawls stuck down (FG only). 	<ol style="list-style-type: none"> 1. Fit thrust collar correctly. 2. Re-assemble low gear pawls (not ASC). 3. Remove, clean, and lubricate.
Difficulty in engaging bottom gear. NOTE.—This must not be confused with the fact that a stronger pull on the control wire is necessary to engage low gear than for high and middle gears.	<ol style="list-style-type: none"> 1. Compensator spring bent and binding in the axle bore. 2. No lubricant on wire inside trigger cable. 3. Faulty coiling or distorted low gear spring. 4. Axle key bent. 	<ol style="list-style-type: none"> 1. Fit new spring (not AM or AC). 2. Lubricate 3. Fit new set of springs (not AM or AC). 4. Fit new key.
Slips in bottom gear.	<ol style="list-style-type: none"> 1. Bad trigger cable ends or kinks in trigger wire. 2. Compensator spring bent. 3. Faulty coiling of low gear spring. 4. Incorrectly fitted pawl springs. 5. Worn dogs on axle and inside low gear dog clutch (FM, FC, ASC) only. 	<ol style="list-style-type: none"> 1. Fit new control cable. 2. Fit new spring which should not be less than $1\frac{9}{16}$" over-all (not AM or AC). 3. Fit new set of springs (not AM or AC). 4. Fit pawl springs correctly. 5. Fit new axle and low gear dog.
Slips in 2nd gear in 4-speeds.	<ol style="list-style-type: none"> 1. Compensator spring set too short. 	<ol style="list-style-type: none"> 1. Fit new set of springs.
Alternates between bottom or low gear and normal.	<ol style="list-style-type: none"> 1. Faulty gear ring pawls. 	<ol style="list-style-type: none"> 1. Fit new pawls (not ASC).
Slips in low and top gears.	<ol style="list-style-type: none"> 1. Dog ring locknut loose (FW and FG only). 2. Secondary sun pinion locknut loose (FM, FC, ASC and AC only). 3. Weak low gear spring (FW only). 4. Dog ring teeth worn (FW only). 	<ol style="list-style-type: none"> 1. Examine dog ring teeth for damage. Tighten locknut. 2. Tighten locknut. 3. Fit new set of springs (K410B). 4. Fit new dog ring.
Slips in normal gear.	<ol style="list-style-type: none"> 1. Gear ring and sliding clutch worn due to bad adjustment. 	<ol style="list-style-type: none"> 1. Fit new parts, and check clutch spring.
Slips in top gear.	<ol style="list-style-type: none"> 1. Planet cage dogs and clutch worn due to bad adjustment or very weak clutch spring. 2. Incorrect R.H. cone adjustment. 3. Tight clutch spring or dirt clogging spring action. 	<ol style="list-style-type: none"> 1. Fit new parts, check clutch spring and re-adjust. 2. Re-adjust correctly. 3. Clean hub and/or fit new set of springs.
Hub runs stiffly. Drag on pedals when free-wheeling.	<ol style="list-style-type: none"> 1. Planet pinions not 'timed' correctly. 2. Too many balls fitted in ball ring. 3. Bad cone adjustment. 	<ol style="list-style-type: none"> 1. Re-time pinions. (See page 47 (FW, FG and AM only).) 2. Fit 24 balls only. 3. Re-adjust both cones.

FAULT-FINDING CHART FOR FW, FC, FM, FG, ASC, AC and AM HUBS—cont.

<i>Symptom</i>	<i>Fault</i>	<i>Remedy</i>
Hub runs stiffly. Drag on pedals when free-wheeling.— <i>cont.</i>	<p>4. Chainstay ends not parallel.</p> <p>5. Corrosion due to inferior oil or lack of lubrication or dirty internals.</p> <p>6. Distorted dust caps.</p> <p>NOTE.—The gear internals are rotated during free-wheeling in FM, FC, and AC hubs; therefore, providing cones are properly adjusted, a slight pull on the pedals and possibly rotation during free-wheeling is in order.</p>	<p>4. 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.</p> <p>5. Clean hub thoroughly and use only a good quality thin oil.</p> <p>6. Check dust caps and replace those showing distortion or signs of binding.</p>
No gear at all.	<p>1. Indicator rod broken or very nearly unscrewed.</p> <p>2. Pawls stuck by incorrect oil.</p>	<p>1. Fit indicator rod and re-adjust (not AM or AC).</p> <p>2. Lubricate.</p>
Sluggish gear change.	<p>1. Distorted axle spring.</p> <p>2. Bent axle.</p> <p>3. Worn toggle chain link.</p> <p>4. Guide pulley out of line so that wire tends to ride up side of pulley flange.</p> <p>5. Lack of lubrication of 'Flick' control or frayed control wire.</p>	<p>1. Fit new set of springs.</p> <p>2. Replace axle.</p> <p>3. Replace indicator and chain.</p> <p>4. Correct alignment of pulley on frame.</p> <p>5. Lubricate control or replace wire.</p>

FAULT-FINDING CHART FOR HUB BRAKES

<i>Symptom</i>	<i>Fault</i>	<i>Remedy</i>
Inefficient brake	<p>1. Oil-soaked or Greasy linings.</p> <p>2. Incorrect adjustment.</p> <p>3. Worn linings—rivet heads protruding and contacting drum surface.</p>	<p>1. Fit new linings.</p> <p>2. Re-adjust. See notes on fitting and adjustment.</p> <p>3. Fit new linings.</p>
Squealing brake.	<p>1. Loose brake-arm clip.</p> <p>2. Lining not tapered off at front edge causing vibration.</p> <p>3. Loose rivets in linings.</p>	<p>1. Secure clip properly.</p> <p>2. Fit linings correctly.</p> <p>3. Secure rivets firmly.</p>
Jerky brake.	<p>1. Hub drum pulled out of shape during wheel building.</p>	<p>1. Re-true wheel or re-build as necessary.</p>
Knocking or clicking noise.	<p>1. Loose hub shell rivets.</p> <p>2. Scored brake drum surface.</p>	<p>1. Fit new hub shell.</p> <p>2. Fit new hub shell.</p>

FAULT-FINDING CHART FOR LIGHTING UNITS

To test whether 'Dynohub' is generating, remove wires from armature terminals, re-tighten terminal nuts and connect a bulb known to be in good condition across the armature terminals; then spin wheel smartly. If bulb does not light satisfactorily, the armature may be faulty.

Connect one lead from a test meter to one of the armature terminals and touch the other lead on any of the armature laminations. If any reading is obtained, this indicates a short circuit between armature winding and the body. Test each armature terminal in turn.

Electrical Faults:

<i>Fault</i>	<i>Cause</i>	<i>Remedy</i>
Total failure.	<ol style="list-style-type: none"> 1. Faulty armature. 2. Broken wire in twin flex. 3. Burnt out bulb or broken filament. 4. Incorrect wiring connections. 	<ol style="list-style-type: none"> 1. Return armature for repair under Service Replacement scheme. 2. Test each wire for continuity. 3. Test each bulb with battery known to be in good condition or test for continuity of filament. 4. Check wiring against appropriate diagrams.
Low output. (Dim lights.)	<ol style="list-style-type: none"> 1. Magnet de-magnetized. 2. Bulbs which have been in use for a long time may not be 100 per cent efficient. 3. Incorrect bulbs. 4. Incorrect wiring connections. 5. Corroded Connections. 	<ol style="list-style-type: none"> 1. Return magnet to works for re-magnetizing. This can only be done at Works and unless keeper ring or armature is sent with magnet, a keeper will have to be supplied in order to return magnet. 2. Test bulbs with battery against new ones. 3. Check bulb ratings and see that they are correct. 4. Check wiring against appropriate diagram. 5. Inspect all Terminal and wire tags.
Partial Failure.	<ol style="list-style-type: none"> 1. Loose bulb or bulbs. 2. Frayed ends of twin flex. 3. Terminal nuts loose. 	<ol style="list-style-type: none"> 1. Check if bulbs are screwed fully home. 2. Check each terminal point. 3. Check nuts for tightness but be careful not to use too much force.
Frequent burning out of bulbs.	<ol style="list-style-type: none"> 1. Loose contacts. 	<ol style="list-style-type: none"> 1. Check all Terminals in Headlamp and Rear Lamp for tightness and ensure bulbs make firm contact.

Mechanical Faults:

<i>Faults:</i>	<i>Cause</i>	<i>Remedy</i>
Rubbing.	<ol style="list-style-type: none"> 1. Usually caused by grit between cover plate and inner dust cap. 2. Loose cones may permit armature and magnet to rub. 3. Dirt between armature and magnet. 4. The omission of the card disc carrying the patent numbers which must be fitted between magnet and cover plate. 	<ol style="list-style-type: none"> 1. The groove should be cleaned and filled with light grease. 2. Correct adjustment of cones will cure this fault. 3. The hub should be dismantled and cleaned if this is the cause. 4. Ensure that disc is fitted.