



**REAR WHEEL – PROCEDURE FOR REMOVAL AND REFITTING.**

**NOTE:** if you are replacing an earlier 3-spd Sturmey wheel (with steel hubshell) with a new Sturmey wheel (with alloy hubshell), you **must** use a new indicator chain (two marks instead of one) and a new Chain Tensioner Nut (longer than the earlier type), and a flanged black nylon chain-guide-disc inside the rear sprocket (with **no** dust-cap or spacer).

To allow wheel removal, one brake block should be removed, or the tyre deflated.

Whenever using new rear-sprocket(s), fit a new chain (**correct length**) as well.

subtext cta rem

**Removing the chain tensioner:**

Park the bike, with the gear trigger(s) in top gear and high gear(s) engaged (back pedal and forward pedal to engage).

Hub-gear control: on a bike with a Sram 3-spd, press the spring clip C on the adjustor A to disconnect the adjustor from the gear chain: on a bike with a Sturmey hub, slacken off the knurled locknut N and unscrew the barrel B.

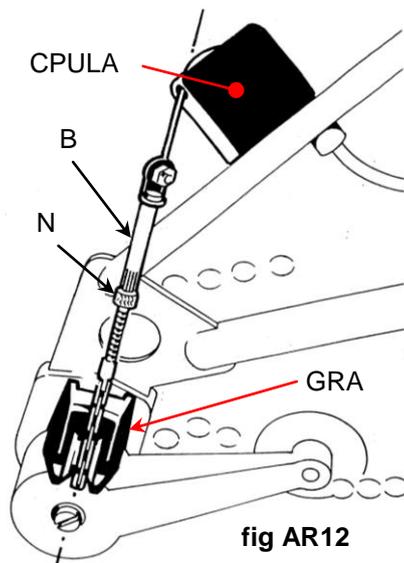


fig AR12

The gear (indicator) chain GICH will be left hanging loose from the end of the axle and should be unscrewed from the hub and withdrawn. On a 5-speed, the guide roller assembly GRA must also be withdrawn from the end of the axle.

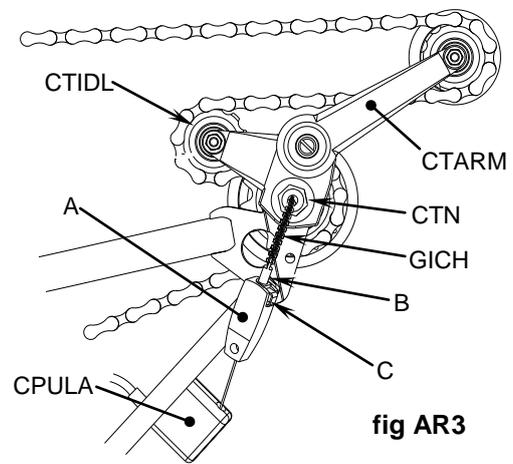


fig AR3

Move the sprung arm, CTARM, anti clockwise and lift the chain off; allow the CTARM to move back clockwise until it comes to a stop; undo the securing nut CTN (on a 3/6-speed this is a special nut, and on a 1/2/5-speed it is a standard wheel nut) and remove it together with its washer(s); the chain tensioner assembly may now be removed by drawing it sideways off the end of the axle.

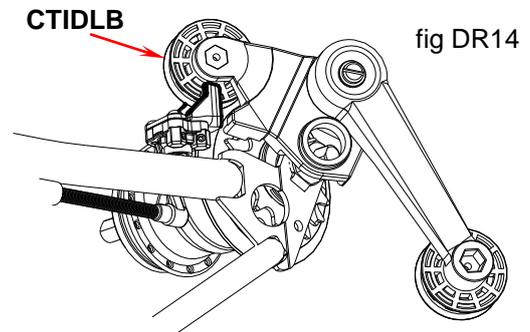
**Removing the wheel:**

Slacken the wheel nuts by few turns, enough to allow any tab-washer to disengage from the axle plate. If the axle or tab-washer tends to stick in the slots, push the rim from side to side or tap the axle end (with care, as the axle can snap).

**Fitting the wheel:** make sure the chain passes round the rear sprocket (as above, make sure you fit a new chain if using new sprocket(s)). Drop the axle into the slots, with the tab washers, if handed, the correct way round. On earlier bikes with a Sturmey hub and sintered tab-washers, the tabs on these washers under the wheel nuts must project **into** the axle slot, and it is these (not the axle) that should be in contact with the end of the slots on the frame. Otherwise make sure that on each side the axle is seated against the end of the slot, and do up the wheel nuts, torque 22NM

## Fitting the chain tensioner:

First arrange the chain so that it is running true over both chainwheel and rear sprocket (on a derailleur, providing high gear is selected, this should be the outer sprocket); next, the chain tensioner body has two flanges on its inner face - these pass either side of the axle plate when fitting the chain tensioner; address the chain tensioner to the axle plate and press home, making sure that the fixed idler sprocket CTIDL lies above (with the rear frame inverted) the chain as per fig AR3. For a derailleur bike, the chain and the fixed idler on the chain-tensioner-base, CTIDLB, have to lie between the "uprights" of the chain-pusher-plate: so, with the LH trigger up and the chain-tensioner inclined slightly outwards as in fig DR14 (chain not shown in this figure), feed the idler CTIDLB between these uprights, and then feed the chain-tensioner base onto the rear axle plate till it abuts squarely.



### Next secure the chain tensioner:

*on a 3-speed*, use the chain tensioner nut CTN and its washer.

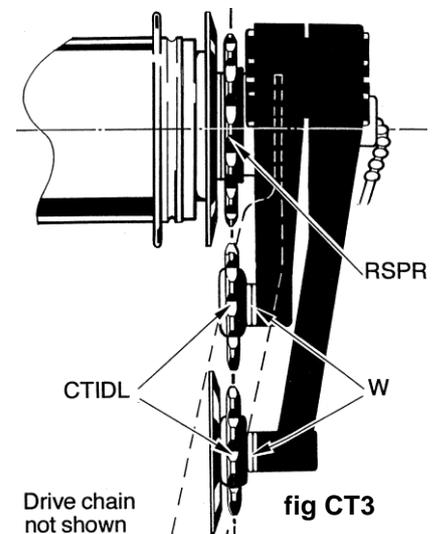
Though similar, the nut and washer needed on a Sturmey hub are different from those for Sram: the Sturmey nut should NOT be done up too tight, a little firmer than hand tight suffices (max torque 5NM). For a Sram hub, up to 8NM.

*on a 5-speed*, use a standard wheel nut, with the anti-rotation washer under this nut, and with the tab washer (TBW) abutting the chain tensioner. It is essential that the TBW, which provides location for the guide roller assy (GRA) is at the correct angle, such that the GRA aligns with the indicator chain when that is connected to the control cable. To obtain the correct position, screw on the nut, just tight enough to prevent the tab washer from moving: fit the GRA over the TBW, and turn it (and the TBW) clockwise until it points accurately towards the cable pulley assy. (CPULA). Remove the GRA, and do up the nut firmly, but not too tight (torque approx. 10NM): take care not to knock the TBW whilst doing this. Misalignment can cause poor gear selection and damage to the hub.

If fitting a new chain tensioner or wheel to a non-derailleur bike, check at this stage whether the idler wheels, CTIDL, are in line with the rear sprocket (fig CT3). If not, then check that the rear sprocket has the correct spacers: if these are OK, then add or remove washers W under the idler wheels to suit.

Now draw up the slack in the chain and feed it over the idler wheel on the sprung arm CTARM (you have to part-fold the rear frame to do this) - check that the chain is flowing correctly by turning the cranks.

For a bike with hub-gears, screw the indicator chain GICH into the hub, and make sure it is fully screwed home. On a 5-speed, fit the GRA and push it home firmly.



## Hub-Gear adjustment.

Adjustment of the gear control must be carried out with the bike fully unfolded (i.e NOT parked), and with the indicator rod screwed **fully home** into the hub (and backed off not more than half a turn to align with the cable). The aim is to make sure that the indicator rod & chain down at the the rear axle moves to the correct position in response to moving the trigger. For this the cable has to be running well: it must be free of kinks or sharp radii, with the cable pulley rolling freely.

While setting gears, you should ensure that the gear you select by moving the control trigger has indeed engaged in the hub, and to this end, each time you are moving the trigger, keep the wheel spinning forwards, and pedal back and forwards, to ensure the gear engages. It's easiest, when actually altering the setting, to have the cable slack: so select top gear and back and forward pedal a bit first.

If you cannot obtain a satisfactory setting, then the most likely cause is either the cable not running freely, or damage to the indicator chain itself, where it runs into the axle end. Otherwise, the fault may be with the hub internals.

### SRAM 3-spd gear adjustment:

The cable is made tighter by pushing the adjuster A further onto the grooved end B of the indicator chain GICH: to obtain a looser setting, the spring clip C has to be depressed.

You can usually get things right first time by moving the trigger into top gear, pulling on the adjuster (away from the pulley housing CPULA), and then feeding the grooved end B of the indicator chain into the adjuster until it is just not loose, i.e. *WITHOUT* pulling the indicator chain out of the axle at all. The setting is correct when:-

- with the trigger in top, the cable is just slack (with a *Brompton Y-trigger* fitted, there should be up to 5mm side-to-side movement at D-D, and with a *Sram Torpedo* trigger, rather less), in other words neither flopping around too much, nor taut. If, when you try pulling the adjuster A away from the CPULA, you can see any movement of the indicator chain back into the axle where it enters it, then the setting is too tight, and
- with the trigger in low, the indicator chain (where it enters the end of the axle) should either move not at all, or perhaps up to 1mm, when you pull the adjuster towards the CPULA (if it moves more than this, then the setting is probably too loose: on the other hand, if, while back-peddalling and moving the trigger slowly from mid- to low-position, you see that the indicator chain stops moving out of the end of the axle *before* the trigger has clicked into low-position, then the setting is probably too tight), and
- when pedalling forwards (under no load) and changing through the 3 gears, both up and down, all three gears are positively selected.

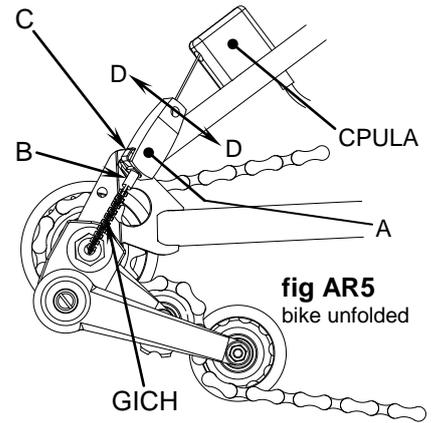
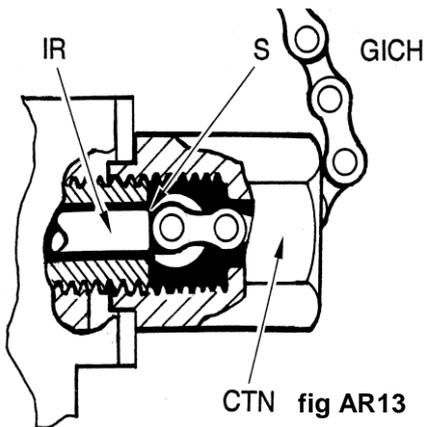


fig AR5  
bike unfolded

### STURMEY ARCHER 3-spd adjustment:

Adjustment is carried out by slackening the lock nut N, turning the barrel B to obtain correct setting, and relocking the nut N. Ensure the indicator rod is the correct length for the hub-type.



CTN fig AR13

**3-speed.** Engage top gear, then move the control trigger to the middle position: the step, S, towards the end of the indicator rod, IR, should be level with the end of the axle, visible through the hole in the CTN. Next, select bottom gear, then middle, then top, and check that all three are engaging correctly.

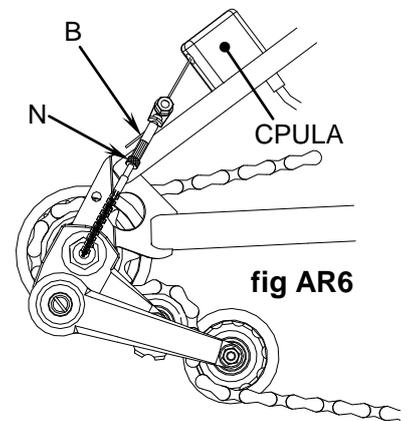


fig AR6

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### DERAILLEUR ADJUSTMENT.

After any changes or maintenance on the rear frame fittings or wheel, the settings should be checked. With a new chain pusher, the derailleur stop screws must be adjusted.

You should also be aware that, for satisfactory gear changes and smooth running, apart from these stop screws, two key elements of the system have to move freely: the actuator (or

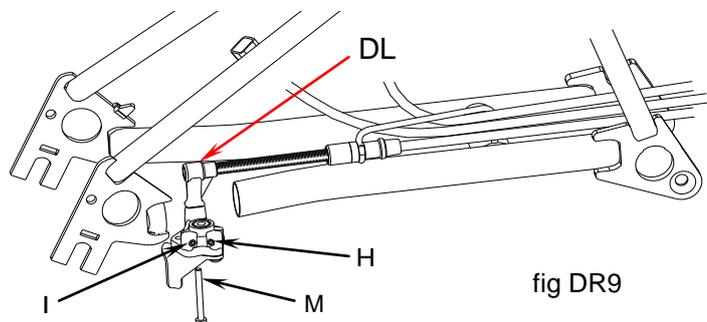


fig DR9

"chain-pusher"), and both idlers on the chain tensioner.

### Chain pusher adjustment.

Use the stop screws, fig DR9, on the chain pusher. The idea is that, in high gear, the inner face of the inner upright IU, fig DR16, shall be as close as possible to the idler wheel, without any rubbing pressure while the idler rotates (to give the slickest change with minimum wear): when the setting is right, you should just be able to see daylight between the two while turning the cranks *forwards*, perhaps with occasional contact. Use a 2mm hex key in the forward stop screw H for adjustment.

The same principle applies for the lower gear setting, only this time, fig DR17, the inner face of the outer upright OU has to just not rub on the idler, and the rear stop screw L is used for adjustment.

**Cable adjustment** should seldom be necessary, as the trigger moves the cable twice as far as the movement of the chain-pusher (an over-ride spring *inside* the dogleg DL absorbs this movement).

### Derailleur trouble shooting.

If the derailleur still malfunctions after adjustment, or if turning the adjustor screws has no useful effect, and there is no obvious sign of dirt

obstructing free movement, then the procedure for diagnosis is as follows. Step 1, remove the chain tensioner: this allows you to identify whether the problem lies with the idlers on the chain tensioner (they should be free to move in and out 7mm) or with the chain-pusher. If the chain-pusher does not move freely, and the cause is not obvious, try slackening the M3 screw slightly (there is supposed to be clearance). Step 2, remove this M3 screw completely: this allows you to identify whether there is a problem with the cable and the dogleg link DL (e.g. dirt on the spring, misalignment of cable and cable stops, etc.), or with the chain-pusher (e.g. hidden dirt, seized bearing: you may need to remove the chain pusher from the frame).

