

A bit of ATD theory!

ATD's can be a bit baffling! Occasionally members phone me, whilst fitting their magneto, to ask if their ATD is faulty.

The conversation goes like this... *"I'm fitting the magneto and just about to fit the ATD. When I hold the ATD in my hand it flicks back OK but as soon as I start to tighten it onto the magneto shaft it doesn't seem to flick back properly. I can move it backwards and forwards by hand but it seems to have gone stiff and won't flick back on its own. I've taken it off again but I can't find anything wrong with it. What's going on?!"*

Think of the ATD as a component that works in three stages....

1) the fixed gear picks up drive from the engine then.....

2) the drive is passed on to a flexible connection made of springs and bob weights, then...

3) the drive is collected from the flexible mechanism by a nut fixed onto the magneto armature shaft.

Remember that the gear is fixed because it is meshed to the camshaft gear, so the springs are trying to pull the magneto armature back to the 'at rest' position whilst one end of each spring is attached to the gear and the other end of each spring is attached to the armature shaft.

Now here's the critical bit.... (and the reason why the ATD doesn't flick back when stationary) ... the magneto armature is not free-floating because there is friction and magnetism in the magneto which prevents the armature responding fully to the pull of the springs. The friction/resistance is caused by the pickup brushes, earth brush, heel of the points, drag in the bearings and the attraction of the magnets.

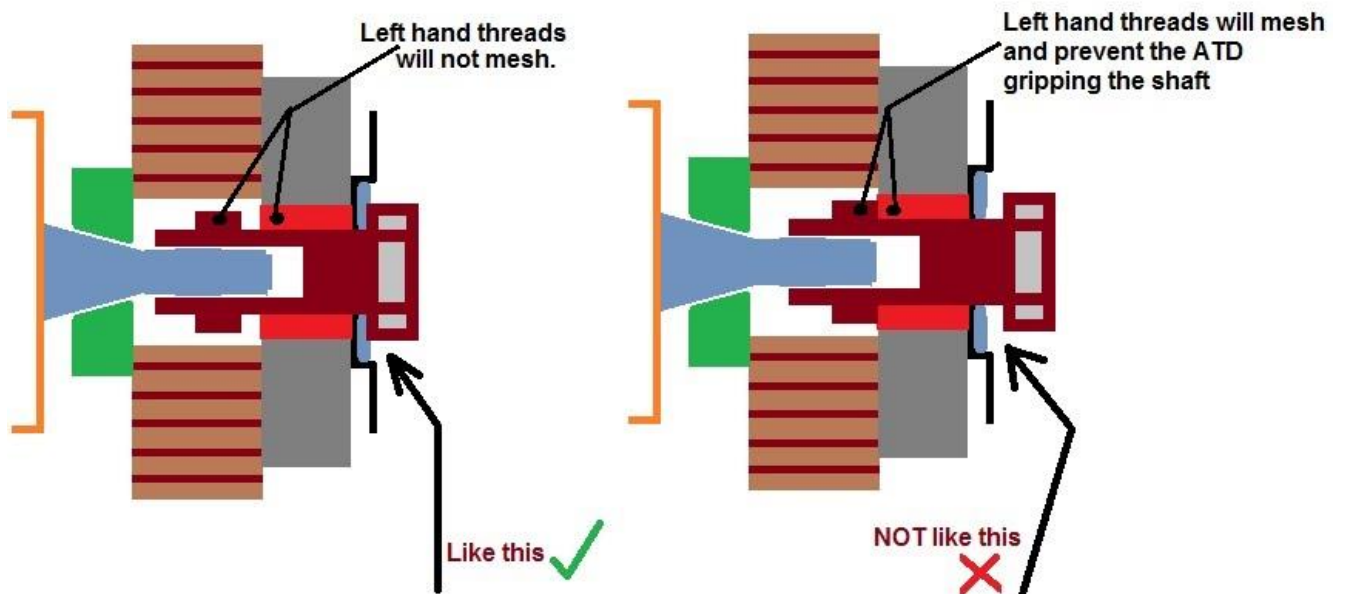
As the engine is turned over very slowly the friction is reduced because the parts are moving - sliding over each other, and the springs are able to pull the mechanism to its 'at rest' position. You can test this by turning the bike over slowly on the kick start and watching the ATD return to its fully retarded position - Hey Presto!

ATD units are not very sophisticated but they do need to work properly. The springs should be strong enough to return the unit to 'fully retarded' as the engine comes to rest - this will enable you to start the bike again without getting launched over the handlebars. They MUST have some 'pre-load'

If the springs are too strong they will prevent the magneto advancing soon enough which may cause overheating and sluggish running.

Springs which are too slack will advance the spark too soon causing advancement at kick start speed (kick-back) and spitting in the carb when blipping the throttle.

Tightening the ATD onto the magneto shaft isn't quite as straight forward as it looks!



When attaching the ATD to the magneto hold the nut, dished washer and C washer together so that the left hand threads don't mesh as you are tightening the nut.