TR3A Control Head Turn Signal Mechanism

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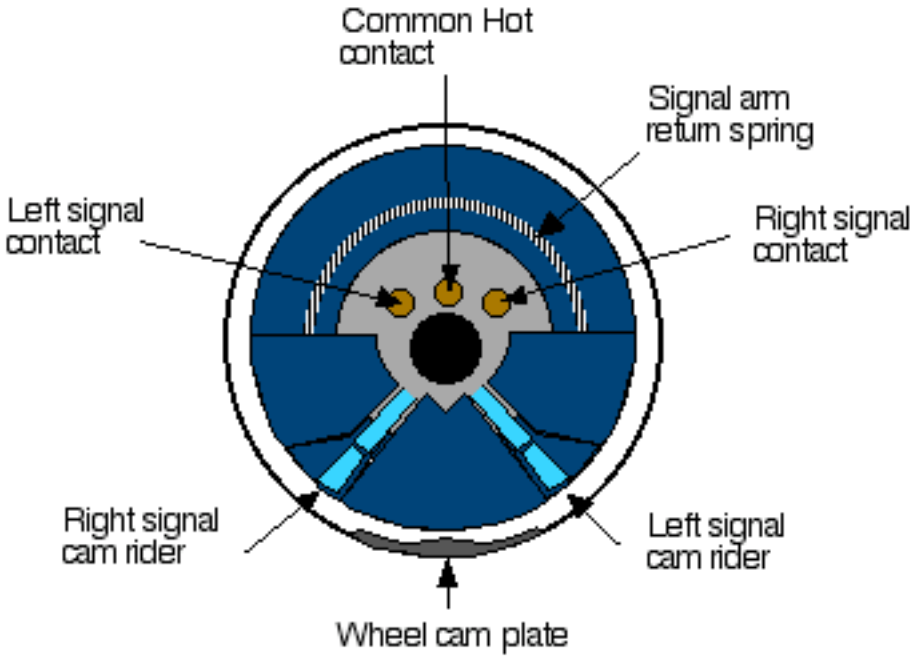
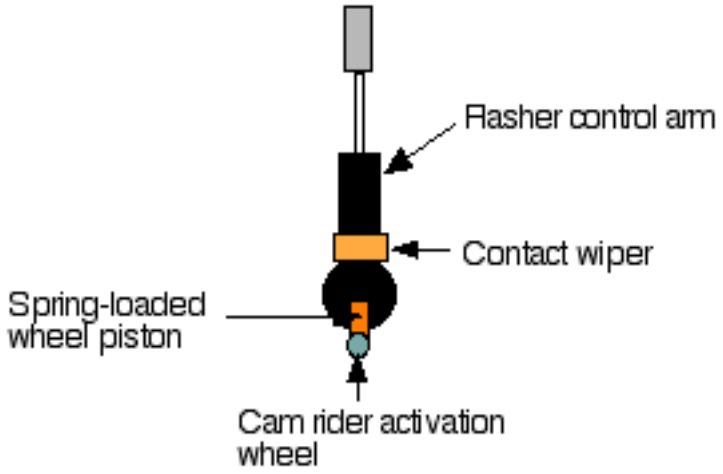
While correcting a horn problem, I had the occasion to disassemble and rebuild a TR3A control head. In the process I learned how the turn signal mechanism works – in particular the method by which the turn signal is turned off after the turn has been completed. I'll endeavor to explain the basics of this mechanism in this document. My terminology will likely differ from any professional manuals that detail the subject, but I hope to convey the basics.

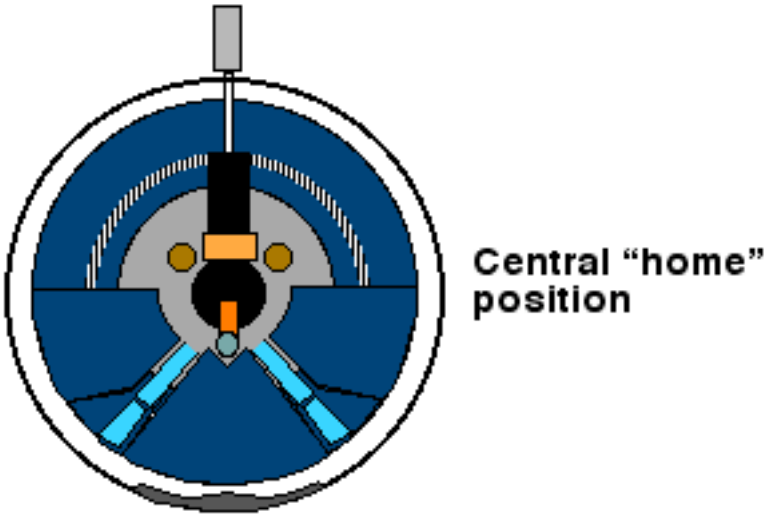
Leaving out the rather simplistic horn contacts and horn button, the control head turn signal mechanism consists of three main components – the control head contact plate, the turn signal arm, and the wheel cam ring and plate. The control head plate and signal arm are attached to the stator tube and remain stationary, while the wheel ring and cam plate rotate with the steering wheel. The wheel cam plate is normally located at the 6 o'clock position when the steering wheel is in the straight ahead position.



The control head contact plate is black plastic or bakelite and has three contact points – a common hot wire, the right turn signal contact, and the left turn signal contact. The central hot contact is connected to either the right or left turn signal contact by a spring-loaded wiper plate located on the signal arm. In addition, there are two "cam riders" which have spring-loaded joints, allowing these riders to bend at the middle. The wheel cam ring and plate make contact with these cam riders to return the signal arm to the home position after completion of a turn.



The signal or flasher control arm is equipped with a small spring-loaded square piston on its bottom edge. At the end of this piston is a small metal wheel which provide for smooth operation of the arm and also presses against the inner ends of the cam riders when either the left or right signal is activated. When no signal is activated, this wheel rests in a "V" shaped area between the cam riders.



To illustrate how all this works, assume we elect to activate the right turn signal. The spring-loaded piston/wheel at the bottom of the signal arm moves clockwise and presses down on the top of the right turn cam rider. This forces the right signal cam rider outwards and also pushes the piston/wheel into the cam rider slot, holding the arm in the rightmost position. Note that this also compresses right side of the signal arm return spring.

Right signal activated

As the steering wheel is moved clockwise during the right turn, the wheel ring and cam plate move past the right cam rider that is being pressed outwards. Note that the left cam rider is loose in its slot and has no effect. Also note how the shape of the control plate cam rider slot allows the spring-loaded cam rider to bend in the middle. This allows the cam rider to "ride past" the cam when the wheel is moving right or clockwise.

Right turn in progress

When the turn has been completed, the wheel cam ring and plate move counter-clockwise. However, when the plate again contacts the right cam rider, the shape of the slot will not allow the cam rider to bend. In this case, the rider is pushed upwards by the central raised area of the cam plate, compressing the spring-loaded piston/wheel.

Right turn recovery

As the cam rider presses upwards and pushes against the piston/wheel, the previously compressed signal arm return spring forces the signal arm back to the home position, allowing the wheel to come to rest in its central "V" shape rest area.

Problems associated with this mechanism

The most common problem associated with the turn signal mechanism is probably the inability of the signal arm to recover to the home position after a turn. As can be readily seen from the illustrations, the likely problem areas to examine are:

1. Spring-loaded square piston/wheel at the bottom of the signal arm. Is the spring broken or weak or missing or incorrect? There are two loose springs in the turn signal area of the control head – a small short spring the fits behind the wiper plate and ensures that the plate makes good contact with the common/left/right contact points; and a longer, more substantial spring the fits inside the signal arm and piston and supplies the pressure that forces the cam riders downward. Note that this is a substantial pressure – not light or "wimpy" – and it must push the piston/wheel out far enough into the cam rider slot to hold the arm in position during a turn.

2. Are the cam riders in the correct position and bending as they should? One end of each of the cam riders is sloped. This slope should point towards the bottom of the control head. In other words, the sloped side is what rides up the cam hump during the recovery stage of the turn. The flat side is what hits the hump during the turn and causes the cam rider to bend in the middle.

3. Are both signal arm return springs present and in position and intact? These two springs (one on each side of the signal arm) are threaded onto a half-circle of thick steel wire and supply the tension that forces the arm to return on its home position once the cam-rider has forced the piston/wheel upwards a sufficient amount to clear the top of the

cam-rider slot. There are two small washers threaded onto this steel wire also – they rest against the side of the signal arm and the springs rest against the washers.

4. Is the wheel ring and cam plate present and intact? There should be a small gradual hump on the inside of the cam plate. It is this hump that forces the cam rider upwards during the recovery phase of the operation. If this hump is worn down, it will not push the cam rider upwards a sufficient amount to push the piston/wheel above the top of the cam rider slot. In this case it may be possible to correct the problem by adding additional metal to the hump (silver solder perhaps?) or by slightly bending the cam plate inwards a bit.

If all of the springs, cams, and mechanisms appear in good working order, the problem is likely to be lubrication. Some light grease or oil on the top of the cam riders and the piston/wheel can help, as well as a drop of oil on the pivot point where the signal arm is joined to the control head contact plate.