REMOTE OPERATED WRENCH ADAPTER

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My invention relates to a remotely operated wrench adapter. In the following description, I will refer to a tool which is useful for adjusting the automatic transmission of an automobile, but it is to be understood that this tool is not limited to that specific use but is capable of many other uses.

The tool of the present invention is designed specifically for adjusting the automatic transmission of a car or other vehicle while it is moving. At the present time, the initial adjustment of an automatic transmission is made before the car is leaving the garage. The car is then driven to determine whether the transmission control linkage should be lengthened or shortened. If it is found that the transmission control linkage needs further adjustment, the mechanic leaves the car and makes the necessary adjustments under the hood on the driver's side. The car is then again driven to determine if any further adjustment is needed. This adjustment procedure usually must be repeated several times before an accurate adjustment is completed. This procedure is not only dangerous, due to traffic conditions, but it is also troublesome and time consuming.

It is the main object of this invention to provide a tool in the form of a wrench adapter which can be controlled from a remote location and which is particularly useful in adjusting the control linkage of an automatic transmission of a car so that accurate adjustment thereof may be made from within the car while in the driver's seat.

Another object of my invention is to provide a wrench adapter of the type indicated which can be readily mounted in association with the transmission linkage or other mechanism to be adjusted.

Another object of my invention is to provide a remotely controlled wrench adapter which is of such a nature that the wrench associated therewith will readily follow the nut being adjusted whether it is advanced or retarded.

Various objects will be apparent.

In the accompanying drawings, I have illustrated the preferred embodiment of my invention. In these drawings:

Figure 1 is a view partly in longitudinal section and partly in side elevation illustrating a tool in which my invention is embodied.

Figure 2 is an end view of the adapter taken along line 2—2 of Figure 1.

Figure 3 is a transverse sectional view through the adapter taken along line 3—3 of Figure 1.

Figure 4 is a similar transverse sectional view, but taken along line 4—4 of Figure 1.

Figure 5 is an enlarged longitudinal sectional view taken through the adapter and showing it associated with the linkage to be adjusted.

Figure 6 is a transverse sectional view taken along line 6—6 of Figure 5.

Figure 7 is a diagrammatic view illustrating how the adapter is used to adjust the linkage of an automatic transmission.

Figure 8 is a diagrammatic view illustrating how the adapter can be operated from the driver's seat of a car.

With particular reference to the drawings, the tool is shown in Figures 1 to 4 inclusive, including a casing 10 of tubular form. The forward end of this casing 10 converges into a smaller clamping socket portion 11 which is of substantially U form in cross section being open at one side, as shown in Figure 2. The top wall of this portion 11 receives the clamp bolt 12 which is threaded therethrough. Within the casing 10, an adjusting sleeve 13 is rotatably disposed. This sleeve 13 has a socket 14 of hexagonal or other suitable form in its forward end.

The sleeve 13 is disposed between the converging forward end 15 of the casing 10 and a flanged bearing sleeve 16 threaded into the rear end of the casing. The sleeve 13 is provided with a bore which receives an extension 17 at the rear end of the adjusting sleeve 13, the extension being rotatable therein. Threaded on the rearwardly projecting sleeve 16 is a cap 18.

Removably-fitting in the extension 17 of the adjusting sleeve 13 is the angular inner end of a cable or flexible shaft 19 by means of which the sleeve 13 can be rotated within the casing 10. This cable 19 is enclosed within a removable flexible tubular sheath or housing 20, the cap 18 cooperating with the flared forward end 21 thereof to anchor it to the bevelled outer end of the sleeve 16 and thereby to the casing 10. A wrench-receiving nut or hand knob 22 is rotatably mounted on the outer end of the sheath 20 and is non-rotatably anchored to the outer end of the cable 19. Within the adjusting sleeve 13, a compression spring 23 is provided. The rear end of this spring fits in a cap 26 in the sleeve and its forward end fits in a cap 27 in the member 24. Outward movement of the member 24 relative to the sleeve 13 is limited by means of an annular shoulder 25 provided at the inner end of the hex socket 14, as shown in Figure 1.

As previously indicated, this wrench adapter may be used in various ways, but as shown in Figures 7 and 8, it is used for adjusting the linkage of an automatic transmission of a car from a remote location, such as the driver's seat. This mechanism may include the accelerator rod 30 which has a lock nut 31 threaded thereon and an adjusting nut 32 threaded on the extreme outer end thereof at opposite ends of a trunnion block 33 which is provided with a trunnion 34 carried by linkage 35. The object of the adjustment is to thread the nut 32 inwardly or outwardly on the threaded rod 30 to move the rod axially relative to the trunnion block 33 through which the rod 30 slidably passes.

To accomplish this adjustment, the lock nut 31 is first backed off away from the trunnion block 33 on the rod 30, as shown in Figure 5. The end socket portion 11 of the casing 10 is slipped laterally over the nut 32 and then is moved axially inwardly over the nut 32 and the block 33, as indicated in Figure 5. The U-shape socket portion 11 will engage the block 33 to prevent rotation thereof. The bolt 12 is tightened to clamp the casing 10 to the trunnion block 33, at which time the nut 32 will be within the hex socket 14 formed in the adjusting sleeve 13. The inner end of the rod 30 will contact the friction member 24 and if such end projects inwardly, a sufficient amount will move the member away from the shoulder 25 and compress the spring 23, all as shown in Figure 5. If it is found that the rod 30 should be, in effect, shortened by moving the nut 32 inwardly thereon, the knob 22 is turned in a clockwise direction and its motion is transmitted through the cable 19 to the actual wrench member, which includes the adjusting sleeve 13 and the hex socket 14, thereby turn-
ing the nut 32 down on the rod 30 and pulling the rod through the trunnion block 33. The spring 23 is further compressed by this action and will serve to push the rod 30 outwardly, thereby causing the nut 32 to contact the inner end of the trunnion block 33 and, consequently, locking the nut 32 in adjusted position by this frictional contact. If the rod 30 needs to be, in effect, lengthened, the knob 22 is turned counter-clockwise, causing a similar rotation of the adjusting sleeve 13 and hex socket 14, thereby backing the nut 32 on the rod 30 and permitting the spring 23 to push the rod 30 farther out of the casing 10. All of these adjustments can be made as indicated in Figure 8 from the driver's seat, even while the car is moving. When the adjustments are completed as needed, the bottom lock nut 31 is adjusted tightly against the trunnion block 33 and the adapter is removed merely by loosening the bolt 12 and slipping the casing off the trunnion block 33 and the adjusting nut 32 carried by the rod 30.

It will be apparent that my remotely controlled wrench adapter provides a simple and inexpensive device, whereby the adjustment of an automatic transmission may be made safer, quicker, with less effort, and more accurately than by present methods. The device can be easily mounted on and removed from the linkage to be adjusted. My device is so made that whether the adjusting nut is advanced or retarded relative to the threaded rod, the adjusting socket will readily move with the nut. Also, the plunger structure will keep the adjusting nut in contact with the trunnion sleeve by exerting a push on the rod with which it frictionally contacts.

Various other advantages will be apparent.

Having thus described my invention, what I claim is:

1. A wrench adapter comprising a tubular casing having a socket portion at its forward end for receiving a first member carrying a second member to be adjusted axially relative thereto, clamping means on said socket portion for clamping the first member therein, and a socket wrench rotatably disposed within the casing for receiving a third member on said second member to be adjusted axially relative thereto.

2. A wrench adapter according to claim 1 in which the wrench member is in the form of a sleeve having an adjusting socket at the outer end thereof, and a plunger within the sleeve for engaging the inner end of said third member within said socket portion.

3. A wrench adapter according to claim 1 in which the side of said socket portion is open to permit lateral insertion therein of the first member and such member and the socket portion are of complemental angular form to preclude relative rotation.

4. A wrench adapter comprising a tubular casing converging at its forward end into a socket portion of U cross-section, a clamping bolt extending through one wall of said socket portion for engagement with a member to be disposed therein, an adjusting sleeve rotatably mounted in said casing and having an adjusting socket in its forward end for receiving a member to be adjusted, a friction member projecting into the inner end of said socket and normally urged into said socket by a compression spring disposed within said sleeve, and means for rotating said sleeve.

5. A wrench adapter comprising a tubular casing having a clamping socket at its forward end, a socket wrench rotatably disposed within said casing, means for rotating said wrench, said wrench including a socket for receiving a nut carried by a threaded member, said socket having an opening at the inner end thereof through which said threaded member may project, and a spring-plunger unit for engaging the inner end of said threaded member.

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