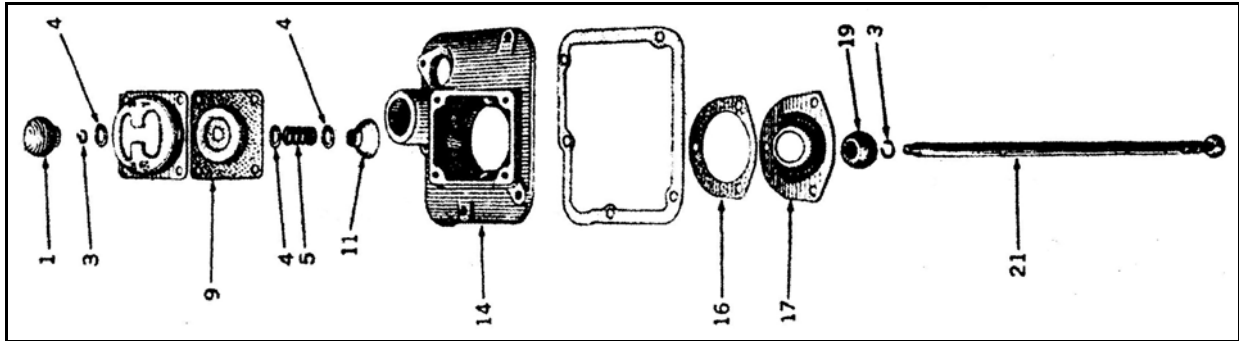


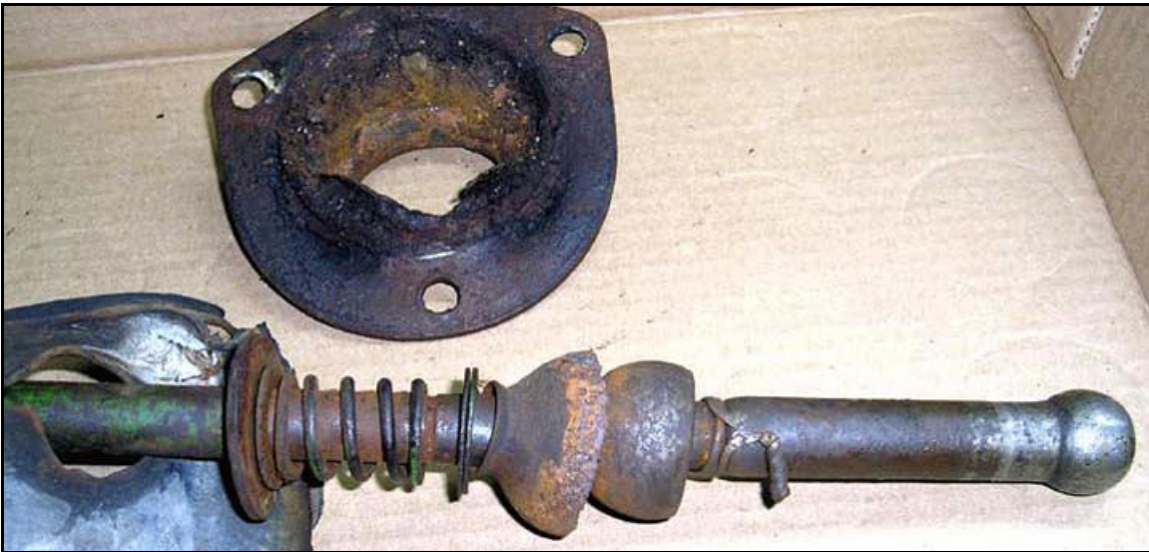
# REBUILDING THE GEAR SHIFT

Excerpt from John Deere "H" Restoration Guide  
4-9-2010



**Figure 406. The Gear Shift -- Illustration (1940 - up)**

The initial discrepancy report item read something to the effect: "Found H378R cover (11) and H718R socket (17) rusted to Smithereens". Before it was over, nearly every item along the H722R lever (21) was replaced except the lever itself and the Handle Ball (knob) (1). Even the lever was machined some! Truly, this was a worst-case rust bucket.



**Figure 407. A Better than Average Find!**

Work began with PB Blaster applied, followed by a soak, then heat along with patience and persuasion for total disassembly which included removal of H717R ball (19). The ball was so deeply pitted that it was beyond recognition had it not been on the lever!

On the H722R lever (21), you should find two grooves milled into the lever that are to accept B387R snap rings (3). This interface is the design weakness of this tractor's gear shifter, and of the A's and B's (1941 and up) and all the G's out there too! The snap ring, as a result of age, is no longer a good match for the groove - if it ever was. The most widely accepted work-around in the John Deere Restoring Community

is to weld a modified 5/8 inch lock washer (bent straight) in for a snap ring at the lower groove; this being just under the H717R ball for the JD "H" tractor. I am told this same fix is to be used for the upper groove as well, but I found an upper welding fix to be impractical because it makes final assembly extremely difficult. You have to have welding capability and perform final assembly at the same time, same place! And in addition, to weld an upper ring in place makes later maintenance actions much more difficult.



**Figure 408 (A&B). External Clip EC-62 in Use, and Compared with B387R**

Rather than a second weld, a decision was made to have the upper groove slightly enhanced on a lathe. The machinist found the lever to be very tough and hard indeed! At any rate, so little was removed that it is fair to say the upper groove was "cleaned up" on the lathe. It was soon learned, however, that the B387R snap ring still would not hold even after "enhancement" of the upper groove. Some experimentation and struggle brought forth a solution in the form of a **5/8 inch External Clip**. It did the job nicely. The clip is not quite as thick as the B387R and so fits down into the lever groove much better.

**The Order of Things** -- With lessons learned, a complete inventory of parts on hand, and a H723R (9) leather seal that was conditioned with a light leather oil, final assembly of the gear shift subassembly can proceed. It is imperative that the H701R/H702R casting (14) IS NOT involved until AFTER the upper snap ring (now an EC-clip) is in place. **Begin:** Weld modified 5/8 inch lock washer in place of the lower B387R snap ring, and then (in order ref fig 406), onto the H722R lever shaft (21), install H717R ball (19), H718R socket (17), H719R gasket (16-dry), H378R cover (11), B2274R washer (4), D377R spring (5), B2274R washer (4), H723R leather seal with its crown up (9), and B2274R washer (4). You are now ready for a compression job!

**Pretreatment** -- Treatment of the H723R leather seal (boot) is best done with Neat's-foot Oil. However, readers are having trouble find this product. Also, many commercial so-called Neat's-foot products contain substantial amounts of petroleum additives. Thus, a two or three-day soak of the H723R in ordinary engine oil will generally prove satisfactory.

**Compression** -- Once again, **special tooling** comes into play. See figure 409A. Here, a combination was used: a 3/8 x 6 inch machine bolt with two nuts to hold a **5/8 inch crowfoot wrench** with 3/8 inch drive, a bench vise, and a person to help. I inserted one end of the stack-up into the crowfoot wrench and applied pressure sufficient to compress all elements installed on the lever while my helper snapped the EC-62 external clip into place. Removal (straight up) is all that remained, and it went like clockwork.

To put a wrap on final assembly, insert lever subassembly up thru H701R/702R casting, being gentle with H723R leather seal so as to work it up thru the casting. Flip this group over. Then bolt and safety wire H719R gasket and H718R socket to casting (no Permatex needed here). See figure 409B.

With cover and gear shift back upright and in place, temporarily install 5/16 x 9/16 inch long cap screws to secure H723R leather to H701R/H702R cast cover. See figure 408A.

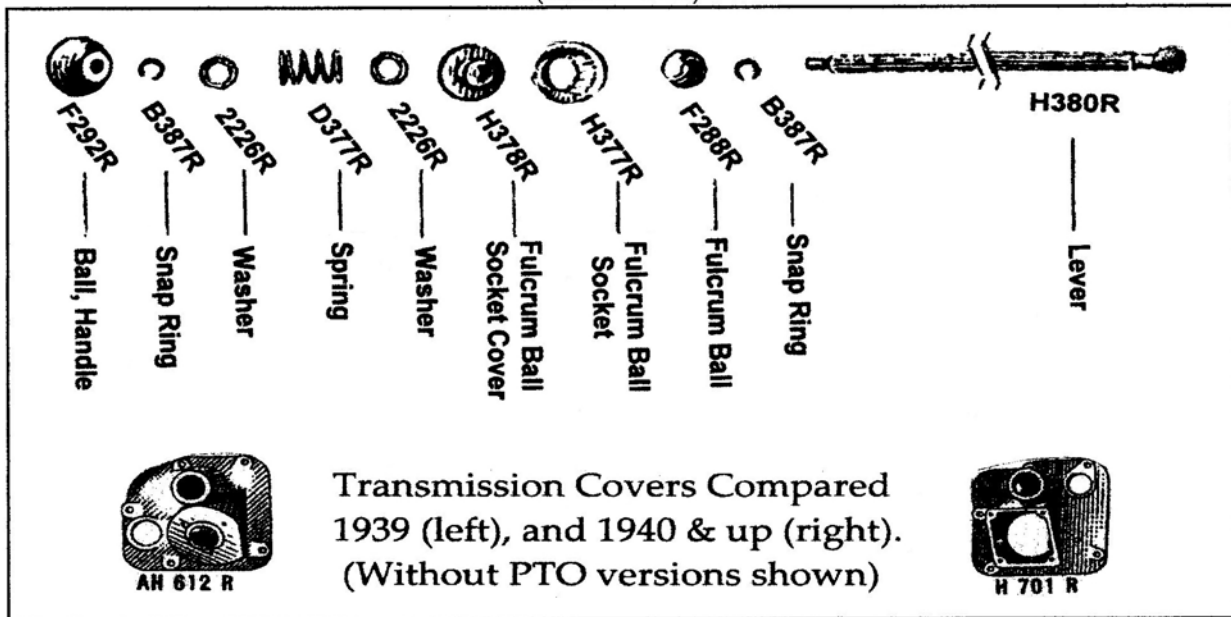


**Figure 409 (A&B). Crowsfoot Wrench w/bolt, & Socket Safety-Wired in Place**

All that remains is installation of H721R quadrant and F292R shift ball, both left to one's discretion, depending on the relevant "final assembly and paint plan". Unit is otherwise complete.

### The 39-H Gear Shift Assembly

(H1000 - 9999)



**Figure 409C. The Gear Shift Illustrated - 1939**

Shown in figure 4-1 (at left - above) is the transmission cover with H377R fulcrum ball socket installed. This socket is a near-press-fit into the cover, making removal a bit of a challenge. To remove the gear shift assembly, remove the F292R ball handle (The handle unscrews from the gear shift lever), and remove the three small cap screws securing quadrant. Lift quadrant away. Reinstall the F292R ball handle to assist in removal of the gear shift assembly which is not easy, and is best done by means of penetrating fluids, moderate heat, and gentle tapping and prying around the outside of the fulcrum ball socket.



**Figure 409 (D&E). 39-H Gear Shift Assembly (left), and Transmission Cover Port (right)**

Trouble with the snap rings? This is not unusual. For the bottom, it is becoming customary to spot-weld a ring in place. The ring can be an old B387R snap ring, or a 5/8" lock washer with the bend taken out of it. For the top snap ring, a few choices exist. If you are real adept with a small Dremel™ type grinding disk, you might try enhancing the groove in the gear shift lever. There is the EC-62 External Clip solution as outlined in earlier text. One enterprising fellow proposed drilling at the groove so as to insert a cotter pin (tricky at best - and may weaken the gear shift lever at a critical point).

Once inspection and repairs are completed, reinstall by reversing disassembly steps above. Ensure the fulcrum ball, its socket and cover are well treated with bearing grease during build-up. Apply a coating of Permatex 2B™ (or equivalent) to the interface of the fulcrum ball socket and transmission cover. You will note that the three holes for mounting the quadrant are not symmetrical. The quadrant piece will fit only one way. In the unlikely event the quadrant base plate breaks away from the "top hat" part, observe the "up" orientation of the base plate BEFORE welding so that its "up" direction is coincident with the "up" direction of the "top hat" part.

For more information on history of the JD "H" tractor over its years of production, see our main book, **John Deere Model "H" Restoration Guide**. Go to Home Page to order. ++++