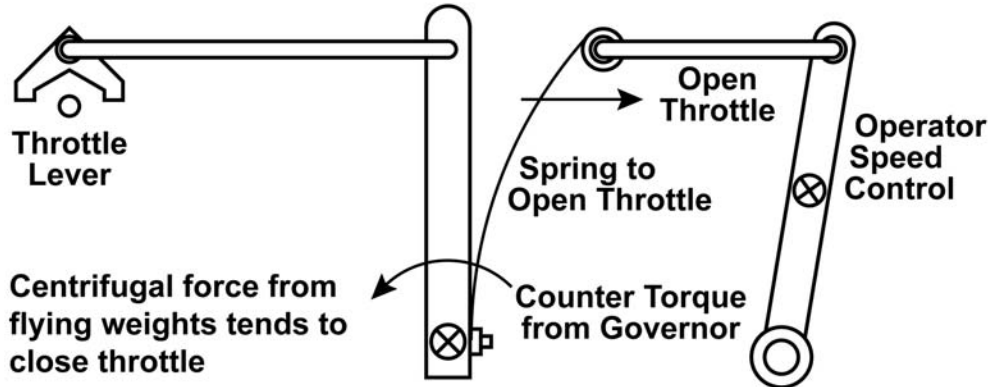


# The Governor-1

(JD-H Tractors, Part 1 of 2),  
7-13-2010

**Governor** -- JD tractors use a flying-weight design to control engine speed over a wide range of varying load conditions. This is accomplished via a fairly simple relationship between the governor shaft and throttle lever. Most speed-control troubles are a direct result of binding linkages or improper linkage adjustment between the governor and throttle. The assembly is lubricated by a line from the oil pump.



**Schematic Diagram, Typical JD Governor**

**General** -- The JD governor is a multi-function assembly. Its primary function is to control engine speed over a wide range of varying load conditions. For best governor action, there should be no significant play in the fly-weight mounting brackets nor in the weight pins. Bearings are to be examined in accord with criterion set forth earlier in this chapter. Look for excessive wear of the lever driving the throttle control shaft. Finally, quality performance depends on the linkage adjustment between the governor and carburetor throttle. Secondary functions are to drive the cooling fan (plus the generator if tractor is so equipped), and the magneto via a coupling at the end of the governor shaft. Inspect the magneto flange and renew as needed. As always, a thorough cleaning makes inspection more effective. The governor-fan shaft interface is a complex and challenging area to restorers of JD tractors.

**Governor Functional Test** – Grasp the governor throttle arm in your right hand, then the carburetor throttle lever in your left. Advance (open) the throttle lever and immediately observe the counter torque of the governor (right hand). The higher the engine RPM, the greater should be the governor's counter torque – trying to close the throttle lever.

**~~~ For JD-H Owners – See Governor-2 ~~~**

*John Deere Model "H" tractors, before tear down, be certain to see [Article Governor 2](#) for WARNING NOTES, plus complete Governor Removal, Overhaul, Adjustment, and Reinstallation Instructions.*

## **Governor Bearings, Model "H", "R", 80 & 820/830**

**Governor and Fan Shaft Bearings** - When you think of Two-Cylinder John Deere tractors, Models A, B, D, G and H come to mind – all Waterloo tractors. And then there were Models R, 50, 60, 70, 80, 520/530, 620/630, 720/730, and 820/830 tractors to supersede these basic beasts of burden! One feature all these

tractors had in common was three-piece automotive ball type bearings in their governor and fan shaft assemblies. Each bearing contains nine or ten small balls to carry the load.

**Why Ball Bearings?** – Up through the design and build time eras for these tractors, the ball bearings chosen were in wide use for automobiles AND are fairly low cost to manufacture, plus – they were up to the task! And so availability, cost and utility made the choice. With the advent of the 1960's, automotive use of ball bearings in front wheels generally stopped. Decreasing demand for a bearing means fewer folks will build it! The follow-on reaction can be a steep price rise as witnessed by the dealer price tag for JD7150 (sub) @ roughly \$125 for JD-H tractors. NOS JD7150 is very hard to find. (JD7150 is the top part number for the three parts JD7151R + JD7152R + JD7153R).

**Bearings are Worn Out** -- Anyone taking a governor or fan shaft assembly apart will observe that the inner cone and bearing cup will be well worn. And while the bearing looks serviceable and rotates smoothly, if they are original, they are worn out! Time in service (re: fatigue) aided by marginal lubrication make the statement over and over!

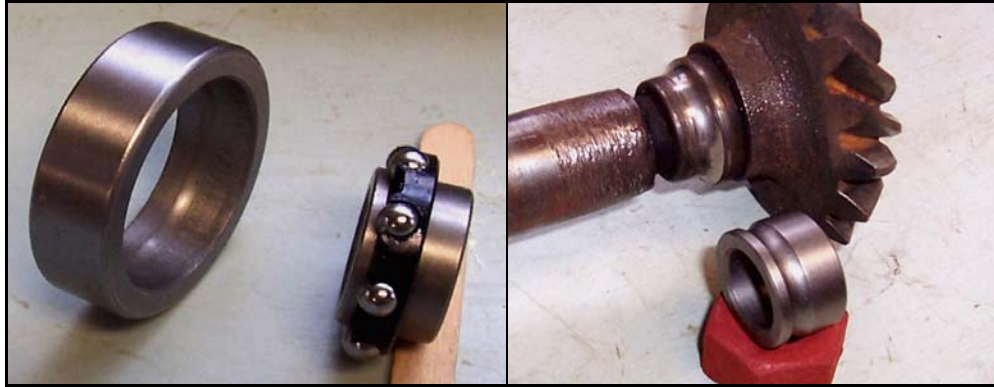


**This is the Original Bearing Configuration; Three Parts**

**Spiral-Bevel Gears at Risk** - When these bearings wear, the shafts move – fan shaft toward the front of the tractor and governor shaft toward the flywheel side. I have viewed one case where bearing thickness decreased by over 0.030" – that's the thickness of two thin paper shim gaskets! Such movement of either shaft increases the spacing (gear heel & mesh) between the precious fan drive and pinion (spiral-bevel) gear set. In turn, these gears take on a new wear pattern, using less and less of the entire gear tooth to carry the load. Perhaps a scheduled adjustment of fan shaft backlash each season would have been wise preventive maintenance. And so during restoration, measure bearing thickness. When new, JD7150 = 0.688". If you have original (worn) bearings in these applications, you likely will have lost at least 0.020". This is a sure sign that the sooner you replace them, the better.

## **NOS Quality Replacements – Hard to Find!**

**Governor Bearings** -- The original bearings for the JD-H governor were by New Departure, a source now dried up! The bearing comes in three parts (JD7151, 7152 & 7153). An altered design replacement is now supplied by Deere under part number JD7150. The main warning for you is that the current dealer part JD7150 IS NOT configured the same as the original parts. In the new dealer JD7150, the bearing's rolling balls are retained by a flimsy, soft rubber gismo. If alignment isn't just right when mating the parts, you will be down on your hands & knees searching for balls! 'Not a very good deal @ \$125 a pop!



On the left, is the Deere JD7150 bearing. Note the black bearing ball retainer -- it made of very soft, jelly-like rubber, and once installed may even cease to exist (don't know!), but if so -- are the bearing balls being held captive by the other two parts -- or will they escape? In the right side photograph, you see one part of each bearing compared, original bearing on the shaft.

### New Product Now Available

New to "the community" are tapered roller bearings (like a Timken) for governor and fan shaft applications. Models H, R, 80, and 820/830 tractors all take the new JD7150 bearing. The tapered roller bearing replacement is now here!



### New Roller Bearing Assembly; Two Parts

**Roller Bearing Advantages** – Increased surface contact area of the roller bearing design versus the ball bearing will result in longer life. Tapered rollers are designed to handle radial/axial (thrust) loads, and it is determined that the governor and fan shaft springs are ideal for loading tapered rollers!

**Biggie Advantage** – An immediate, perhaps more valuable advantage comes into play during the build-up phase of your tractor. With a two-piece bearing, there's no bearing cage to fall out of position or alignment. This happens to many first-timers and also to very senior restorers; and it's frustrating! These bearings have no free or floating parts.

**Governor Bearing Central** – Perhaps you print these pages out and hang them in your workshop. JDHPUBS.com has now become the prime place to find governor and fan shaft bearings for all H, R, 80 and 820/830 JD tractors. Quality is tops and you will like the prices too! JD7150 bearings are expected to continue to sell for roughly HALF of the current dealer price, plus shipping. JDHPUBS.com will also carry JD7654 (front fan in ball bearing form) – so if in need, please ask us when you call. Contact Pat Browning by using website [www.jdhpubs.com](http://www.jdhpubs.com), or call (386) 624-7916 to learn more and/or to purchase.

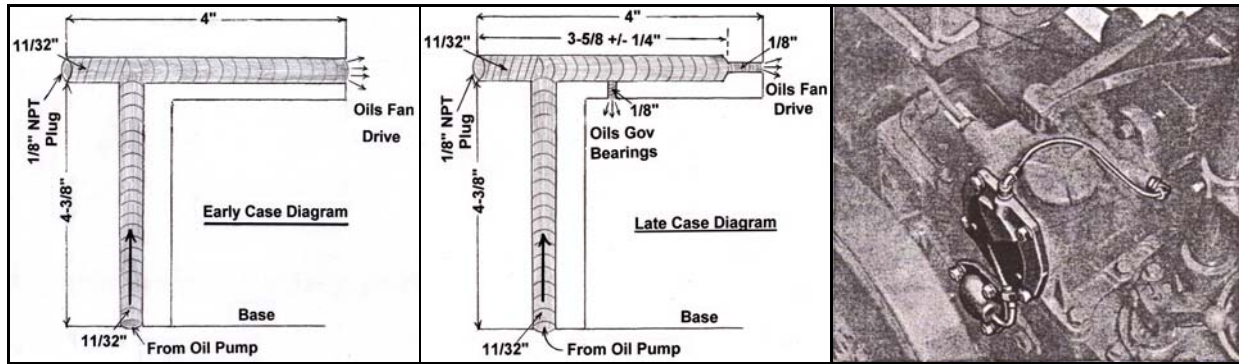
## **John Deere "H" L.H. Bearing Housings (Configuration Analysis)**

**Left Hand Bearing Housings** -- While the governor remained the same over the years of JD "H" production, not so the L.H. governor bearing housing. The L.H. governor bearing was housed by four physically different castings with three different part numbers. The driving issues were: (1) power lift unit and (2) a need for increased oiling of the left camshaft bearing through H-17580. The oiling problem resulted in issuance of field changeover assemblies or kits.

**1. Power Lift** -- For early tractors, governor shafts were similar to their A, B and G counterparts -- the left end terminating with a ball bearing assembly with a rather flat bearing housing or cover. Beginning at H-27000, a longer governor shaft with a splined extension became the standard. The shaft extension was needed to drive a hydraulic power lift control unit that would bolt onto the governor casting in place of the H396R left bearing housing. As such, its function had to include housing the L.H. governor bearing. Casting H396R was changed -- driven by the longer shaft. Thus, for tractors not equipped with a power lift, the changed bearing housing (called the "pointy" one) provided sufficient room for the extended shaft. The part was changed, but not the part number. The reason is that the later version of H396R is fully serviceable on earlier units! Power lift unit installation on tractors before H27000 required the new, longer shaft be installed in the governor unit.

Thus, working a tractor with power lift makes the governor-fan shaft assembly more difficult to manage! The odds are that the tractor was operated for years without using the power lift -- also ignoring its lubrication needs. These power lift units are often found to be worn-out rust buckets. As a result, many owners decide to remove it from the tractor entirely. When you do, two choices exist: (a) find an AH1223R (with later version H396R casting) L.H. governor bearing housing with elongation designed to envelop the longer governor shaft (the "pointy one"), or (b) find an earlier vintage governor bearing housing such as an early AH1223R, or AH1222R (H802R casting) and shorten the long shaft! In so doing, be mindful that a neat feature is given up: the JD "H" power lift is "live". So long as the engine is running, the unit is being driven. When the lift unit is removed, you should install **H898R (Safety) Extension**, PC304, page 29-16. On tractors H28840 and earlier, one will need to match-drill two holes, 11/32 inch in diameter, into the AH608R platform to facilitate mounting H898R.

**2. Field Changeover Assemblies** -- External oiling kits were announced in FSB 121-S, 15-May-1941 (Late point of 1941 production), for tractors produced 14 to 33 months beforehand, and 14 months AFTER an apparent fix! That fix turned out to be a casting change in the H386R governor case, and kit analysis points H16626 as the change point. PC304 Model "H" Parts Catalog, page 5 defines the parts in each kit. Keep this in mind: **Not one Model "H" tractor ever left the factory with any of these kits installed!**



**Figure 309 (A, B & C). Governor Oiling Channels, and Changeover Assembly**

It is interesting is that there was no pipe from the rear side of the governor case (oil in-feed) from 16626-up! This tends to indicate that beginning at H16626, there is oil enough being delivered to the L.H. governor bearing to warrant elimination of the oil in-feed pipe. While it's not written, one may logically conclude any number of reasons existed for keeping the oil pipe between L.H. bearing housings for the governor and camshaft. It can be surmised that momentum of the change, or even fear played a role in deciding to use the lower part of the oiling kit beyond H16626. Perhaps a flaw in the maintenance data analysis drove product support engineers to this decision. At this point, we don't know.

**Conclusion & Tests** -- If your tractor has an **Early Case** governor (governor cases CAN be switched over time), the external oiling kit should be installed to protect the life of the L.H. governor and camshaft bearings. Lube by "Oil-Splash" isn't sufficient. See Figure 309 above. Governor case tests follow:

**Early Case** -- The hole at the forward end of the horizontal pathway is full-sized and there is no outlet hole near the turning point of the internal oiling channel. You have to look inside of the governor case to learn this. Alternate Test: Remove 1/8" NPT plug, rear side of governor, and a section of **3/16" rod** can be inserted to a depth of **4-1/4 +/- 1/8 inches!**

**Late Case** -- The final 'fraction of an inch' of the forward end of the horizontal pathway is 1/8" in diameter and there IS a 1/8" diameter hole at the turning point of the internal oiling channel; again, as viewed from inside the case. Alternate Test: Remove the 1/8" NPT plug, rear side of governor, and a section of **3/16" rod** can be inserted to a depth of **3-5/8 +/- 1/4 inches**. (The length of the 1/8" diameter section varies).

**TIP:** The most vulnerable bearing for "early case" tractors is the L.H. governor bearing. You can install a grease fitting into the L.H. governor bearing housing for the added lubrication needed. For tractors with hydraulic lift, at minimum, install the top oil pipe (rear of case to upper L.H. governor bearing housing).

**For JD-H Tractors, Be Sure** – to read "GOVERNOR-2" for the **Build-Up Phase** of Governor & Fan Shaft Assemblies.