The Multiple Disk Clutch

by Tom Endy

In the beginning:

From the beginning of production until November 1928, Model A Fords were delivered with a multiple disk type of clutch. The change over to a single disk clutch occurred in November 1928 and is documented in the November 1928 service bulletin, pages 296 & 297. The multiple disk clutch was a well-engineered clutch, and required a lot of intricate machining to manufacture. During the Model A era many expensive cars, such as the Lincoln, featured a multiple disk clutch. I suspect the change over to a single disk clutch on the Model A Ford was done for two reasons. The first being that they were definitely cheaper to manufacture. The second reason probably had to do with the complexity of the multiple disk clutch and the difficulty mechanics and non-mechanics alike encountered while trying to replace one. Unless you have an alignment tool to line up the exterior teeth of the clutch that fits inside the flywheel, you will never get it installed.

A negative reputation:

The Model A Ford multiple disk clutch has received much bad press over the years. Modern "How to" books don't say much about them, and when they do, they treat the subject poorly and advise people to avoid them by changing them out to the single disk clutch. The judging standards are also silent on the multiple disk clutch. The only place I have been able to locate any documentation about them is in the service bulletins. The repair of the multiple disk clutch is described in very good detail in the service bulletin of February, 1928, pages 221 through 226. It also shows a picture of the K. R. Wilson alignment tool that is necessary to properly align the four driving disks.

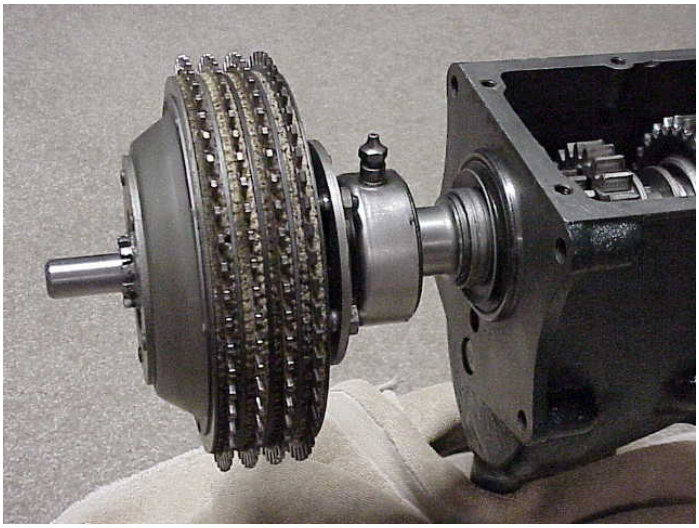
The K. R. Wilson alignment tool

The restoration of a multi disk clutch:

In order to proceed with the task of reinstalling a multiple disk clutch in an early 1928 Model A Ford that currently has a single disk clutch installed it is necessary to acquire all the required original hardware that was discarded. Since there are no new replacement parts available, it is necessary to acquire the needed original parts from the swap meet market.

Transmission and flywheel:

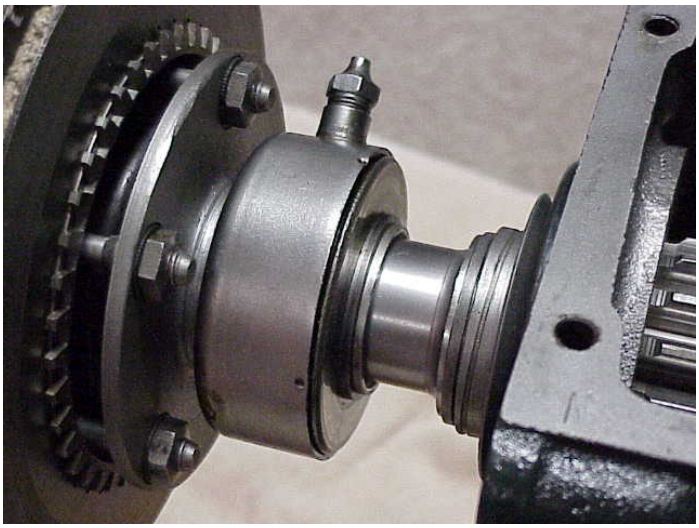
To change back to a multiple disk clutch from a single disk clutch it is necessary to change the flywheel, the bell housing, and the transmission input shaft. The multiple disk clutch transmissions were slightly different. They did not use the A7050 front bearing retainer that the throw-out bearing mechanism slides on with a single disk clutch. In fact, there are no bolt holes in the front of the transmission case to mount one. You can get away with using the later transmission case provided you replace the single clutch A7017B input shaft with the A7017AR input shaft used with the multiple disk clutch. The early shaft has a threaded end with a large castle nut on it. The multiple disk clutch assembly slides onto the shaft and is held in place by the castle nut. There is also an extra oil baffle located on the outside of the transmission front ball bearing.



The multiple disk clutch and transmission

The throw out bearing:

The multiple disk clutch used a completely different throw-out bearing than the one used with the single disk clutch. There are no new replacements; you have to locate an original. Surprisingly, most of the originals that I have seen were perfectly serviceable. These early throw-out bearings were better designed and better made. The grease fitting is mounted right on the bearing, and spins with the bearing. When you grease one of these throw-out bearings you are pumping grease directly into the bearing itself. When you grease a throw-out bearing on a single disk clutch, you are only applying grease to the slider part of the front bearing retainer, you are not greasing the bearing itself. That's probably why they eventually fail. As soon as the factory applied grease is gone, so is the bearing. The multiple disk throw-out bearing is mounted right on the clutch assembly and mounts backwards to the single disk throw-out bearing. The smooth machined surface of the bearing is pushed on by the fork located in the bell housing.



The throw-out bearing and extra oil baffle

The K. R. Wilson alignment tool:

It is essential to have either the K. R. Wilson alignment tool shown on page 223 of the service bulletin, or a reasonable substitute. You can easily get the multiple disk clutch assembly apart using a shop press, and you can also put it back together using a shop press. However, unless you concoct a means of lining up the outer teeth of each of the four driving disks that has the composite lining material on them, you will never get the clutch installed in the flywheel. The alignment tool, or a shop press, is needed to compress yet another of Henry's "killer" springs. I was fortunate enough to acquire the loan of a K. R. Wilson alignment tool from a fellow Model A'er who is a 1928 purest and has a multiple disk clutch installed in his car.

Driving and driven:

The series of disks that make up a multiple disk clutch are divided into two categories, the driving disks, and the driven disks. There are four driving disks; each has outer teeth that mesh with the inside teeth machined into the flywheel. Both sides of the driving disks have a composite clutch material riveted on. The material is the same as used on a single disk clutch. The design provides eight sides of composite clutch surface. The driven disks are made of saw blade material and in fact look much like a circular saw blade. There are five driven disks. The inside diameter of these disks have teeth that mesh with mating teeth machined on the clutch assembly drum that is attached to the input shaft of the transmission. The driving and driven disks are alternated in the assembly providing a metal surface for each side of the eight composite surfaces to rub against. Henry's killer spring tightly sandwiches them together whenever the clutch is engaged.

Driving disk (left) driven disk (right)

The driving disks:

The composite material used on the driving disks is the same as that used on single disk clutches and any clutch rebuilding facility will have the capability of replacing the composite material on the driving disks. However, the cost is significant, as the clutch material has to be applied to both sides of four disks. On the other hand, many of the disks, in their original condition, are still serviceable. As long as the composite material is not torn or worn off, or hopelessly soaked in oil, they can be reused. I found that by bead blasting the composite surface, along with the rest of the disk, any glaze residing on the surface could easily be removed.

The driven disks:

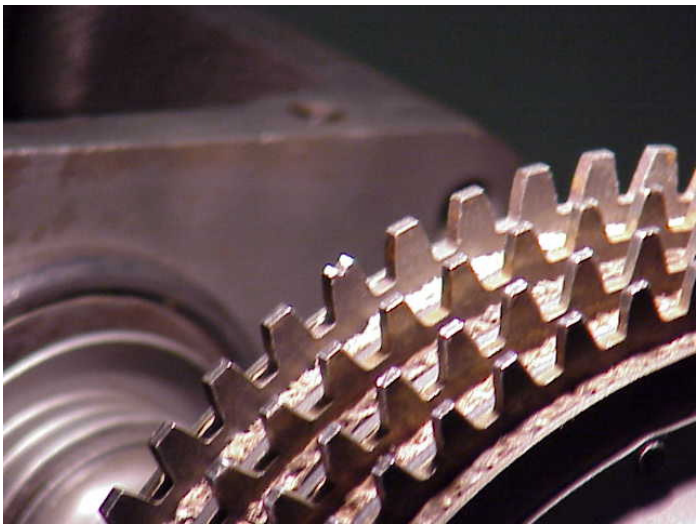
The saw blade material that makes up these disks can also be cleaned up with a bead blaster. Inspect them for grooves in the surface. If they are not too bad they can be reused. I know of no way to resurface these disks. Use the best you can find.

Disk teeth:

Inspect the shape of the teeth on both the driving and the driven disks. The teeth should be flat across the top giving them something of a square look. Disks that have seen a lot of service will tend to wear the teeth such that they become pointed. Use the best you can find.

The service bulletin:

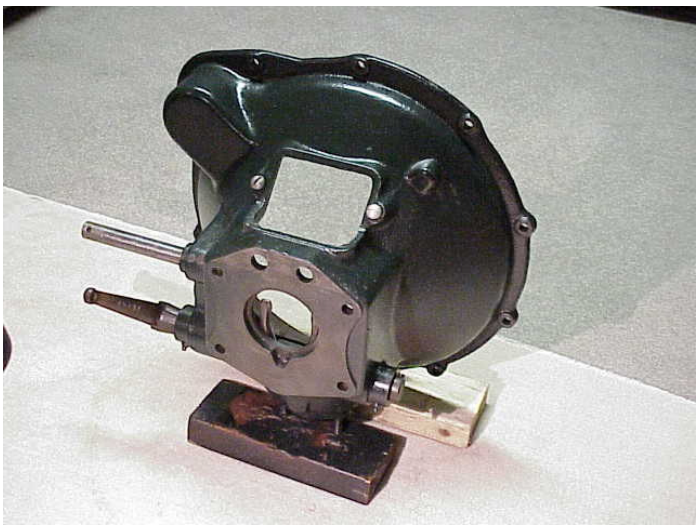
If you plan to rebuild and restore a multiple disk clutch study the information contained in the February 1928 service bulletin on pages 221 through 226. The assembly process is very well explained. Pay particular attention to instructions pertaining to a notch cut into one tooth of the last driving disk. The instructions explain that the outside dimension of this disk is slightly larger so that it will fit snug inside the flywheel. Several clutch assemblies I have taken apart did not have a notched disk, which leads me to believe that some era mechanics didn't pay attention to simple instructions very well. The repair and assembly is pretty straightforward, once you have been through one it is fairly easy.



The notched tooth driving disk

The multiple disk clutch bell housing:

The bell housing used with the multiple disk clutch is slightly different than the one used with the single disk clutch. There is another oil baffle (A7047-R) retained with a large snap ring (A7046-R) that attaches to the transmission side of the bell housing mounting surface. The bell housing must be bolted to the transmission housing before the multiple disk clutch assembly is mounted onto the transmission input shaft. To install the bell housing onto the back of the flywheel housing it is necessary to engage the external teeth of the four driving disks of the clutch with the internal teeth of the flywheel. This is where you hope the K. R. Wilson alignment tool was used correctly. The pedal shaft used with this early bell housing is smaller in diameter than those used with the single disk clutch. Early pedals with a matching diameter must be used with this bell housing. The fork used to push against the throw-out bearing is slightly longer than the one used with the single disk clutch. The cover plate that provides access to grease the throw-out bearing is also different (part number A7518-AR). It is smaller, bent at an angle, and has no vent holes.

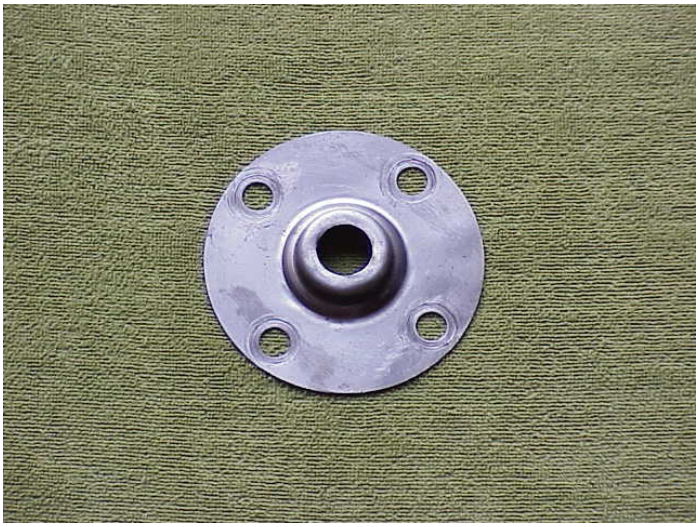


The multiple disk clutch bell housing

Oil baffle and snap ring mounts in recess

The multiple clutch flywheel:

The flywheel used with the multiple disk clutch is completely different from the one used with the single disk clutch. The distinguishing feature is the internal teeth machined into the flywheel to accept the teeth of the driving disks. It is important that the flywheel teeth be clean and in good condition. Flywheels that have seen a lot of service will tend to have grooves worn into one side of the internal teeth caused by the mating teeth on the driving disks. There is no way to repair it, so select the best flywheel for use that you can find. The pilot bearing that is mounted in the center of the flywheel is held in place with a retainer plate (A7609-AR), and includes a felt insert (A7608-R).

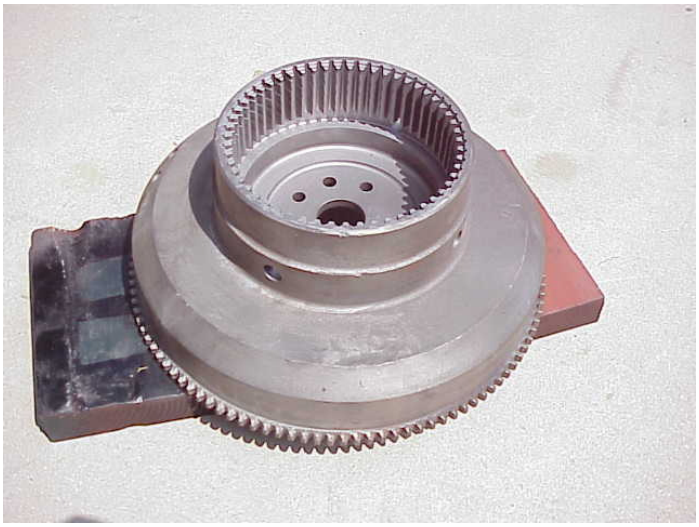


The A7609-AR Retainer (felt not shown)

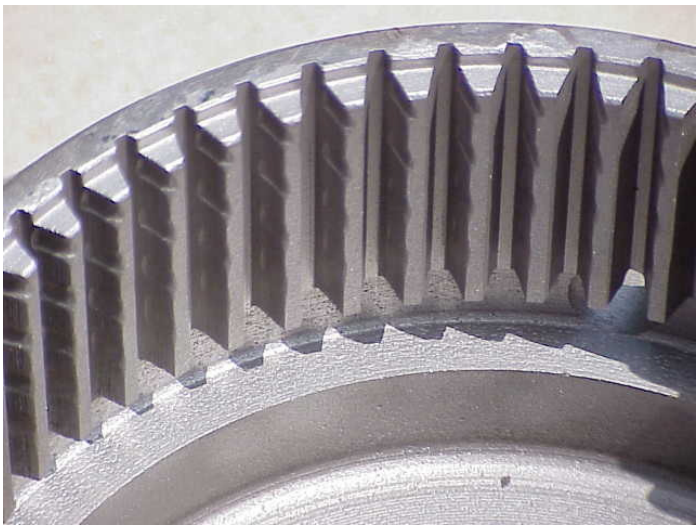
Transmission oil control:

Neither the single disk clutch nor the multiple disk clutch like to have oil on them. One area where I believe oil tended to migrate onto the multiple disk clutch is through the front ball bearing in the transmission. The multiple disk clutch transmission does not use a A7050 front bearing retainer as does the single disk clutch. These front retainers provide some shielding and drain back for any oil that may migrate through the

transmission front ball bearing. The only protection the multiple disk clutch has is the addition of two extra oil baffles just forward of the transmission front bearing. This may not have been enough protection. It would be very prudent to install one of the new sealed ball bearings in the front of the transmission. This I believe will help prevent oil from reaching the clutch.



The multi-disk clutch flywheel



Notches worn in the flywheel

A7047-R oil baffle and A7046-R snap ring

Engine oil control:

A metal retainer with felt is installed on the flywheel just behind the pilot bearing. It is shown in the service bulletin of February 1928 on page 221, figure 448 and referred to as "clutch pilot bearing felt and retainer". The service bulletin does not explain it's purpose, but I suspect it is to prevent oil from the engine from reaching the clutch. It may also provide protection from dirt migrating into the pilot bearing.

A smooth clutch:

I had the opportunity to drive a Model A Ford with a multiple disk clutch and I was impressed with how smooth the clutch operated. I would certainly install one if I had an early 1928 car.☺