Flywheel Magneto Assembly

By Tony Wiltshire

The Model T Magneto is well known for its problems. In this article we will describe how to assemble the Magnets onto the flywheel to give maximum output & ease of setting the gap between the Magnet Plates & the Coils mounted on the back of the cylinder block.

It is important to maintain an even .025" gap between each coil & the Magnet Plates. Over time your crankshaft thrust bearings will wear & this will increase that gap. As the gap gets larger the output will be affected to a point that there will be insufficient output to properly fire the Ignition Coils.

To achieve equal clearance we must make sure that all of the components are within dimensional tolerance that will give us as near to equal clearance as possible.

The Magneto comprises of five major components.

1. The Flywheel.
2. Spacing Spools.
3. 16 Horseshoe Magnets.
4. Magnet Plates.
5. 16 Coils mounted on a plate attached to the back of the cylinder block.

Drawing #1

So first let's start with the flywheel. In drawing #1 you can see the cross section of the Flywheel showing the height from the lower platform where the Spool sits to the upper platform where the Magnet sits. This dimension should be .750" +/- .001". Measure this dimension in at least four places around the flywheel. I have measured quite a few flywheels & they all seem to be very close & should not be a cause of concern.

Drawing #2

Next in the buildup are the Spools or spacers. If your spools are aluminum I would recommend you throw them away as they have a tendency to crumble at the edge & not give the Magnet proper support. Brass ones seem to be the best, at least in my opinion.

These should all be measured & need to be .750" +/- .001" This is the same height from the lower platform to the upper platform on the Flywheel shown in the drawing #1

Drawing #3

Now the Magnet height at the end that sits on the Spool can vary quite a bit & needs to be within +/- .001" of each other. The other end does not matter.

You will notice that this end has been machined down, so it seems they were trying to maintain an equal height on all Magnets. Over time Magnets were removed & maybe never kept in sets so it's not surprising that we can find quite a difference from Magnet to Magnet.

What I have done is to have the ends surface ground so that each Magnet is the same dimension on the Spool end again keeping them to +/- .001". See photo #1

Drawing # 4

The last part of the buildup is the Magnet Plate & Brass Screw. I have seen the following problems with reproduction plates & brass screws. The reproduction plates can have, material too soft, countersink in the plate too deep & the plate flat (not convex as the original Ford plate). See drawing #5.

The reproduction Brass Screw is quite different from the original. The main problem is that the head of the screw is .405" were as the original Ford Brass Screw is .436".

The shank of the reproduction screw is .214" (original Ford .238"). The threads I believe are rolled & maybe this is the reason for the shank being a smaller diameter. This causes no problem but is not as per the original

Ford Drawing. In fact the only detail that is, is the slot in the head for the screw driver & the #14 x 24 TPI thread size. However I am told that there are some screws out there that have a different TPI so make sure you can screw the Brass screw in by **hand**.
As a general note, always make sure you can screw nuts, bolts & screws in by hand. Any friction in the threads will reduce the amount of clamping force when you reach the specified torque, as the extra torque required to turn the screw will be subtracted from the actual torque required to give the desired clamping force.

Any one or a combination of can give you a problem.
With the countersink too deep & the head of the screw too small, this allows the screw head to go further down inside of the countersink & when tightened bends the flat reproduction plates, giving you a concaved plate with the ends turned up. This is not a good situation & can vary from plate to plate making it difficult to set the .025" gap with the coils.

If you have original plates they should be slightly convex as in drawing #5. This is from the Ford original drawing. If you are lucky to have a set of NOS Brass Screws, (most unlikely) & a set of original plates they should look like those in photo #2.
However if you have original plates, make sure they are still convex, & if you are using reproduction screws they should look like those in photo #2. Although the head of the screw is lower in the countersink, when tightened down should not cause the plate to bend too much still keeping it slightly convex & the ends down.

With the Magnets ground equal & the plates selected to all be within +/- .001" we should end up with an overall dimension of around 1.624" as in Drawing #4 (depending on how much you grind off the end of the Magnet.) Original plates are around .128" to .130" Not sure about the reproduction ones but you must end up with them as close to +/- .001"

The way I prefer to measure (if all magnet plates are within let's say +/-.005" of each other) is to use a magnet base & dial indicator clamped to a piece of steel that will sit on the face of the flywheel as in photo #3. If you have used the original magnet plates that still are convex then you should take the measurement in the center of the plate as in the photo #3.
I personally am not in favor of using the original method of using the KRW tool & a hammer to adjust the height the of the plate. If you do use this method make sure the screw is still tight after you have adjusted a plate by hitting it with a copper or lead hammer, as it may have become loose.

Now comes the question of how we magnetize the magnets. There are two methods that I have used & they seem to work OK.

1. Is if you have a single magnet magnetizer then this is probably the most preferred method.
2. An alternative is to do them after you have assembled the magnets to the flywheel. This is covered at the end of this article.

When assembling the magnets to the flywheel they must be placed with the South Pole next to the South Pole of the next magnet & the North Pole next to the North Pole of the next magnet. See drawing #6

One way of reusing original brass screws is to put a small countersink in the flywheel or ring gear, This will allow you to peen the brass screw over into the countersink. If you prefer not to do this then you have to use reproduction screws. These will sit a little lower in the magnet plate but should be OK if you are using original plates.
You may want to talk to the vendors as I think they are looking at making the plate correctly with the convex but to use the reproduction screw.

Using option two to magnetize the magnets.

This can be done by placing the flywheel on a plastic bucket with the magnets face up, then line the coils up with the magnets & place them directly on the magnet plates. See Photo #4. Make sure that a pair of South Pole magnets are lined up with the coil adjacent to the Magneto contact as in Photo #5. Now with a 24 or 36 volt battery supply hold the positive lead onto the Magneto contact & flash the Negative lead to the coil housing plate, ground, as in Photo #4. Five times. Do not hold it on for any length of time. As this could cause possible damage to the coils.
You will find by lifting the coil plate up it should also lift the flywheel up with it. You will have to use a lever too separate them.

Note.

1. Beware that exposing your compass to a magnet for any length of time can cause the Red end of the needle to align with South, a condition called reverse polarity. This I found out the hard way!
2. Remember when your compass Red end of the needle points to your magnet, it is pointing to the South Pole of the magnet, **Like Poles repel**, **opposite poles attract.**