# King Pin Geometry!

**by Tom Endy**

There are many articles written about how to install new king pins in a Model A Ford. However, unless you fully understand the geometry of the Model A front end, there may be an element of doubt concerning whether you did the job correctly. Since I did not understand the front-end geometry, I turned to Les Andrews for a proper explanation. Most of what is written here about the front-end geometry is a paraphrase of Les's explanation.

The weight of the body and frame in the front is resting on the center of the front spring where it is U-bolted to the frame. This weight is transferred out to each end of the front spring where the shackles attach it to the front axle. Therefore all the front-end weight is sitting on the front axle. This full weight is transferred to the king pins. To test the theory, slip a king pin into one end of the axle, without the spindle installed, and install the locking bolt, the king pin is now an integral part of the axle. It is easy to see that the weight of the axle will now be applied to the bottom side of the king pin flange. The king pin is locked in place in the axle and does not rotate.

Directly under the king pin flange a thrust bearing will be installed. The weight will now be on the thrust bearing and it will sit on top of the top surface of the spindle when it is installed. When the wheel is on the car and it is sitting on the ground the front-end weight is pressing down on the thrust bearing and against the top surface of the spindle. The spindle will rotate on the thrust bearing around the stationary king pin.

One would think all you had to do was put the parts together and you're good to go. Unfortunately reproduction parts and 75 plus years of wear enter into the equation. The thrust bearings available today (Timken part number T-83) are not as thick as were the originals (Ford part number A-3123), therefore shims are required for proper fit. The repo dust cover retainers supplied today are incorrectly made and will interfere with the installation. Wear to the mating surfaces of the axle and spindles are also a factor. All these variables must be taken into consideration when installing new king pins.

When installing new king pins the first effort should be to determine how many shims are needed under the thrust bearing. To do this install the king pin, the thrust bearing, and the spindle. Leave the dust seal off. Lock the king pin to the axle with the locking nut and bolt. Rotate the spindle and see how freely it rotates. Note any up and down movement. You will probably have up and down movement so add one or two shims. Check it again. Add shims until the spindle seems to be binding and not turning freely. Remove a shim if that is the case.

The shims will take up the free space that is between the bottom of the thrust bearing and the spindle. This free space is created by the lack of proper thickness of the thrust bearing and any wear that has occurred on the mating surfaces of the axle and the spindle.

Bratton's Antique Auto claims to stock a repo metal dust cover that is made to the original Ford drawing. That may be the case, but it still may not fit properly due to wear to the axle or spindle surfaces. Les Andrews says to leave them out completely. If you are a purest you may not want to do that.

My advice is to go ahead and try to install them. If they interfere, remove them and grind the lip down a little bit.

When you think you have the proper amount of shims installed and you think the dust cover is not interfering, there is a way to test it. With the car still sitting on jack stands, place a floor jack under the end of the spindle near the threaded end and run the jack up to put pressure on spindle. This will simulate the wheel being installed and the car sitting on the ground. With your fingers try to rotate the thrust bearing. You <u>should not</u> be able to move it. Do the same with the dust cover; you <u>should</u> be able to rotate it.

Correct installation of king pins, along with correct adjustment of the front wheel bearings is essential to safe proper steering. ☺