ATTACHMENT 1 - Converting to Front Wheel Tapered Bearings on my 34 DA

My original front wheel bearings were toast from running loose when I purchased the car five years ago. The picture on the right from the 1934 Chevrolet Repair Manual, page 81, shows the particular assembly of concern. The bearing spacer is a two-part assembly, the bearing spacer itself and its cover.

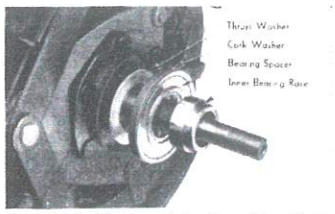


Fig. 176—Cork Washer, Brake Flange Plate, Thrust Washer, Bearing Spacer, showing rotation of assembly

At that time, I installed the "Filling Station" tapered front wheel bearings. This past year I removed both knee actions and had them rebuilt. Originally, I did not notice any problems but on reinstalling everything I found the bearing spacer cover to be sandwiched between the tapered bearing cone (race) and the bearing spacer. The bearing spacer cover has a smaller ID than the OD of the inner bearing cone.

A brief review of the knee-action operation will aid in understanding my concern. The spindle moves up and down on an arc described by the load bearing arm. The brake flange plate is held in a stable fixed position by the radius rod. For every degree the spindle moves up or down, the brake flange plate will rotate on the spindle journal the same number of degrees.

If we leave the cover trapped between the bearing cone and the bearing spacer we have to consider the following:

Amount of movement = $\pi D/360$ X number of degrees of spindle movement = inches of movement.

a. Cover does not move with the brake flange plate.

Movement that the brake flange plate must make occurs in the cork gasket mating surfaces.

Note the diameter of the cork gasket is approximately 3 inches. For a 10 degree up or down movement of the spindle, the cover cork must accept 0.25 inches of rotational surface movement.

b. Cover moves with the brake flange plate.

Movement the brake flange plate must make occurs in the mating surfaces between the cover and the bearing spacer and between the cover and the inner bearing cone.

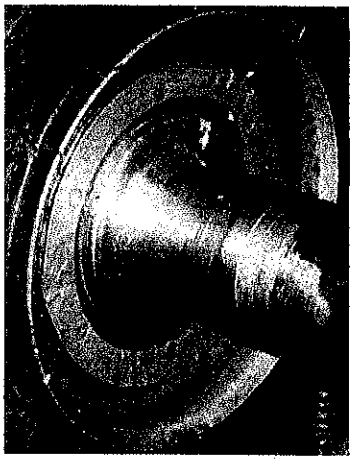
Note the diameter of the inner bearing race is about 2 inches. The length of the rotational surface movement for 10 degree up or down movement of the spindle is about 0.125 inches.

Please note in the picture above the spindle and knee-action arm is at about a 40 degrees.

These two pictures show the wear that occurred on the bearing spacer from running with loose bearing. Note, the tang has been well worn down and the other side shows significant wear. The OD of that wear is about 1.75 inches and the wear area is about 0.25 inches wide. It is this wear that confirms the inner bearing cone has a smaller ID than that of the cover and the bearing cone slides through to mate with the bearing spacer. The other bearing spacer has similar wear.

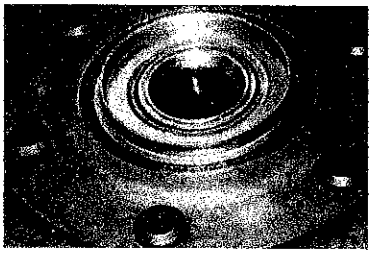
The picture of the thrust washer shows the wear that was on each thrust washer.

The picture at the right shows one of the spindles and the center portion of the brake flange plate. If you look closely at it you will notice that the shoulder on the spindle has the corner well rounded off. It is very difficult to check for the clearance, 0.002 to 0.004, called for on page 80 of the repair manual. This rounding off was apparently caused by the bearing spacer not being secure in the keyway.



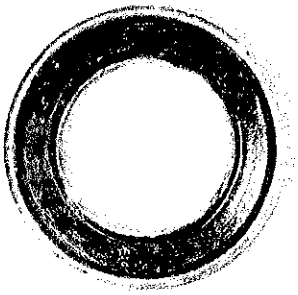
The next picture shows the inner tapered bearing installed in the brake drum with the grease seal in place. The cover has had its ID increase to 2 inches and is laid on top of the grease seal. Note that the inner bearing cone does not extend very far above the cover.

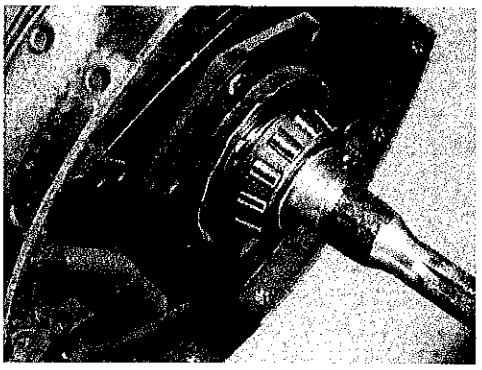
A cover was painted black. The thrust washer, the black cover with bearing spacer was installed in the brake flange plate and the brake drum was put in place. Two things occurred with the drum in place on the spindle.



1 – There is no clearance. On spinning the drum, the black paint on the cover was worn off around the edge where it met the edge of the bearing grease seal.

2 –The inner wheel bearing does not slide all the way the spindle to the shoulder. The spindle journal starts to increase in diameter to meet the shoulder, as you can see in the upper picture. The lower picture with the bearing on as far as it will go shows that this distance is greater than the thickness of the bearing spacer. What occurs here is that you can lock this bearing up on this increase in diameter. To get it off, you have to pull the drum off and the bearing and grease seal stays on the spindle. In this case hope you have the tire mounted on the drum, so you have something to grip, wiggle and pull. Once you get the drum off, you now have to pry where-ever you can and hope you do not ruin the grease seal.





My correction for this problem was to make a new spacer. The bearing spacer has an OD ~2.85", ID ~ 2", Thickness ~ 0.125".

I elected to keep the bearing spacer as is for future reference, if needed. I found "McMaster-Carr" on the internet and from them I purchased the following carbon steel "wide-rim ring shims":

97063A520 3" OD, 1 ½" ID, 0.134" ± 0.008

Minimum package size was 5 shims. All of these in my package had a thickness of around 0.128.

97063A451 2" OD, 1" ID, 0.134" ± 0.008"

Minimum package was 5 shims

From all of the above I felt this shim needed to be something greater than 1/16 (0.0625) which is probably close to the thickness of the dust cover. My real desire was for a 3/32 (0.093) shim. There was one other choice which I did not choose. The 97063A443 had a thickness of 0.075 ± 0.007 with a minimum package size of 25.

My local machine shop put this all together for me. They centered the 2 inch on the 3 inch, made the OD the same as the original bearing spacer, and made the tang about 3/16 high so I would have a good connection in the spindle journal keyway. The ID of the ***A451 shim was increased to 1.25+ so there would not be any interference with the spindle or the curve up to meet the shoulder. Also the OD edge of the ***A520 shim was eased on both side to aid in pushing past the dimples on installation in the dustcover.

Prior to inserting the bearing spacer within the cover, the thrust washer and bearing spacer was installed on the spindle. Wear signs on the bronze thrust washer was cleaned up on a sheet of emery cloth. Two PVC water pipe couplings were used, as shown, to hold everything in place. With the radius rod disconnected from the knee action, the brake flange plate could be rotated and clearance checked. The spindle nut was screwed on tight enough that the bearing spacer had good pressure on the spindle shoulder. Holding the rim of the flange plate and rotating, a light drag was desired. It took one 0.005 shim (part number 374033) on each flange plate to achieve the drag desired.

The bearing spacer was then installed in the cover. It was found that some of the dimples were not holding the bearing spacer within the cover. To correct this, the whole thing was locked in a vise, such that the cover could spin. An 8p nail, dull the point, was used to give each dimple a light tap with an 8oz ball pein hammer.

In this last picture, everything is installed and shows that the cover rotates independent of the center bearing spacer. What is not known at this point is clearance between the seated cover in the flange plate and the bearing spacer. On installation, the bearing spacer stops when it reaches the spindle shoulder, while the cover can continue until it is completely seated in the flange plate. Clearance needs to be maintained here and hopefully the ***A520 only being about 0.003 thicker than the original bearing spacer leaves some clearance to the cover.

On installation of the drum, everything went well and I do not have to worry about wear. The tapered wheel bearings have a known and positive adjustment. However, at some point I will have to take the bearing spacer down to the machine shop and have the two inch(***A451) washer reduced in thickness. For proper adjustment of the wheel bearing I had to use one size smaller cotter pin than normal because wheel bearing adjustment did not fully expose the cotter pin hole in the spindle.

In conclusion, it is interesting what poor maintenance can do and what difficulties you can have in a conversion project. I will take my spare 3 inch and 2 inch washer down to the local machine shop and have a second set made that on installation will leave the cotter pin hole in the spindle fully exposed.