

What I Learned from Franz about Adjusting Brakes

By Vince O'Brien

We are lucky to have Franz Fraitzl as a member of the Durant Club. Franz is an excellent machinist who always fixes things better than they ever were. His rebuilds of fan hubs and water pumps are better than anything Durant ever did and will last longer than the rest of the car. I am especially lucky that Franz's car has the same brakes as mine. Thus, when Frank Witkowski showed up at the Auburn meeting with the same brakes and Franz started to work on them, I didn't hesitate to crawl under to take a look. Here's what I learned.

Frank's Star has the "locomotive-style" brakes on the rear. Each wheel has two shoes – one on the inside and one on the outside – that pinch against the drum when the brake pedal is depressed. See *Figure 1*. A similar set up on the front of the rear drum is for the parking (emergency) brake.

The condition of the outside shoes can be determined easily. Loose rivets which Frank had are a sure sign that the linings are long gone. Unfortunately, the condition of the linings themselves can not be accurately assessed in this way. Their edges tend to push out and expand so that they appear thicker than they really are. Without taking the wheel off, you can assess the condition of the linings by listening for a rubbing sound or a squeal when stopping or by how extreme the adjustments described below are to get them to work.

Rear Wheel Only Brakes

To adjust the brakes, both rear wheels must be safely and firmly off the ground e.g. block the front wheels before jacking the rear up and use jack stands. Release the parking brake and take the transmission out of gear after the car is in the air.

The first thing to know about adjusting these and most of the mechanical brakes is that ALL of the major adjustments are made at the wheel. The linkages may have threaded yokes that allow for shortening or lengthening the rods but these are mainly for balancing the brakes. The one on the rod between the brake pedal and the shaft transverse the car is only for adjusting the height of the pedal – and nothing else.

There are two adjustments at the wheel for the shoes. Both involve a shaft perpendicular to the wheel at the top of the drum. The first is a 1 1/4 inch hex nut (*C* in *Figure 1*) that simultaneously moves both shoes backwards and forwards relative to the drum. Note that this will not affect the distance between the shoes – just their position relative to the drum. The second is a lever (*B* in *Figure 1*) that moves the shoes closer or further away from the drum and each other.



Under Franks Star at the National meet in Auburn, Indiana

To adjust the shoes, loosen the retaining nut and bolt *A* and the retaining nut *D*. Be sure that both the nut and bolt are loose so that the bolt slides freely in the slot. Then slide the lever forward and rearward until the outside shoe touches the drum. Hold the shoe

against the drum and rotate the 1 1/4 inch nut *C* until the shoes both touch the drum. The wheel should be difficult to rotate by hand. If not, repeat the steps above.

Slowly pull the lever *B* rearward until the shoes are no longer pressing against the drum. Since the shoes pivot, one end or the other may be resting against the drum. This is fine. Rotate the wheel by hand and listen for a slight dragging sound. It will probably be intermittent as few of the drums are perfectly round. Keep adjusting the lever *B* until the drag is minor. It is important that you get the adjustment as tight as possible without the shoes dragging.

Check to see that the shoes are equidistant from the drum. If not, rotate the 1 1/4 inch nut *C* until they are. A good way to tell if they are equidistant is to apply the brakes and see if you can wiggle one of the shoes. Neither should move when applied. If the adjustment is good, retighten the retaining bolt and nut *A*. Check the adjustments again by rotating the wheel by hand. If all is O.K., tighten the retaining nut *D*. Do this on both wheels.

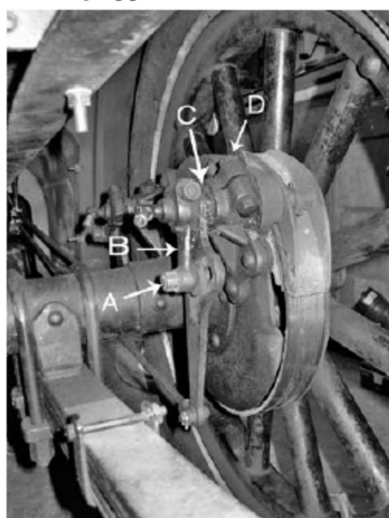
Now, have someone depress the brake pedal or better yet use a spreader clamp. The newer Irwin Quik-Clamps can be reversed to act as a spreader and allow you to position the pedal exactly where you want it. A three-foot clamp placed between the pedal and the seat base is ideal for this. In a pinch, a board will do but it will slow you

down considerably. Depress the pedal enough so that one of the wheels requires a firm push to rotate

If the other wheel does not drag equally, you will have to back off the adjustment on the dragging wheel. This is done by loosening the retaining bolt and nuts *A* and *D* and gently tapping the lever *B* to the rear. Release the brake pedal before making this adjustment. If you have threaded yokes on each side, you can use them to fine tune the balancing. Always loosen (increase the length of) the linkage on the wheel that drags the most rather than tightening the other.

When you think you've got everything adjusted, depress

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Rear Brakes *Figure 1*

Adjusting Brakes *Continued from page 11*

the brake pedal further and see if the wheels will lock up. If they won't, repeat the steps again double checking that the shoes press on the drum equally. When they do, the shoes should line up so that the smallest shoe is complexly within the larger one. If this isn't the case, the linings are worn and may need to be replaced. If the wheels do lock up and the shoes line up, you're now ready to go!

Four Wheel Brakes

Frank's car only had rear brakes so Franz couldn't show me how to do these. Here's what I've figured out. I'm not an expert mechanic so do this at your own peril!

The key thing to remember with four wheel brakes is that you must start with the front brakes. They are spring-loaded and retract the linkage when released. The rear linkage follows this action with a little help from a spring that pulls the transverse tube (the one that rotates when the brake pedal is depressed) back to the rest position.

First, inspect the levers that actuate the front brakes. There are two on each side. One is attached to the linkage with the other end floating free. The other is attached to the shaft that rotates the shoes with the other end floating free. The free ends should meet up directly under and in alignment with the kingpin. (See *E* in Figure 2). This way, when the wheel turns, the levers rotate around this point so that they remain in contact. This allows the brakes to be applied while turning. (When the brakes are at rest, the levers actually rest on the bottom of the king pin.)

The locomotive-style front brakes are similar to the rear ones. There are two adjustments as shown in Figure 2. Again, there is a 1 1/4 inch nut (*C* in Figure 2) that moves both shoes forward and rearward while maintaining the gap between them. However, instead of a lever, the shaft has been squared off (*B* in Figure 2) to accept a 7/16" wrench. Rotating this, moves the shoes closer or further away from the drum. Adjustments are made just as described for the front brakes above.

To start, all of the retaining nuts and bolts on all four of the wheels should be loosened. Then, adjustments to the front brakes are made followed by the rear. Equalizing, however, is a little different. The linkage is designed so that front and rear brakes on a side work together. However, the rear brake hits first. As the pedal is depressed further, roughly equal pressure eventually is applied to both front and rear.

Thus, balancing the brakes tends to be a left versus right side issue. After adjusting all four brakes at the wheel, balance the rear brakes first. Follow the procedures described above. There will be no yokes on the rear part of the linkage so all of the adjustments must be made at the wheels. Once the rear brakes are equalized, depress the pedal further until one of the front wheels starts to drag.

There is a threaded yoke on the front part of the linkage on each side. This can then be used to fine tune the balancing. Increasing the length of the linkage will loosen the brakes because it has the effect of pushing the lever on the rear wheel to the rear. Keep adjusting the brakes until the front wheels hit at exactly the same time.

Parking (Emergency) Brakes

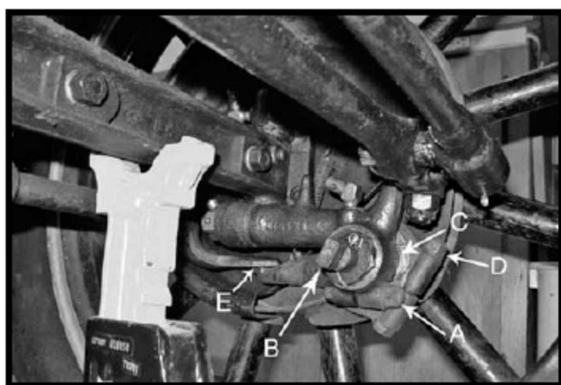
The parking brakes are on the forward side of the rear wheels. Each has two shoes and is adjusted just like the other brakes by making the same two adjustments.

Helpful Hints

To rotate the 1 1/4" nut, you will need a very thin wrench. There's not enough room for a standard thickness wrench. I made one with a 12 inch handle out of 3/16" bar stock. If you can find it, a 1 1/4" fan hub wrench will work fine.

You can rotate the front shaft with a 7/16" wrench but a vise grip will work better.

There is a stop on the rear linkage that limits how far it will travel. Likewise, a running board bracket can limit the travel in the other direction. If you keep adjusting the rear brakes and nothing seems to change, you may be at the limit of one of these. If so, you'll have to readjust the brakes at the wheel or change the threaded yoke position to get the linkage moving again.



Front Brakes Figure 2

There are ten different adjustments in total – five on a side. It is easy to get them so out of wack that nothing seems to work. I start out by setting the adjustable yoke to the half way point. That way there is room to lengthen or shorten the linkage as needed.

A small adjustment at the wheel will have a big impact on the linkage. That's why I try to get the shoe adjustments as close as possible. This is especially true for the front wheel adjustments on the squared off shaft *B*. These are very sensitive adjustments.

The adjusting mechanisms use a cam action. Rotating the nut or lever rotates the cam to make the desired adjustment. If the cam is over-rotated, the cam will be moving the shoes opposite the desired direction. Keep an eye on the shoes to make sure they are going the way you wish.

Adjusting these brakes is as much art as it is science. If you have four wheel brakes, plan on spending at least a full day on them the first time. I found out it was best to work a few hours and then take the rest of the day off. Patience is definitely required. Hopefully, things will go much quicker the next time around.

The shaft around which the adjustments are made is worn on my car. Most likely it is on yours. This compounds the process as the resulting slop can offset an adjustment. It looks as if this can be fixed by removing the wheel and replacing a bushing. That would probably make for a good winter project and another article. ♦