ADJUSTING EARLY CHRYSLER CORP.

(and others: Auburn, Franklin, Graham, Reo, and more)

LOCKHEED BRAKES

Major and Minor Adjustments
It's Not as Easy as it Sounds

This article grows out of necessity. My own. I own an early '30s Chrysler, and recently experienced brake trouble. I'm no stranger to brakes; I've rebuilt, adjusted and bled brake systems for years, but with the Chrysler (and this holds true for many Chrysler products - Plymouth, DeSoto, Dodge), and a number of other marques that used Lockheed-Wagner brakes, the normal adjustments often didn't seem to be adequate. And the instructions in the Owner's Manual didn't answer the questions that I had.

I am grateful to Dyke's Automotive Encyclopedia, Chilton's Motor Manual, and yes, even to the Internet, for the information on making proper and complete adjustments to Chrysler Corp. four-wheel hydraulic brakes. A recent brake problem (overheating of brakes and the subsequent locking of the shoes against the drums) necessitated disassembly of the rear brakes to determine the problem. I did reline the shoes and have had the drums turned, but it moved the job from a minor adjustment of the brakes to a major one. The process is totally different.

A 1933 copy of the Chilton's Interchangeable Parts Handbook lists a number of other marques that used Lockheed brakes during the early 1930s. These include many models, but not all, of Auburn, Cord, Franklin, Graham and Graham-Paige, Jordan, Paige, Peerless, Reo and Velie. All of these marques are listed as having used an adjustable anchor pin. Please refer to your owner's manual or service manual for details on the adjustment of brakes for your particular model as the technique may vary from Chrysler.

The Chrysler Owner's Manual barely refers to the extra service needed for a major brake adjustment. Chrysler used Lockheed brakes - an excellent system - but the service goes far beyond just adjusting the shoes. I have pasted a copy of the explanation of the brake system and the instructions for adjustment taken directly from the Chrysler owner's manual. Owners of early 'thirties Chrysler products, and other marques too, will, I hope, find the following information and details helpful.

Editor

The information in the following section is taken directly from:

Chrysler Six Instruction Book, Sixth Edition April 1931

Chrysler Sales Corporation, Detroit, Michigan

The Chrysler hydraulic four-wheel brakes are self-equalizing and their adjustment is simple. There are no operating rods or cross shafts, and, consequently, nothing to rattle and no joints to lubricant. Simple in construction, the brakes depend only upon the fundamental displacement principle of hydraulics for their operation and equalization, and when treated with a reasonable amount of consideration will need but little attention.

Operation

Connected to the brake pedal is a piston which operates in a master cylinder, bolted to the left hand side of the flywheel housing. Leading from this master cylinder to cylinders at each of the four brake supports are metal tubes and heavy non-expanding hose. In each wheel cylinder are two pistons, each of which presses against the upper ends of the brake shoes. The whole system (that is, all cylinders and lines) is full of liquid, all air having been expelled in the process of filling. There is no pressure in the system when the brakes are not in operation and the brake shoe facings are held clear of the drums by the brake shoe return springs.

When the brake pedal is depressed, the piston in the master cylinder moves forward, expelling into the lines sufficient liquid to force out the pistons in each of the brake wheel cylinders until the brake shoe facings come in contact with the drums.

There can be no braking pressure applied to any one drum until all facings are in contact with their drums. The greater force required to give braking pressure cannot be supplied until the resistance in all wheel cylinders is built up to that force. This is governed by the physical law that force or pressure exerted upon a column of liquid is expended equally in all directions. With the eight brake shoes at the point of braking, the additional pressure of the foot pedal is naturally transmitted equally to all brakes, giving a positive braking action, absolutely self-equalizing in its application.

When the brake pedal is released, the pistons in the wheel cylinders are returned to their stops by the brake shoe return springs, forcing the liquid, used in displacing the pistons, through the lines back into the master cylinder.

To Adjust Wheel Brakes

Adjustment of the brake shoes, to compensate for wear of the facing, is made by turning the brake shoe adjusting cams. This is accomplished by turning the nuts (#7, Fig. 1) . The car wheel should first be raised sufficiently to spin free from the floor. Then the nut (7) should be turned until it is observed that the brake shoe facing is just touching the drum. This can best be determined by spinning the wheel and at the same time turning the adjusting nut. Then, when the facing touches the drum, the adjusting nut should be turned in the opposite direction so that the facing is just free from the drum. The adjusting nut is held in position by a friction spring and does not require locking. When one brake shoe has been adjusted the other shoe should be adjusted by turning the

other adjusting nut (7) and spinning the wheel in the same manner. There are two brake shoes for each wheel and each shoe has a separate adjusting nut.

Initial adjustments of new brakes (brakes on which new facings have been installed) are made in a different manner and the instructions given under "Refacing Brakes" should be followed.

Refacing Brakes

The surface of the brake shoes carrying the facing is very carefully machined to the proper shape. The facing is of moulded segments which are very carefully ground after being placed on the shoes.

In the event that it becomes necessary to reface the brakes due to facing wear, new facings should be installed. These facings are obtainable at Chrysler Service Stations and should be used to insure the satisfactory operation of the brakes.

The brake shoes can be removed after the wheel and brake drum have been removed by removing the brake shoe return spring and the brake shoe anchor pins. The anchor pins are removed by taking off the anchor pin nut and pulling the anchor pin out.

After installing new shoes or new facings it will be necessary to adjust the anchor pins (#11, Fig. 1), which are eccentric, so that the proper clearance between the facing and the drum will be assured. To do this it will be necessary to have a special precision tool so that adjustments can be made and clearances checked accurately. The anchor pins and cam adjustments should be so set that the clearance between the bottom of the facing and the drum is .006″ (.152 mm.) and the clearance at the top .012″ (.305 mm.).

Due to the method of grinding the facing at the factory it will not be necessary to run the facings in, and under no condition should facings be burned.

This ends the section on brakes from the Chrysler Instruction Book

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As indicated above, a simple brake adjustment is made by merely turning the adjusting nuts at the top of the brake backing plate. At the lower side of each backing plate, though, are two additional nuts. These secure the brake anchor bolts, and as they come from the factory are not adjustable from the back of the wheel. When the brake drums are removed, the heads of the anchor bolts are clearly visible and are an elongated shape so that they may be held with a wrench.

Proper adjustment of the brake shoes - when new facings have been installed or when the brake shoes have been removed for any reason - must be made to both the top and bottom of the shoes with relation to the brake drum.

When this vintage vehicle was new, or even several years old, dealers had a special tool supplied by Wagner-Lockheed for setting the correct gap between the brake shoes and the brake drums. These tools seem to be extinct today. An alternative is a cut-away brake drum which allows measurements to be taken and adjustments to be made. These too, are seemingly obscure. (See page 30 for illustrations)

Information on the Internet from a gentleman named Don Lohr (we have tried to locate Mr. Lohr, but his e-mail address is no longer active and he is not listed in the Dodge Bros. Club Roster), offers a rather simple tool for making the necessary adjustments. The first step is to be sure that the brake shoes are adjusted so that they form a perfect circle. This is accomplished by equalizing the distance from the center of the axle shaft to both the top and bottom of the brake shoes. Mr. Lohr's device fits over the axle shaft, and allows the distance between the top of the shoe and the axle (the radius of the 'perfect circle') to be set on the device, and then transferred to the bottom of the shoe.

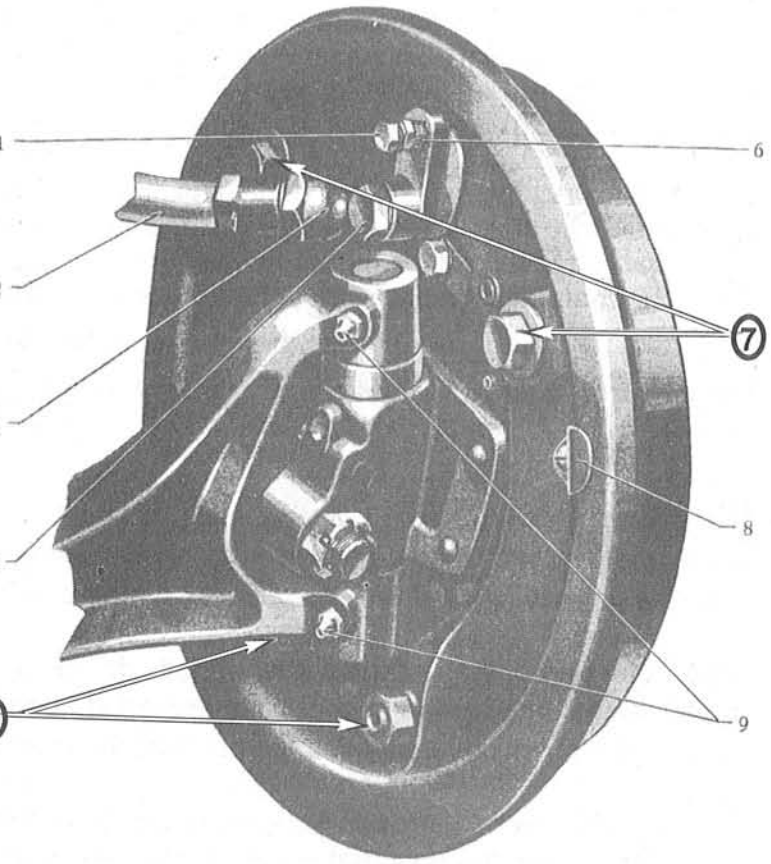


Fig. 2 Backing Plate, as seen from the rear
#7 Brake Adjusting Nuts; #5 Anchor Bolt Nuts

The first step is to adjust one of the top adjusting nuts so that the top of the brake shoe just contacts the brake drum. This can be accomplished with the brake drum installed and the wheel being rotated until contact is barely felt between the brake shoe and brake drum while turning the adjusting nut (#7, Fig. 2).

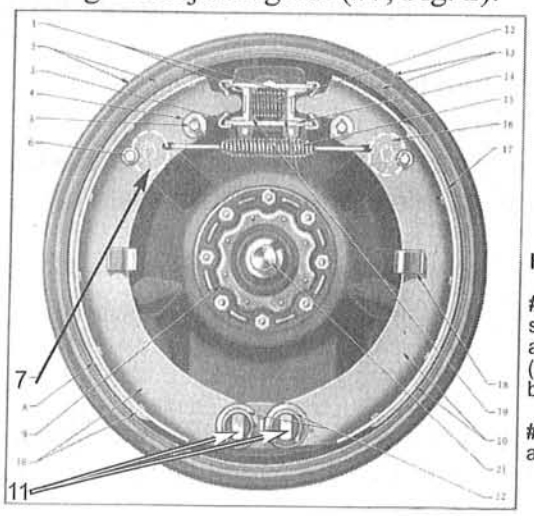


Fig.1

#7 Brake shoe adjusting cam (accessible from back side)

#11 Brake shoe anchor bolts

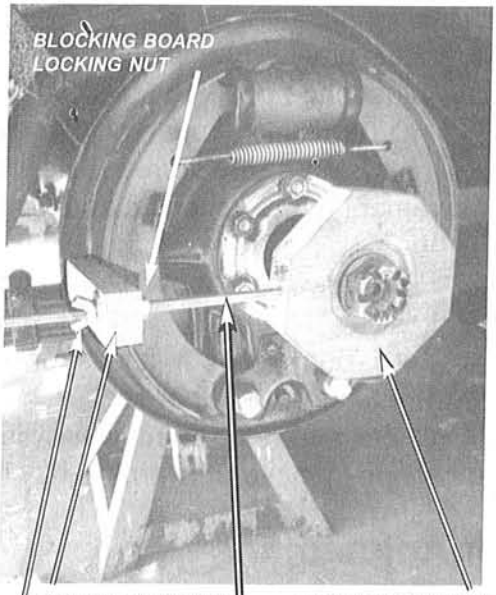


Fig. 3 Adjusting Device

The drum is then removed, and the device placed on the axle shaft. The outer board is then set against the top of the brake shoe, and the wing nut and locking nut locked in position.

The outer board is then rotated to the lower end of the brake shoe, with no adjustments being made, and the shoe adjusted by means of the anchor bolt adjustments so that the distance of the shoe is equal to the top measurement.

The correct clearance can then be made using the outer board as a substitute for the wheel drum. The correct clearance (for the 1931 Chrysler Six - and this may vary by year and model. Refer to the Owner's Manual for the correct measurement) is 0.012" at the top of the shoe, and 0.006" at the bottom.

Our sincere thanks to Mr. Tod Fitch for the following explanation from the website: http://www.ply33.com/Repair/brakes

Major Adjustment

A major adjustment should be made whenever new or reconditioned brake shoes are installed. A major adjustment should also be performed after every two or three minor adjustments.

If the outer part of the eccentric anchor bolts do not have screwdriver slots in them, you will need to add them: Remove the anchor bolts and grind off the surface hardness. Then using a hacksaw blade, cut a screwdriver slot into the outer section parallel to the inside adjusting flats.

1. Set the minor (upper) adjusting cam to its fully released position (all the way in).
2. Loosen the nuts that secure the eccentric anchor bolts to the backing plate so that the eccentric anchor bolts may be rotated.
3. Turn the eccentric anchor bolts inward toward the axle until both brake shoes are at the topmost, inward position.
4. Install brake drum.
5. Adjust one shoe at a time:
   a. Turn minor (upper) adjusting cam out and away from the axle until the brake just drags.
   b. Using a screwdriver, turn the anchor eccentric bolt of the same shoe inward and down. Movement of the eccentric anchor lowers the shoe so that the lining at the top no longer drags.
   c. Repeat the above two steps until adjusting the eccentric anchor bolt no longer frees up the brakes.
   d. Back off both adjustments slightly until drums turn freely.
6. Tighten the nuts that secure the eccentric anchor bolts to the backing plate.
7. Check and refill the master cylinder reservoir. (Adjusting the shoes will allow the wheel cylinder pistons to move outward slightly increasing the static volume of the hydraulic system.)

Minor Adjustment

1. Turn one of the minor (upper) adjusting cams out while spinning the wheel. When a slight drag is felt, back off the cam slightly.
2. Repeat for the other shoes.
3. Check and refill the master cylinder reservoir. (Adjusting the shoes will allow the wheel cylinder pistons to move outward slightly increasing the static volume of the hydraulic system.)

Use of the Homemade Brake Adjusting Device

After installing new brake shoes, or new brake linings, it will be necessary to adjust the anchor pins at the bottom of the backing plate. When replacing brake shoes or facings, take the extra step and have the drums 'turned' on a brake lathe. This process will remove any high spots in the drum so that the shoe will contact the drum properly. It is highly recommended that the lining be 'arced' to the drums. Arcing is a grinding process in which the shop fits the brake shoes to each drum for a perfect fit. Arcing should provide that the center of the lining (about halfway between the top and bottom - toe and heel) of the brake shoe makes contact first, and then the ends of the shoe will contact the drum as further pressure is applied. Unfortunately, fewer and fewer shops do arcing any longer. A brake specialist could probably recommend a shop, or perhaps they could do it for you.

To make the major adjustment to the brakes, the brake drums will have to be removed. The anchor pins (see #11, Fig 1) are actually eccentric bolts (Fig 4). A lock washer and nut on the bottom of the backing plate secures and locks them into place. Some Chrysler models have screwdriver slots machined into the bolt. If yours does not, it is recommend that the bolts be removed, the hardened surface ground down and slots be cut into the bolt with a hacksaw, Dremel or angle grinder. This will make future adjustments considerably easier.

With the anchor pins in place and the new shoes installed, turn the adjustment nuts (at the top of the backing plate) so that the toe (top) of the brake shoe is fully retracted

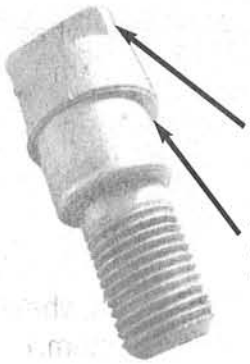


Fig. 4

Chrysler Anchor Pin

Note that the head is machined to accept a wrench.

Also, the bolt section below the head is offset (eccentric) so that it acts as an adjusting cam.

Loosen the anchor pin nuts and turn both pins so that the heel (bottom) of the brake shoes are fully retracted.

Install the brake drum and, using the adjustment nuts (do one shoe at a time) so that the toe of the shoe just contacts the drum. There should be contact but virtually no drag. Without disturbing the adjusting nut, remove the drum. Install the device described on the previous pages on the axle. Secure it with the axle nut. Set the outer blocking board so that it just contacts the top of the brake shoe. Secure the position of the backing board with the locking nut and the wing nut. Be sure that the backing board is perpendicular to the threaded rod and that it contacts the surface of the lining squarely.

Without making any adjustments to the device, rotate the backing board to the heel (bottom) of the shoe. Adjust the anchor pin for that shoe so that the shoe just touches the backing board. The radius is now the same for the top and bottom of the brake shoe.

Again, without making any adjustments to the device, adjust the anchor pin so that the gap between the bottom of the brake shoe and the backing board matches the specifications in the owner's manual (approxiamtely 0.006"). Lock the anchor pin, and recheck the clearance.

Now rotate the backing board to the top of the brake shoe and set the clearnace as specified in the manual (approximately 0.012").

Do the same for the other shoe on that wheel,

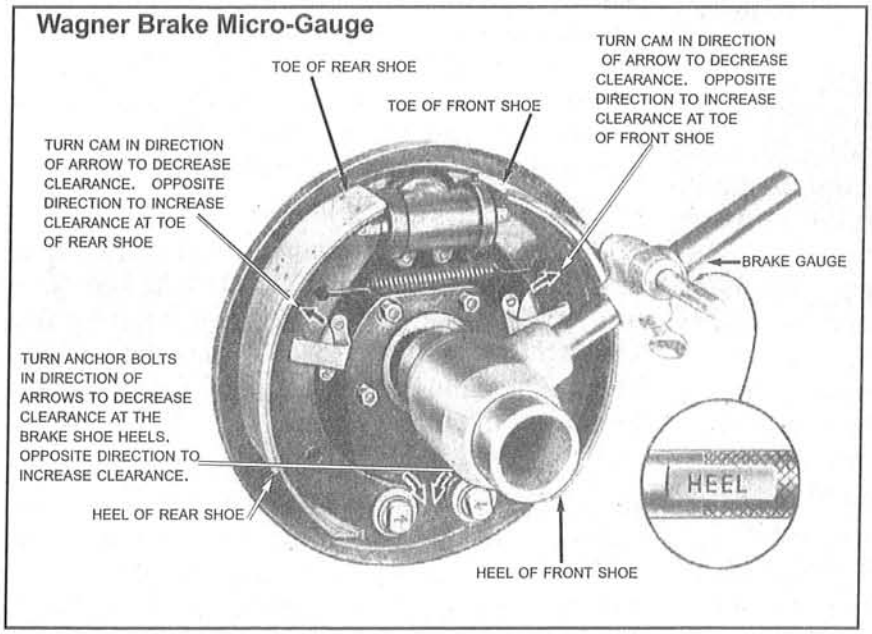
Continue to make the same adjustments on each of the four wheels.

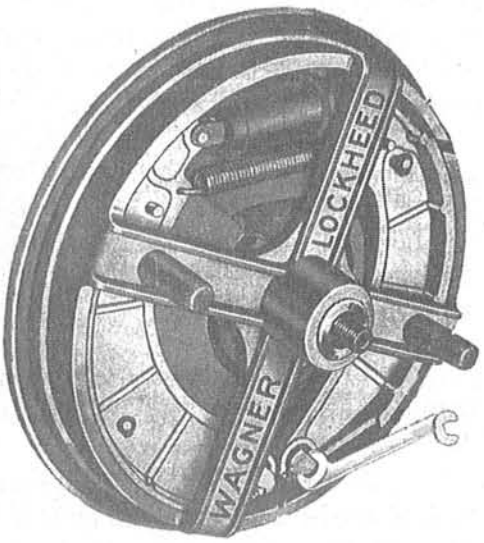
If the drums have not been properly turned, or the shoes properly arced, they may be slightly out of round. You may experience some dragging or too-loose adjustment when the high or low spot on the drums contacts the shoe.

Back in the day, specialized tools were available for making brake adjustments to Wagner-Lockheed hydraulic brakes. Wagner supplied two different types of tools for accurately adjusting the clearance between the brake shoes and the drums.

Unfortunately, today these tools no longer seem to exist. Even finding illustrations of the original tools has proven to be a challenge. We thought that you might be interested in seeing what they looked like. Perhaps while digging through someone's 'junk' at a swap meet you will find one of these.

In the meantime, make yourself a substitute as pictured and described in the previous pages. If you are careful and conscientious, it will work well for you in making adjustments to your early Lockheed brakes.





Wagner Ring Gauge In Place

Make Easy Adjustments to your Lockheed brakes with adjustable anchor pins (also known as an anchor bolt) by cutting slots into the back (threaded) end of the anchor bolt.

It takes a steady hand, but with a caliper, measure the face of the threaded end of the bolt. Divide that number by 2 and set that measurement on your caliper. Use a Magic Marker or Dykem on the bolt face, and using the caliper, mark a score mark indicating the halfway point of the bolt face. Be sure to make the score mark parallel to the elongation on the other end of the anchor bolt so that you will have an index when you make brake adjustments,

Use an angle grinder or a Dremel tool with a 1/16 thick cut-off wheel (designed for metal cutting). Carefully cut a slot so that you can make adjustments from the back of the wheel using a screwdriver, and you will not have to remove the brake drum.

S.K.