

Bendix Duo-Servo Brakes

Characteristics of Construction

The Bendix "Duo-Servo" model brake is of the two shoe internal type mechanically operated by either levers or cables. It differs from previous models of the same make in that it has equal energization in either forward or backward movement of the car, and also in the details of the shoe mountings and methods of adjustment.

The two shoes in each brake assembly are identical in every respect and fully interchangeable. They are linked together at the lower end by a right and left hand threaded screw (D-Fig. N26) through articulating pins. At the upper end of the shoes are two anchor pins (6-Fig. N25), one of which serves as the anchor for braking in the forward direction and the other as the anchor for braking in the reverse direction. (Some models have only one anchor.) The shoes are expanded against the drums by means of a balanced cam (top of Fig. N25). Two cam trunnion blocks bear on the curved ends of the shoes and provide compensation for unequal lining wear.

There are three points of adjustment, all of them being made from the frame side of the backing plate as follows:

The right and left hand threaded screw (D-Fig. N26) which serves as an adjustment for clearance between the lining and drum.

The eccentric adjustment (A-Fig. N26) which centralizes the shoes in the drum and prevents dragging when brakes are released.

The anchor pins which enable centering of the operating cam to the shoes; the slightly elongated holes in the backing plate permit this movement of the anchors.

The cam lever (Fig. N26) which is mounted on the serrated camshaft allowing the lever to be moved to take up any wear in the linkage. The cam lever adjustment is used only on models with lever control.

There are several models of the Duo-Servo utilizing the cable and conduit type of control. Brakes with this type control may be of either double or single anchor construction. The double anchor cable controlled type has been largely superseded by the single anchor "equal action" model. The "equal action" brake may be identified by its integral lever and cam, as shown in Fig. N29 A, page 57.

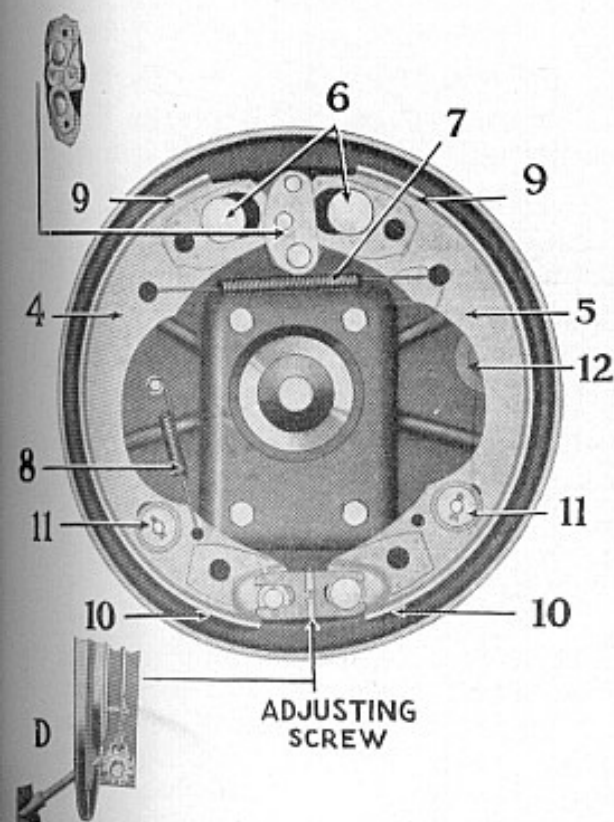


Fig. N25—Wheel side Duo-Servo brake.

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|---------------------------|---------------------|
| 4—Primary shoe | 9—Heel end of shoes |
| 5—Secondary shoe | 10—Toe end of shoes |
| 6—Anchor pins | 11—Steady rest pins |
| 7—P. and S. return spring | 12—Eccentric |
| 8—Primary shoe spring | |

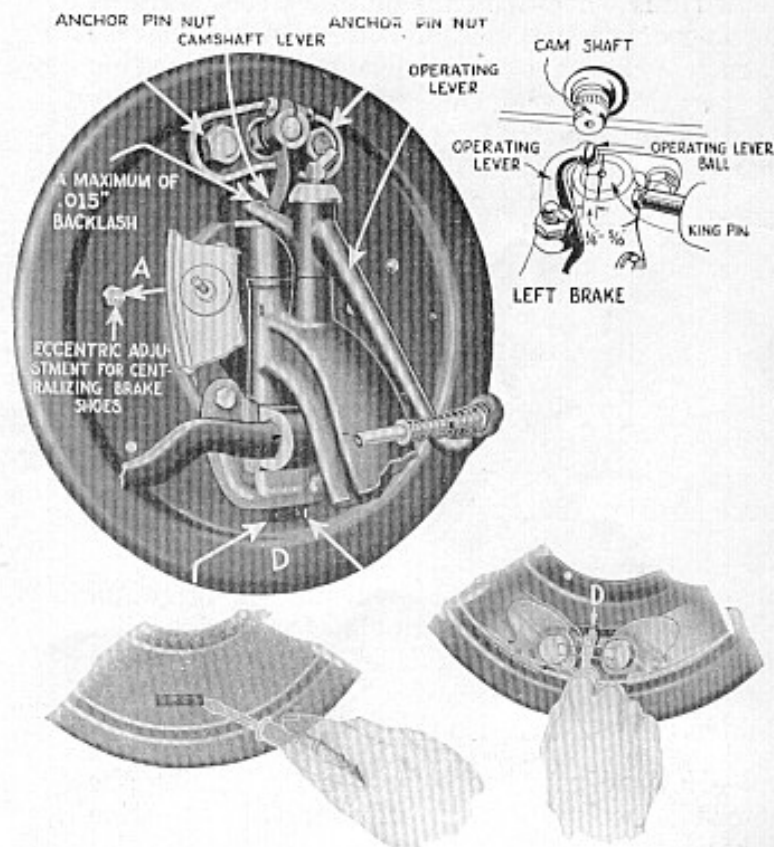


Fig. N26—Left front brake showing all points of adjustment. Sketched view at the right of "A" shows the wheel side of the eccentric adjustment. Note correct front cam lever position in upper right corner, and clearance adjustment at "D"

Duo-Servo Lever Control

Adjustment Procedure

On those models of the two-shoe Duo-Servo brake provided with lever type controls the center of the operating lever ball end (at front brakes only) should be 1/4 to 5/16 in. behind the center line of the knuckle king pin (see Fig. N26, Page 53) when the brakes are released. As linkage wear takes place the ball end of the operating lever will move to some extent. Any slight variation from the position mentioned above will not cause trouble, but if the hookup has been tampered with and the ball end (of operating lever) is far off position it will cause one of the front brakes to be applied when the car turns a corner.

As before stated this is not a delicate adjustment but it is advisable to check same by turning the steering wheel to the full right turn position. Now apply the brakes to light drag. If the front control levers are correctly positioned the left (outer) brake should be released with the right (inner) one showing drag. Now turn steering wheel to full left turn position, apply brakes and check right wheel which should be free with left showing drag. If the outer wheel does not release when tested as above it indicates wrong position of operating lever which should be changed by moving the camshaft lever (Fig. N26, Page 53) rearward on its serrations and readjusting the length of the front pull rod. Hookup linkage should be adjusted to just remove the backlash. Never adjust pull rods to take up lining wear.

Minor Adjustment

1—Jack up all four wheels. Make sure that service pedal and hand brake lever are fully released. Loosen lock nut of the eccentric adjustment (A-Fig. N26, Page 53) on all four brakes.

2—Rotate wheel by hand and at the same time turn the eccentric adjustment in the direction wheel rotates when car is moving forward, until a very slight drag is felt, then turn eccentric in opposite direction until wheel is just free. Now tighten the locknut. Do this on all four wheels.

3—Now adjust shoe clearance by turning the notched wheel with a screwdriver (the direction of hand end of screwdriver should be toward axle) until the brake drags slightly, then turn notched adjuster in opposite direction until wheel is just free. See D, Fig. N26, Page 53. Do the same to the other three brakes.

4—Try car on brake testing machine or road and if not perfectly equalized loosen notched clearance adjusting wheel (D, Figs. N26 and N25, Page 53) on the tight wheel.

Major Adjustment

If brakes are being relined or if the anchor pin nuts are found loose or if previous adjustment has failed to give satisfactory results apply the major adjustment. Major adjustment includes all of the work mentioned in paragraphs 1, 2 and 3 plus centering of the 8 shoe anchors.

5—Jack up all four wheels. Loosen the two anchor pin nuts (Fig. N26, Page 53) until same are free of their lock washers.

6—Tighten clearance adjustment notched wheel as outlined in paragraph 3, but set each shoe up so tight that wheel can be just turned with both hands. Tap ends of both anchor pins with soft hammer, then tighten anchor nuts with a 16-in. wrench. Anchors must be set up very tight.

7—Now back off on the clearance adjustment (notched wheel) until road wheel is free of drag.

8—Recenter shoes by turning eccentric adjustment until wheel just drags, then back off until wheels turn freely, as outlined in paragraph 2.

9—Readjust shoe clearance by turning adjuster "D" until wheel just drags, then back off until drag is just removed.

10—Repeat 5, 6, 7, 8, and 9 on other three brakes. Try car on testing machine or road, making final equalizing adjustments at notched wheels "D" (Figs. N25, 26, Page 53).

IMPORTANT NOTE

Whenever possible, it is advisable to check the lining to drum clearance with some form of measuring device. Recommended specifications call for approximately .008 in. clearance at the anchored (heel) end of shoes and about .014 in. at the unanchored or adjusting screw end of the shoes. Although these clearances vary with some linings, it is important to maintain the proper ratio, i. e., anchored end of the shoes should have about half as much clearance as the unanchored end.

Duo-Servo Cable Double Anchor

Adjustment Procedure

1. Disconnect all four brake cables at the cross-shaft levers. Jack up all four wheels. Make sure that cross shaft, pedal and hand lever are fully released.
2. Loosen eccentric adjustment locknut (A. Fig. N27, 28). Turn eccentric adjustment in direction wheel rotates going **forward**, until a **very slight drag** is felt, then turn eccentric **back** until wheel is just free. Now **tighten** the locknut.
3. Loosen the anchor pin nuts (O Fig. N27) free of their lock washers. Tighten clearance adjustment notched wheel "D" until wheel can just be turned with both hands. Tap threaded ends of both anchor pins with a soft hammer; then tighten anchor nuts as tightly as possible with a sixteen inch wrench.
4. With shoes still expanded, adjust cable lengths so that clevis pin will just enter clevis and cross-shaft lever with cable held tight. Reconnect cables.
5. Back off the notched wheel adjuster until each of the 4 wheels is **just free of drag**.
6. Use pedal depressor to check for even drag at all wheels. Try on testing machine or road and get final equalization by loosening clearance adjustment (D) at "tight" wheel.

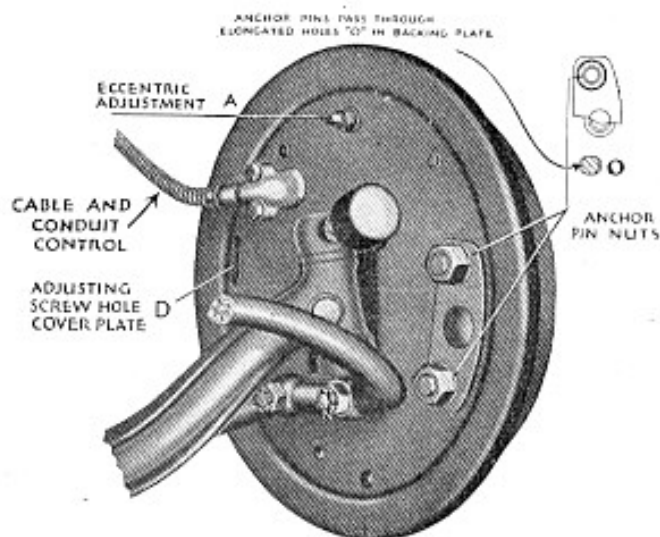


Fig. N27—Cable control type double anchor Bendix Duo-Servo brake as used on 1931 Studebaker cars

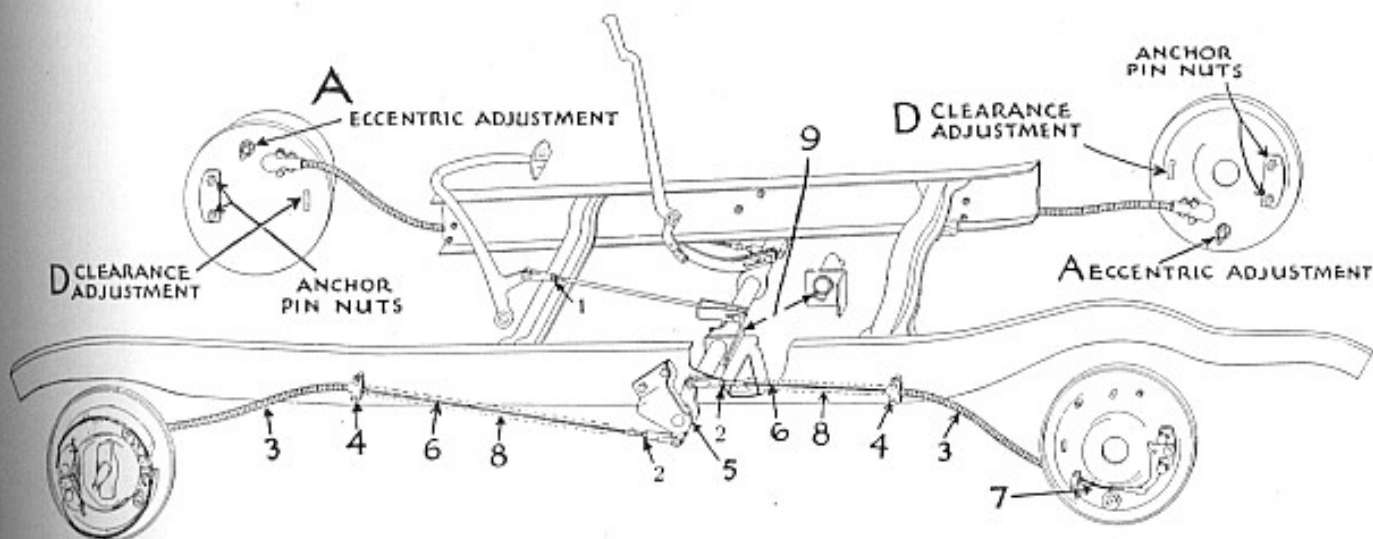


Fig. N28—Typical chassis linkage hookup using cable type controls. Dotted lines indicate section of cable which is in conduit during lubrication

Lubrication of Cables

The portions of the pull cables that are enclosed by the conduits (3) should be lubricated every 3000 miles as follows:

A—Clean the exposed section of the 4 cables (6) with waste, or preferably a lintless wiping cloth. See Fig. N28, Page 55.

B—Remove shoes and disconnect cables at their clevis ends. Pull cables out from backing plate as far as they will go.

C—Clean and apply graphite grease (Bendix recommend Gredag No. 213½) liberally to the cables. Each time the wheels are removed apply some of the graphite grease to points (7) where the cables contact the backing plates.