Drill the lining so that rivet heads may be placed down in the material as deeply as it is safe to go without danger of the lining pulling off the shoes. By following this procedure, we leave as much usable thickness as possible for wear purposes. The depth at which rivets may be safely placed varies, depending upon the make and type of brake lining. With some linings, it is safe to drill to a depth of from only about one-half to two-thirds of the total thickness of the material. With American Brakeblok, some applications of which have wire mesh reinforcing back, it is best to drill until the wire back is just barely visible. Then the head of the rivet will seat squarely on the reinforcing back, the riveting job will be tight, there will be a maximum of friction material for wear purposes and the braking strains will be evenly distributed throughout the entire segment of lining.

It is especially important to obtain 100% contact between the brake lining surface and the brake drum. Whenever possible, it is helpful to grind the lining on the shoes to the correct drum radius. Machines which mount on the axle spindle and grind the lining on the shoes while they are in place in the assembly do an especially fine job, providing a good quality machine is used.

On rivet sets chamfer the ends of each brake lining segment back past the centerline of the end rows of rivets. This eliminates end contact which is a frequent cause of brake squeaks. All bolts and nuts in the brake, wheel and drum assembly should be securely tightened.

ENERGIZING EFFECT

Friction causes the rotating drum to drag on the shoe linings. If the drag exerts a pulling force it "energizes" the shoe, helping to force it into the drum. This "self-energization" multiplies the effect of the controlled actuating force to produce additional braking effort or to reduce the amount of force required. If the drag exerts a pushing force it "de-energizes" the shoe, resisting the effort to force it into the drum. "De-energization" reduces the braking effect. If the brake shoes are individually anchored (suspended), a shoe energized by forward drum rotation is a "primary" or "forward-acting" shoe. A shoe de-energized by forward drum rotation is a "reverse-acting" shoe (Fig. 6).

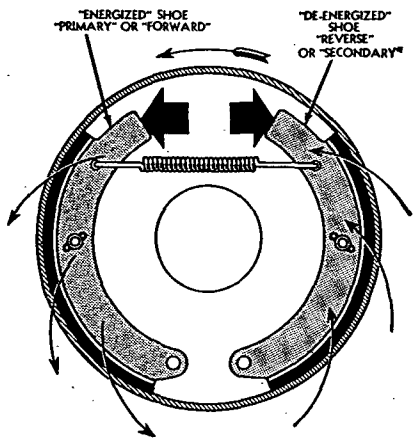

Figure 6

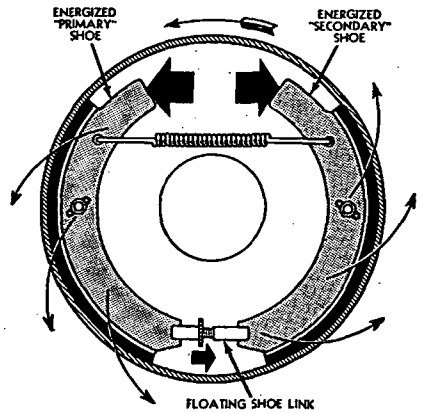

Figure 7

If the brake shoes are linked together by a floating link, actuating force is transmitted from one shoe to the other creating a wedging or servo action. **The first shoe from the source of actuating force in the direction of forward drum rotation is the "primary" shoe. The shoe linked to the primary shoe is the "secondary" shoe (Fig. 7).**

Some systems have two forward acting shoes, actuated by dual hydraulic cylinders (Fig. 8).

Self-energization is important in all motor vehicles as it provides powerful braking action controllable with light pedal pressure. The advantage of this design is offset to a degree by one disadvantage. Variation of friction on one wheel and that on the opposite wheel, due to contact, grease, foreign matter, drum make and design or other causes,

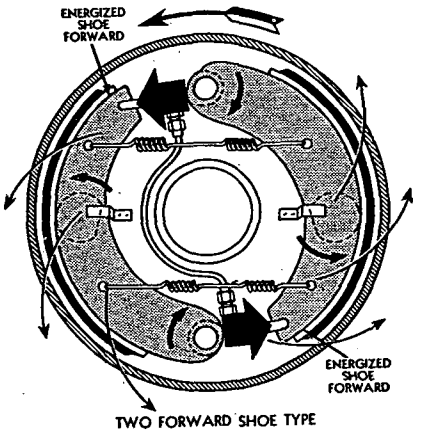

Figure 8

will magnify through the self-energizing principle and will cause **pulling** to the right or left side. Equal brake effort at each wheel is essential to efficient and effective stops. Equalization is dependent upon anchor pin adjustment, condition of drum, and lining contact, tire tread wear, and camber limits.

BRAKE LINING MATERIALS

Brake linings are of several types, are manufactured by a wide variety of methods, use many different materials—in various combinations—to obtain the strength and frictional characteristics desired. The principal types in use today are the woven, molded and block varieties. It is a hard, dense material and is held to the brake shoes by rivets or by cementing or "bonding" with adhesive of a special type which is heat cured on the shoe.

Materials used in the manufacture of brake linings include asbestos, rubber (natural or synthetic), resins, drying oils, coke, coal, brass, zinc, lead and others. These materials are baked, cured and vulcanized by the application of heat and pressure to form linings of any desired shape, texture, density, hardness and frictional characteristics wanted.

Similar to the molded linings used on passenger cars but much thicker and wider, the brake blocks used on heavy duty trucks are shaped to fit either inside or outside of the drums and are attached to heavy pressed steel or cast iron shoes or bands. Such brakes are usually power operated by means of air pressure tanks, vacuum cylinders or electricity.

Therefore brake linings should have the following qualities:

- **Constant friction value throughout its service life.**
- **Recovery from effects of water and oil.**
- **Non-compressible.**
- **Suitable for existing cast alloy drums.**
- **Uniformity of material and quality of control in production.**
- **Noise and fade-free and long wear life.**

It is important to use a high quality brake lining on all jobs. This insures