This invention relates to brakes and is illustrated as embodied in an internal expanding brake for an automobile. An object of the invention is to construct the shoes so that they may be mounted in the brake in such a manner as to have a rocking movement to permit them to adjust their positions to the surface of the brake drum. This has the double advantage of making it unnecessary to form some of the parts with extreme accuracy and on the other hand it allows the brake shoes to compensate for distortions of the drum or shoes which take place in service.

In one desirable embodiment the shoe is formed with a novel spherical socket containing a spherical ball mounted pivotally to support the shoe for movement about an axis extending crosswise of the shoe while still permitting rocking of the shoe about other axes. Preferably the ball is formed with a diametrical opening to receive the brake shoe pivot. In the arrangement illustrated in the drawing, and which shows a very strong and rigid shoe which can be constructed at a low price, the shoe has a stiffening web preferably formed of two flanges, and which may form parts of two novel stampings making up the brake shoe, the metal of the flanges being drawn in opposite directions to form half-sockets of semi-spherical form which face toward one another and which embrace the above-described spherical ball.

Other features of the invention relate to the mounting of the pivot member so that it is carried by spaced flanges forming part of one brake shoe and passes through the above-described spherical ball carried by a different shoe straddled by the spaced flanges, and to a novel interlocking arrangement of the pivot with a stop, and to a combination of a novel steady-rest with the above-described pivotal mounting for the shoe, and to other novel combinations of parts and desirable particular constructions, which will be apparent from the following description of one illustrative embodiment shown in the accompanying drawing, in which:

Figure 1 is a vertical section through the brake just inside the head of the brake drum and showing the shoes in side elevation;
Figure 2 is a partial section on the line 2—2 of Figure 1 showing the novel pivotal connection between two of the shoes and showing the interlocking with the stop;
Figure 3 is a partial section on the line 3—3 of Figure 1 showing the anchorage of one shoe; and
Figure 4 is a partial section on the line 4—4 of Figure 1 and showing one of the novel steady-rests in detail.

The particular brake selected for illustration includes a rotatable drum 10, at the open side of which there may be arranged a suitable support such as a backing plate 12, and within which are arranged three shoes 14, 16, and 18, preferably being identical and interchangeable. The shoe 16 is anchored on backing plate 12 or other equivalent support by being mounted on a pivot member 20, while the shoes 14 and 18 are connected to the shoe 16 by pivots 22 and 24, which may be of the same general construction. The brake may be applied by suitable means such as a double cam 26, forcing the shoes 14 and 18 in opposite directions against the resistance of a return spring 28, the shoe 16 being applied by movement of the shoes 14 and 18 (principally the shoe 18) against the resistance of an auxiliary return spring 30.

The shoe 16 is shown as built up of two sheet metal stampings 32 and 34, generally L-shaped in cross-section but preferably provided with a narrow reinforcing flange 36 along the inner edges, and which are riveted or welded or otherwise secured back to back to form a shoe T-shaped in cross-section. Each of the shoes 14 and 18 is built up throughout the major part of its length by L-section stampings welded or riveted or otherwise secured back to back as appears in Figure 4, the flanges of the stampings being spread apart at the end of the shoe as appears in Figures 2 and 3 to form spaced parallel arms straddling the adjacent end of shoe 16 and formed for pivotal engagement with the pivots 22 and 24 as shown in Figure 2.

According to an important feature of the present invention, the radial flanges of the stampings 32 and 34 which form the stiffening web of shoe 16 are drawn in opposite directions at the ends of the shoe, to form partially semispherical sockets 36 and 38 embracing a spherical ball 40 forming a bearing for the shoe permitting it to rock crosswise. The ball 40 forming the bearing at
the left end of shoe 16 in Figure 1 is formed with a diametrical opening to receive the pivot 22 as shown in Figure 2. Pivot 22 is formed with a flange 42 at its end interlocking with a novel grooved eccentric stop 44 against which it is urged when the brake is released by auxiliary spring 30. The spherical ball 40 at the right end of the shoe is also formed with a diametrical opening to receive the anchor 20 which is fixedly mounted in any suitable manner on the backing plate 12, and which passes through relatively large openings 46 in the arm forming the end of the shoe 14. Ball 40 for the anchor 20 is confined between a shoulder 48 on the anchor 20 and a nut 50 threaded on the end of the anchor. The pivotal connection 24 between shoes 14 and 16 may be, and preferably is, the same as the connection 22 shown in Figure 2 except that it is not necessary to provide a stop 44.

In order to limit the rocking of the shoes, I prefer to provide each of them with a novel steady-rest, one of which is shown in detail in Figure 4 and which includes a shouldered pin 52 carried by the backing plate or other support projecting through a slot 54 in the stiffening flange of the shoe. A washer 56 seated against the shoulder of pin 52 engages one side of the stiffening flange of the shoe, while a washer 58 is yieldingly held against the opposite side of the stiffening flange by a spring 60 confined by a washer 62 held by a center pin or the like 64. This arrangement positively limits the rocking of the shoe in one direction and yieldingly limits the rocking in the opposite direction.

While one illustrative embodiment has been described in detail, it is not my intention to limit the scope of that particular embodiment or otherwise than by the terms of the appended claims.

I claim:

1. A brake shoe having in one end a partial spherical socket, and a spherical ball mounted in said socket and formed with an opening crosswise of the shoe to receive a pivot for the shoe, the shoe being movable on the ball in any direction about the center of the ball.

2. A brake shoe having in one end a partial spherical socket, and a spherical ball mounted in said socket and formed with a cylindrical diametrical opening crosswise of the shoe to receive a pivot for the shoe, the shoe being movable on the ball in any direction about the center of the ball.

3. A brake shoe formed of two parts secured together, each formed at the end of the shoe with part of a partial spherical socket, and a spherical ball mounted in said sockets and formed and arranged pivotally to support the shoe for movement about an axis extending crosswise of the shoe.

4. A brake shoe formed of two halves secured together in the central plane of the shoe, each formed at the end of the shoe with one half of a partial spherical socket, and a spherical ball mounted in said socket and formed and arranged pivotally to support the shoe for movement about an axis extending crosswise of the shoe.

5. A brake shoe having at one end a partial spherical socket, and a spherical ball mounted in said socket and formed and arranged pivotally to support the shoe for movement about an axis extending crosswise of the shoe, the socket extending entirely around the ball to retain the ball permanent in the socket.

6. A brake shoe having at one end two flanges jointly forming a partial spherical socket, and a spherical ball mounted in said socket and formed and arranged pivotally to support the shoe for movement about an axis extending crosswise of the shoe, the socket extending entirely around the ball to retain the ball permanently in the socket.

7. A brake shoe having a central stiffening web including two flanges drawn out in opposite directions to form semi-spherical half sockets facing each other, and a spherical ball seated between said half-sockets and formed and arranged pivotally to support the shoe.

8. A brake shoe having a central stiffening web having parts projecting in opposite directions to form semi-spherical half-sockets facing each other, and a spherical ball seated between said half-sockets and formed and arranged pivotally to support the shoe.

9. A brake shoe with a cylindrical friction part having at least at one point a web formed of two flanges integral with portions of the friction part and with the metal of the flanges displaced away from each other to form semi-spherical half-sockets facing each other.

10. A brake shoe having at least at one point a web formed of two flanges and with the metal of the flanges displaced away from each other to form semi-spherical half-sockets facing each other.

11. A brake shoe formed of two pressed metal parts secured together lengthwise of the shoe and each including a stiffening flange extending lengthwise of the shoe, and with the metal of the flanges displaced away from each other to form semi-spherical sockets facing each other.

12. A brake shoe formed of two L-section pressed metal parts secured together back to back lengthwise of the shoe and including two stiffening flanges secured together and extending lengthwise of the shoe, and with the metal of the flanges displaced away from each other to form semi-spherical sockets facing each other.

13. A brake shoe having at one end a spherical bearing permitting it to have piv-

14. A brake shoe having at one end a semi-spherical socket extending crosswise of the shoe, the socket extending entirely around the ball to retain the ball permanently in the socket.

15. A brake shoe having a central stiffening web including two flanges drawn out in opposite directions to form semi-spherical half-sockets facing each other, and a spherical ball seated between said half-sockets and formed and arranged pivotally to support the shoe.

16. A brake shoe having a central stiffening web having parts projecting in opposite directions to form semi-spherical half-sockets facing each other, and a spherical ball seated between said half-sockets and formed and arranged pivotally to support the shoe.

17. A brake shoe with a cylindrical friction part having at least at one point a web formed of two flanges integral with portions of the friction part and with the metal of the flanges displaced away from each other to form semi-spherical half-sockets facing each other.

18. A brake shoe having at least at one point a web formed of two flanges and with the metal of the flanges displaced away from each other to form semi-spherical half-sockets facing each other.
otal movement and also permitting it to rock crosswise, in combination with a steady rest some distance from said end and limiting the crosswise rocking.  

15. A brake shoe having at one end a spherical bearing permitting it to have pivotal movement and also permitting it to rock crosswise, in combination with a steady rest some distance from said end and positively limiting the crosswise rocking in one direction and yieldingly limiting the crosswise rocking in the opposite direction.  

16. A brake shoe having a spherical socket at one end, a spherical ball in the socket having an opening extending crosswise of the shoe, a stop, and a pivot member in the opening interlocking with said stop.  

17. A brake shoe having a spherical socket at one end, a spherical ball in the socket having an opening extending crosswise of the shoe, a stop, and a pivot member in the opening interlocking at one end with said stop.  

18. A pair of brake shoes, one having spaced flanges and the other having adjacent flanges projecting between the spaced flanges and there formed with semi-spherical half sockets facing each other, a spherical ball in the half-sockets having an opening extending crosswise of the shoe, and a pivot member carried by the spaced flanges and extending through said opening.  

19. A pair of brake shoes, one having spaced flanges and the other projecting between the spaced flanges and there formed with a spherical socket, a spherical ball in the socket having an opening extending crosswise of the shoe, and a pivot member carried by the spaced flanges and extending through said opening.  

20. A brake comprising, in combination, a rotatable drum, a backing plate at the open side of the drum, a shoe within the drum having a stiffening web formed with an opening, a steady rest carried by the backing plate and having a shoulder to form a reduced portion projecting through the opening, washers encircling the steady rest on opposite sides of the stiffening web, the one on the side next the backing plate rest ing against the shoulder, a part held on the end of the reduced portion of the steady rest, and a coil spring sleeved on the reduced portion and confined between said part and the washer on the side of the web opposite the backing plate.  

21. A brake comprising, in combination, a rotatable drum, a backing plate at the open side of the drum, a shoe within the drum having a stiffening web formed with an opening, and a steady rest carried by the backing plate and projecting through the opening, the steady rest having means positively preventing movement of the stiffening web toward the backing plate and yieldingly resisting movement of the web away from the backing plate.  

22. A brake comprising, in combination, a rotatable drum, a backing plate at the open side of the drum, a shoe within the drum, and a steady rest secured to the backing plate and positively preventing movement of the shoe toward the backing plate and yieldingly resisting movement of the shoe away from the backing plate.  

23. A brake comprising, in combination, a rotatable drum, a backing plate at the open side of the drum, a shoe within the drum, and a steady rest secured to the backing plate and positively preventing movement of the shoe toward the backing plate.  

In testimony whereof, I have hereunto signed my name.  

ADIEL Y. DODGE.