

March 3, 1936.

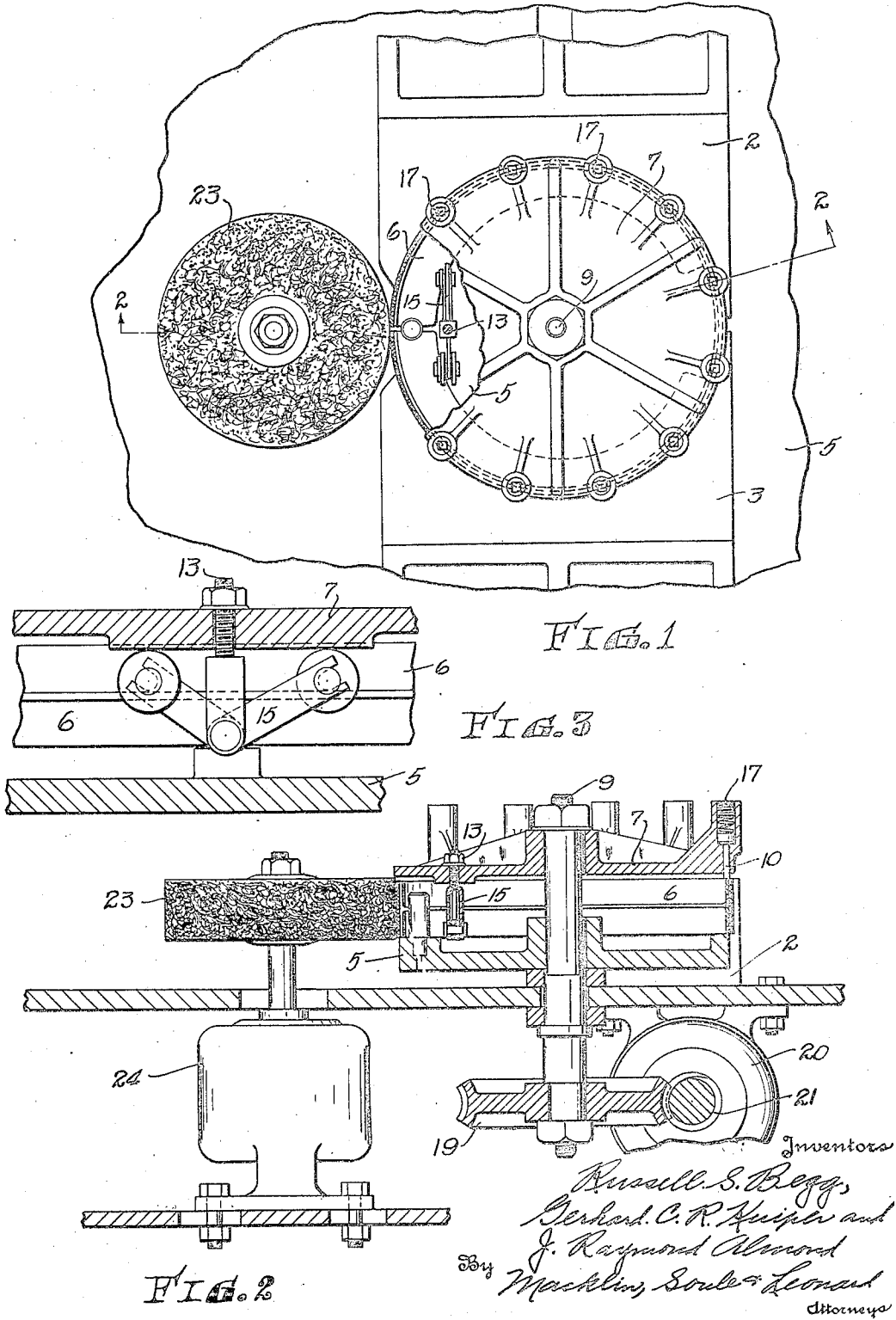
R. S. BEGG ET AL

2,032,864

BRAKE SHOE AND METHOD OF FORMING SAME

Filed Feb. 7, 1931

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

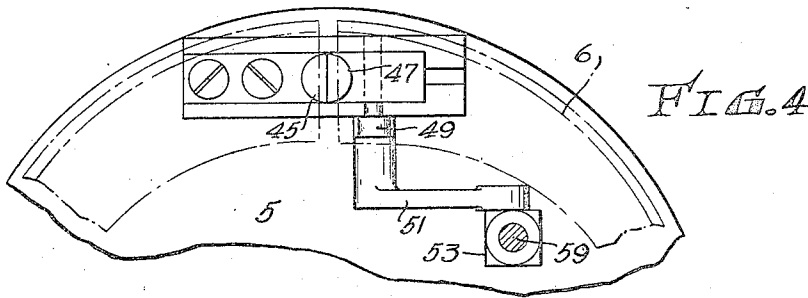
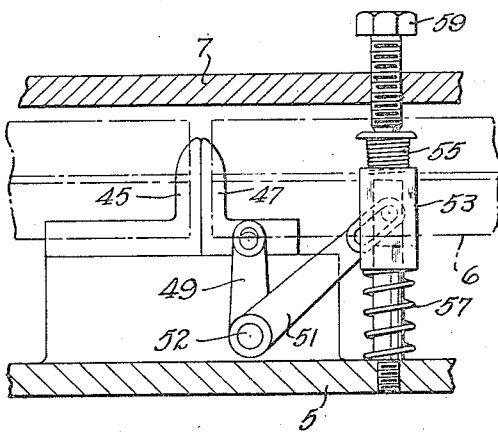


FIG. 5

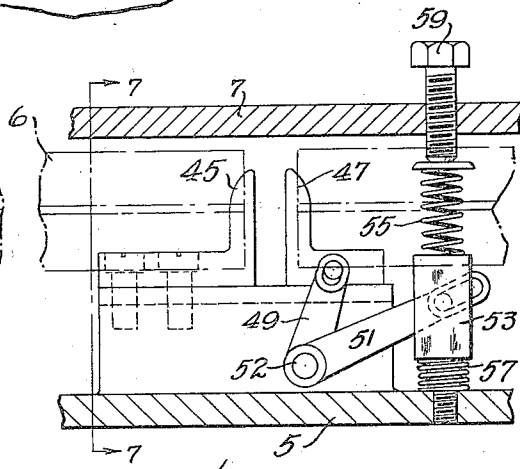


FIG. 6

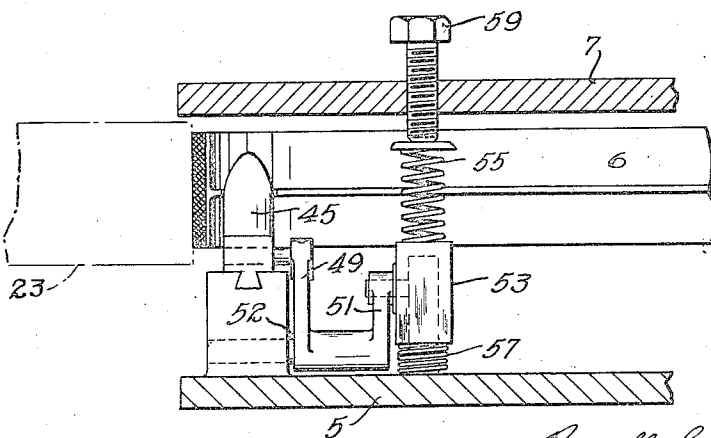


FIG. 7

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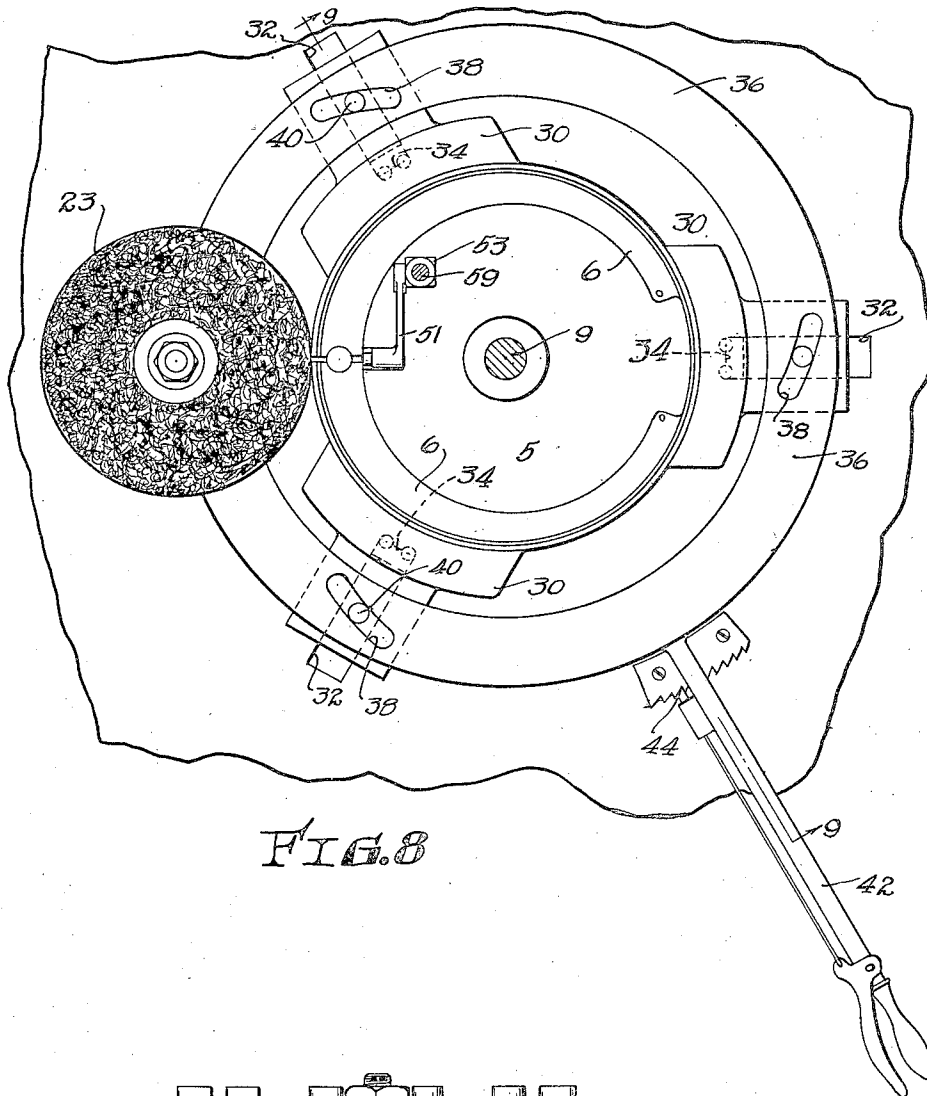


FIG. 8

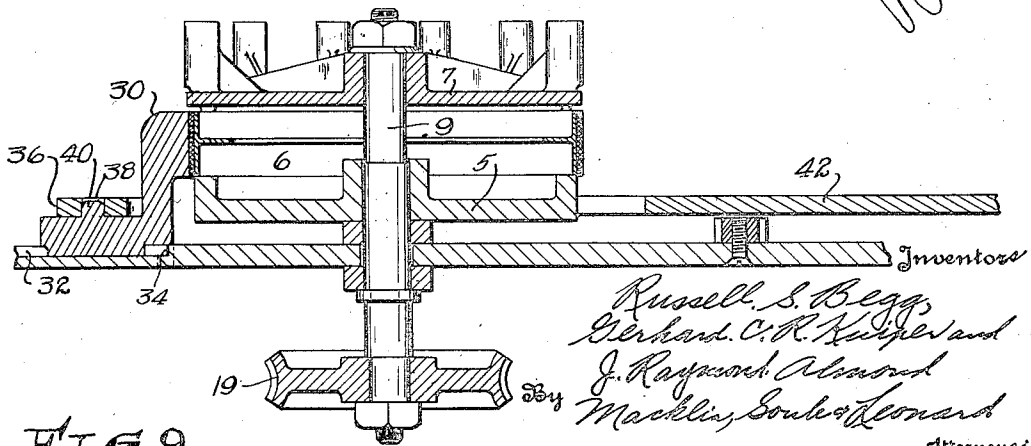


FIG. 9

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BRAKE SHOE AND METHOD OF
FORMING SAME

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2 Claims. (Cl. 51—105)

This invention relates to brakes and particularly to a method of and apparatus for grinding the brake shoe lining so as to obtain efficient co-operation of the brake shoe and drum.

For the purpose of illustration I shall describe my invention as applied to internal expanding brakes the application to external brakes being apparent therefrom.

The types of internal expansion brakes now generally used include a cylindrical drum and a brake shoe expansible in the drum, the shoe being covered with a lining, usually of a fibrous material adapted to flex with the shoe and engage the drum when the shoe is in the expanded position. The shoe may comprise the well known split cylindrical band of metal having its free ends connected with a toggle or other suitable connection so as to permit expanding, or the usual two piece shoe pivoted at a point diametrically opposite the free ends, the free ends being connected to a toggle for expanding.

Experience has proven that a brake so formed gives poor contact between the shoe lining and drum. This results to some extent from low spots in the shoe or lining and is partly overcome by grinding to a sufficient depth. The greater effect, however, results from the fact that the shoe does not expand as a true circle but tends to become elliptical in the expanded position. As a result the parts of the shoe along the termini of the major axis of the ellipse contact with the drum while the low areas along the minor axis are out of contact with the drum when the brake shoe is expanded.

The usual practice is to grind the contact surface of the shoe while holding it in its normal unexpanded position or the position it assumes when out of operation. This practice produces a shoe which is cylindrical when in idle or unexpanded position but which is distorted when stressed into operating position.

Our invention contemplates a solution of the problem thus presented by expanding the shoe and grinding the drum contacting surface while expanded so that its contact surface is circular when expanded into operating position in the drum. In this manner substantially the entire surface of the shoe lining engages the operating surface of the drum thus producing more effective contact between the shoe and drum.

To accomplish the best results, the lined shoe is expanded so that the low spots and the low areas are disposed slightly outside the circle defined by the complementary surface of the drum, the amount of expansion being dependent upon

the depth of the low spots and radius of the low areas.

In practice we find it advisable to grind or otherwise remove a sufficient depth of the lining about the entire circumference while the shoe is so expanded, so that the lined shoe is cylindrical and of substantially the same outside diameter as the inside diameter of the drum with which it is to be associated.

Such a method removes a greater thickness of lining in some places than others but the usual linings are of ample thickness to permit such removal. In operation a brake shoe so ground contacts substantially with the drum over the entire shoe surface and consequently excessive localized wear of the lining is reduced. We have found that a shoe so prepared will continue to wear more evenly or uniformly and to operate more efficiently throughout the life of the lining.

The same process is applicable to external contracting brakes, the shoe being contracted to slightly less than operating position and ground. In the following specification, an apparatus for carrying out our process on internal expanding brakes is described by way of illustration.

In the drawings—

Fig. 1 is a plan view of a grinding apparatus suitable for carrying out the method of our invention.

Fig. 2 is a cross sectional view of the apparatus taken on a plane indicated by the line 2—2 of Fig. 1.

Fig. 3 is an enlarged partial sectional view of the apparatus illustrated in Fig. 2 showing the shoe expanding means.

Fig. 4 is a partial plan view of the expanding means of a slightly modified form of apparatus.

Fig. 5 is a sectional view of the elements illustrated in Fig. 4.

Fig. 6 is an illustration of the apparatus illustrated in Fig. 5, showing another position thereof.

Fig. 7 is a partial sectional view of the apparatus illustrated in Fig. 6 and is taken on a plane indicated by the line 7—7 of Fig. 6.

Fig. 8 is a partial plan view of a modified form of apparatus for carrying out our method.

Fig. 9 is a sectional view of the apparatus illustrated in Fig. 8, and is taken on a plane indicated by the line 9—9 of Fig. 8.

Referring particularly to Figs. 1 and 2 our apparatus may include a gauge having a plurality of jaws such as 2 and 3 which have cylindrical shoe contacting surfaces of a diameter slightly greater than the diameter of the brake drum for the particular shoe which is to be

ground. The jaws 2 and 3 of the gauge are movable relatively toward and away from each other so as to receive the brake shoe therein, suitable stops being provided to correctly space the jaws at their innermost position to assimilate a brake drum having its friction surface perfectly true. Intermediate the jaws 2 and 3 is a grinding table 5 which is adapted to receive the brake shoe 6 which is to be ground. The brake shoe 6 is placed on the table 5 and the jaws 2 and 3 moved relatively together so that in effect a drum or an annular surface slightly larger in diameter than the brake drum is formed. A locking plate 7 is then placed over the shoe and secured in fixed axial position to a rotatable spindle 9 of the table 5. About the periphery of the plate 7 are suitable means such as pins 10 which are adapted to be placed in engagement with the shoe. When the shoe is thus positioned between the jaws 2 and 3 and the plate 7 is in place, a screw 13 extending through the plate 7 is brought into contact with the toggle 15 of the brake shoe and operates the toggle to expand the shoe tightly into contact with the jaws 2 and 3. While the shoe is held in this position the pins 10 are forced thereagainst by means of the screws 17, to lock the shoe in the expanded position.

The spindle 9 is provided with means such as a gear 19 driven from a motor 20 or other suitable source of power through a complementary gear 21 for rotating the table 5 and the plate 7, thus rotating the shoe which is held firmly between the table and plate 7. A grinding wheel or suitable cutting tool 23 movable radially toward and away from the spindle 9 is fixed in the desired position relative to the spindle 9 so as to remain a constant distance therefrom and in contact with the shoe lining. The grinding wheel is shown as driven by a motor 24.

The jaws 2 and 3 are withdrawn from the shoe and the table and shoe are then revolved about the spindle 9. The grinder 23 likewise is revolved usually at high speed about its axis. The grinding wheel is secured in position inwardly of the table 5 a sufficient distance so that the low spots and low areas of the expanded shoe are brought into contact therewith and the lining is ground off for a sufficient depth so that the operating contact surface of the shoe is cylindrical and of the same diameter as the drum with which the shoe is to be associated. A shoe ground in this position will be circular or cylindrical when applied to the drum and will assume its elliptical shape when unexpanded or out of operating position.

In some cases instead of bringing the jaws together and expanding the shoe to fit therein, it is desirable to place the shoe on the grinding table in its extreme expanded position and then to move the jaws inwardly against the shoe to contract the shoe to the proper diameter and to lock it in this contracted position. A form of apparatus for practicing our method in this manner is illustrated in Figs. 4 to 8 inclusive. This apparatus is similar in all respects to the apparatus previously described, with the exception of the contracting jaws and the brake shoe expanding means.

Referring particularly to Figs. 8 and 9, a plurality of jaws indicated at 30 mounted on the frame of the apparatus about the table 5, may be used. These jaws are slidable radially of the table 5 on suitable guides 32 on the frame of the machine and are all operated concurrently.

Stops 34 may be provided to limit the inward motion of the jaws so as to stop them at the correct position. For operating the jaws concurrently, a ring 36 which is slotted adjacent to each jaw with an outwardly sloping slot, may be used, as indicated at 38. Each jaw is provided with an operating pin 40 rigid therewith and engageable with a cooperating slot 38. The entire ring 36 is rotatable relative to the jaws so as to cam the pins inwardly and outwardly and thus move the jaws outwardly along their respective guides 32.

For purposes of illustration I have shown the cam ring 36 operated by a lever 42 having ratchet latch mechanism 44. Obviously by swinging the lever 42 in one position the jaws are withdrawn, by bringing it to another position they are moved relatively toward the center of the table 5.

In using this apparatus, the operating toggle of the shoe is released as also are any retrieving springs so that the shoe is in its extreme expanded position. The shoe is then placed on the table 5 and the jaws moved inwardly to contract the shoe to the desired outer diameter, as described, the pins 10 of the plate 7 then operated to lock the shoe in place. In order to insure that the shoe will lie snugly against the jaws, the table 5 is provided with binding post elements 45 and 47. As better illustrated in Figs. 4 to 7, the binding post element 45 may be stationary and the element 47 movable toward and away therefrom. When the shoe is placed on the table the web or other part of one of the free ends of the shoe is placed in engagement with the post 45 and the other end engages the movable post 47. At this time the posts 45 and 47 are separated as illustrated in Fig. 6. The movable post 47 is provided with a toggle mechanism having lever arms 49 and 51 pivoted as indicated at 52. The arm 51 is raised to move the post 47 toward the post 45 and lowered to withdraw it. The toggle arm 51 is operably connected to a suitable lug 53 which is engaged at the top and bottom by springs 55 and 57. An adjusting screw 59 may be provided in the plate 7 for compressing the springs 55 and 57 the proper amount.

Obviously when the free ends of the shoe are positioned one against each of the posts 45 and 47 and the jaws 30 are moved inwardly to contract the shoe, the free ends of the shoe force the post 47 toward the post 45 so that the shoe may be contracted the proper amount and at the same time held snugly against the jaws by a yieldable pressure due to the springs 55 and 57. The shoe is then engaged by the pins on the plate 7, as described, and locked in the contracted position and the jaws then withdrawn for proceeding with the grinding operation. Obviously if external contracting brakes are to be ground in this manner it is only necessary the jaws 30 be used to contract the shoe to a less diameter than its normal operating diameter. However, the jaws could be replaced with internal jaws about which the shoe is contracted for bringing it to the correct grinding diameter and the jaws then withdrawn.

In referring to the grinding of the shoe we have specified grinding the lining as this illustrates the use of the apparatus on a generally used type of brake. However, the process is equally applicable to brake shoes which do not have a lining of fibrous or other material and in the appended claims, reference to the grind-

ing of the shoe surface is meant to include the grinding of the contact surface of the shoe whether the contact surface be a lining secured to the shoe or the metal of the shoe itself if the shoe is not lined with other material.

Again, the term "low spots" includes pits or uneven surfaces on the shoe or lining and "low areas" the braking areas disposed closer to the geometric center of the shoe due to the shoe assuming an elliptical shape when stressed.

We claim:

1. A method of forming braking surfaces on internal expanding brake shoes which includes flexing the shoe to dispose the low areas of the braking surface thereof slightly beyond the operating braking position and removing the outer portion of the shoe surface while in the expanded position to form a finished surface of substantially the same diameter as the contact surface

of the drum with which the shoe is to be associated, whereby the contact surface of said shoe defines a true cylinder when the shoe is expanded to operating position.

2. A method of forming braking surfaces on internal expanding brake shoes which includes flexing the shoe to dispose the low spots of the braking surface thereof slightly beyond the operating braking position and removing the outer portion of the shoe surface while in the expanded position to form a finished surface of substantially the same diameter as the contact surface of the drum with which the shoe is to be associated, whereby the contact surface of said shoe defines a true cylinder when the shoe is expanded to operating position.

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