

Jan. 3, 1933.

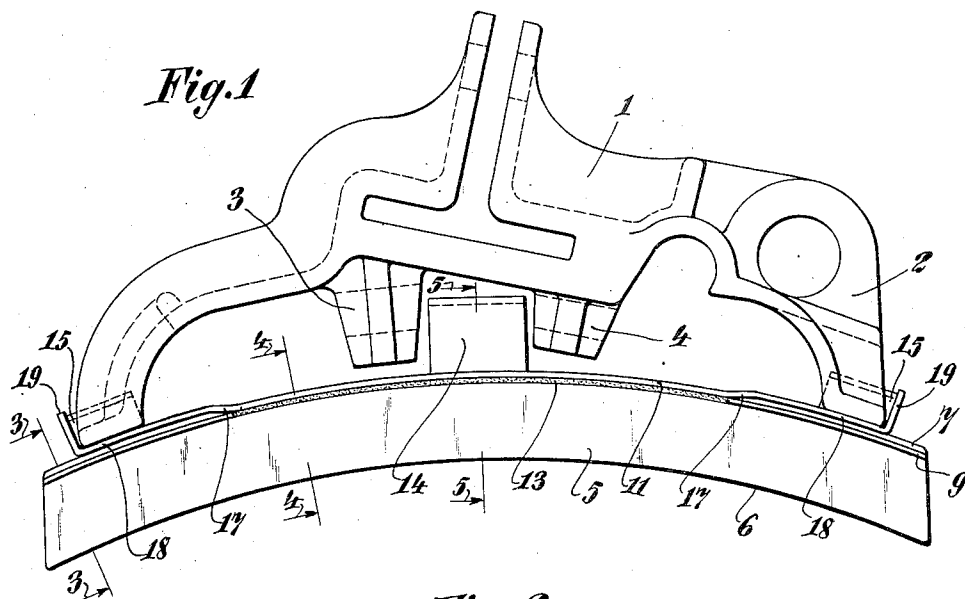
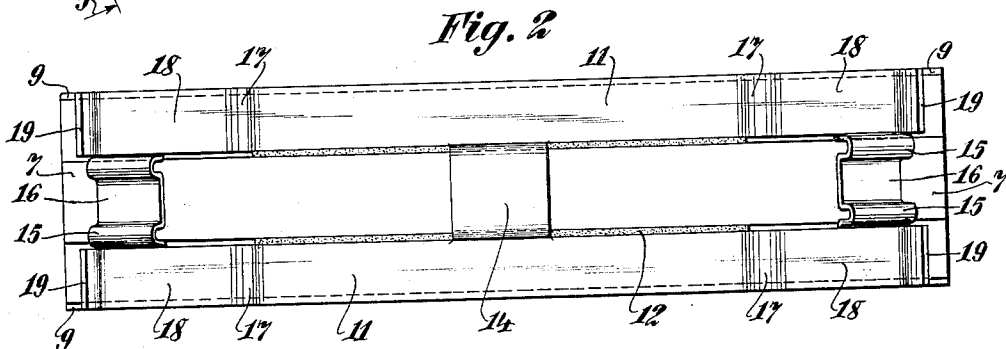
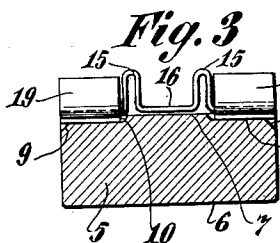
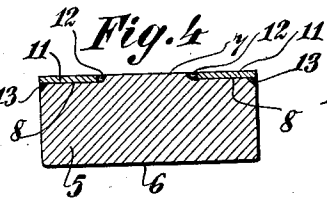
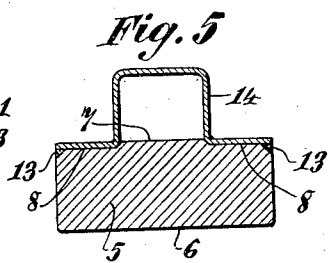
W. D. SARGENT

1,893,306

BRAKE SHOE

Filed Sept. 13, 1930

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig. 6

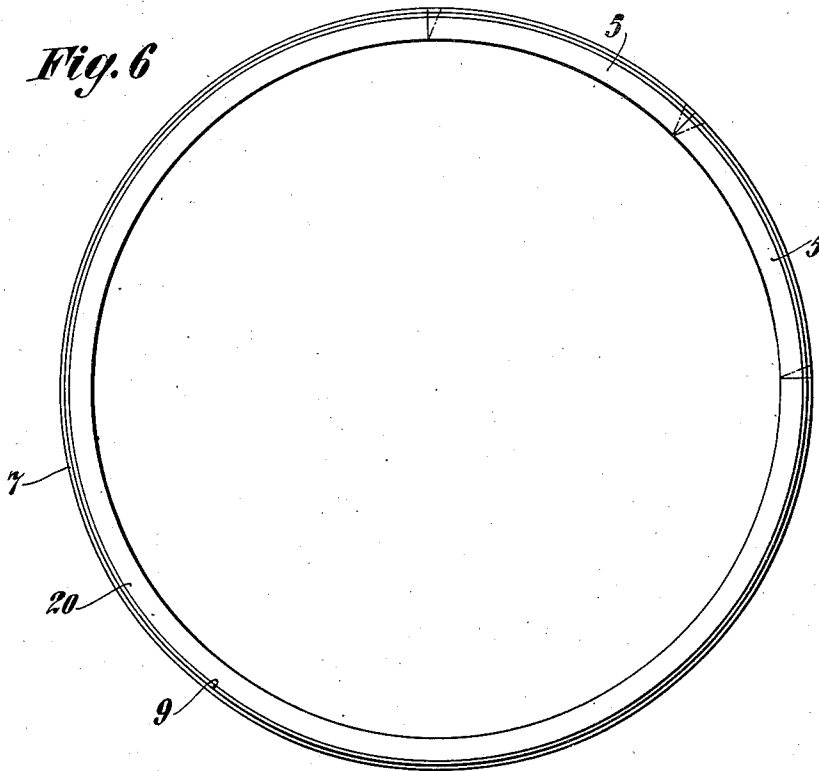
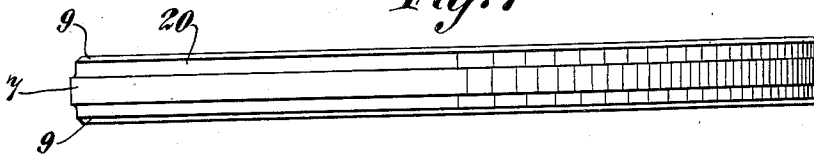


Fig. 7



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UNITED STATES PATENT OFFICE

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BRAKE SHOE

Application filed September 13, 1930. Serial No. 481,686.

The present invention relates to brake shoes and embodies, more specifically, an improved brake shoe and method of manufacturing the same whereby the resulting structure is not only wear resistant to a high degree but also of great strength and possessed of high frictional qualities. More particularly, the invention embodies an improved brake shoe and method of manufacturing, wherein the metal of the shoe is cast centrifugally to provide a shoe, the metal of which is highly dense and having the characteristics noted above.

For a great number of years, shoes have been made by casting iron in suitable sand or other stationary moulds, steel being cast with the structure to impart strength thereto and provide desirable wearing and frictional qualities for service of this character. The imperfect union of the iron and steel, when the shoe is formed in this fashion, frequently results in the cracking off of the particles of the iron, thus in many instances, providing a dangerous construction for use in railway service. Furthermore, as is commonly known, difficulty is had with inaccuracies due to the moulds and moulding processes, thus resulting in poor fits and inferior shoes.

It is required that brake shoes be formed with steel backs and it is proposed, by the present invention, to effectively and conveniently apply steel backs to suitably formed brake shoes in a highly improved and efficient manner. When the steel backs are cast with the shoe, as is now common practice, there frequently results an imperfect union between the cast metal and the steel back due to the repulsion of the two metals under heat. It is proposed herein to overcome these difficulties and provide a brake shoe with a steel back secured effectively thereto in a simple and inexpensive fashion.

The character of centrifugally cast metal is commonly known. By casting an article centrifugally the density of a forging is obtained and thus the resulting structure has the general characteristics, in so far as strength is concerned, of steel. The extreme accuracy with which articles may be moulded in this fashion eliminates many steps in the

present method of forming brake shoes and enables the finished shoe to be cast in a simple operation, at the same time possessing far greater strength, wear resistance and frictional qualities than the present shoes now available. It is therefore proposed, by the present invention, to combine metallurgically (that is, in the cupola or melting device) a suitable iron mixture with steel scrap or other hardening element to give the desired physical characteristics to secure extremely uniform distribution and dense structure. The enormous pressure due to the centrifugal force of the molten metal serves to impart the highly desirable characteristics noted above.

An object of the invention, accordingly, is to provide an improved brake shoe of great density and possessing great strength, wear resistance and abrasive qualities.

A further object of the invention is to provide a brake shoe of the above character wherein the shoe is accurately made and is readily adapted to be applied to a brake head without requiring a great number of finishing operations.

A further object of the invention is to provide a method of producing a brake shoe wherein the shoe is cast centrifugally.

A further object of the invention is to provide a method of the above character wherein annular rings are centrifugally cast, having the cross section and radius of a brake shoe, the rings being cut into sectors of suitable lengths.

A further object of the invention is to provide a method of the above character wherein the brake shoe is formed with a steel back secured effectively thereto.

A further object of the invention is to provide a brake shoe of the above character, the shoe being formed with resilient means by means of which it may be yieldingly secured to a brake head.

A further object of the invention is to provide a brake shoe which is so formed as to adapt it readily to having secured thereto a steel back by means of a simple welding operation.

Further objects, not specifically enumerated

ed above, will be apparent as the invention is described in greater detail in connection with the accompanying drawings, wherein:

Figure 1 is a view in side elevation, showing a brake head having secured thereto a brake shoe constructed in accordance with the present invention, the shoe being provided with a steel back.

Figure 2 is a plan view of a brake shoe constructed in accordance with the present invention and provided with a steel back.

Figure 3 is a view in section, taken on line 3—3 of Figure 1, and looking in the direction of the arrows.

Figure 4 is a view in section, taken on line 4—4 of Figure 1, and looking in the direction of the arrows.

Figure 5 is a view in section, taken on line 5—5 of Figure 1, and looking in the direction of the arrows.

Figure 6 is a view in side elevation, showing a ring cast in accordance with the present invention and from which brake shoes are to be cut.

Figure 7 is a plan view showing a ring constructed in accordance with Figure 6.

Referring to the above drawings, a brake head is shown at 1, having bifurcated arms 2. Depending lugs 3 and 4 are formed on the brake head, these lugs being apertured in the usual fashion to receive a key. This structure is in accordance with National Car Builders standard practice and constitutes no part of the present invention.

With reference to the figures, briefly described above, a brake shoe is shown at 5 formed with a friction surface 6 and an outer surface having a circumferential rib or tongue 7. This rib is preferably adjacent the median plane of the shoe, when viewed transversely, and form peripheral lands 8 against which a steel back is adapted to engage. The outer edges of the shoe are preferably cut with a filet 9 to facilitate the welding of a steel back to the shoe, the sides of the rib 7 likewise being fileted at 10.

Secured to the back of the shoe 5 are parallel steel strips 11 which are adapted to lie on the lands 8. These strips are spaced sufficiently to receive the rib 7 therebetween and provide sufficient space for welding, as indicated at 12. The outer edges of the strips 11 are also welded to the tapered side portions 9 of the shoe, as shown at 13.

Intermediate the ends of the strips a connecting lug 14 is secured thereto, while adjacent the ends crimped guide members 15 are secured, these guide members being formed with a groove 16 upon which a securing key is adapted to be received. It will be noted that the strips 11 are bent outwardly at 17 to provide feet 18 which are spaced from the adjacent land portions of the shoe 5. The guide lugs 15 thus connect the feet together and form a reinforced yielding means against

which the bifurcated extensions on the brake heads are adapted to engage. When the shoe is thus applied to the head, the resiliency of the feet 18 prevents any possibility of an inaccurate or loose fit, the elements being secured together securely and effectively. The securing key thus lies upon the grooves 16 and passes through the lug 14 in the usual manner, also passing through the apertured lugs 3 and 4. If desired, the ends of the feet 18 may be upset as at 19 although this is not necessary to the proper functioning of the brake shoe.

With reference to Figure 6, it will be seen that the shoe is formed by casting a ring 20 formed with a circumferential rib 7 adjacent the median plane thereof. From these, ring segments 5 are cut which constitute individual brake shoe elements.

It will therefore be seen that the cylinders are cast with inner and outer diameters corresponding to the respective diameters of the shoes desired, the width of the cylinder being equal to the width of the desired shoe. The cylinder is then cut into sectors, each brake shoe so formed receiving a steel back which is secured thereto by four longitudinal welds, as clearly shown in Figures 2 and 4.

By casting the rings centrifugally, the resulting shoe is far stronger than the old forms of shoes and far more resistant to wear friction and breakage. This enables the ordinary steel back and lug to be dispensed with and a one piece light weight pressed steel stamping substituted therefor.

The centrifugally cast shoe, as noted above, possesses great strength, density, wear resistance and friction and, combined with a pressed steel back which is welded thereto, results in a shoe which is far more serviceable than any shoe heretofore produced. By forming the steel back with spaced feet a spring effect is afforded in the mounting of the shoe on the brake head and thus a more accurate fit is provided.

The centrifugally cast shoe provides a metal which does not fracture and is well finished and accurately made. Instead of having a great number of individual sand moulds, a plurality of shoes may be made in a single operation, the shoes being cut from a cylinder in a simple and inexpensive fashion. The space thus required for manufacturing the shoes is comparatively small and the amount of manual supervision correspondingly reduced. It will be apparent that the backs may be welded on the ring prior to cutting the latter into a plurality of segments instead of the method outlined above.

While the invention has been described specifically herein with respect to the accompanying drawings, it is obvious that changes in the manufacturing steps as well as the design of the shoe may be made without depart-

ing from the scope of the invention as defined in the appended claims.

I claim as my invention:

1. As an article of manufacture, a brake shoe formed of centrifugally cast metal, and having a circumferential rib formed on the back thereof and in the central plane of the shoe. 70
2. As an article of manufacture, a brake shoe formed of centrifugally cast metal and having the circumferential edges of the back thereof chamfered. 75
3. As an article of manufacture, a brake shoe formed of centrifugally cast metal and having a circumferential rib formed on the back and in the central plane of the shoe, the circumferential edges of the back of the shoe being chamfered. 80
4. As an article of manufacture, a brake shoe formed of centrifugally cast metal and having a back secured thereto. 85
5. As an article of manufacture, a brake shoe formed of centrifugally cast metal and having a back welded thereto. 90
6. As an article of manufacture, a brake shoe formed of centrifugally cast metal and having a back secured thereto by means of a plurality of circumferential welds. 95
7. As an article of manufacture, a brake shoe formed of centrifugally cast metal and having a back consisting of spaced side members secured to the shoe by a plurality of circumferential welds. 100
8. A device of the character described comprising a brake shoe, a back secured thereto, and yielding means carried with the back to engage the brake head. 105
9. A device of the character described comprising a brake shoe, a back secured thereto having spaced side members, and extensions on the side members spaced from the shoe to afford a spring mounting. 110
10. A device of the character described comprising a brake shoe, a back secured to the shoe having spaced side members and a securing lug therebetween, and extensions on the side members spaced from the shoe to afford a spring mounting. 115
11. A device of the character described comprising a brake shoe, a back secured to the shoe having spaced side members and a securing lug therebetween, extensions on the side members spaced from the shoe to afford a spring mounting, and guide lugs between the extensions at either end of the shoe. 120
12. A device of the character described comprising a brake shoe having a circumferential rib, a back having spaced side members, means to secure the back to the shoe with the rib between the side members, a securing lug on the back and connecting the side members, extensions on the members spaced from the shoe, and guide lugs connecting the extensions. 125
13. A device of the character described comprising a brake shoe having a circumferential rib, a back having spaced side members, means to secure the back to the shoe with the rib between the side members, a securing lug on the back and connecting the side members, extensions on the members spaced from the shoe, and guide lugs on the back between the extensions forming spacing shoulders and circumferential guide grooves. 130
14. A device of the character described comprising a brake shoe having a circumferential rib, a back having spaced side members, a transverse lug between the members intermediate the ends thereof, raised extensions on the members, guide lugs between the extensions, and welds between the outer edges of the side members and the sides of the shoe between the adjacent ends of the extensions and between the said ends of the extensions and the securing lug along the inner edges of the side members and the sides of the rib. 75
15. A device of the character described comprising a brake shoe having a circumferential rib, the edges of the shoe and rib being chamfered, a back having spaced side members, a transverse lug between the members intermediate the ends thereof, raised extensions on the members, guide lugs between the extensions, and welds between the outer edges of the side members and the chamfered sides of the shoe between the adjacent ends of the extensions and between the said ends of the extensions and the securing lug along the inner edges of the side members and the chamfered sides of the rib. 80
16. As an article of manufacture an unfinished centrifugally cast brake shoe having a light steel back welded thereto. 90
17. As an article of manufacture a centrifugally cast brake shoe having a sheet steel back welded thereto by a plurality of circumferential welds. 95
18. As an article of manufacture an unfinished centrifugally cast iron brake shoe having a steel back welded thereto. 100

This specification signed this 3rd day of September A. D. 1930.

WILLIAM D. SARGENT.