No. 716,993. Patented Dec. 30, 1902.

R. L. DURBIN.

BRAKE SHOE.

(Application filed July 26, 1902.)

(No Model.)

Fig. 1.

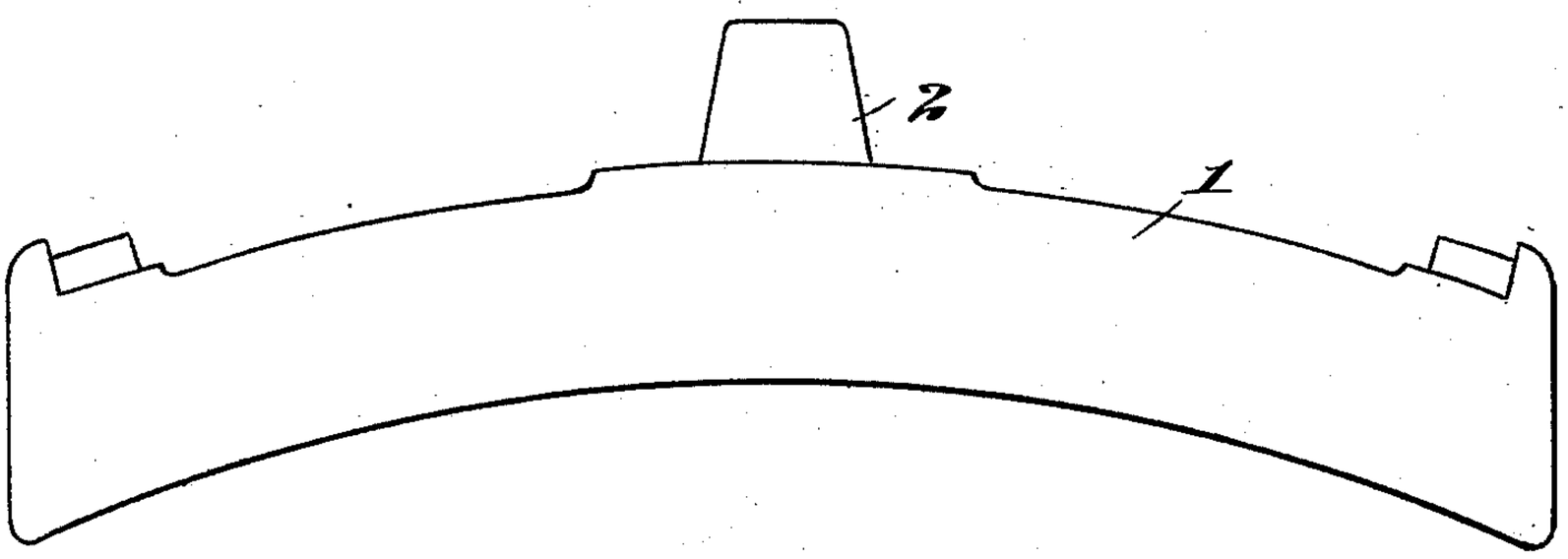


Fig. 2.

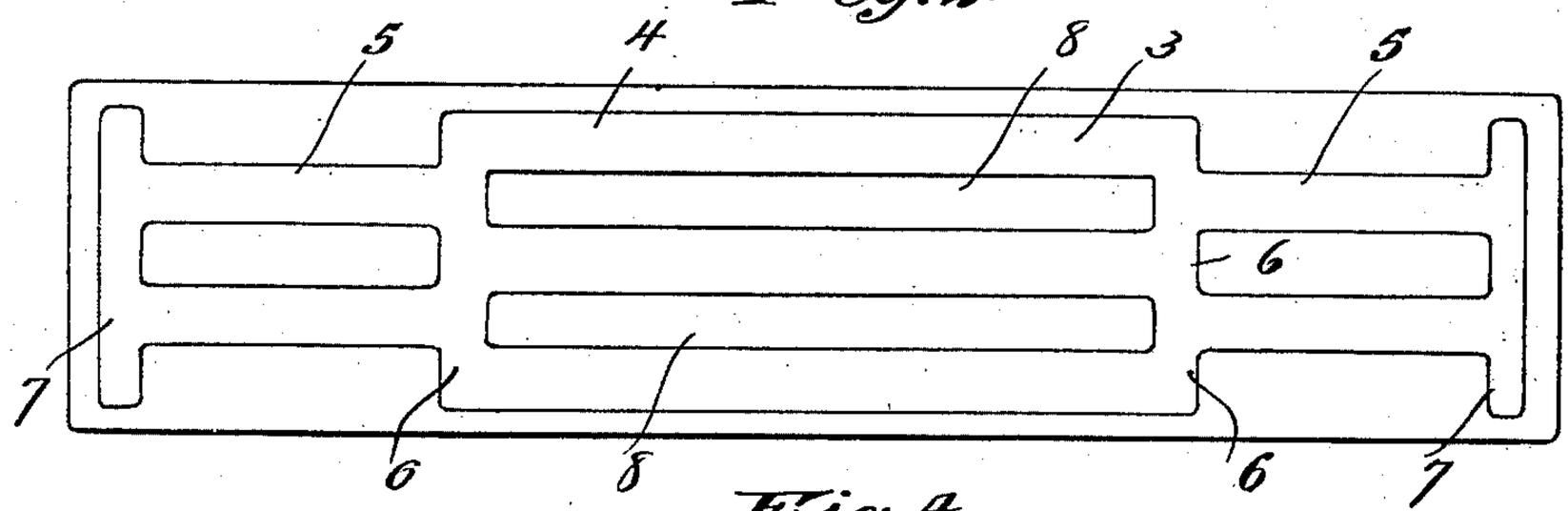


Fig. 4.

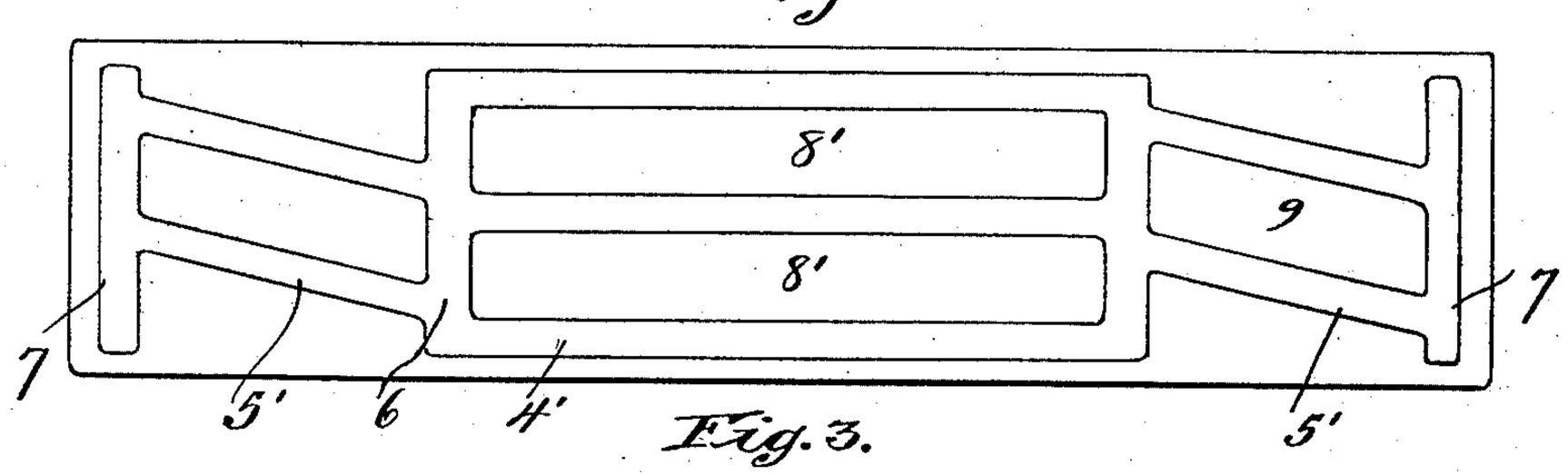
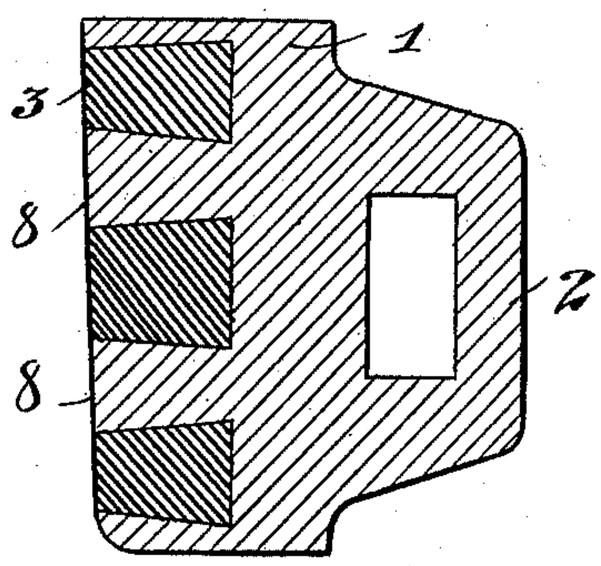


Fig. 3.



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UNITED STATES PATENT OFFICE.

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BRAKE-SHOE.

SPECIFICATION forming part of Letters Patent No. 716,993, dated December 30, 1902.

Application filed July 26, 1902. Serial No. 117,084. (No model.)

To all whom it may concern:

Be it known that I, RICHARD L. DURBIN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Brake-Shoes, of which the following is a specification.

This invention relates to improvements in brake-shoes, and refers more specifically to brake-shoes of that type wherein the face of the shoe is provided with a metallic inset of a different character, usually harder than the main body of the shoe.

The salient object of the present invention is to provide a construction which while possessing the usual advantages of a shoe of this character is nevertheless not substantially weakened in strength by the inset at points subject to great breaking strain.

Subordinate objects are to provide a construction of the character last referred to which may be cheaply and readily constructed, which is susceptible of variation in form to provide a greater or less proportion of one kind of wearing-face to the other without departing from the invention, and in general to provide an improved, efficient, and durable structure of the kind referred to.

The invention consists in the matters hereinafter described and more particularly pointed out in the appended claims and will be more readily understood from the following description by reference to the accompanying drawings, forming a part thereof, and in which—

Figure 1 is a side elevation of a brake-shoe embodying my improvement. Fig. 2 is a face or plan view of the same; Fig. 3, a central transverse sectional view, and Fig. 4 a view similar to Fig. 2, of a modified construction.

Referring to the drawings, 1 designates as a whole the main brake-shoe body, which may be of any usual or suitable construction and is provided at its outer or rear face with the usual beam-engaging lug 2, whereby it may be attached to the brake-beam.

Referring to Fig. 2, 3 designates as a whole a metal inset, which is usually of hard metal and is cast into the main body of the shoe in a well-understood manner, so that the wearing-face of the inset and of the main body of the shoe are flush with each other. Described generally, said inset takes the form of a grid, comprising in the present instance a plurality of longitudinal bars, as 4 and 5, and connecting transverse bars 6 and 7. Desirably the bars comprising the grid-like inset are of increasing cross-sectional size inwardly from the face of the shoe, so that when cast in the grid is positively united with the main body against possibility of being disengaged by wear. The salient object of the invention is to provide such a construction of the grid or inset that the strength of the shoe to resist transverse breaking strains is not substantially lessened by reason of the presence of the inset and at the same time to give to the inset such form that a uniform proportion of hard and soft metal will be presented to the face of the wheel throughout the full wearing-face of the shoe.

In practice it is found that brake-shoes ordinarily crack and break across in lines near the central portion of the shoe, but usually just at one side of that portion of the shoe which is backed or supported by the brake-beam. In practice the shoe seldom or never breaks near its ends unless it has some flaw in its structure, due to imperfect casting or the like. The cause for this condition is that the leverage applied to the shoe through the brake-beam brings the maximum breaking stress upon the central portion of the shoe, and inasmuch as that portion immediately beneath the brake-beam or between the latter and the face of the shoe is supported against breaking the shoe breaks closely adjacent to this supported portion to one side or the other. Heretofore, so far as I am aware, metal insets have never been constructed with reference to providing against this breaking stress, but, on the contrary, such insets have usually been of such form as to very materially lessen the strength of the shoe by providing lines of separation between the inset and main body portions which extend transversely across or partially across those portions of the shoe subjected to the greatest stress. In the present invention I overcome this serious difficulty or objection by providing an inset which takes the form of continuous or uninterrupted bars which extend throughout the full length

of the central portion of the shoe and throughout the length of that portion of the shoe liable to break under the stress of ordinary wear. These longitudinally-extending bars (4 in the drawing Fig. 2 and 4′ in Fig. 4) are desirably arranged to extend parallel with each other and in any event are uninterrupted, so that this portion of the shoe is not weakened by the presence of the inset to any extent unless the inset be of a weaker material than the body of the shoe. In order that a uniform proportion of each metal may be presented to the wheel throughout the entire width of the acting face of the shoe, I provide at each end other bars 5, which latter are in offset relation to the bars 4, considered on lines extending longitudinally of the face of the shoe—that is to say, each longitudinally-opposite pair of bars 5 is arranged in alinement with the corresponding space 8 intervening between the bars of the central portion of the inset—and in order to preserve the proper proportions I make the combined length of each pair of bars 5 equal to the length of the bars of the central portion of the inset, or approximately so. The central bars 4 and the end bars 5 of the inset are united integrally with each other by the cross-bars 6, which preferably extend the full width of the acting face of the shoe, and in order to provide means for modifying to a certain extent the proportion of inset metal to the main body of the shoe without necessitating a rearrangement of the members of the grid or inset I provide at each end the transverse bars 7, likewise formed integrally with the remainder of the grid. Obviously by increasing the breadth of these transverse bars—that is, by increasing their width measured longitudinally of the shoe—the proportion of inset metal may be increased relatively to the main body, and vice versa.

It will be observed that with the construction described the front or acting side of the shoe is not weakened by the inset except at points so near the ends as to be outside of the breaking zone. Nevertheless the construction is such that the same proportion of hard and soft metal is presented to the wheel on any given two lines extending longitudinally across the face of the shoe.

It is not to be understood from the foregoing that equal amounts of hard and soft metal are to be presented to the face of the wheel, because this may be and in practice is varied; but it is necessary that whatever proportion of hard and soft metal obtains in any given line extending longitudinally of the acting face of the shoe must likewise obtain in all other parts of the acting face, since otherwise the wheel would be worn into ridges, owing to the inequality of wear.

In Fig. 4 the same idea is carried out in a structure intended to provide for a lesser proportion of inset metal to that of the main body of the shoe. In this construction the central or main portion of the grid is composed of longitudinally-extending parallel and uninterrupted bars 4′, extending throughout the full length of the breaking zone of the shoe, and at each end of the main or central grid portion are end portions likewise composed of longitudinally-extending bars, as 5′, integrally united with the central grid-body. In this instance, however, the bars of the grid 4′ and 5′ do not, as in the former instance, occupy practically one-half of the face area of the acting portion of the shoes, but are made considerably narrower, so that the intervening exposed portions of soft metal 8′ and 9 between the grid-bars are wider than the faces of said bars, and the longitudinal bars 5′ of the end sections are disposed obliquely or diagonally, so as to distribute their wearing-surfaces entirely across the intervening spaces or portions 8′ of the main or central grid. When thus arranged, it will be seen that a line drawn longitudinally through the face of the shoe at any point will intersect substantially the same proportion of hard and soft metal as a similar line at any other given point extending across the face of the shoe parallel therewith. In this instance the transverse connecting-bars 6 and the end bars 7 are also provided and for the same purpose as in the previously-described construction. Obviously the same result of avoiding the weakening of the front side of the shoe within the breaking zone is secured by this latter construction as in the previously-described one.

It is found in practice that a brake-shoe of the inset-metal type is more effective where the inset portions bear such relation to the acting portions of the main body that alternate areas of hard and soft metal are presented to the wheel during the traverse of the latter past the shoe, the change from hard to soft, or vice versa, occurring, preferably, several times in the traverse of any given point on the wheel over the face of the shoe. This increased efficiency may be accounted for on the theory that the harder inset metal operates to loosen or tear away molecules of metal, while the soft metal holds such molecules in frictional engagement with the face of the shoe until worn out. However the greater efficiency be accounted for, it will be seen that this element is taken into consideration in the construction of the shoe embodying my present invention in each of the modifications, of which it will be seen that hard and soft metal are alternately presented to the wheel on any given line extending longitudinally across the face of the shoe and that there are a number of such alternations in every case. It is to be noted, furthermore, that a shoe constructed in accordance with the present invention is actually less liable to become broken through transversely than one made of solid cast metal—*i. e.*, unprovided with metal insets—provided the metal inset be approximately as strong as the main body, because the uninterrupted bars serve to arrest the cracking or

breaking of the shoe in case it be partly fractured, and therefore prevent the shoe from breaking entirely across where it otherwise would. This is obviously a feature of considerable importance in itself, since it is not a rare thing that by reason of the presence of some flaw or defect a brake-shoe will start to crack across, and once the crack is begun it rapidly extends, unless some means be provided for preventing it.

From the foregoing it will be understood that the invention may be modified in its details without departing from the spirit thereof, and accordingly I do not limit myself to the precise construction shown, except to the extent that such construction is made the subject of specific claims.

I claim as my invention—

1. A brake-shoe provided centrally of its length and at the rear side thereof with an attaching-lug, and provided in its front or acting face with a metal inset consisting of a plurality of longitudinally-extending parallel bars spaced apart laterally and extending uninterruptedly across the central portion of the shoe and throughout approximately one-half the length of the shoe, as and for the purpose set forth.

2. A brake-shoe provided in its acting face with a grid-like metal inset consisting of a central main body composed of uninterrupted bars extending longitudinally of the shoe and spaced at intervals apart, and end sections also consisting of longitudinally-extending bars spaced apart and integrally connected with the central grid portion, the bars of said end sections being arranged in longitudinal alinement with the spaces intervening between the bars of the main grid-section, as and for the purpose set forth.

3. A brake-shoe provided in its acting face with a series of longitudinally-extending metal inset bars extending uninterruptedly across the central portion of the face of the shoe throughout a distance equal to one-half or more of the length of the shoe, and other metal insets arranged at the end portions of the shoe, each comprising obliquely-disposed bars which are arranged in longitudinal alinement with the spaces between said central bars, for the purposes set forth.

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