No. 616,568

Patented Dec. 27, 1898.

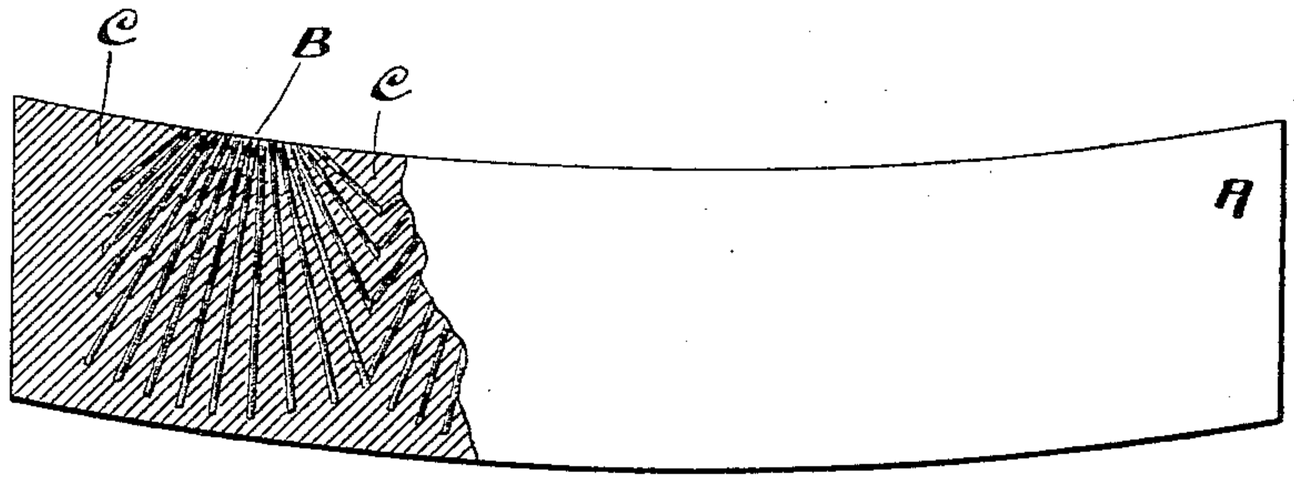
J. D. GALLAGHER.

BRAKE SHOE.

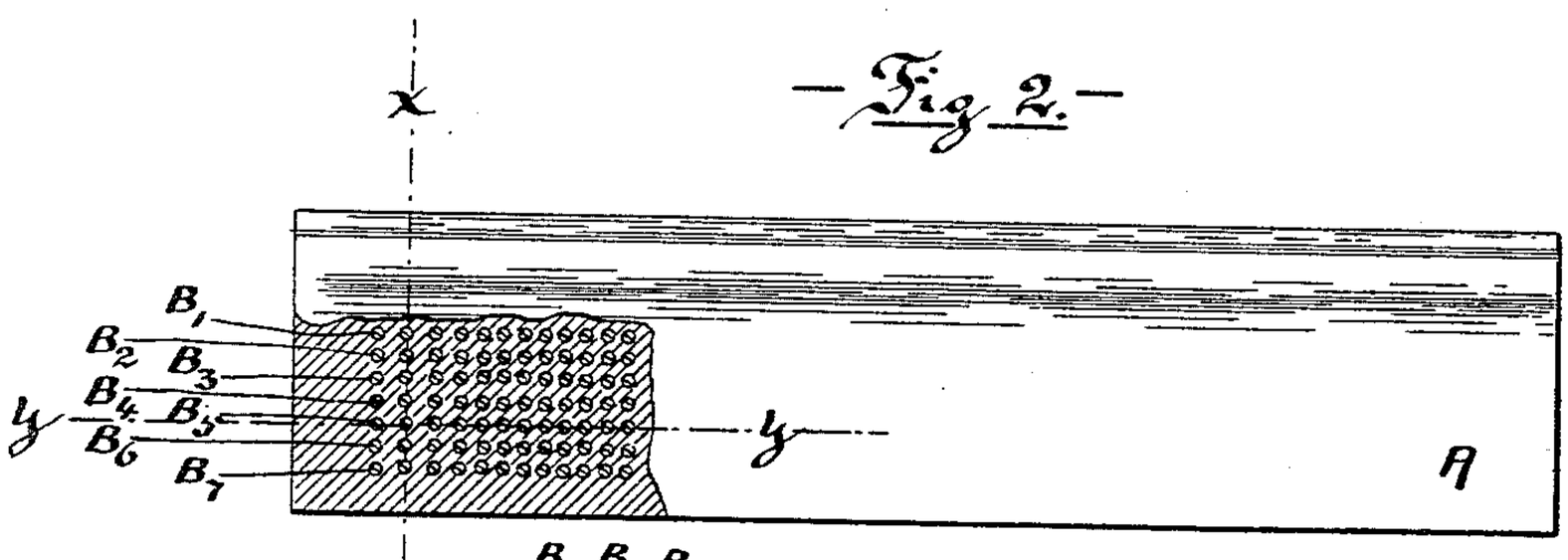
(Application filed Sept. 17, 1898.)

(No Model.)

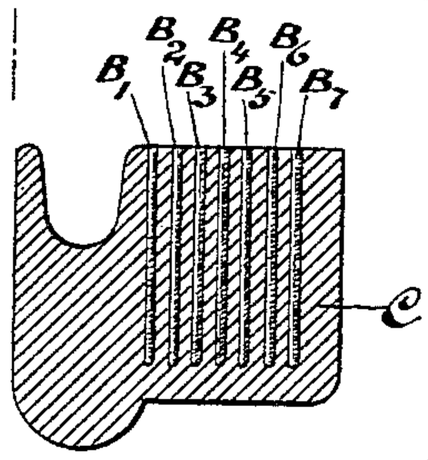
— Fig. 1. —



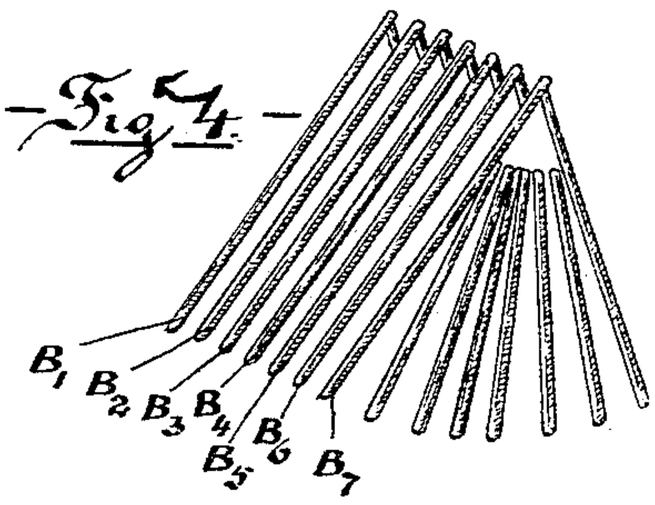
— Fig. 2. —



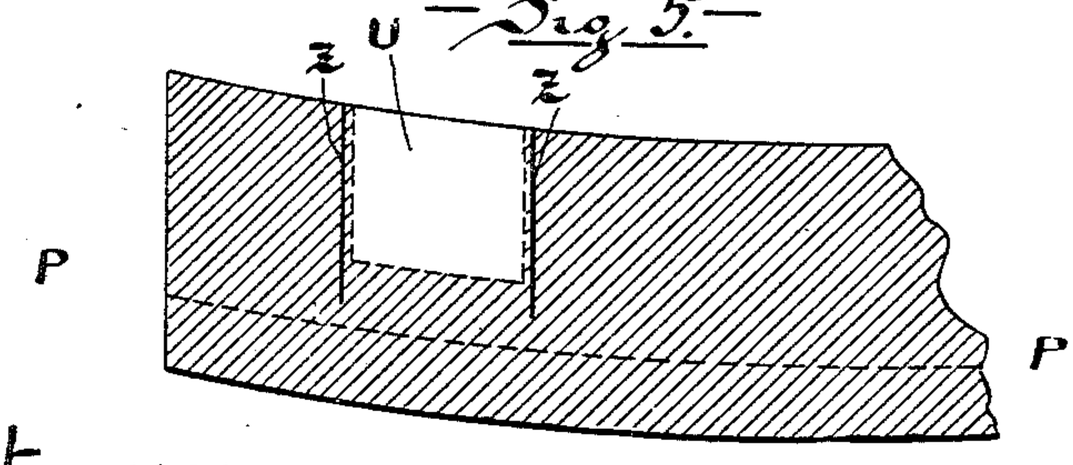
— Fig. 3. —



— Fig. 4. —



— Fig. 5. —



— Witnesses —

Percy L. Gallagher.

Charles W. Brower.

— Inventor —

Joseph D. Gallagher

— by his Attorney —

August M. Spretnow.

UNITED STATES PATENT OFFICE.

JOSEPH D. GALLAGHER, OF GLEN RIDGE, NEW JERSEY.

BRAKE-SHOE.

SPECIFICATION forming part of Letters Patent No. 616,568, dated December 27, 1898.

Application filed September 17, 1898. Serial No. 691,159. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH D. GALLAGHER, a citizen of the United States, residing in the borough of Glen Ridge, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Brake-Shoes; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

This invention relates to brake-shoes to be used on locomotives and cars propelled by power of any description.

The principal object of my invention is to provide a brake-shoe having great braking qualities combined with great wearing qualities.

Heretofore brake-shoes have in most cases been made of cast-iron. When made of this material, the shoes possess great braking power; but owing to the softness of the cast-iron they quickly wear out in use. Brake-shoes have also been made of cast-iron with metal inserts of various forms and kinds, inserted to increase the wearing qualities of the shoe. When these inserts have been of the common form—that is, in blocks or rods of considerable diameter—one difficulty has been that owing to the imperfect character of the union between the metal of the insert and the cast metal of the body of the shoe the insert weakened the shoe at the points or lines of junction between the metals. Owing to this difficulty it has become the custom to put the metal insert through only about one-half the thickness of the shoe in order to give a backing of solid cast metal. Therefore when the shoe containing the insert becomes worn down in use, say, to the line *x x* in Figure 5 the shoe becomes simply a soft-metal shoe. It has also been proposed to embed in a cast-metal shoe layers or strips of ductile metal throughout the body of the shoe. The difficulty with shoes constructed on this principle is that if the metal inserts be hard enough to give additional wearing qualities to the shoe they are so thoroughly distributed throughout the shoe that they form practically the whole wearing-surface, and the shoe is deprived of the good braking qualities of a cast-iron shoe. It has been found in practice that the best results in combined wearing and braking qualities have been produced by a brake-shoe having a part of its wearing-surface chilled and the remainder soft iron, the chilled sections resisting the wear of the wheel and the soft-iron sections giving the braking effect. One difficulty with shoes of this class has been that it has been impossible to regulate efficiently the hardness of the chilled sections, another that owing to the danger of causing chill-cracks the chill could not be made to extend through the whole depth of the shoe, and a third that as the shoe wore down the "chill," so to speak, weakened, and the shoe after its face was worn off speedily became a soft-iron shoe.

It is the object of this invention to provide a shoe having the good qualities of the shoe composed of alternate chilled and soft sections in braking power and long life without the defects referred to. To accomplish this result, I propose to use in a cast-iron shoe metal inserts which will give great wearing qualities to the shoe without having any of the disadvantages attending the use of the present inserts—that is, I propose to use an insert which will not cause a crack in the shoe at the point or line of union between the insert and the cast metal or otherwise weaken the shoe and may therefore be inserted to the full depth of the shoe, which will not extend over the entire face of the shoe, but will leave large areas of cast-iron between the different inserts or parts of inserts, thereby giving good braking qualities to the shoe, and which will not vary in area during the wear of the shoe, but the area of which will remain constant, thus insuring evenness of braking power throughout the life of the shoe.

It is well known that while a large or massive piece of cold metal, such as the inserts now most commonly used, will not uniformly unite with molten metal poured around it, so as to form a homogeneous mass, a small piece will unite with the molten metal and become a part of the metal itself. I have taken advantage of this well-known fact in making the shoe of this invention. Instead of in-

serting the wearing metal in a block or mass, as is now done, I divide the insert into a number of small parts or sections, preferably bringing all of these sections or parts together at the face of the shoe and causing them to radiate therefrom—that is, separate from each other like the ribs of a fan as they penetrate the shoe. I make each one of these sections or ribs of the same size throughout its length, so that while they separate from each other and grow farther and farther apart as the shoe wears they will present to the surface of the shoe always the same area of wearing metal. This arrangement will be more fully understood by reference to the drawings.

In the accompanying drawings, Fig. 1 is a longitudinal part section of the shoe of my invention through the line *y y* of Fig. 2, showing the proposed form of the insert. Fig. 2 is a face view of the brake-shoe with a part broken off. Fig. 3 is a cross-section through the line *x x* in Fig. 2 and shows the preferred form of the insert from that position. Fig. 4 is a perspective view of the preferred form of the insert before its introduction into the shoe. Fig. 5 is a longitudinal section of a brake-shoe containing one of the present form of inserts.

In Fig. 1, A represents a brake-shoe made according to this invention cut longitudinally through the middle on the line *y y* in Fig. 2. B represents the insert as it appears in a longitudinal section of the shoe. C represents the soft iron, forming the rest of the shoe.

In Fig. 2, A represents the shoe of this invention, looking down on the face or tread of the shoe. B represents the insert, showing the ends of the ribs of which it is constructed in the preferred form. C represents the soft iron of the shoe.

Fig. 3 represents a cross-section of the brake-shoe A of this invention through the line *x x* in Fig. 2. B represents the insert as it appears at that point, and C represents the soft iron, forming the rest of the shoe.

In Fig. 4, B represents the insert in its preferred form.

In Fig. 5, U represents the insert now used in some forms of brake-shoes. Z represents the cracks, formed between the hard metal and the soft iron, and the dotted line *p p* shows where the surface of this shoe would be when worn down in use.

In making my shoe in one of its forms I take a bunch of steel wires, each row in the bunch marked from B′ to B⁷, unite these wires at one end, and cause them to diverge from each other throughout their length, the bunch being when completed not unlike the ribs of several open fans placed side by side, but separated a little from each other. The side view of this bunch is shown in Fig. 1 and the edge view in Fig. 3 and the perspective in Fig. 4. I prefer in bunching these wires to have one or more of them extend beyond the rest, so that when the bunch is inserted in the mold before the molten iron is poured around it it will be securely held in place; but any of the well-known means of holding the insert in the mold may be used instead of this. When this bunch is formed, I insert one or more of them into the mold in which the shoe is to be cast, depending, of course, on how large a proportion of wearing metal I desire in the shoe. I then pour the molten iron into the mold and when cool remove the shoe. The wires will be found to be firmly embedded in the shoe and forming a part of the casting. Owing to the small mass of each wire there is little or no danger of a crack forming in its junction with the soft iron; but if such cracks should form in some cases, not being large or continuous, they do not materially weaken the shoe.

It is not essential that steel wires should be used, although I prefer that form. Cast-steel inserts of similar form may be used or other metals. I especially recommend the use of chilled-iron inserts of the form mentioned or hard charcoal-iron inserts, as I have found these to give excellent results in wear without in any way cutting the wheels, the essential feature being that the strands of the insert should not be large and that they should radiate longitudinally of the shoe from a point at its surface, so that as they penetrate the shoe they become farther and farther apart and that the proportion of wearing metal presented at the face of the shoe should be the same at all times during the life of the shoe.

I claim—

1. A brake-shoe containing a metal insert consisting of a series of strands passing substantially through the wearing part of the shoe and diverging from each other longitudinally, substantially as described.

2. A brake-shoe containing a metal insert of a bunch of steel wires fastened together at one end, and diverging from each other throughout their length.

In testimony that I claim the foregoing I have hereunto set my hand this 13th day of September, A. D. 1898.

JOSEPH D. GALLAGHER.

Witnesses:
FRANK B. SMITH,
AUGUST M. TRESCHOW.