No. 725,587. PATENTED APR. 14, 1903.

D. RAWSTRON.

BRAKE SHOE.

APPLICATION FILED SEPT. 23, 1902.

NO MODEL.

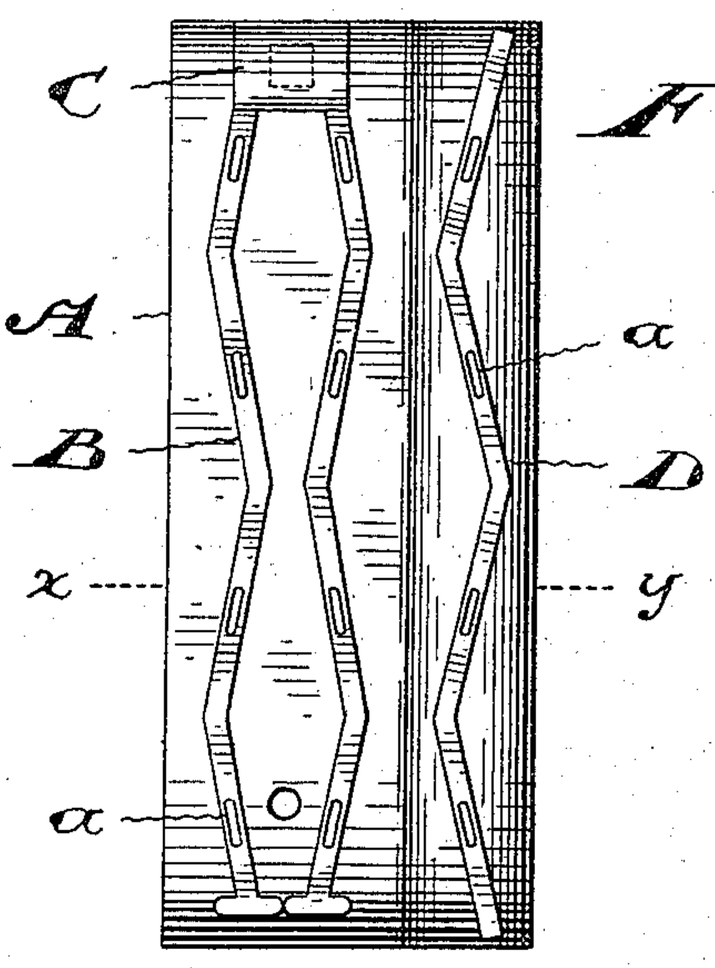

Fig. 1.

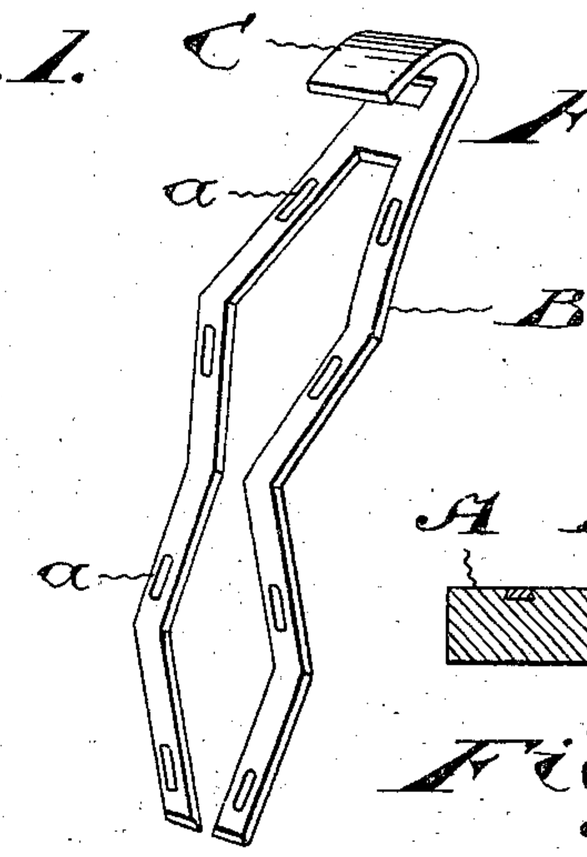

Fig. 2.

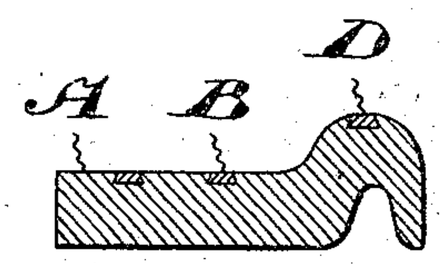

Fig. 6.

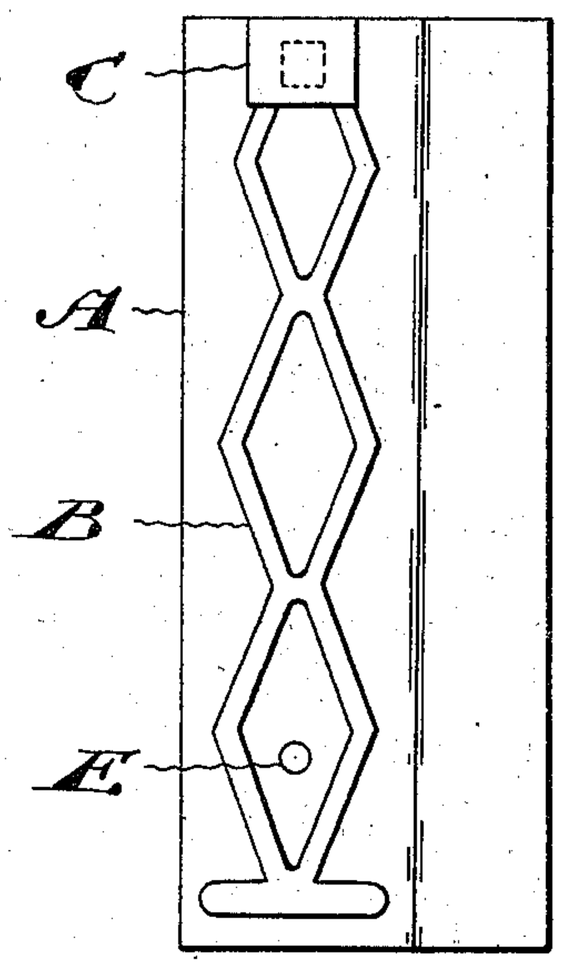

Fig. 3.

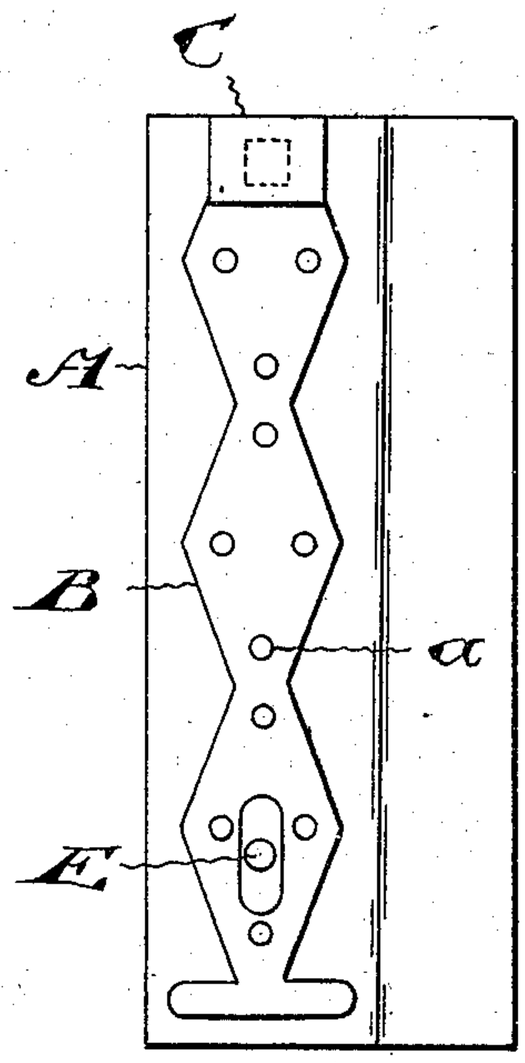

Fig. 4.

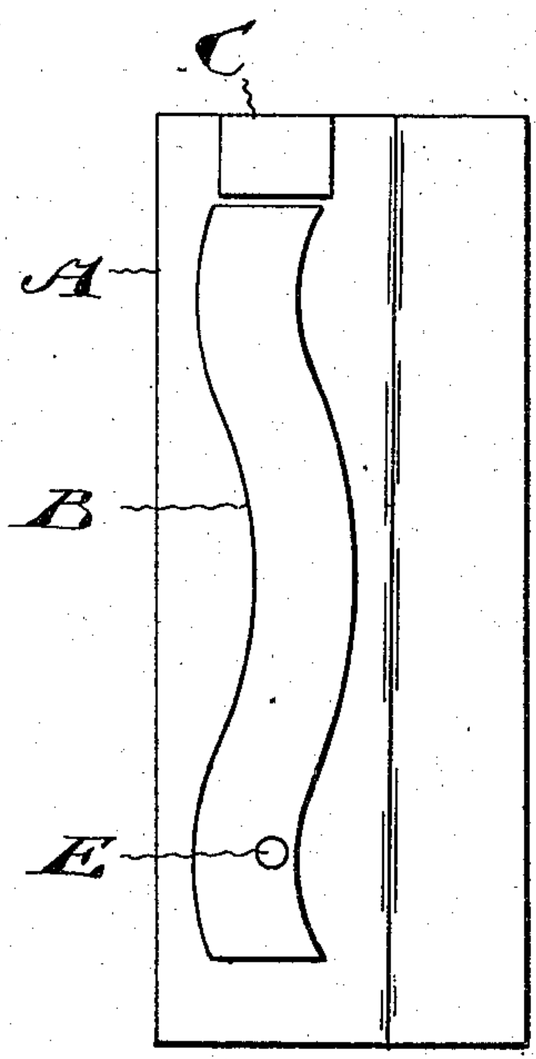

Fig. 5.

Witnesses

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UNITED STATES PATENT OFFICE.

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BRAKE-SHOE.

SPECIFICATION forming part of Letters Patent No. 725,587, dated April 14, 1903.

Application filed September 23, 1902. Serial No. 124,546. (No model.)

To all whom it may concern:

Be it known that I, DONALD RAWSTRON, of the town of Harvey, in the county of Cook, State of Illinois, have invented certain new and useful Improvements in Brake-Shoes, of which the following is a specification.

My invention relates to brake-shoes in which the body is formed of cast metal strengthened by a back of tougher metal, onto or around which the body of the shoe is cast.

The essentials of a satisfactory back are: It must add strength to the shoe. It must serve to hold the shoe together in case the cast metal becomes fractured in one or more places. It should lie right at the back of the shoe in order that as much of the cast metal as possible may be available for wear. It must be securely held in place in the process of casting, as any subsequently applied fastenings involve too much expense. No greater surface of metal should be employed than is absolutely necessary, as "blowing" in the casting is liable to take place when a back presents a large continuous surface of cold metal to the molten iron, and it is desirable that one set of dies shall suffice to make backs suited for a number of different shoes.

I am aware that backs have been used of rods or plates embedded in the shoe; but such are objectionable, as the cast metal at the back of the plates or rods is practically wasted. Wide backs or plates have been used at the back of the shoe, but such are difficult to properly secure to the shoe at all points of the back, and, further, cause blowing in the cast metal of the body of the shoe, and backs have been formed with two narrow straight plates extending from end to end of the shoe. While at some extent such strengthen the back, they do not adequately resist end strain to hold the parts of the shoe in place when one or more transverse fractures have occurred.

I attain the advantages described as essential in a back by using one or more strips of steel or other tough metal, each extending from end to end of the shoe and provided with beveled edges over which in casting the molten metal of the body of the shoe will flow flush with the back. Each strip is made sinuous or zigzag, the salient and reëntrant angles or curves in each being respectively opposed to the corresponding parts in the other. The strips may be united at one end in a lug for attachment to the brake-head and their other ends slightly enlarged to prevent the extreme end of the shoe falling off in case of a fracture occurring adjacent thereto. Another zigzag strip may be cast or placed in the back of the flange portion of the shoe. Holes or slots with beveled edges will also be formed in the strips to give additional holding-surface. Through the body, between the strips, is formed the bolt-hole, which with the lug forms the means of connecting the shoe to the brake-head.

Referring now to the drawings, Figure 1 is a plan view of the rear of a brake-shoe provided with my improved back. Fig. 2 is a perspective view of the back. Fig. 3 is a plan view of a modification of the back. Fig. 4 is a plan view of another modification. Fig. 5 is a plan view of a modification in which curves are substituted for angles. Fig. 6 is a cross-section on the line $x\ y$ in Fig. 1.

In the drawings like letters of reference indicate corresponding parts in the different figures.

In Fig. 1, A is the body of the shoe, formed, as usual, of cast-iron. B is the back, formed of steel or other suitable comparatively strong and tough metal. This back is preferably formed of two strips integrally connected together at one end to form the lug C. These strips are of a zigzag or sinuous shape, the salient and reëntrant angles or curves in each being respectively opposed to the corresponding parts in the other. The edges of these strips are preferably beveled, so as to give the strips a dovetailed cross-section. Through each strip I prefer to form a series of holes a, the sides of the holes being preferably beveled similar to the edges of the strips. The free ends of the strips may be either formed as shown in Fig. 2 or slightly enlarged, as shown in Fig. 1 in dotted lines, the object of the enlargement being to give the back an additional grip on the extreme end of the shoe to prevent it falling off in case of a fracture occurring adjacent thereto. It is not essential that the lug C be formed integral with the back, as it may easily be made integral with the cast portion of the

shoe, as is now commonly the case. In such a case of course the opposite ends of the back will be substantially similar to one another.

A back such as I have described possesses all the advantages set out in the preamble of this specification. For example, the back contains sufficient metal to be amply strong, and yet it contains so little metal and that so well distributed over the back that blowing will not take place in the cast metal when the back is being molded in position. The back is much more securely held in place than is possible with single-plate backs, as no less than four beveled edges are presented, as well as the ends, over which the cast metal may flow, in addition to the holding effect where the molten metal enters the beveled holes formed in the various strip or strips.

It is well known to those acquainted with foundry practice that whenever a large continuous surface of cold metal is presented to the molten metal they do not absolutely set close together when cold. This defect which exists in shoes so constructed is reduced to a minimum in my form of construction, for the reason that I reduce very materially the amount of cold metal in my back, besides furnishing surfaces or edges of contact by which the back and the body are made secure to each other. Additional contact-surface is of course obtained by the metal filling up the holes *a*.

A glance at the drawings is sufficient to show that any number of transverse fractures might take place through the cast metal and the shoe be still held securely together by the back, as, owing to the constant changes of direction of the parts of the back, no portion of the cast metal can be drawn off the back longitudinally, and the back has with its beveled edges too secure a grip of the cast-iron to enable pieces of the latter to be wrenched off from the front.

I prefer to strengthen the flange portion of the shoe by providing it with the back D, formed of a single zigzag or sinuous member having the beveled edges and bevel-sided holes similar to those of the back B.

Many backs now in use require for their manufacture a different set of dies or patterns for each type of brake-shoe to which they are to be applied. This is due to the varying relations between the lug and bolt-hole. I make one pattern of back fit a variety of shoes by forming only one of these parts on the back—namely, the lug C—the bolt-hole E, usually employed with such a lug, being formed only through the body. Thus if in different types of shoe the relative position of the lug C and the hole E is required to vary it is merely necessary for the back to be fitted in the mold in a slightly different position.

In Fig. 5 I show a back in which curves are substituted for angles, the effect being substantially the same as in the form already described.

In Fig. 3 I show a slight modification, in which the strips forming the back instead of being entirely separated are formed integral where the reëntrant angles are opposed. This form will answer nearly as well as the form shown in Fig. 1, with the exception that a little connecting-surface is sacrificed.

In Fig. 4 I show a further modification of the form shown in Fig. 3, in which the diamond-shaped openings *b*, formed by the peculiar construction shown in Fig. 3, are omitted and a single plate of sinuous or zigzag shape is employed. Such a plate is effective in holding the shoe together in case of transverse fractures.

What I claim as my invention is—

1. In a brake-shoe a cast-metal body, in combination with a back of tough metal secured in the shoe in the process of casting flush with the rear surface, the said back comprising a plate having its sides sinuous or zigzagged, substantially as described.

2. In a brake-shoe a cast-metal body, in combination with a back of tough metal secured in the shoe in the process of casting flush with the rear surface, the said back comprising a plate having its sides sinuous or zigzagged and cut on a bevel to engage the cast metal, substantially as described.

3. In a brake-shoe a cast-metal body, in combination with a back of tough metal secured in the shoe in the process of casting flush with the rear surface, the said back comprising two plates, each having its sides sinuous or zigzagged, substantially as described.

4. In a brake-shoe a cast-metal body, in combination with a back of tough metal secured in the shoe in the process of casting flush with the rear surface, the said back comprising two plates, each having its sides sinuous or zigzagged and cut on a bevel to engage the cast metal, substantially as described.

5. In a brake-shoe a cast-metal body, in combination with a back of tough metal secured in the shoe in the process of casting flush with the rear surface, the said back comprising two plates, each having its sides sinuous or zigzagged, the salient and reëntrant angles or curves of one plate being opposed to the corresponding parts of the other, substantially as described.

6. In a brake-shoe a cast-metal body, in combination with a back of tough metal secured in the shoe in the process of casting flush with the rear surface, the said back comprising two plates, each having its sides sinuous or zigzagged and cut on a bevel to engage the cast metal, the salient and reëntrant angles or curves of one plate being opposed to the corresponding parts of the other, substantially as described.

7. In a brake-shoe a cast-metal body, in combination with a back of tough metal secured in the shoe in the process of casting

flush with the rear surface, the said back comprising two plates integrally connected at one end, each having its sides sinuous or zigzagged, substantially as described.

8. In a brake-shoe a cast-metal body, in combination with a back of tough metal secured in the shoe in the process of casting flush with the rear surface, the said back comprising two plates integrally connected at one end, each having its sides sinuous or zigzagged and terminating in a lateral enlargement, substantially as described.

9. In a brake-shoe a cast-metal body, in combination with a back of tough metal secured in the shoe in the process of casting flush with the rear surface, the said back comprising two plates extending from end to end of the shoe and integrally connected at one end to form a lug or hook, a fastening-hole being formed through the cast body between the said plates toward the other end of the shoe, substantially as described.

10. In a brake-shoe a cast-metal body, in combination with a back of tough metal secured in the shoe in the process of casting flush with the rear surface, the said back comprising a plate having one side sinuous or zigzagged and cut on a bevel to engage the cast metal, substantially as described.

11. In a brake-shoe a cast-metal body, in combination with a back of tough metal secured in the shoe in the process of casting flush with the rear surface, the said back comprising two plates, each having one side sinuous or zigzagged, substantially as described.

12. In a brake-shoe a cast-metal body, in combination with a back of tough metal secured in the shoe in the process of casting flush with the rear surface, the said back comprising two plates integrally connected at one end, each having one side sinuous or zigzagged, substantially as described.

13. In a brake-shoe a cast-metal body, in combination with a back of tough metal secured in the shoe in the process of casting flush with the rear surface, the said back comprising a plate having one side sinuous or zigzagged, substantially as described.

14. In a brake-shoe a cast-metal body, in combination with a back of tough metal secured in the shoe in the process of casting flush with the rear surface, the said back comprising two plates, each having one side sinuous or zigzagged and cut on a bevel to engage the cast metal, substantially as described.

Chicago, Illinois, September 11, 1902.

DONALD RAWSTRON.

In presence of—
J. F. HILL,
H. RAWSTRON.