H. H. URQUHART.

BRAKE SHOE.

APPLICATION FILED JUNE 16, 1909.

951,350.

Patented Mar. 8, 1910.

2 SHEETS—SHEET 1.

Fig. 1.

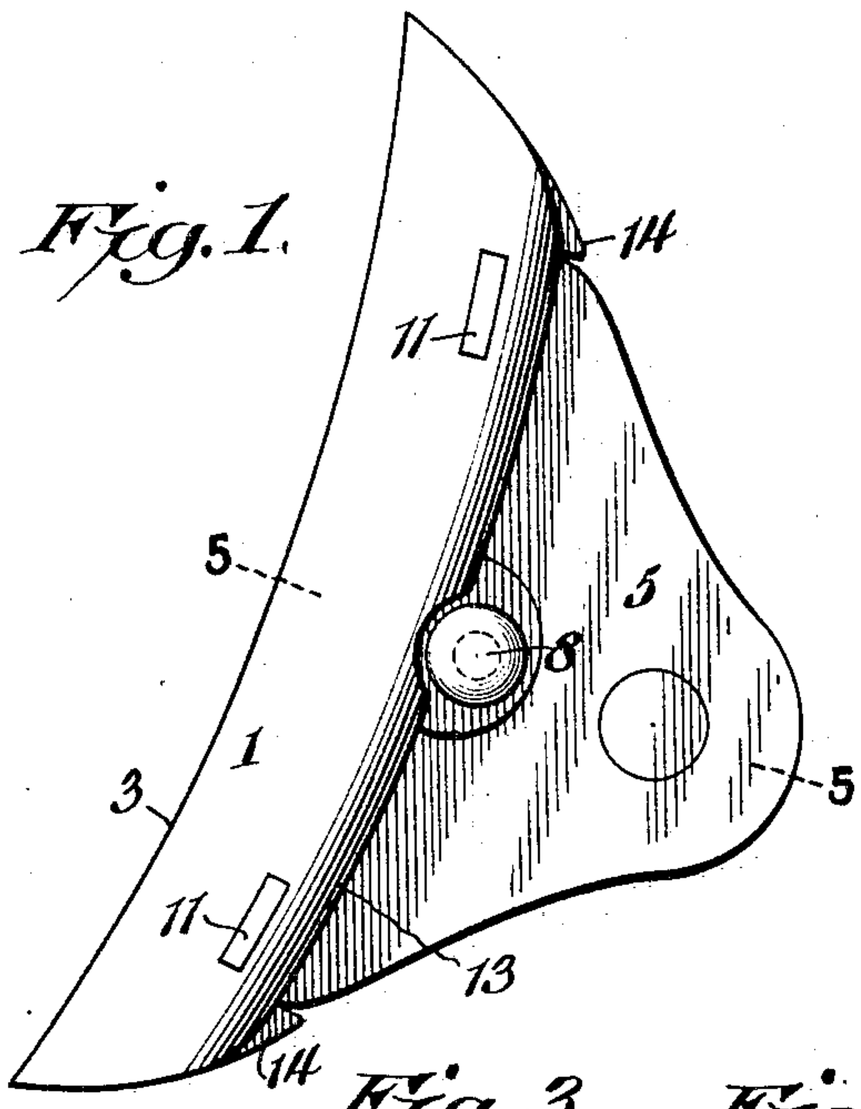


Fig. 2.

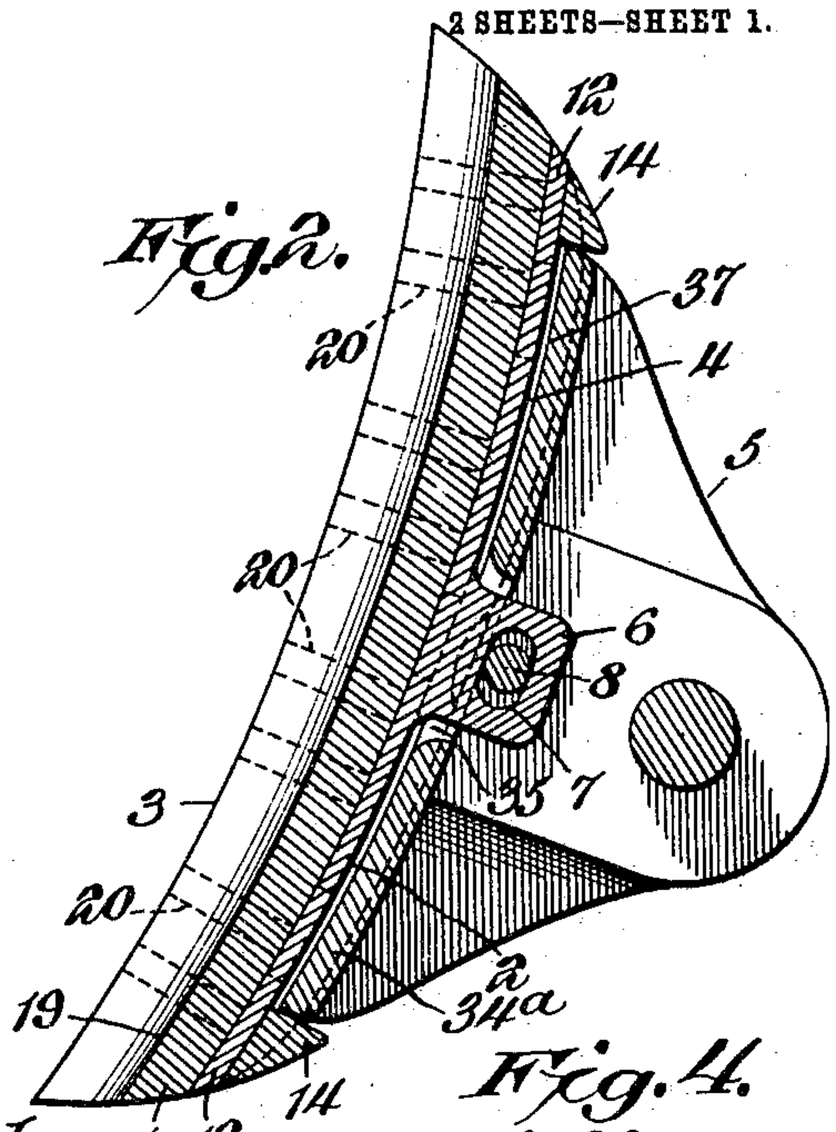


Fig. 4.

Fig. 3.

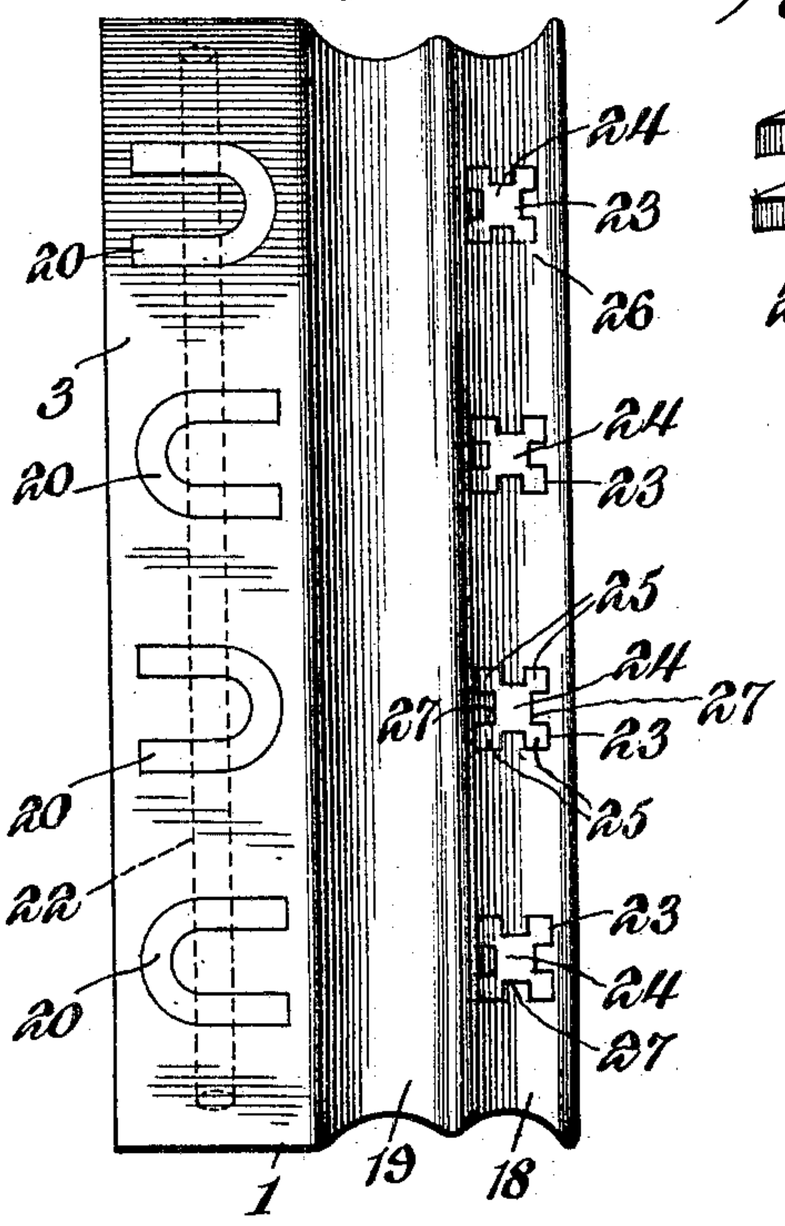
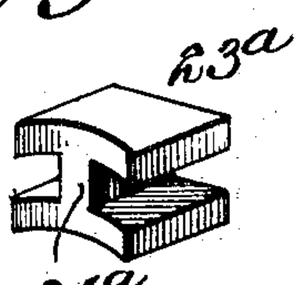
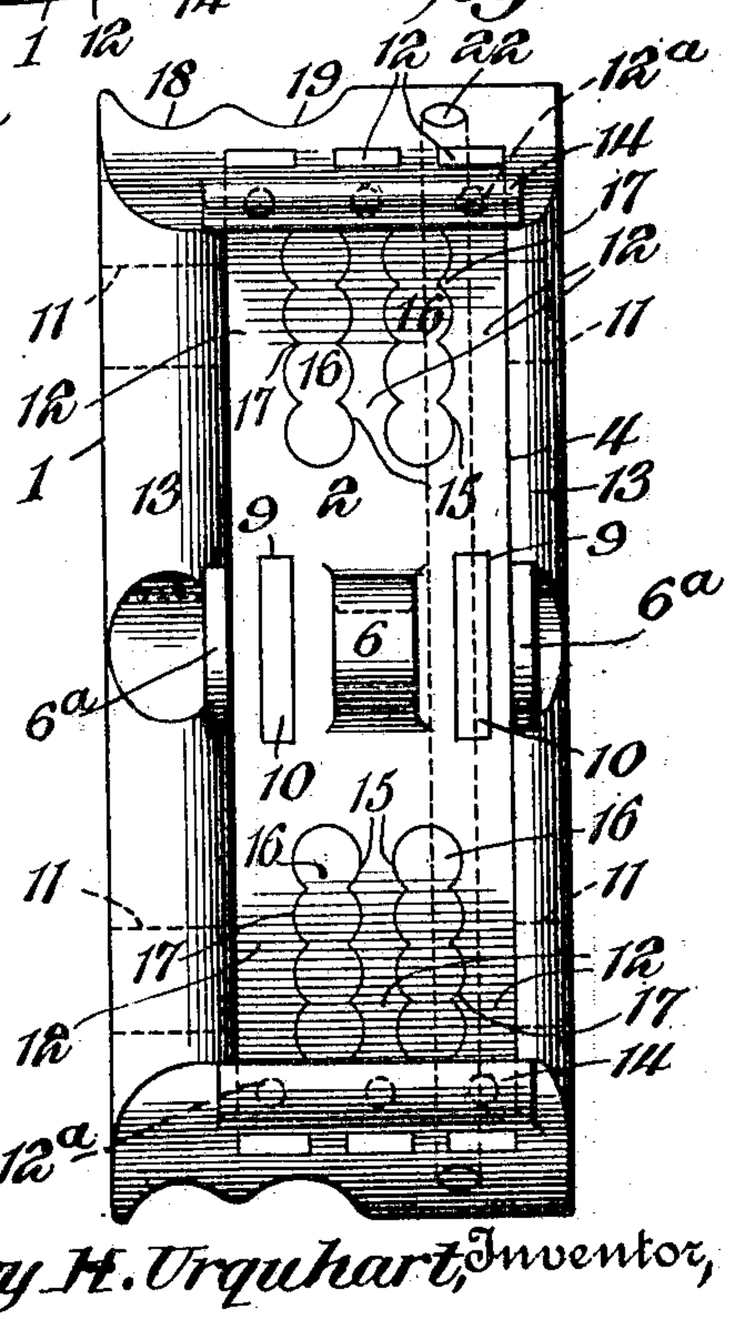


Fig. 11.





Witnesses

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2 SHEETS—SHEET 2.

Fig. 5.

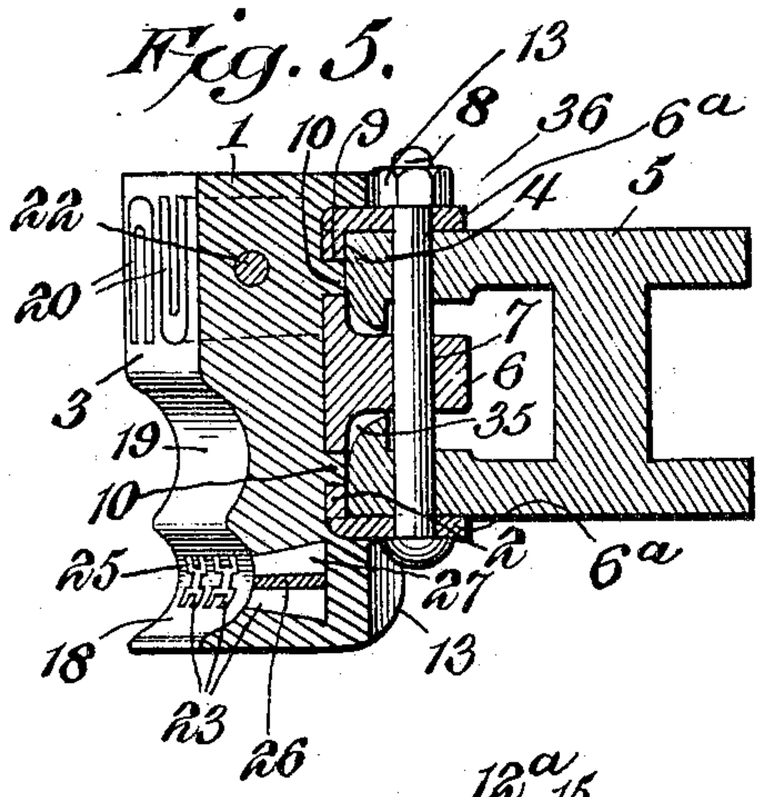


Fig. 7.

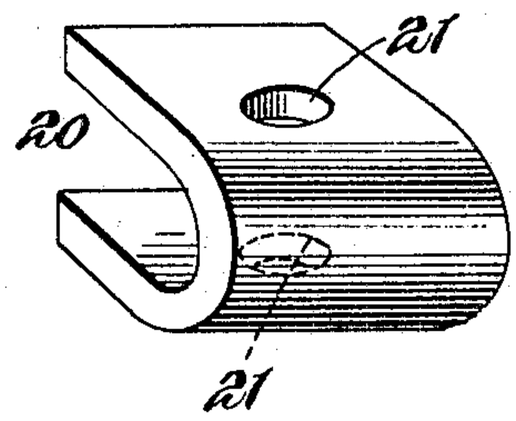


Fig. 8.

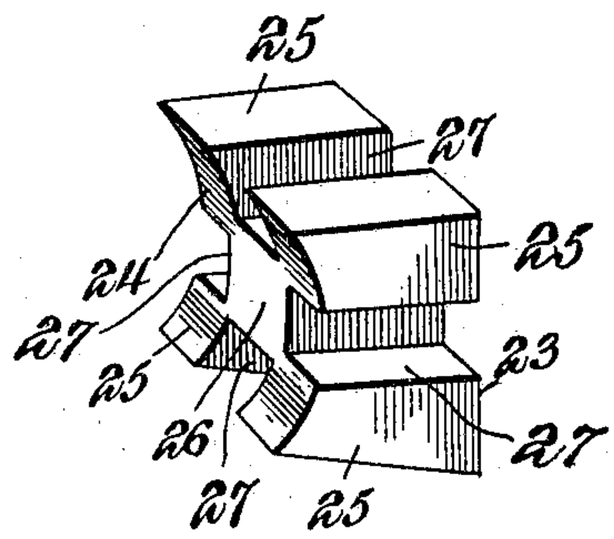


Fig. 6.

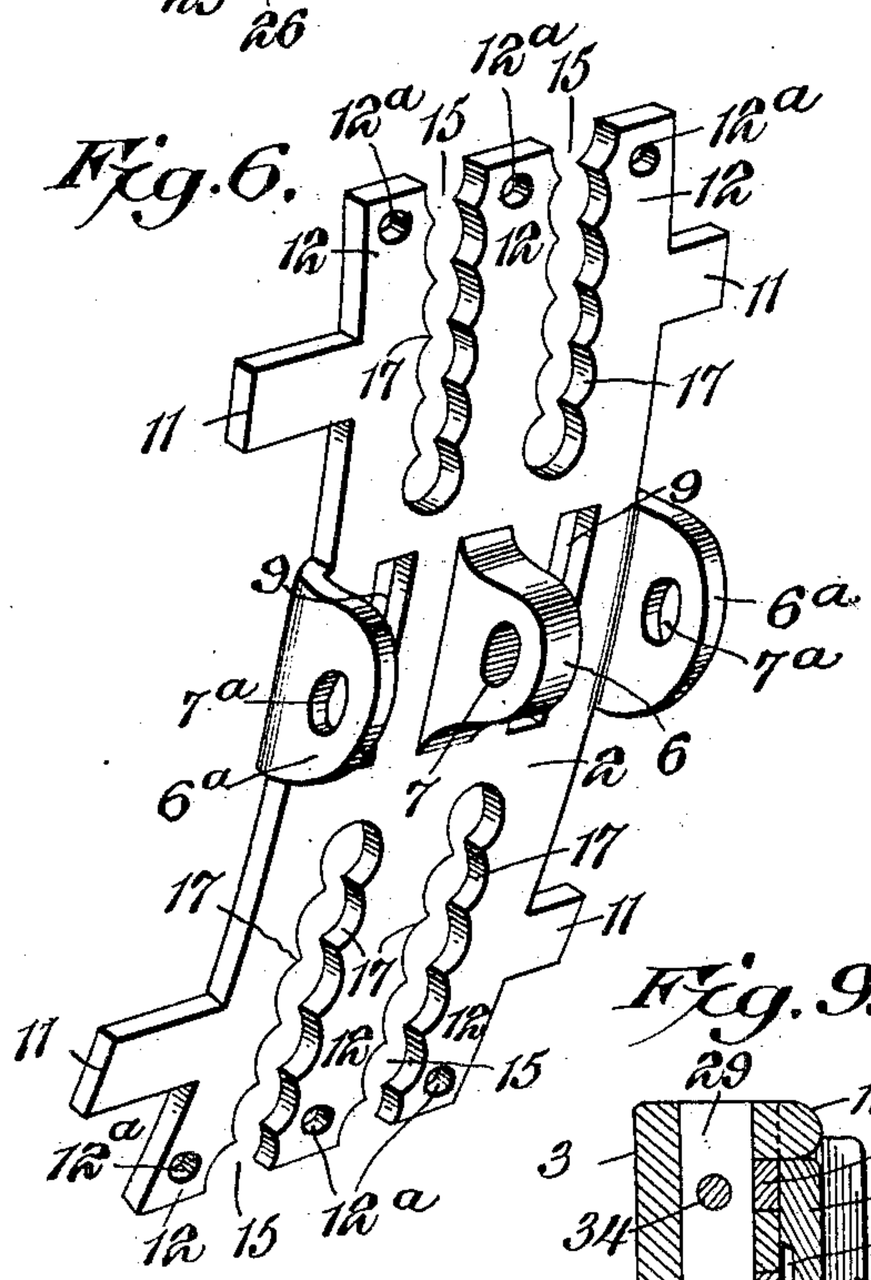


Fig. 9.

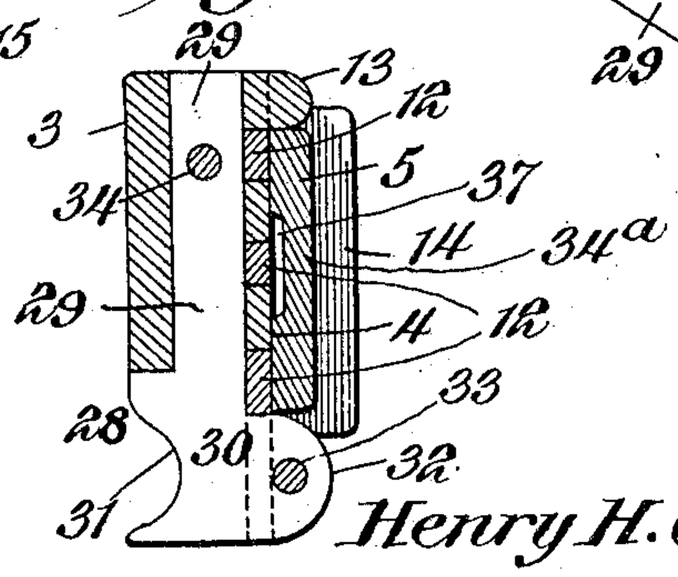
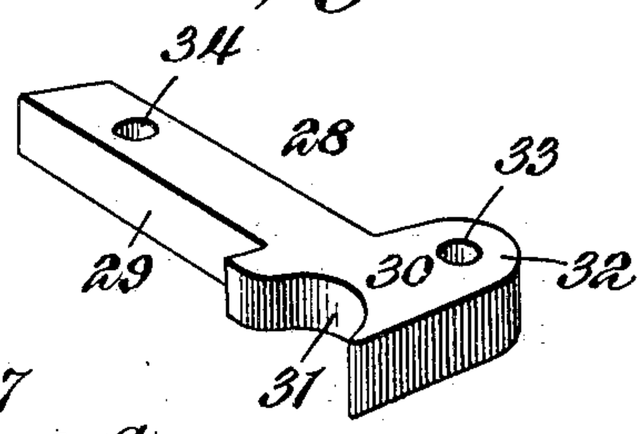


Fig. 10.



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Witnesses

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UNITED STATES PATENT OFFICE.

HENRY H. URQUHART, OF PADUCAH, KENTUCKY.

BRAKE-SHOE.

951,350. Specification of Letters Patent. Patented Mar. 8, 1910.

Application filed June 16, 1909. Serial No. 502,591.

To all whom it may concern:

Be it known that I, HENRY H. URQUHART, a citizen of the United States, residing at Paducah, in the county of McCracken and State of Kentucky, have invented a new and useful Brake-Shoe, of which the following is a specification.

The invention relates to improvements in brake shoes.

The object of the present invention is to improve the construction of brake shoes, more especially that shown and described in Patent No. 877,748, granted to me Jan. 28, 1908, and to provide reinforcing means adapted to increase the life of the brake shoe, and capable in event of the breaking or cracking of the shoe of retaining the parts thereof in place until the shoe is worn out or the broken parts removed.

With these and other objects in view, the invention consists in the construction and novel combination of parts hereinafter fully described, illustrated in the accompanying drawings, and pointed out in the claims hereto appended; it being understood that various changes in the form, proportion, size and minor details of construction, within the scope of the claims, may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings:—Figure 1 is a side elevation of a brake shoe, constructed in accordance with this invention. Fig. 2 is a central vertical sectional view of the same. Fig. 3 is a front elevation, showing the wheel-engaging face of the brake shoe. Fig. 4 is a rear elevation of the same. Fig. 5 is a transverse sectional view, taken substantially on the line 5—5 of Fig. 1. Fig. 6 is a detail perspective view of the reinforcing steel frame. Fig. 7 is a detail perspective view of one of the U-shaped reinforcing inserts. Fig. 8 is a similar view of one of the concave inserts. Fig. 9 is a transverse sectional view, illustrating another form of the invention. Fig. 10 is a detail perspective view of the reinforcing inserts, illustrated in Fig. 9. Fig. 11 is a detail perspective view of one of the H-shaped inserts.

Like numerals of reference designate corresponding parts in all the figures of the drawings.

The brake shoe consists of a body portion 1 of gray iron or other suitable material, reinforced at the back by a frame 2 of steel, embedded in the body 1 by molding the latter around the former like the reinforcing frame of the aforesaid patent. The brake shoe, which is provided at the front with a wheel-engaging face 3, has a recess or depression 4 at the back for the reception of a brake head 5. The reinforcing steel frame, which preferably consists of a drop steel forging, is located within the recess or depression and constitutes the major portion of the rear face of the brake shoe, and it is provided with a centrally arranged steel lug 6. The steel lug 6 is provided with a transverse opening 7, through which passes a transverse bolt 8 for securing the brake shoe to the brake head. The bolt 8 also passes through opposite ears 6^a, located at the side edges of the reinforcing frame and having alined openings 7^a, arranged in alinement with the opening 7 of the central lug 6. The side ears 6^a are integral with the reinforcing frame and are bent outward or rearward, as clearly illustrated in Fig. 6 of the drawings. The central attaching means formed by the lug 6 can be omitted, as the integral side ears will be ample for securing the brake shoe to the brake head. The brake shoe is curved longitudinally, and the reinforcing frame is curved to conform to the configuration of the shoe, and the said frame is provided at opposite sides of the lug with longitudinal openings 9, which receive portions 10 of the metal of the body of the brake shoe. The sides and ends of the frame are interlocked with the body of the brake shoe by means of side and end arms 11 and 12, which extend through the marginal side and end walls 13 and 14 of the recess or depression 4. The side arms 11 are located between the ears and the ends of the frame. The end arms are located at the center and side portions of the ends of the frame, the end arms being spaced apart to provide longitudinal openings 15, which receive portions 16 of the metal of the body of the brake shoe. The outer portions of the end arms 12 are provided with openings 12^a, and when the metal is cast around the reinforcing frame, portions of the gray iron extend through the openings 12^a, forming integral rivets or connecting portions to prevent the outer portions of the end walls from being knocked off. The edges 17 of

the reinforcing frame at the longitudinal openings 15 are scalloped, forming a plurality of inwardly projecting points and intervening recesses or seats, which result in interlocking the reinforcing frame more securely with the body portion of the brake shoe, and enabling the former in event of breakage of the latter to hold the parts together until the shoe is worn out or the broken parts removed.

The wheel-engaging face of the brake shoe is provided at the inner side with a groove 18, arranged to receive and engage with the flange of the wheel, and the brake shoe is also provided at an intermediate point with a groove 19, adapted to relieve a portion of the periphery of the engaged wheel of wear. The brake shoe is provided at the outer side portion with approximately U-shaped reinforcing inserts 20, extending from the reinforcing frame to the braking surface of the shoe and exposed thereat. The reinforcing inserts 20, preferably consisting of drop steel forgings, are also adapted to operate as chills for hardening the body portion of the brake shoe. The sides and connecting portion of each U-shaped insert are of uniform width and thickness, and the insert presents a continuous U-shaped edge at the braking surface of the shoe. The U-shaped inserts, which are reversely arranged, as clearly illustrated in Fig. 3 of the drawings, are provided at opposite sides with alined openings 21, adapted to receive an anchoring rod 22, which is embedded in the body portion of the brake shoe, whereby the U-shaped reinforcing inserts are connected together and are adapted to operate with the reinforcing frame in maintaining the parts of the brake shoe together, should the brake shoe become cracked or broken. Instead, however, of employing a rod for connecting the series of U-shaped inserts, the metal of the brake shoe body at the opposite sides of the U-shaped inserts, uniting through the openings of the latter, will securely retain the same in place. The brake shoe is also provided at the groove 18 with reinforcing inserts 23, consisting of drop steel forgings tapered outwardly or forwardly, as clearly shown in Fig. 8 of the drawings, but the inserts 23 may be of the same cross sectional area at their ends, as the recesses hereinafter described will serve to securely retain the inserts in the body of the brake shoe. The reinforcing inserts 23 are provided with concave outer faces 24, arranged in flush relation with the face of the brake shoe at the groove 18, so as to be exposed at the braking surface of the shoe. In Fig. 11 of the drawings, I have illustrated an approximately H-shaped reinforcing insert 23ª, composed of two sides and a connecting web or portion 25ª. The H-shaped reinforcing insert is provided at opposite sides of the connecting web or portion 25ª with recesses, which receive portions of the metal of the body of the brake shoe.

The preferred form of concave reinforcing insert is illustrated in Figs. 3 and 8 of the drawings. These reinforcing inserts 24 are composed of rectangular corner portions 25 and a central rectangular portion 26, recesses 27 being provided at the sides between the connecting corner portions. The recesses 27, which are located at each side of the reinforcing metal seat instead of at the opposite sides, as illustrated in Fig. 11, receive the metal of the body portion of the brake shoe and besides reinforcing and increasing the life of the shoe also operate like the U-shaped inserts to constitute chills for hardening the body portion of the brake shoe. The recesses and the spaced arrangement of the U-shaped reinforcing inserts and the recessed concave inserts prevent blow-hole or air-hole imperfections of a casting from causing the insert to fall out. The gray iron is coarser in grain than the reinforcing inserts and of a less degree of hardness, and the dust worn from the gray iron passing between the inserts and the wheel will maintain the engaging face of the brake shoe in a smooth condition, thereby preventing the gray iron of the body portion from taking such a hold on the wheel as to cause the same to slide and flatten.

In the embodiment of the invention illustrated in Fig. 9, transversely disposed reinforcing inserts 28 are substituted for the inserts 24. The inserts 28, which extend across the brake shoe, consist of a straight shank portion 29 and a head 30, extending in advance and in rear of the straight shank and having a curved face 31 conforming to the configuration of the groove, which engages with the flange of the wheel. The rearwardly extending portion 32 of the head 30 is provided with an opening 33 and the shank 29 has a similar opening 34. These openings permit the metal to flow through the inserts 29 and unite with the metal at each side of the same. The shanks 29 of the transverse reinforcing inserts 28 will in practice be arranged in the spaces between the U-shaped inserts.

The brake head is composed of two sides and a front connecting portion 34ª, provided with an opening 35 through which the lug 6 passes, and the side walls of the brake head are pierced by the transverse bolt 8, provided at one end with a head, and threaded at the other end to receive a nut 36, which may be keyed or otherwise locked to the bolt. The brake head is also provided in its front wall or connecting portion with a longitudinal groove 37, extending above and below the central opening and adapted to guide the lug to the said

opening and for affording the necessary clearance for the lug.

The brake shoe is adapted for use at either the right or left hand side of a locomotive, car or the like, and the brake head slides in the depression or recess 4, as clearly illustrated in Fig. 2 of the drawings, the brake shoe being supported by the upper end wall, which relieves the transverse bolt of strain and prevents the bolt from being bent or otherwise injured. The openings 7 and 7ª of the lug and the ears are elliptical, and the end walls are spaced from the bolt when the parts are assembled.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. A brake shoe consisting of a body provided at the back with a depression or recess, and a reinforcing frame embedded in the body at the back thereof and provided with openings having scalloped edges forming projecting portions and intervening recesses.

2. A brake shoe consisting of a body provided at the back with a depression or recess, and a reinforcing frame embedded in the body at the back thereof and having longitudinal openings located at each end of the frame in spaced relation and provided with scalloped edges forming inwardly extending projections and intervening seats or recesses.

3. A brake shoe consisting of a body portion provided at intervals with substantially U-shaped reinforcing inserts extending from the back portion of the shoe to and exposed at the braking surface of the same and composed of spaced sides having alined openings, and a connecting portion.

4. A brake shoe consisting of a body provided at intervals with substantially U-shaped reinforcing inserts extending from the back of the shoe to and exposed at the braking surface of the same and composed of sides and a connecting portion, the sides and the connecting portion being of uniform width and thickness and presenting a continuous U-shaped edge at the said braking surface.

5. A brake shoe consisting of a body portion provided at intervals with substantially U-shaped reinforcing inserts extending from the back portion of the shoe to and exposed at the braking surface of the same, said reinforcing inserts being reversely arranged and composed of spaced sides, and a connecting portion, the sides being provided with openings.

6. A brake shoe consisting of a body portion provided at intervals with substantially U-shaped reinforcing inserts extending from the back portion of the shoe to and exposed at the braking surface of the same, said reinforcing inserts being reversely arranged and composed of spaced sides and a connecting portion, the sides being provided with alined openings, and a binder rod embedded in the body of the brake shoe and passing through the openings of the inserts and connecting the same.

7. A brake shoe consisting of a body provided at the inner side of its braking surface with a groove adapted to receive the flange of a wheel, and reinforcing inserts embedded in the body at the said groove and having a concave outer face exposed at the braking surface, each insert consisting of a substantially rectangular block provided with a plurality of recesses located at the sides of the insert and extending from the inner to the outer face of the insert and receiving portions of metal of the body of the brake shoe.

8. A brake shoe consisting of a body provided at the inner side of its braking surface with a groove adapted to receive the flange of a wheel, and reinforcing inserts embedded in the body at the groove and having a concave outer face exposed at the braking surface, each insert consisting of a rectangular block or piece recessed at each side and forming central and rectangular portions.

9. A brake shoe consisting of a body provided at the back with a depression or recess, and a reinforcing frame embedded in the body at the back thereof and provided with arms having their terminals extended through the walls of the recess and provided at the said terminals with openings through which portions of the metal of the walls extend.

10. A brake shoe consisting of a body provided at the back with a depression or recess, and a reinforcing frame embedded in the body at the back thereof and provided with longitudinal openings having scalloped edges and forming end arms, the latter being extended through the end walls of the recess or depression and provided with openings through which portions of metal extend.

In testimony, that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

HENRY H. URQUHART.

Witnesses:
HAL A. CORBETT,
ISLA ELLIO.