

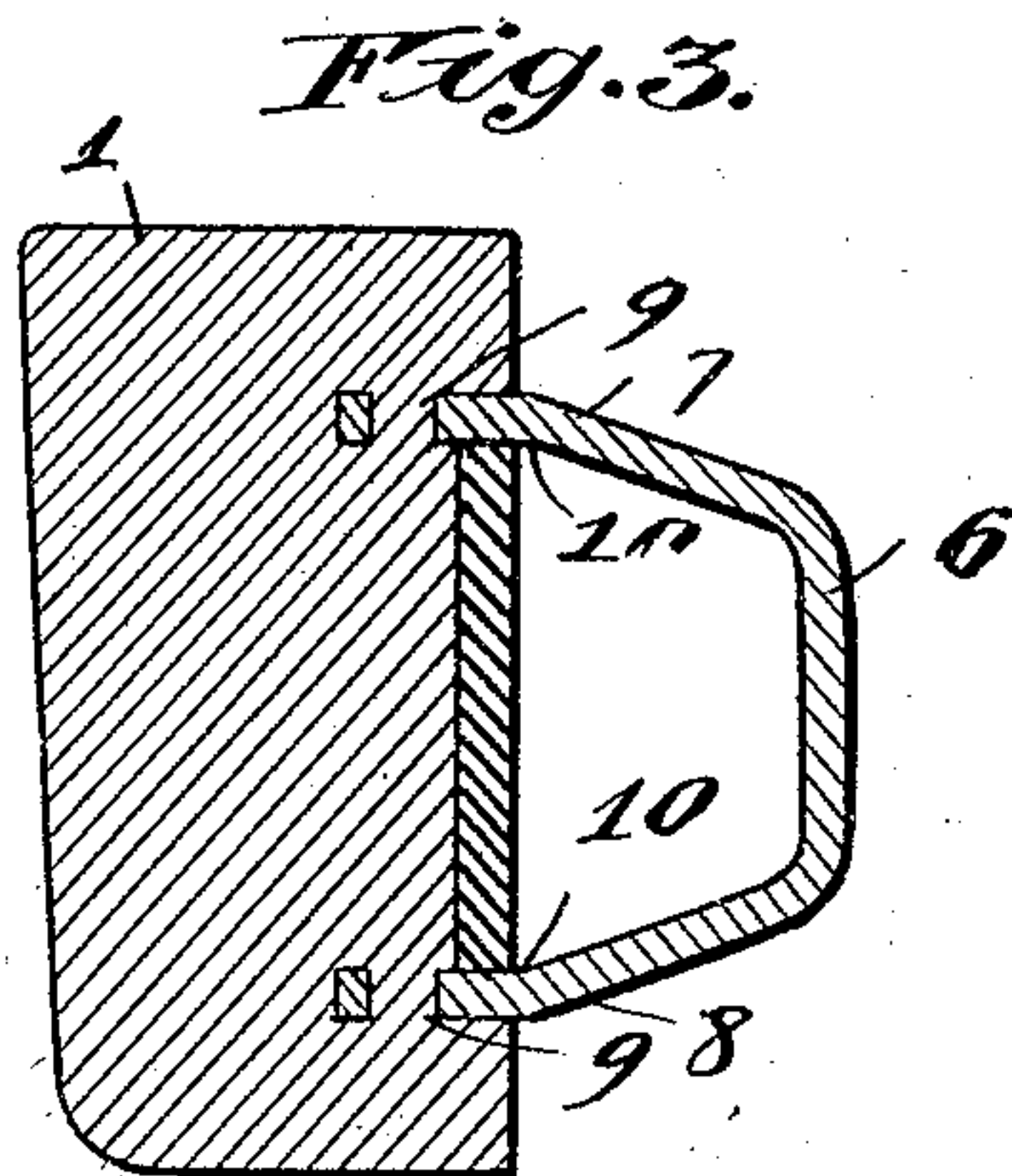
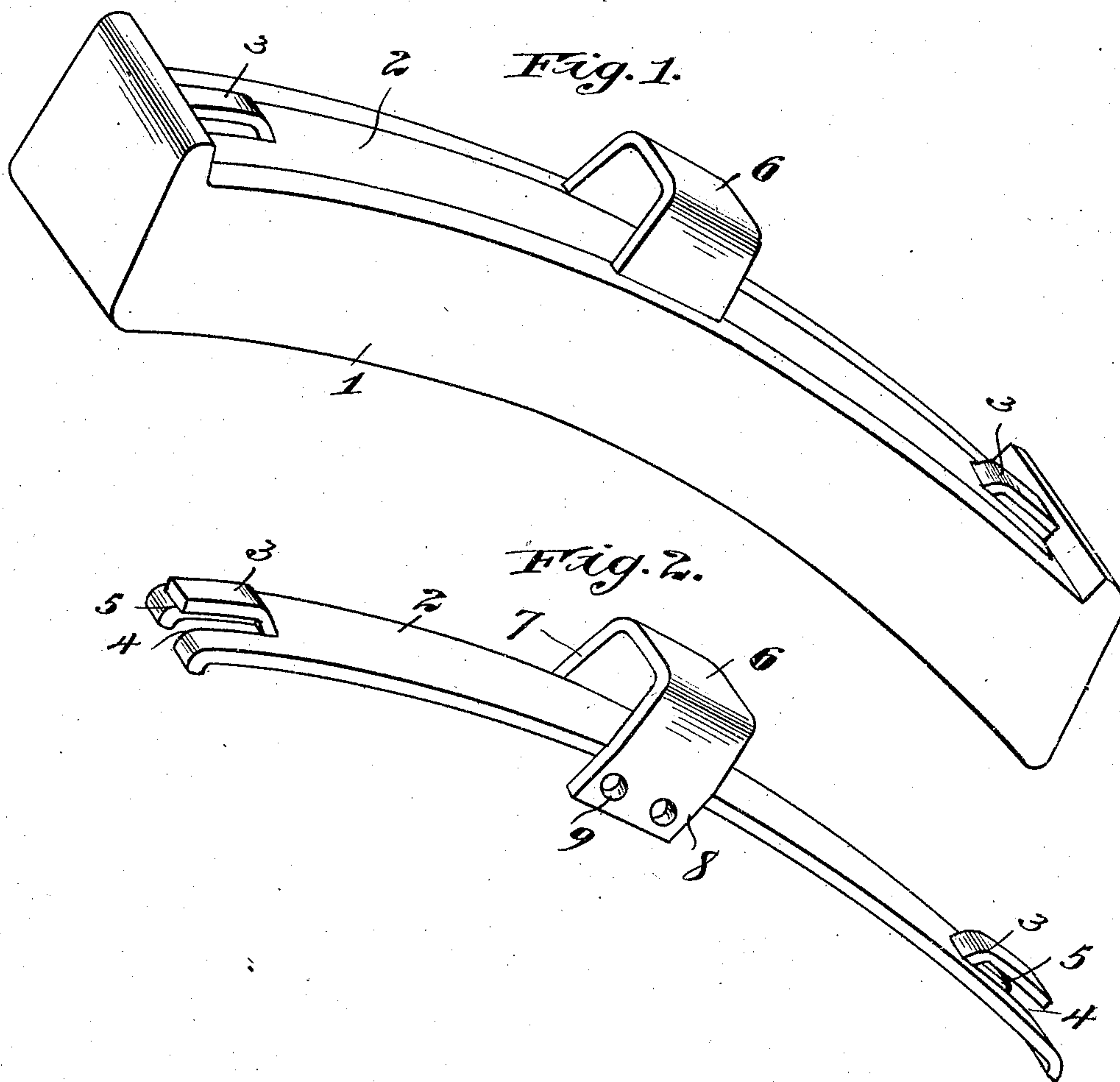
No. 791,181.

PATENTED MAY 30, 1905.

J. R. CARDWELL.
BRAKE SHOE.

APPLICATION FILED JAN. 19, 1903.

2 SHEETS—SHEET 1.



Witnesses,
J. O. Mann,
A. N. Graves

By

Inventor,
James R. Cardwell,
Offield & Co. Litho.
J. R. C.

No. 791,181.

PATENTED MAY 30, 1905.

J. R. CARDWELL.
BRAKE SHOE.

APPLICATION FILED JAN. 19, 1903.

2 SHEETS—SHEET 2.

Fig. 4.

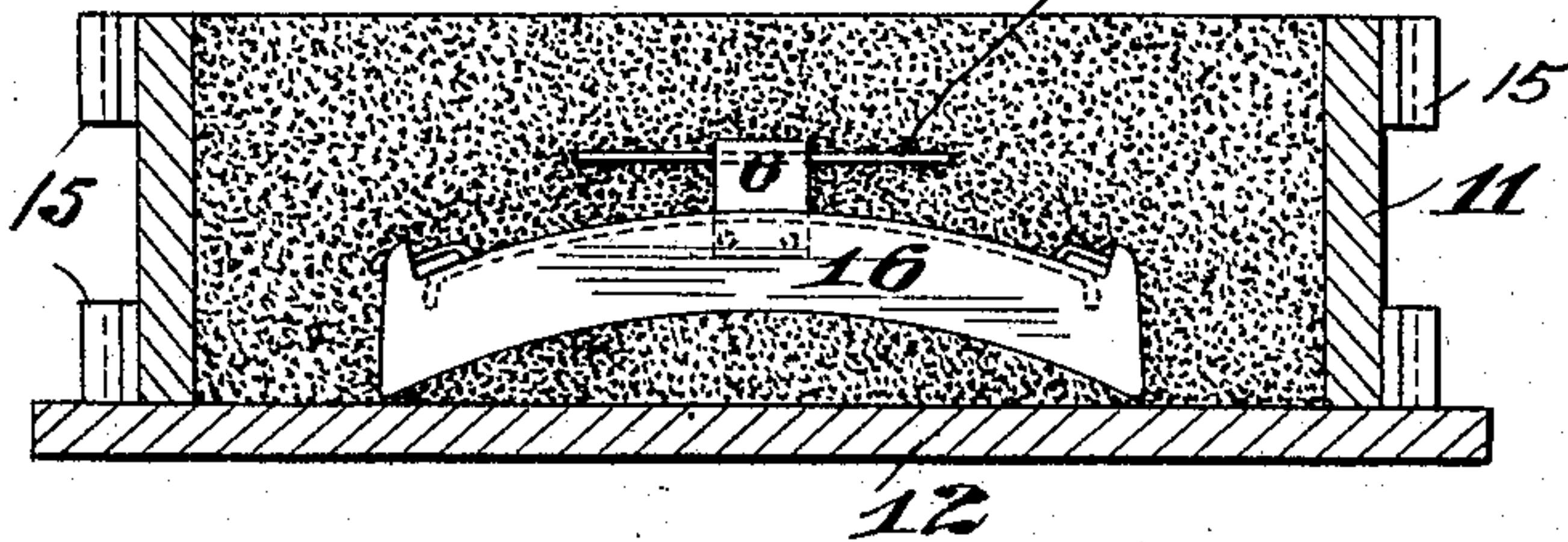


Fig. 5.

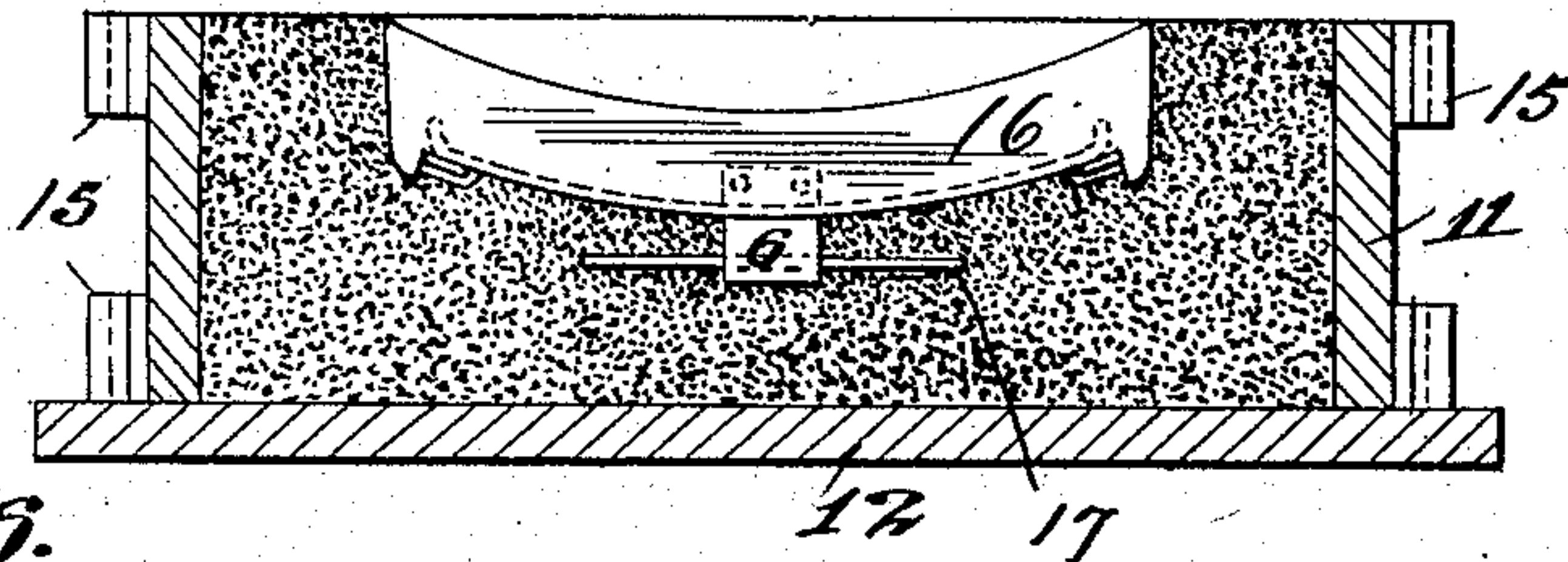


Fig. 6.

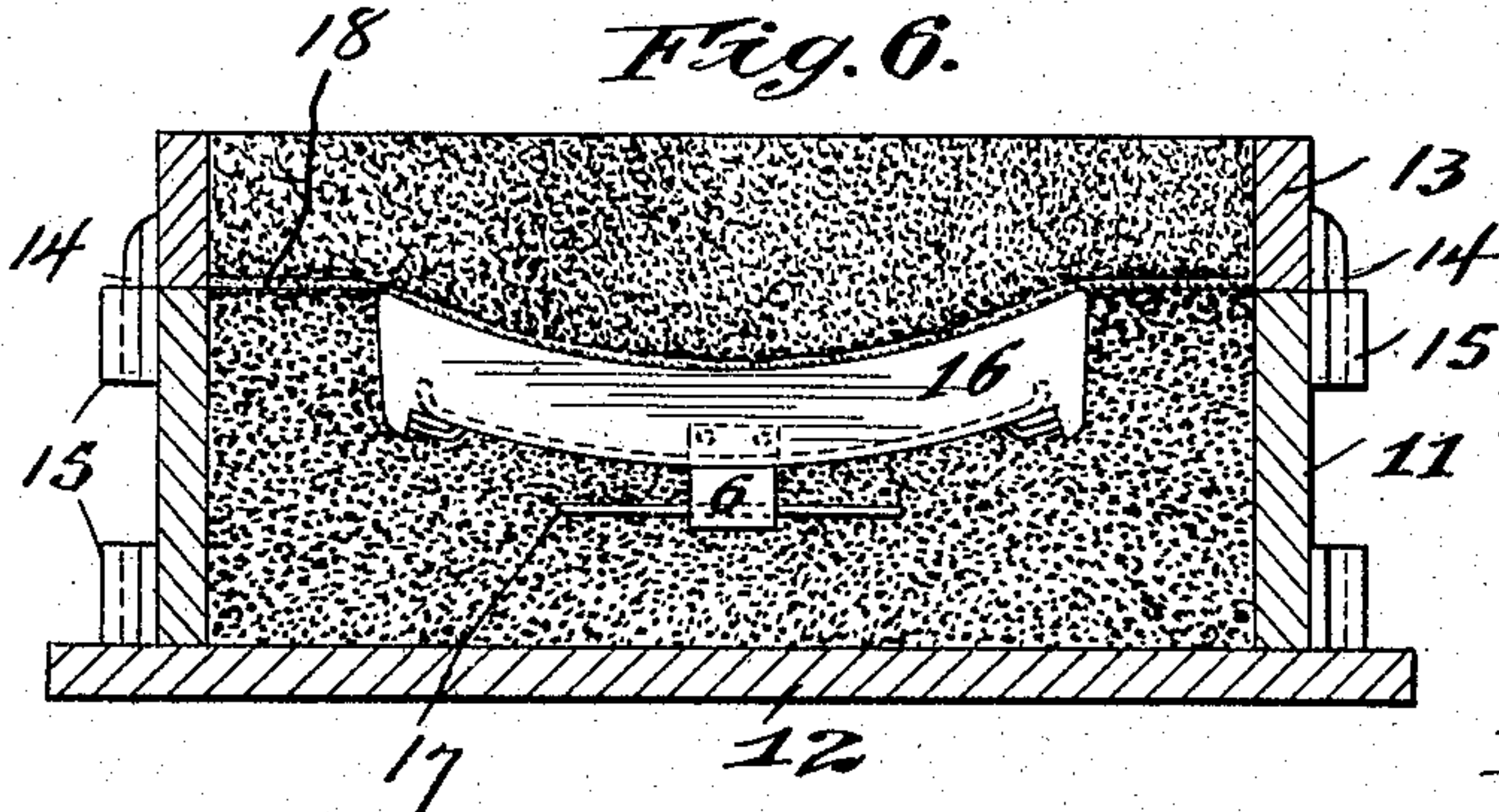


Fig. 7.

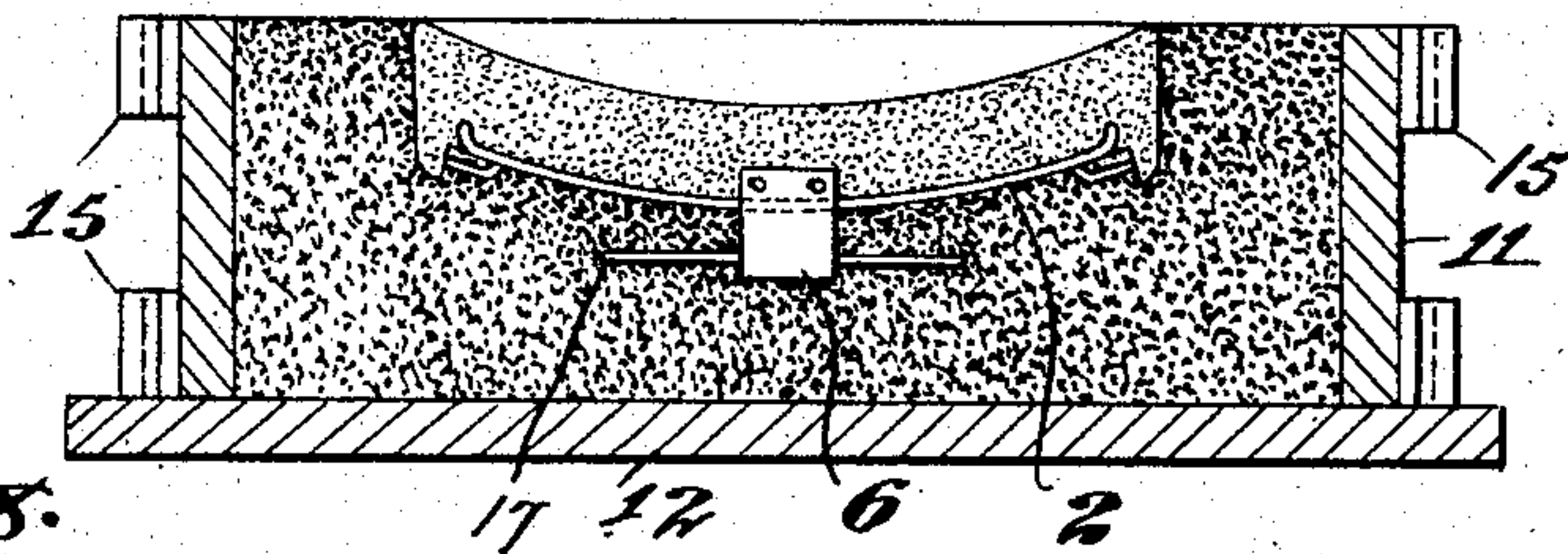


Fig. 8.

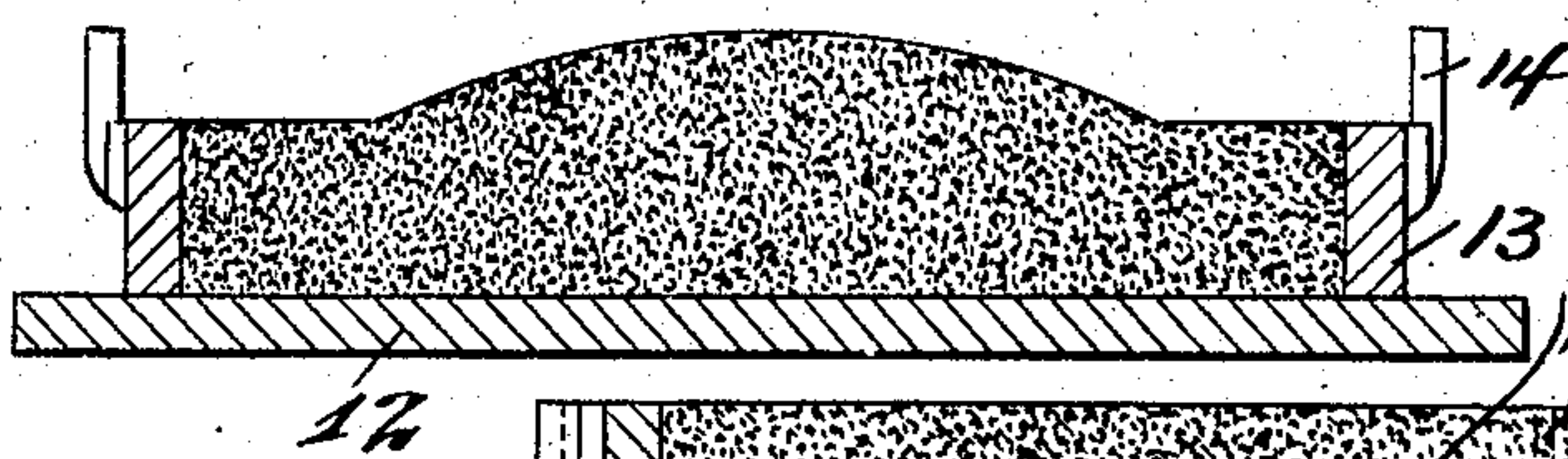
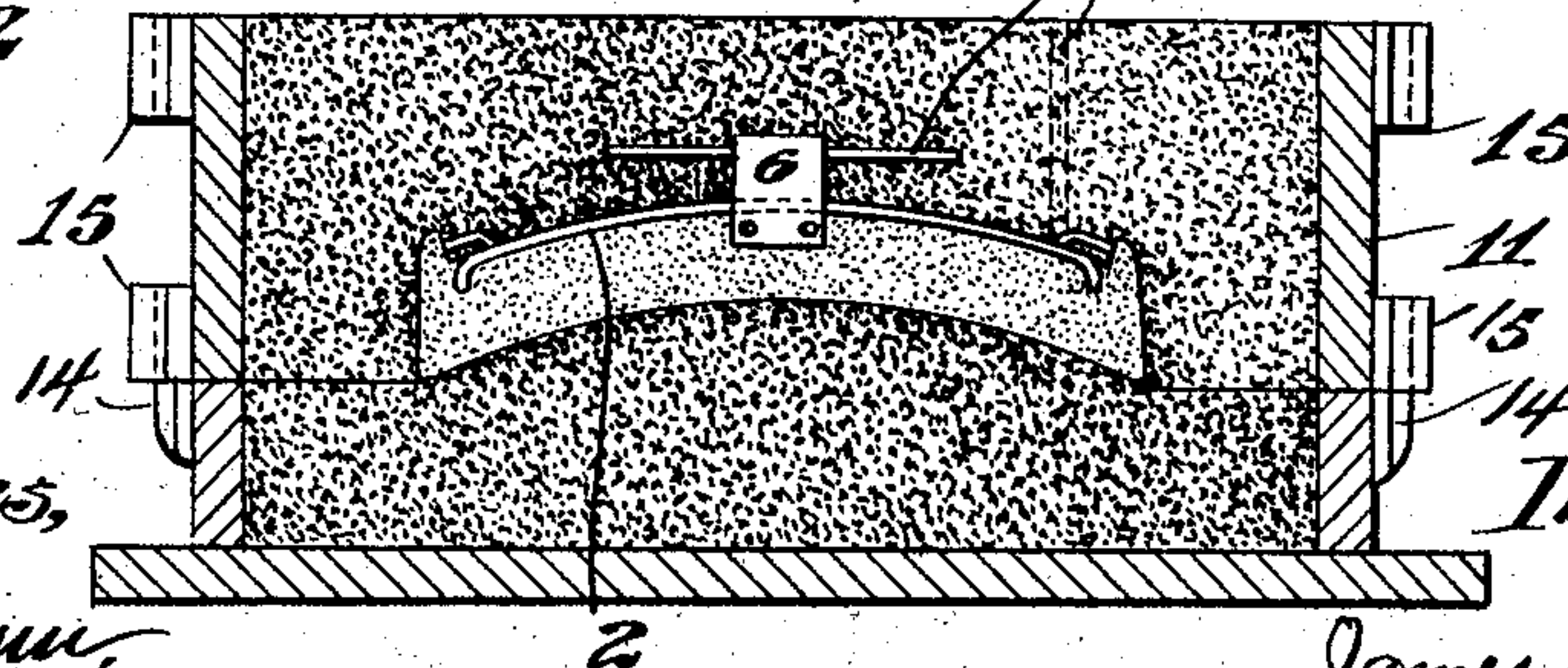


Fig. 9.



Witnesses,

J. S. Mann,
A. N. Grace

Inventor,

James R. Cardwell,
By Offield Fowler Lathum
Attys.

UNITED STATES PATENT OFFICE.

JAMES R. CARDWELL, OF CHICAGO, ILLINOIS, ASSIGNOR TO AMERICAN BRAKE-SHOE & FOUNDRY COMPANY, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

BRAKE-SHOE.

SPECIFICATION forming part of Letters Patent No. 791,181, dated May 30, 1905.

Application filed January 19, 1903. Serial No. 139,579.

To all whom it may concern:

Be it known that I, JAMES R. CARDWELL, a resident of 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 an improved brake-shoe of that type wherein the main body of the shoe is of cast metal and the back thereof is reinforced with wrought metal or analogous tough metal.

Among the salient objects of the invention are to provide an improved construction in which the shoe is provided with a wrought-metal attaching lug or loop and also with a wrought-metal or analogous reinforcing back plate, the back plate and attaching-lug being so combined as to facilitate the making of the article *per-se*; to provide a construction in which both the reinforcing member and the attaching lug or loop are integrally united with the shoe-body proper by being embedded or partially embedded during the casting operation; to provide a construction in which the reinforcing member is provided with means adapted to interlock with the brake-head to hold the shoe accurately in position and positively against rotative movement about an axis radial to the acting face of the shoe; to provide a construction which enables the molding operation to be carried out with the utmost simplicity and at the same time insures absolute accuracy in the positioning of the parts which are to be cast in or attached relatively to the mold-cavity which defines the main body of the shoe, and to provide a construction which enables the reinforcing member and attaching-lug to be secured within the mold preparatory to the casting step in an improved and less costly manner.

To the above ends the invention consists in the matters hereinafter described, and more particularly pointed out in the appended claims, and the invention 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 perspective view of a complete brake-shoe embodying my invention. Fig. 2 is a similar perspective view of the reinforcing member and the attaching-lug assembled in proper relation to each other and detached or shown separated from the brake-shoe body. Fig. 3 is a transverse sectional view taken through the attaching-lug and perpendicular to the acting face of the shoe; and Figs. 4 to 9, inclusive, illustrate the successive steps of forming a mold and assembling the cast-in members therein preparatory to casting the shoe, Fig. 4 showing the flask in upright position with the pattern and reinforcing member and attaching-lug assembled in the position assumed at the end of the first step of forming the mold, Fig. 5 showing the flask inverted and the sand cleaned away to expose the then upper face of the pattern, Fig. 6 showing the cope applied, the parting-sand distributed over the surface of the flask half of the mold and the cope filled, Fig. 7 showing the cope removed, (the latter being shown in Fig. 8,) the pattern withdrawn, and the parts to be cast in remaining in the bottom of the mold-cavity, and Fig. 9 showing the mold reinverted or in upright position, closed, and in readiness for casting.

Prior to my present invention it has been common to provide brake-shoes with reinforcing back plates or members, and it has also been common to provide brake-shoes having cast-metal bodies with wrought-metal attaching-lugs. So far as I am aware, however, no construction has heretofore been devised in which it was possible to employ the complementary parts (which are to become a part of the finished shoe) as parts of the pattern, assembled with the latter and placed within the flask during the process of forming the mold, and left therein when the main body of the pattern is withdrawn. In other words, it has been necessary heretofore where it was proposed to unite complementary parts with the back of the shoe to first provide a pattern of the complete shoe, from which pattern a mold was formed, and the complementary parts were subsequently placed in position,

the aperture or key-opening of the attaching-lug being formed by a core, likewise placed in position after the body of the mold has been completely formed. Furthermore, it is found in practice necessary, or at least highly desirable, to cast the shoe with the acting face downwardly, and this has necessitated the employment of means for securing the complementary parts within the cavity of the mold in such manner that when the flask is inverted in position for casting they will nevertheless be held in the then upper part of the cavity. Both the matter of placing the complementary parts accurately in position within the cavity and the matter of securing them reliably in such position are accompanied with serious difficulties, rendering the process of casting slow, expensive, and more or less unreliable. In my present invention I overcome these objections.

Describing first the construction of the shoe shown in Figs. 1 to 3, inclusive, 1 designates as a whole the main body of the shoe, which may be of the usual conformation so far as its general features are concerned and is of cast metal. 2 designates as a whole a reinforcing strip or plate which is arranged to extend longitudinally of the back of the shoe throughout the principal length of the latter, said reinforcing-strip being preferably cast into the body of the shoe, so that its outer surface is approximately flush with the outer surface of the cast body 1. At each end said reinforcing member is provided with an integral struck-up lug portion 3, which forms a holding-lug which fits within a corresponding recess in the face of the brake-head and holds the shoe positively from lateral movement at its ends relatively to the brake-head. Said lug is conveniently formed by slitting the end portion of the reinforcing member some distance inwardly, as indicated at 4 and 5, and striking up the lug by means of a suitable die into the form shown, or so that it occupies a plane outside of the main plane of the reinforcing-plate. Preferably for a purpose which will hereafter appear the central portion of the reinforcing member is made of a transverse width equal to the width of the opening of the attaching-lug, which is designated as a whole 6. The loop 6 is preferably of wrought metal or steel and is of approximately inverted-U shape, the loop being arranged to extend transversely of the shoe-body, so that the opening therethrough is longitudinally disposed in position to receive the attaching-key. The two arms 7 and 8 of the lug or loop are made of sufficient length to extend into the body of the shoe a substantial distance beyond the lower surface of the reinforcing member 2 and are provided with holes or recesses 9, into which the molten metal may flow, so as to integrally and reliably secure the lug in position, as best indicated in sectional view, Fig. 3.

As a special feature contributing to the accurate and convenient carrying out of the casting of the shoe I so construct the attaching-lug that the arms thereof will closely embrace and frictionally hold the side edges of the reinforcing member prior to the filling of the mold and while these complementary parts are assembled within the mold. Conveniently those portions of the arms of the lug which are to be embedded within the body of the shoe are parallel with each other, while the parts external to the shoe-body converge outwardly more or less, as shown clearly in Fig. 3, obtuse angles 10 being formed at points coincident with the outer surface of the reinforcing member. These angles in the arms of the lug are of assistance in determining the relative adjustment of the lug and reinforcing member; but it is to be noted in this connection that this feature is not essential, since the pattern upon which the complementary parts are assembled prior to making the mold may be provided with means for determining the relative positioning of these parts.

The pattern employed in conjunction with the complementary parts in forming the mold is of the exact configuration of the shoe-body, with the reinforcing member 2 and attaching-lug 6 removed therefrom—that is to say, the pattern is provided in its back with a recess adapted to receive the reinforcing member and with other recesses at each side of the reinforcing-member recess adapted to receive the inwardly-projecting ends of the lug-arms. The lug-arm-receiving recess may be made of the exact depth and width to accurately determine the position of the lug as a whole relatively to the pattern, in which case the angles 10, hereinbefore referred to, are not essential.

Describing now the method of molding a shoe constructed as hereinbefore described and referring to Figs. 4 to 9, inclusive, 11 designates as a whole a suitable flask provided with a removable bottom 12 and with a cope 13 of ordinary construction and adapted to be held in register with the main body of the flask by means of interfitting lugs or ears 14 and 15 or other suitable devices. The reinforcing member, attaching-lug, and pattern (the latter being designated 16) having been assembled are placed in the flask in the position shown in Fig. 4 and the molding-sand filled in and properly tamped around the pattern. Before completely covering the attaching-lug a bar 17 is inserted through the latter and held in bearing with the upper side thereof while the molding-sand is tamped thoroughly within the opening of the lug and beneath the bar. The remainder of the flask is then filled and the latter inverted, as shown in Fig. 5. The molder then removes the sand, so as to expose the face of the pattern, then applies the cope, distributes the parting-sand over the exposed

surface of the pattern and the molding-sand within the flask, as indicated at 18, in the usual manner, and then removes the cope and withdraws the pattern, leaving the complementary parts—i. e., the reinforcing member 2 and attaching-lug 6—in the bottom of the mold, as shown clearly in Fig. 7. The flask is then inverted and placed upon the cope, thus bringing the assembled parts into the position shown in Fig. 9, it being understood that the sprue (indicated in dotted lines at 19) has been placed in position during the forming of the mold, so that upon the withdrawal of the latter the mold is in readiness for filling. When the mold is thus completed and inverted, it will be understood that the reinforcing member and attaching-lug are supported at the upper side of the mold-cavity, the supporting-bar 17 serving to hold these parts reliably in position by distributing the weight of the latter over a considerable area of the compacted sand. In this connection it may be noted that in some cases it may be practicable to dispense with the use of the supporting-bar, since the molding-sand will be tamped firmly within the interior of the attaching-lug and if the weight of the reinforcement be not too great will support the latter with sufficient security. It will be noted in this connection that the frictional engagement or clamping of the sides of the lug upon the edges of the reinforcing member is relied upon to hold the latter in position. It is important, therefore, that the attaching-lug be so constructed as to embrace tightly the edges of the reinforcing member, and this is readily accomplished by so forming the lug that the arms thereof normally stand slightly nearer together than the width of the central portion of the reinforcing member. The resilience of the attaching-lug permits the member to be readily forced into position between the arms. The casting is poured in the usual manner, thus completing the operation of forming the shoe.

The peculiar method of casting the shoe hereinbefore described is not claimed as a part of the present invention, this method being made the subject of a divisional application, Serial No. 158,663, filed May 25, 1903.

From the foregoing it will be understood that I attain the several objects of my invention and produce an improved article at a minimum expense with the expenditure of a minimum amount of labor and with uniform accuracy and reliability. It will be further understood that the details of the invention, both as to the specific construction of the sev-

eral members of the shoe and as to the several steps of casting the shoe, may be to some extent modified without departing from the invention.

I claim as my invention—

1. A brake-shoe comprising a cast-metal body, a tough-metal reinforcing-plate applied to the back side thereof, and a separately-formed tough-metal attaching-loop of approximately U shape and having its ends non-approaching each other and projecting into and cast within the body of the shoe, the exposed portions of the arms of said loop converging as they leave said body and holding said reinforcing member by frictionally engaging the edges thereof, for the purpose described.

2. A brake-shoe having a cast-metal body and a reinforcing-plate of tough metal united with the back side thereof and provided at its end with an integrally-formed struck-up holding-lug extending longitudinally of said shoe-body, the end of said plate being formed into a hook and embedded in said cast-metal body substantially as described.

3. A brake-shoe, comprising a cast-metal body, a tough-metal reinforcing-plate united with the back side thereof and provided at its end with an integrally-formed struck-up holding-lug extending longitudinally of said shoe-body, and a tough-metal attaching-loop of approximately U shape and having its ends projected parallel with each other into and cast within said shoe-body, the exposed portions of the arms of said loop converging as they leave said body and holding said reinforcing member by frictionally engaging the edges thereof, substantially as and for the purpose described.

4. A brake-shoe comprising a cast-metal body provided with a longitudinally-extending reinforcing-plate of tough metal having its opposite ends turned inwardly to form hooks, said hooked portions extending radially into and embedded in the shoe-body.

5. A brake-shoe comprising a cast-metal body provided with a longitudinally-extending reinforcing-plate of tough metal having its opposite ends bent into hooks and embedded in said shoe-body, the inner faces of said hooks being toward each other and extending at substantially right angles to or transversely of said metal plate.

JAMES R. CARDWELL.

Witnesses:

ALBERT H. GRAVES,
FREDERICK C. GOODWIN.