

No. 753,040.

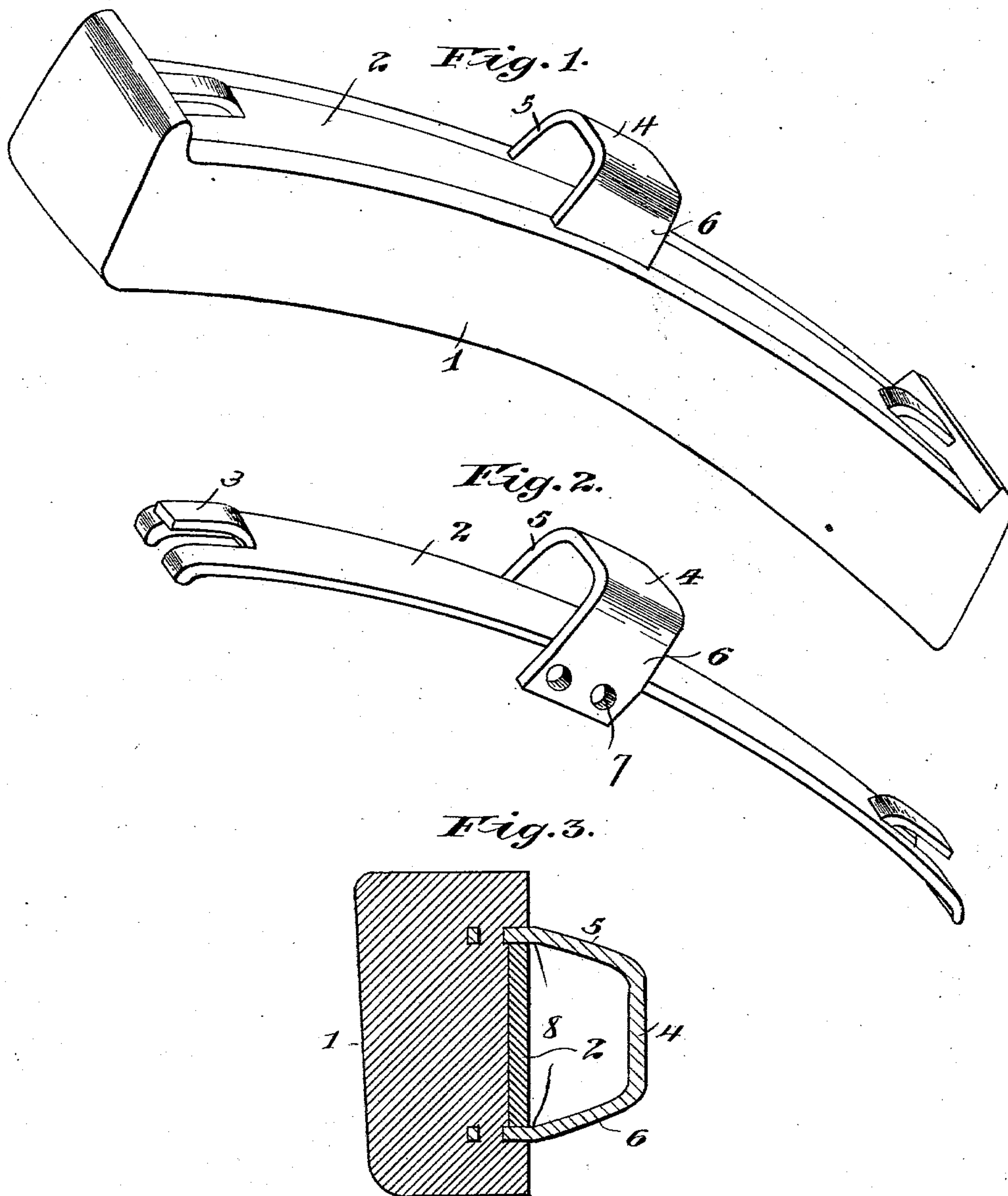
PATENTED FEB. 23, 1904.

J. R. CARDWELL,  
METHOD OF MAKING BRAKE SHOES.

APPLICATION FILED MAY 25, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses,

J. E. Mann.

A. N. Graves

Inventor,

James R. Cardwell,

By *Offield Towle Lenthicum*,  
Att'y.



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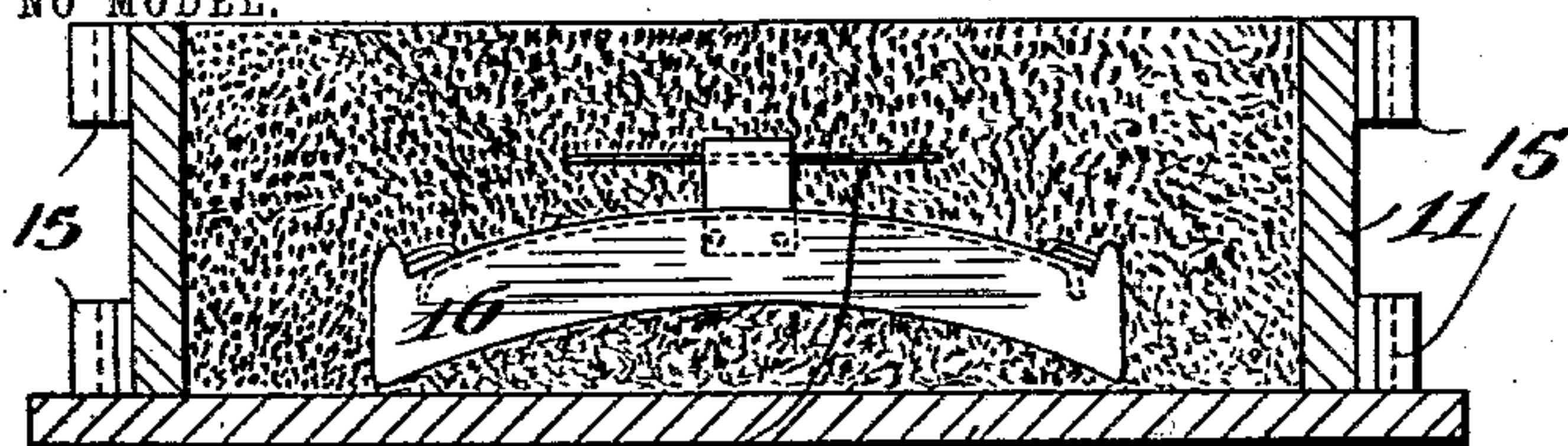


Fig. 4.

Fig. 5.

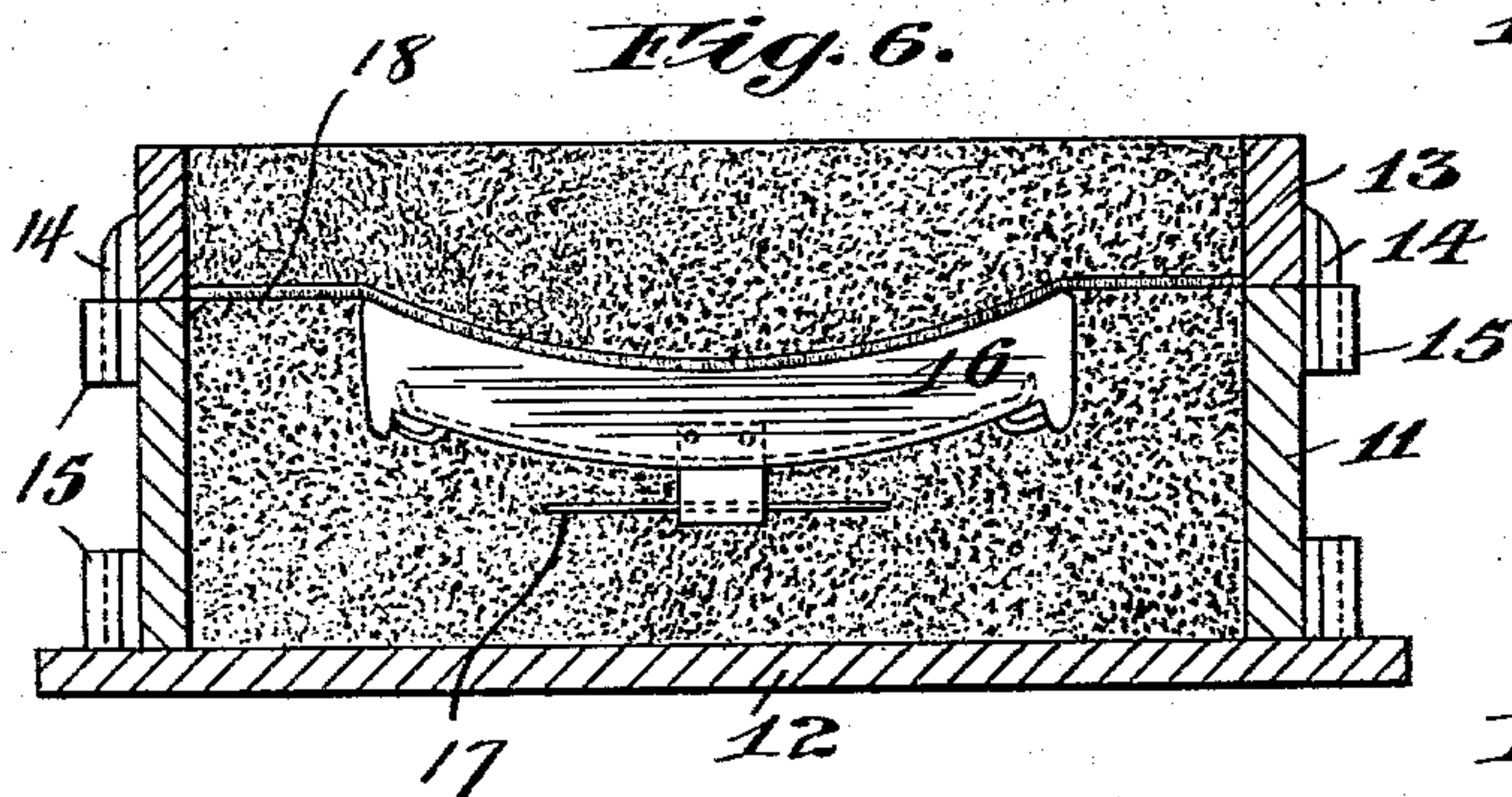
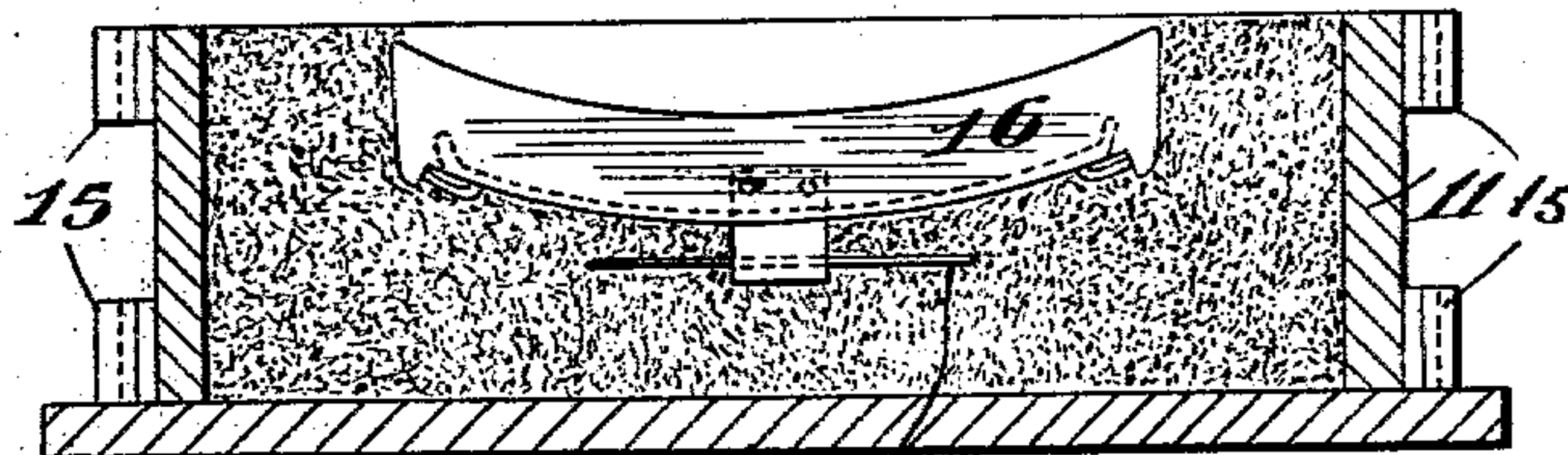


Fig. 6.

Fig. 7.

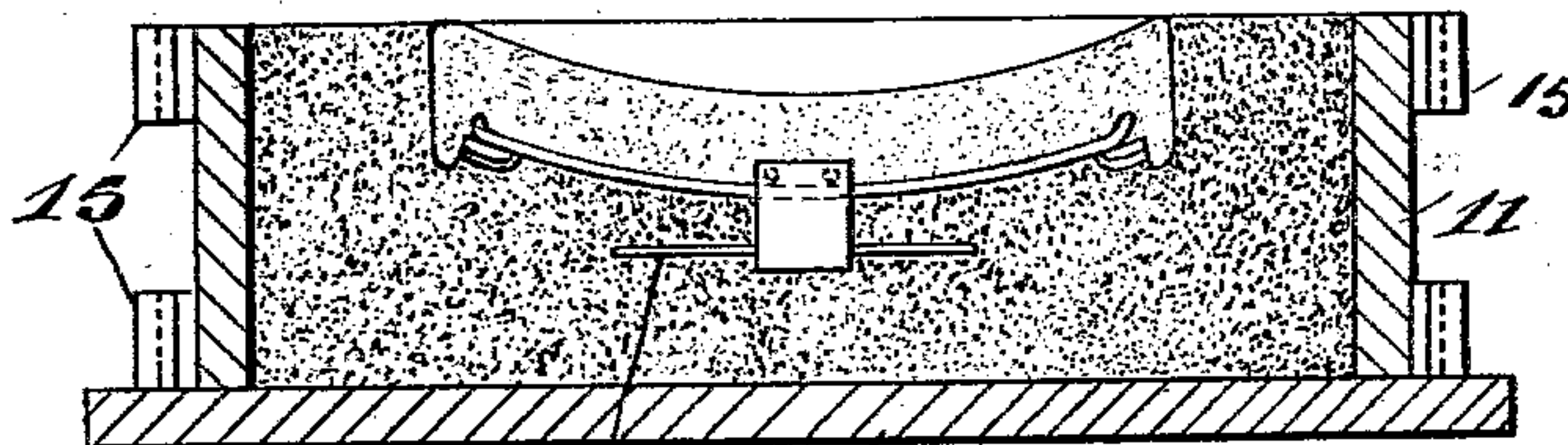


Fig. 8.

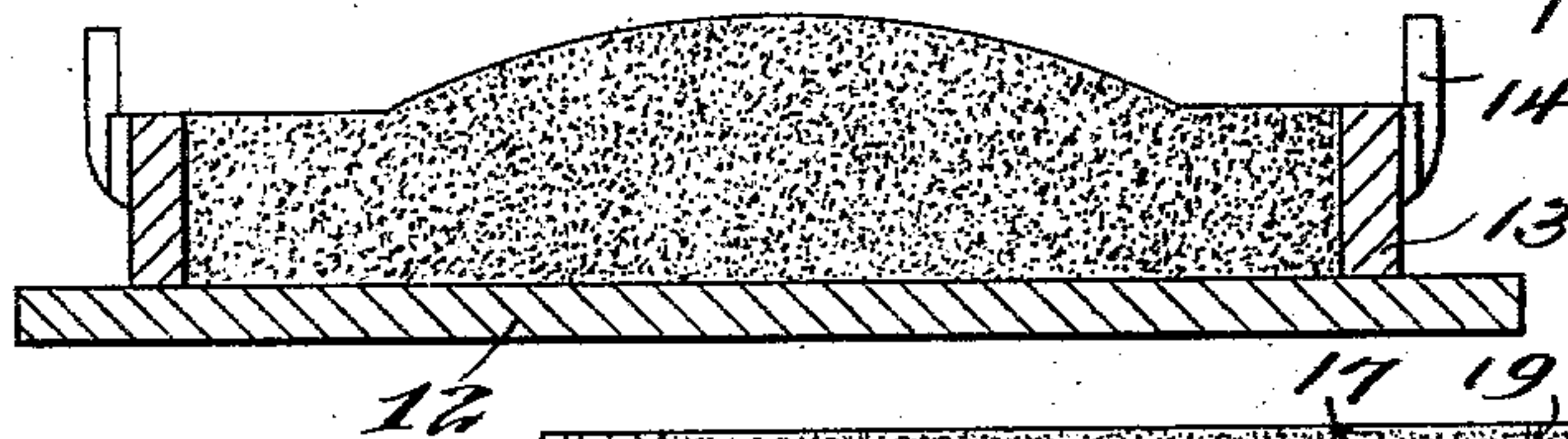


Fig. 9.

Witnesses,

E. J. Mann.

A. N. Graves.

Inventor,

James R. Cardwell,  
By *Offield Cowley Lenthum*

*Atty's*



# UNITED STATES PATENT OFFICE.

JAMES R. CARDWELL, OF CHICAGO, ILLINOIS.

## METHOD OF MAKING BRAKE-SHOES.

SPECIFICATION forming part of Letters Patent No. 753,040, dated February 23, 1904.

Application filed May 25, 1903. Serial No. 158,663. (No model.)

*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 Methods of Making Brake-Shoes, of which the following is a specification.

This invention relates to an improved method of making brake-shoes, wherein the main body is formed of cast metal and to which main body is united in the operation of casting one or more complementary parts.

The salient objects of the invention are to simplify the operation of molding and casting, to provide a method of carrying out these operations which insures greater accuracy, of placing the complementary part or parts within the mold and thereafter casting the latter into the main body, to provide an improved method wherein the operation of seating the complementary part or parts within the mold-flask in proper relation to the main body-mold serves to secure the complementary part or parts in position without the provision of special means for temporarily holding said parts, and in general to provide an improved method of the character referred to.

To the above ends the invention consists in the matters hereinafter described, and particularly pointed out in the appended claims.

In the drawings, Figure 1 is a perspective view of a complete brake-shoe formed in accordance with the 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 up-

per 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) and 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 the 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, it has never heretofore been proposed 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 thereafter 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 into position for casting said parts 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 inaccurate. In my present invention I overcome these objections.



One form of brake-shoe for the making of which my improved method is well adapted is that shown in the drawings, in which—

1 designates as a whole a main body, which may be of the usual conformation as to its general features and is of cast metal.

2 designates a reinforcing strip or plate arranged to extend longitudinally of the back and in casting so united with the body of the shoe that the outer surface of the strip is approximately flush with the outer surface of the shoe-body 1. At each end said reinforcing member is provided with an integral struck-up lug portion 3, which forms a holding-lug for engagement with the brake-head.

4 designates the attaching-lug, which is separately formed of wrought metal or steel and is of approximately inverted-U shape, the attaching-lug 4 and the reinforcing-strip 2 constituting the complementary parts. The loop-shape or attaching lug is arranged to extend transversely of the shoe-body, so that the opening thereto is longitudinally disposed for the purpose of receiving the attaching-key of the brake-head. The two arms 5 and 6 of the lug are made of sufficient length to extend below the under surface of the reinforcing member and a substantial distance into the cast body of the shoe, the extremities of said arms being provided with holes or recesses 7, into which the molten metal will flow, so as to integrally and reliably secure the lug in position, as best shown in Fig. 3.

As an important feature contributing to the carrying out of the method constituting my invention 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 therein. Desirably those portions of the arms of the lug which are to be embedded within the body of the shoe are constructed to extend parallel with each other, while the parts external to the shoe-body converge outwardly more or less, as shown in Fig. 3, obtuse angles 8 being formed at points coincident with the outer surface of the reinforcing member, which angles are of assistance in determining the relative adjustment of the lug and reinforcing member. 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 complementary parts omitted—that is to say, the pattern is provided in its back with a recess to receive the reinforcing member and with other recesses at each side of the reinforcing member of the recess adapted to

receive the inwardly-projecting ends of the lug-arms. These latter recesses 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 8, hereinbefore referred to, are not essential.

Describing now the method of molding a shoe, and referring more particularly 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 4—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.

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.

I claim as my invention—

1. A method of making brake-shoes having a main cast body and a separately-formed open loop-like attaching-lug cast therein, which consists in forming a pattern of the main body of the shoe provided with cavities conformed to, and adapted to receive the cast-in portions of the lug, assembling therewith said attaching-lug to form a complementary part of the pattern, forming a mold of the combined parts and in so forming the mold, covering and filling all parts of the lug which remain outside of the completed shoe-body and tamping the molding-sand firmly so as to anchor the lug therein, withdrawing the pattern of the main body, leaving the lug anchored in position in the mold, and finally filling in the metal to form said main body.

2. A method of making brake-shoes having a main cast body, a separately-formed open loop-like attaching-lug and a separately-formed reinforcing back strip, which consists in forming a pattern of the main body of the

shoe provided with cavities conformed to, and adapted to receive, the cast-in portions of the lug and said reinforcing back strip, securing together said lug and reinforcing back strip and assembling these with the pattern of the main body to form a complete pattern, then placing an anchor in position to support the attaching-lug and tamping in covering and filling all parts of the lug and anchor and pattern, except only such portions of the lug as are to be cast in, thereby forming a mold of the combined parts, then withdrawing the pattern of the main body, leaving the complementary parts anchored in position in the mold, and finally filling in the metal which forms said main body.

3. A method of making brake-shoes having a main cast body, a separately-formed loop-shaped attaching-lug and a separately-formed reinforcing back strip, both attached to said main body by being cast in, which consists in forming a pattern of the main body of the shoe provided with cavities conformed to, and adapted to receive the cast-in portions of the lug and reinforcing-strip, wedging the back strip between the arms of the attaching-loop and combining said complementary parts with the pattern of the main body to form a complete pattern, inserting an anchor through the lug and forming a mold of the combined parts, withdrawing the pattern of the main body and leaving the lug and back strip anchored in position in the mold, inverting the mold, and finally filling in the metal to form the main body.

JAMES R. CARDWELL

Witnesses:

E. C. PAGE,  
ZON ELLA DURBIN.