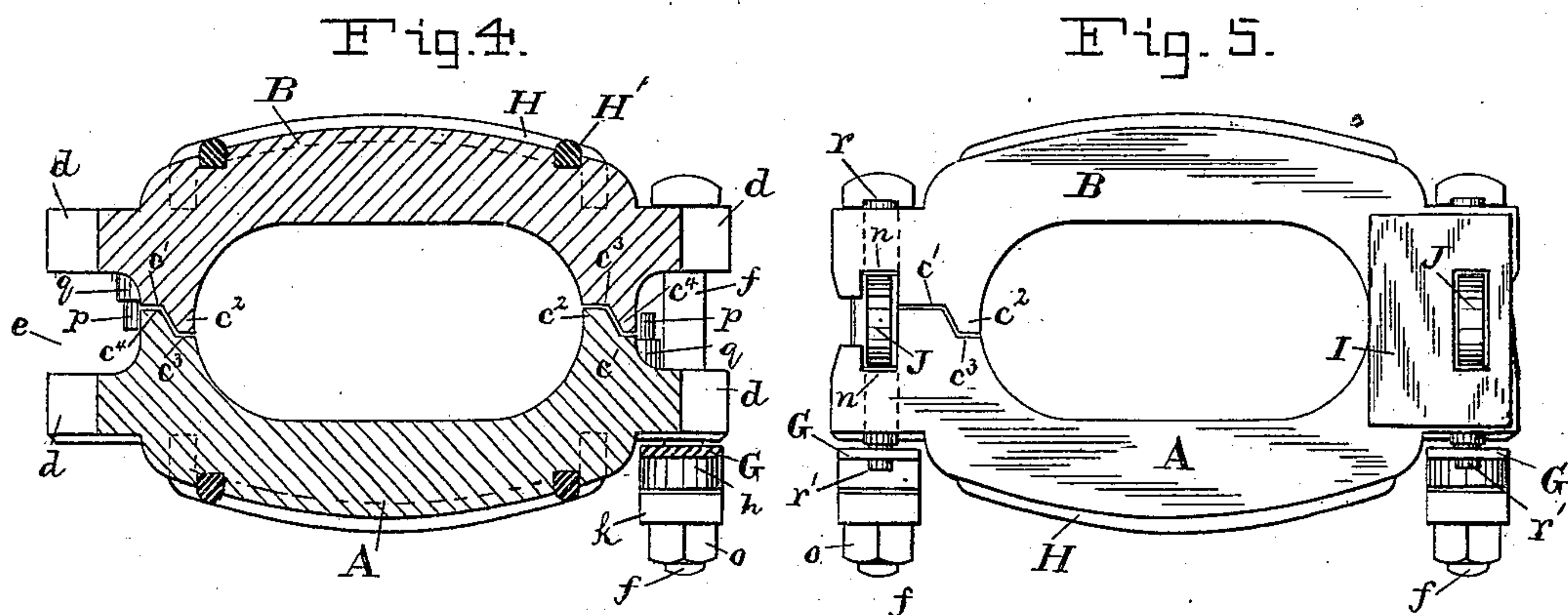
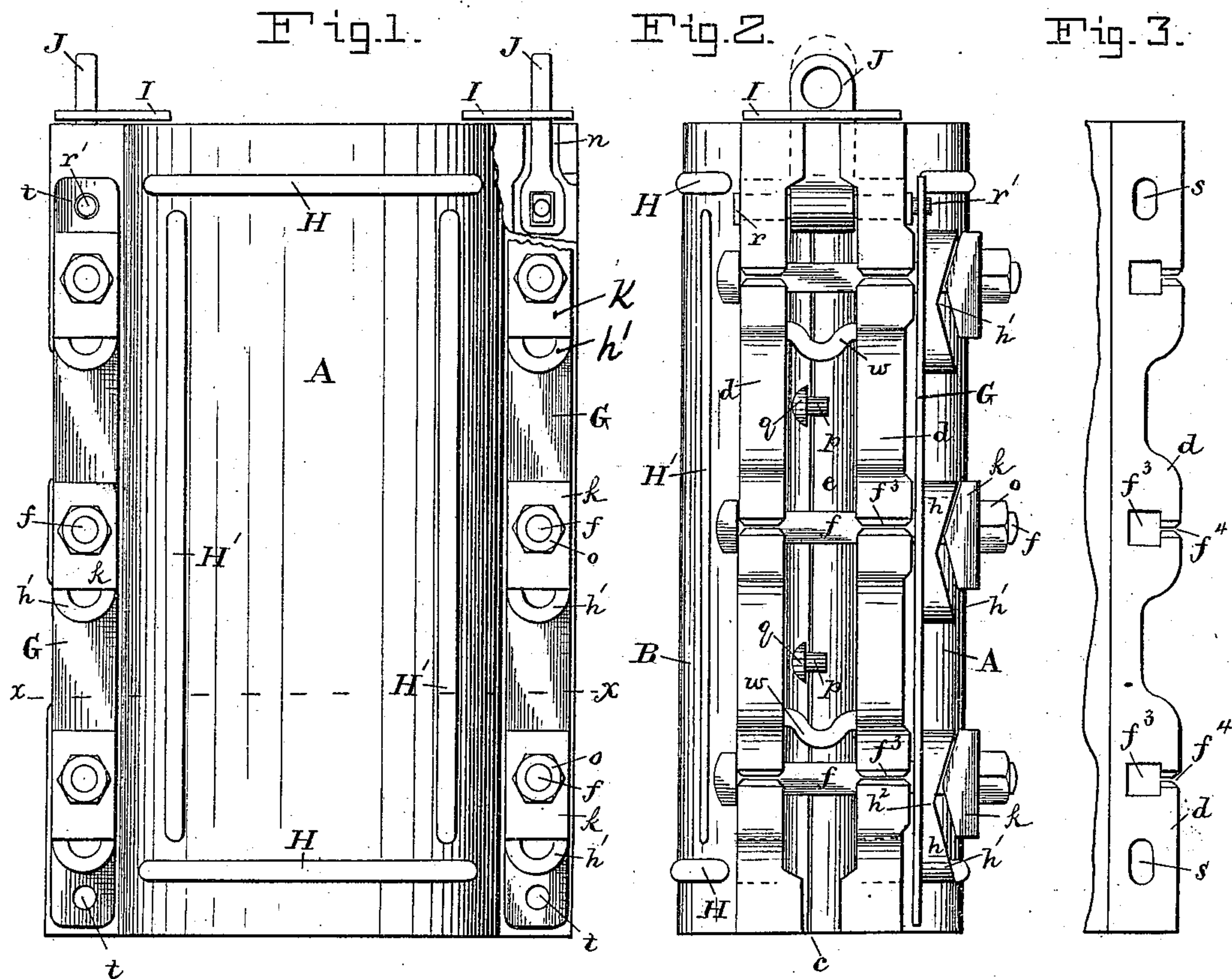


J. SABOLD.

INGOT MOLD.

No. 354,743.

Patented Dec. 21, 1886.



WITNESSES:

A C Eader  
John E. Morris.

Fig. 6.



INVENTOR:

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ATTORNEY.

(No Model.)

2 Sheets—Sheet 2.

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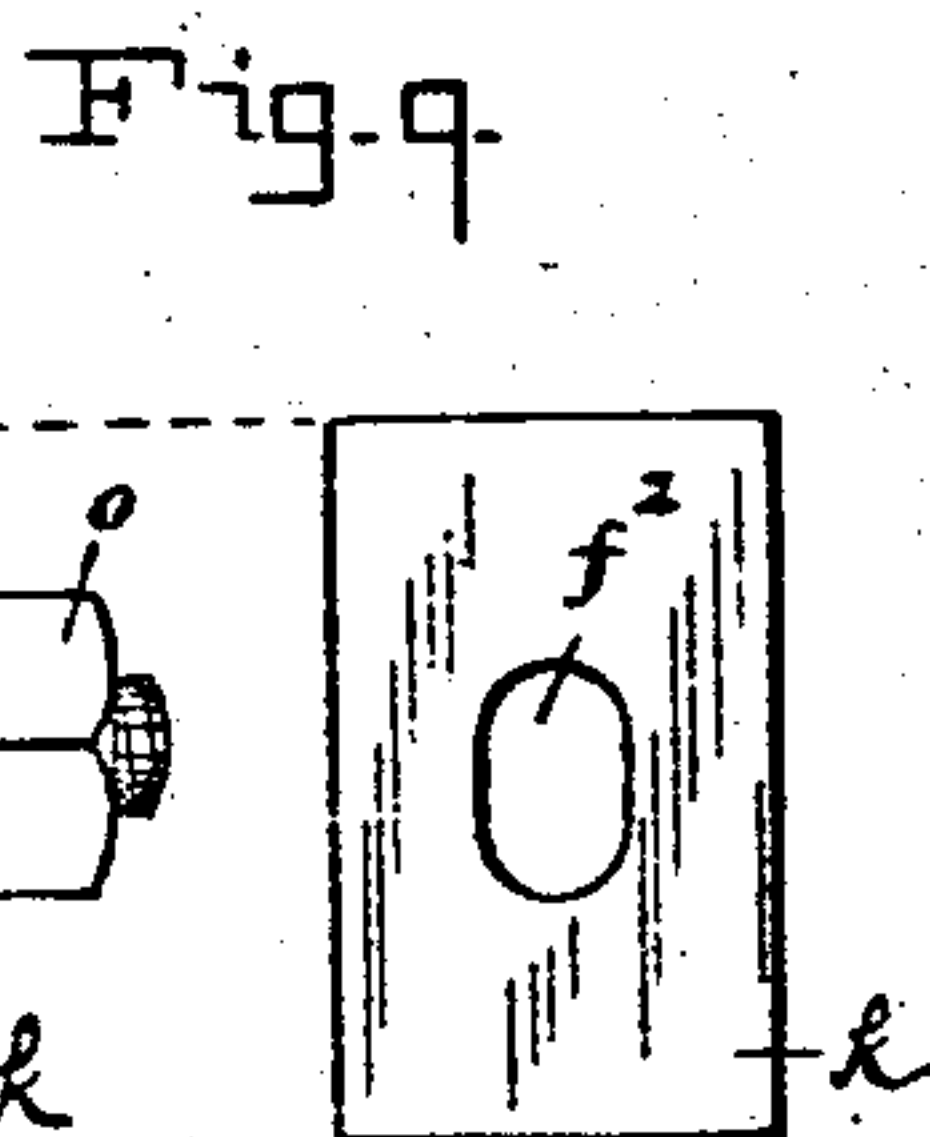
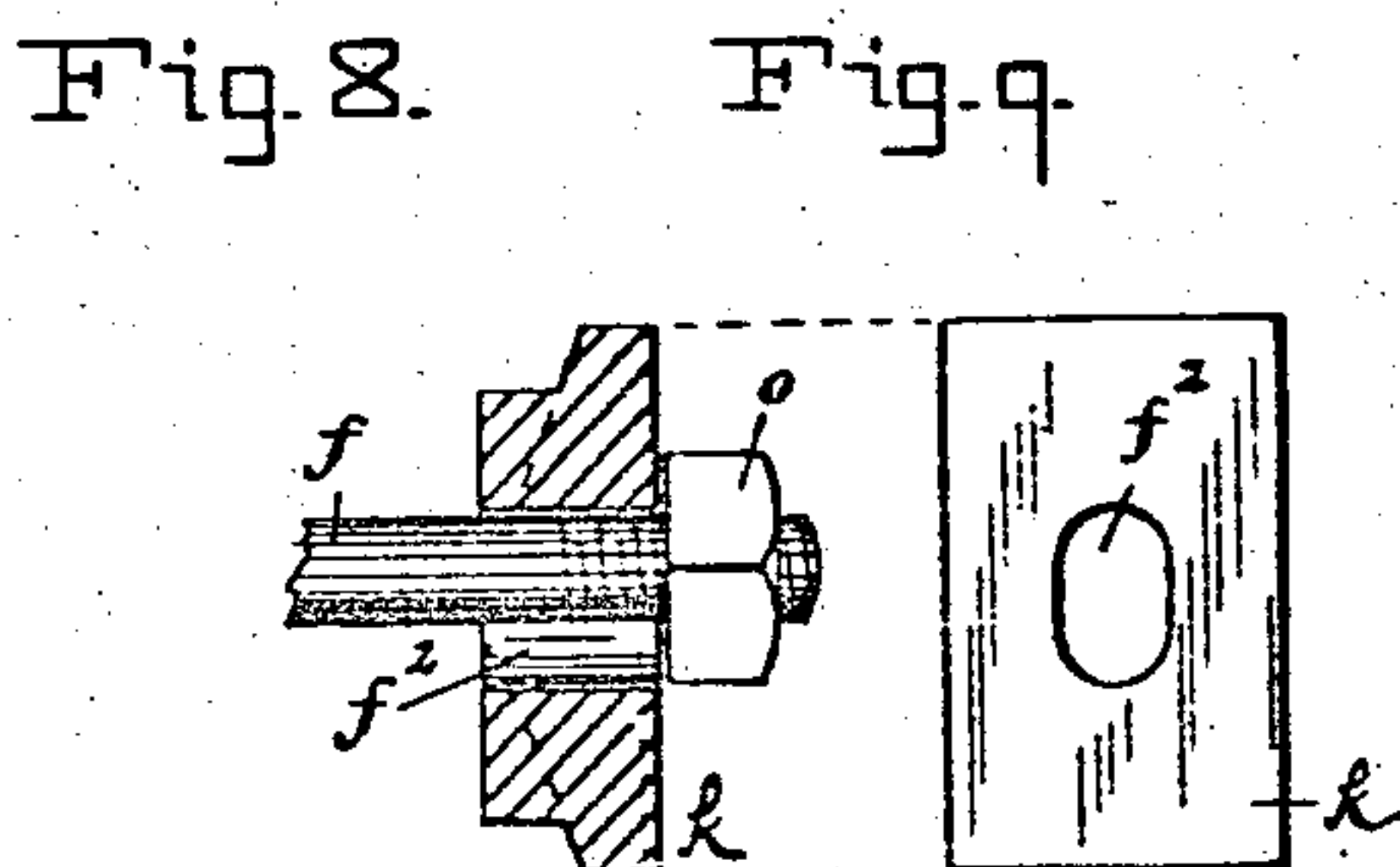
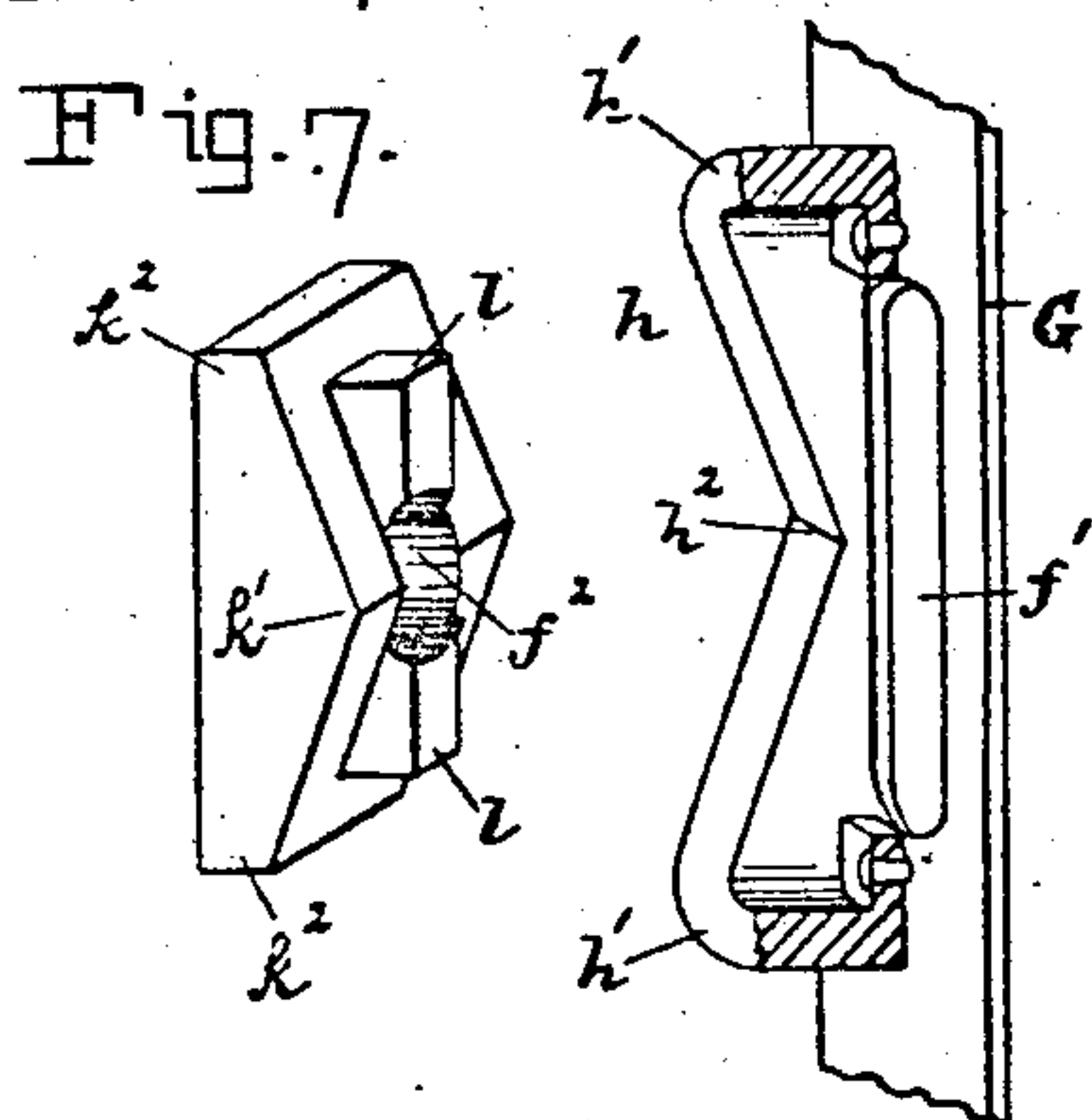


Fig. 10.

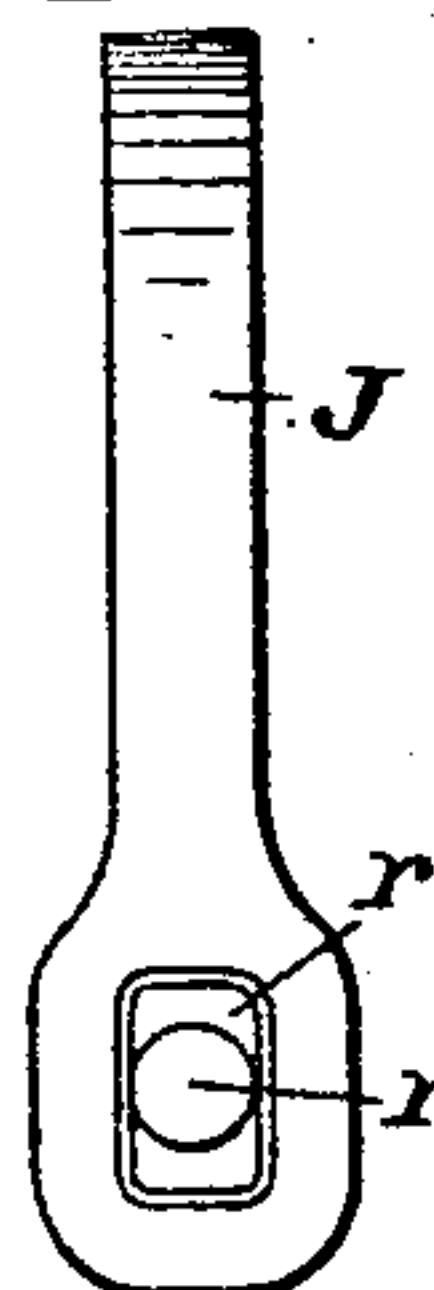


Fig. 11.

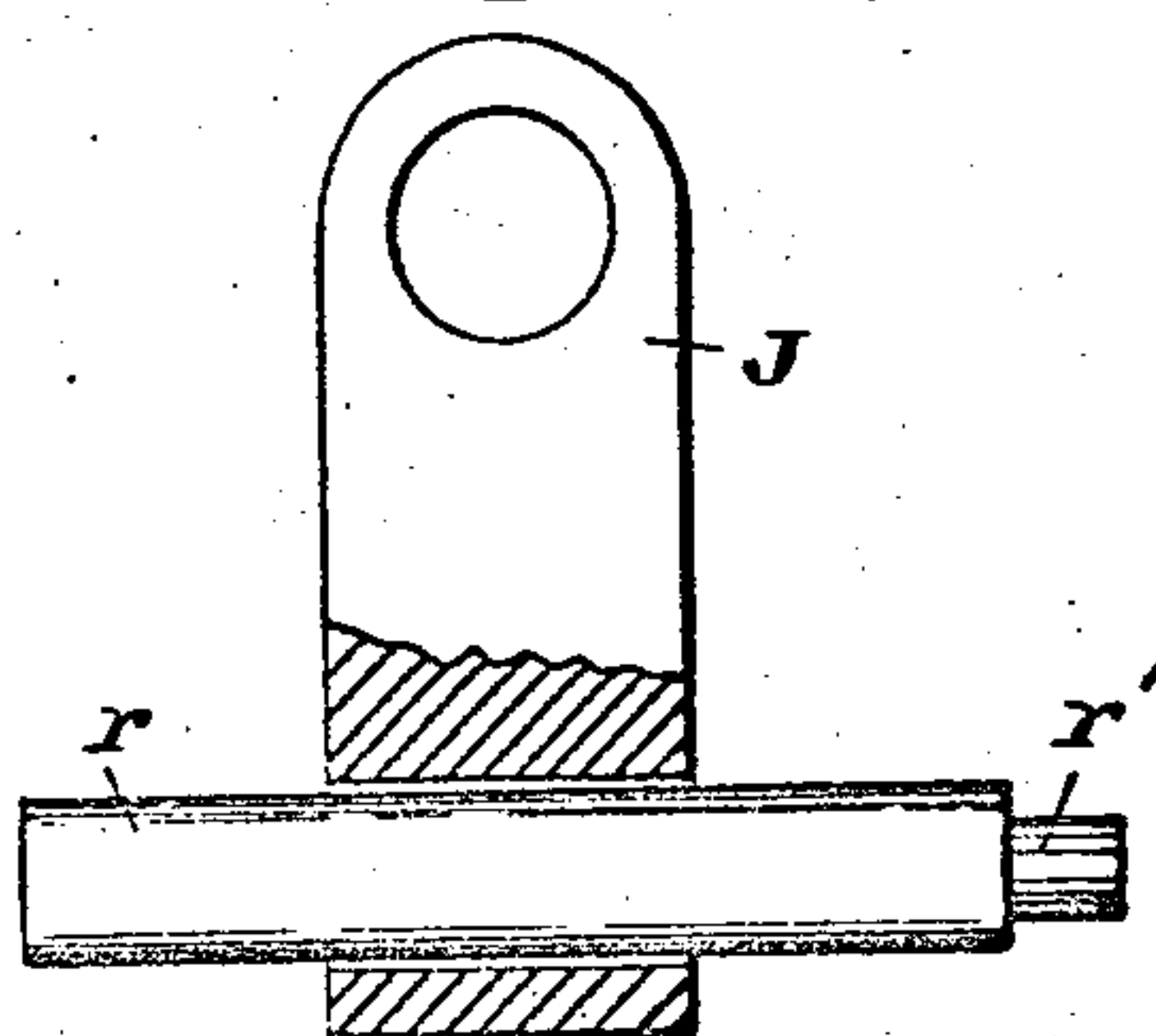


Fig. 12.

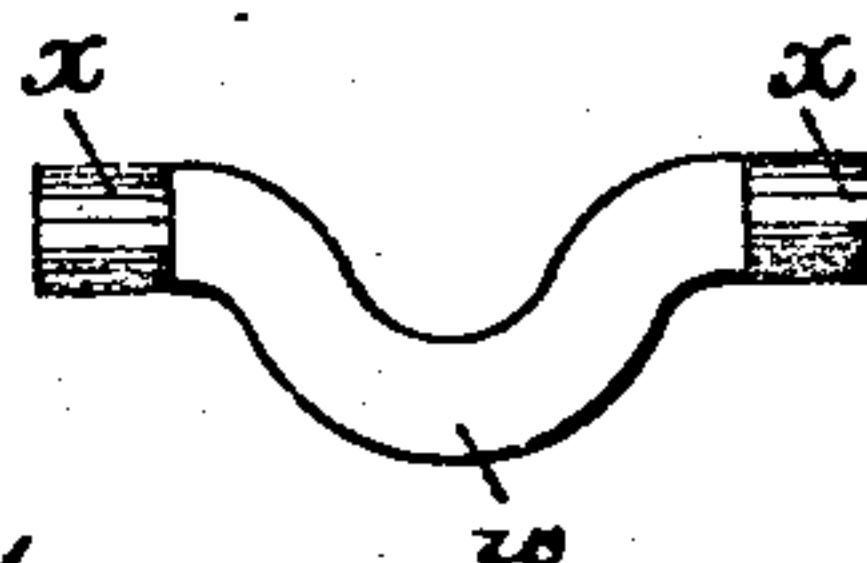


Fig. 13.

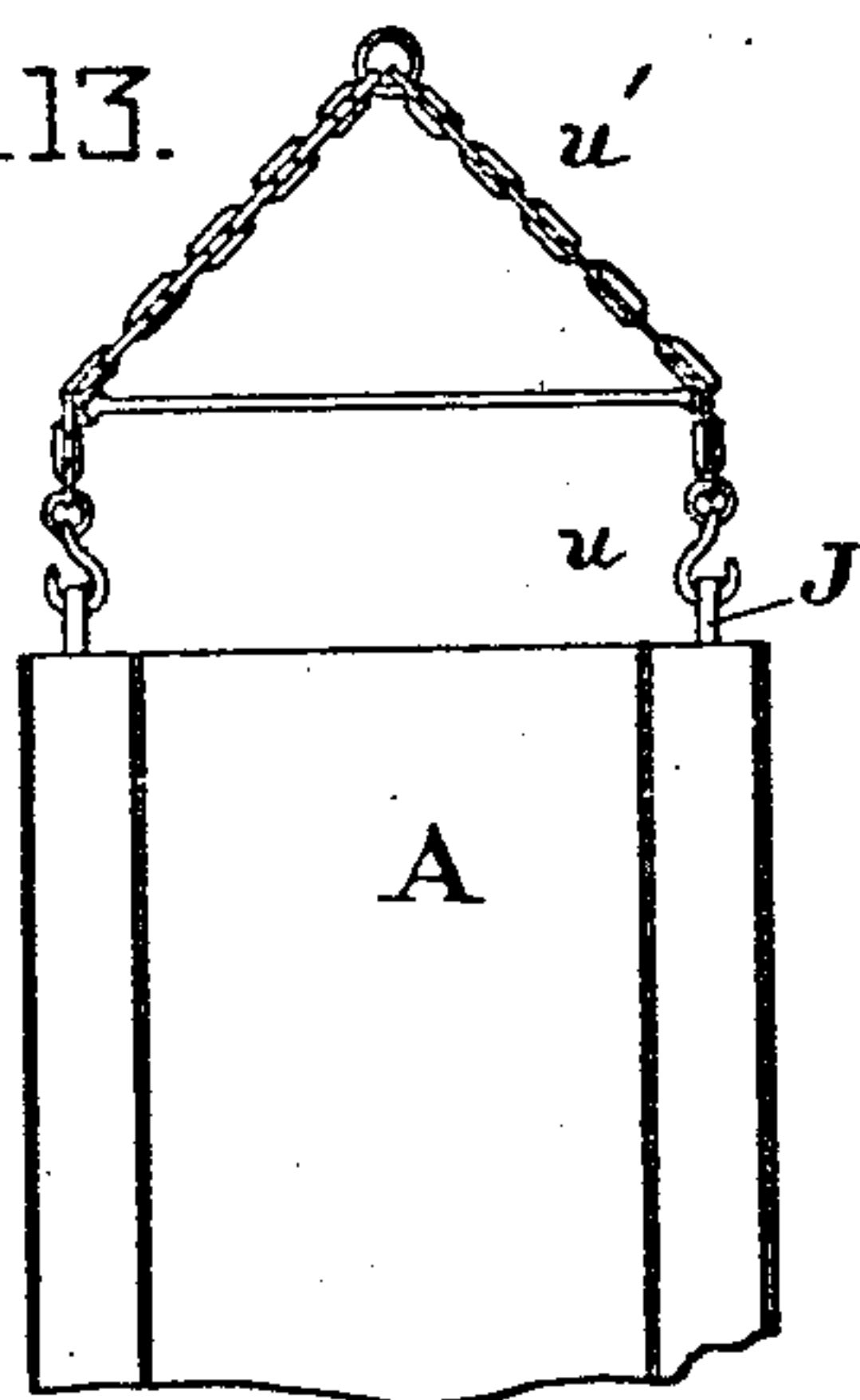


Fig. 14.

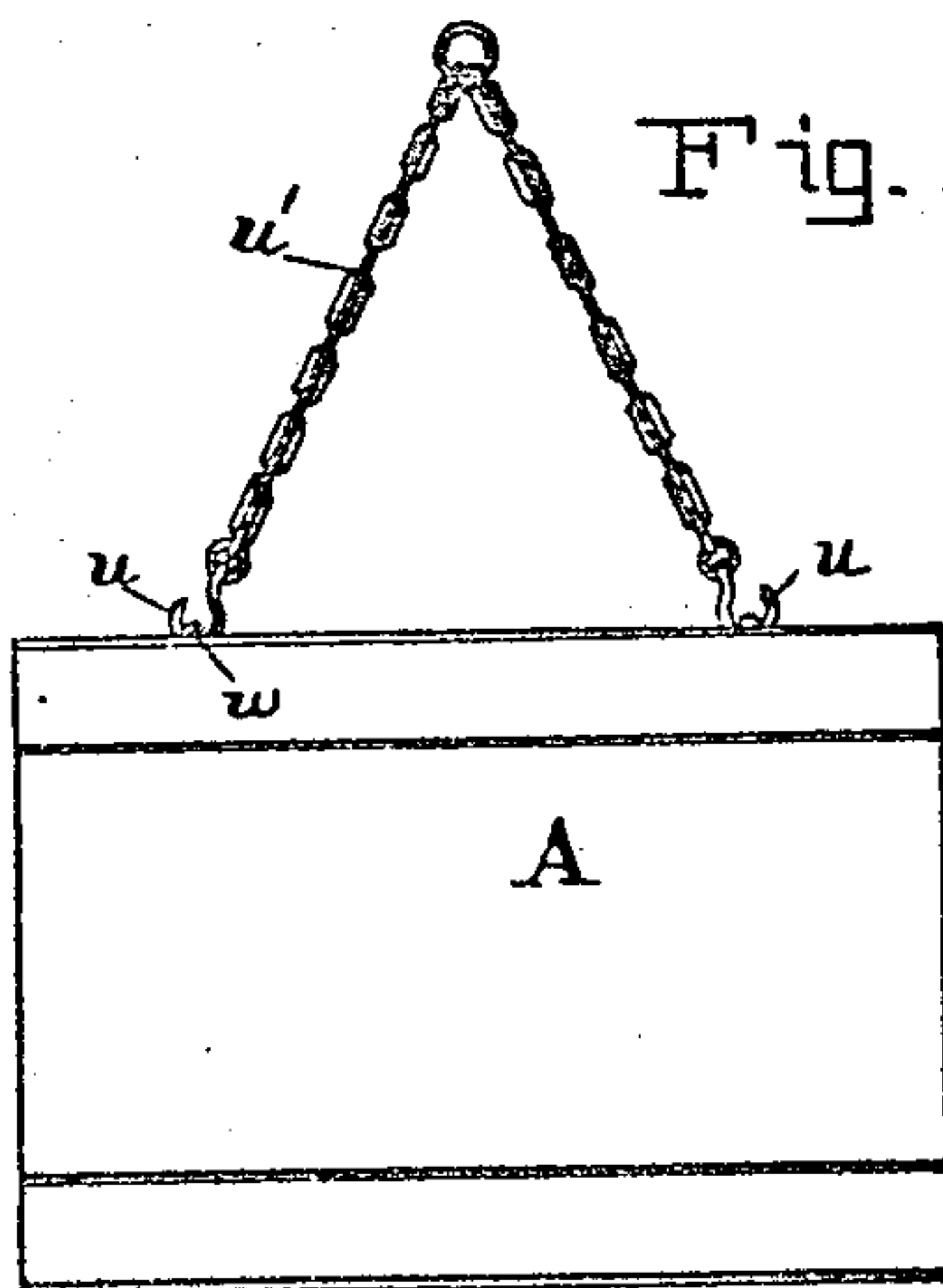
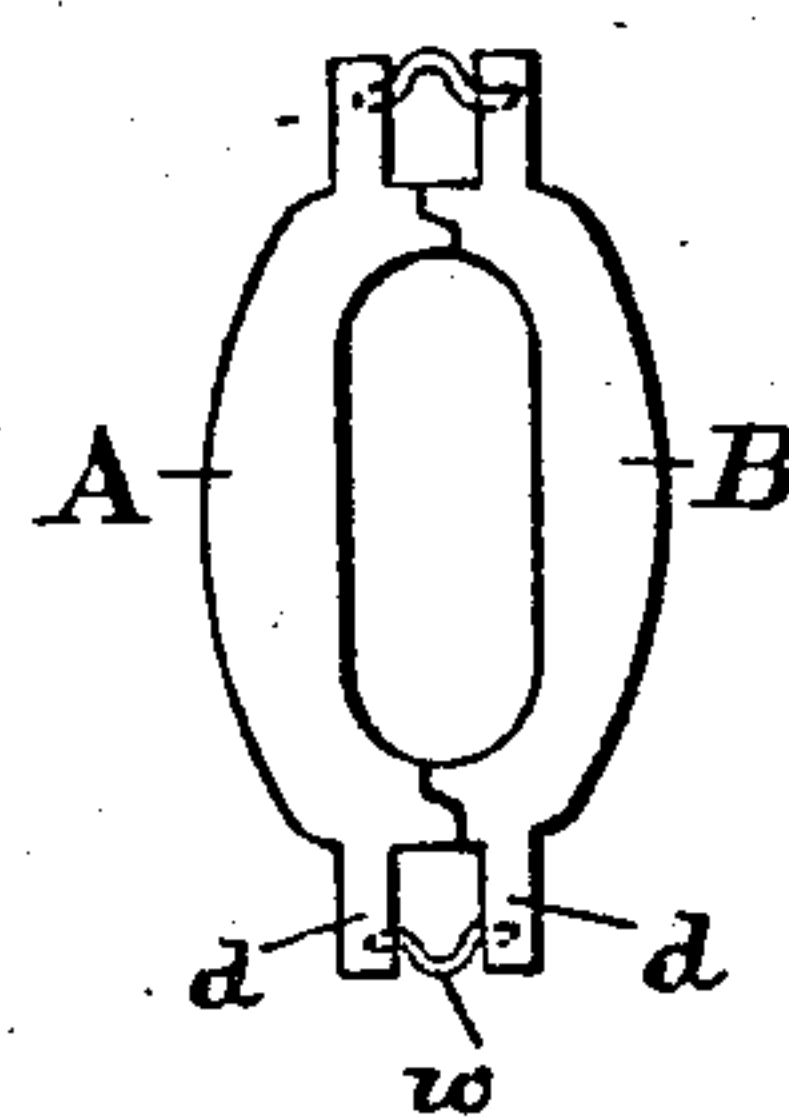


Fig. 15.



WITNESSES:

A. C. Eader,

John E. Morris.

INVENTOR:

John Sabold

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Chas B. Mann

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# UNITED STATES PATENT OFFICE.

JOHN SABOLD, OF LITTLE OLEY, PENNSYLVANIA.

## INGOT-MOLD.

SPECIFICATION forming part of Letters Patent No. 354,743, dated December 21, 1886.

Application filed October 6, 1886. Serial No. 215,441. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN SABOLD, a citizen of the United States, residing at Little Oley, in the county of Berks and State of Pennsylvania, have invented certain new and useful Improvements in Ingot-Molds, of which the following is a specification.

This invention relates to improvements in ingot-molds, and is illustrated in the accompanying drawings, in which—

Figure 1 is a broad side view of the mold, showing the upper right-hand corner broken away for the purpose of better illustration. Fig. 2 is a narrow side view of the mold. Fig. 3 is an elevation of the flange on each mold-section. Fig. 4 is a horizontal cross-section of the mold on the line  $xx$ . Fig. 5 is a top end view of the mold. Fig. 6 is a view of the shield-plate. Figs. 7, 8, and 9 are detail views of the improved clamping device. Figs. 10 and 11 are views of the end-lift ears. Fig. 12 is a view of one of the side-lift bars. Figs. 13 and 14 illustrate the manner of lifting the mold by the end and side, respectively. Fig. 15 is an end view of the mold showing the side-lift bars in position.

The letter A designates one section and B the other of a metal mold. These two sections are in all respects alike and may be produced by a cast taken from the same pattern. These two sections unite at the narrow sides, which are opposite each other and are separable at the uniting edges  $c$  of said narrow sides. By reference to Fig. 3 it will be seen that the uniting edges are rabbeted in a special manner. This rabbet consists of an angular groove,  $c'$ , and a tongue,  $c''$ .

Each section A B has an angular groove and a tongue on each of its uniting edges, but those at one uniting edge have a reversed relative position from those at the other edge. Each mold-section at one edge has the angular groove  $c'$  on the outer side and the tongue  $c''$  on the inner side, and at the other edge the angular groove  $c''$  is on the inner side and the tongue  $c'$  on the outer side. It will thus be seen that while the tongues of one mold-section fit in the grooves of the other section the position of these parts at one uniting edge is reversed from those at the other edge, whereby any slight variation, like a warp or twist at the edges, due to the shrinkage of the casting,

will not prevent a close fit or union of the two mold-sections, inasmuch as the bolts will draw the parts together.

Each mold-section has at one of its narrow sides one or more wrought-iron lugs or pins,  $p$ , which are secured by being cast into the metal forming the mold, the said pins being embedded in a boss,  $q$ . These lugs or pins  $p$  are on the narrow side only which has the angular groove outermost, (see Fig. 3,) and each pin projects horizontally and across the uniting edge  $c$  and laps over onto the next mold-section. As the pins  $p$  are made of wrought-iron, their projecting ends may be bent slightly toward or away from the angular groove by slight blows made with a hammer, and thereby made to fit properly in contact with the tongue of the next mold-section.

The two narrow sides of each mold-section A B are each provided with a flange,  $d$ , which may extend continuously from top to bottom, or may extend at intervals only, with spaces between. The flange  $d$  on each section is a short distance away from the uniting edge  $c$ , whereby a separating-space,  $e$ , is left between the two flanges which are on the same side of the mold. The flanges have bolt-holes  $f^s$  for the bolts  $f$ , and also have on the outer side a slit or slot,  $f^t$ , at each bolt-hole. This slot provides against any detrimental effect on the flange, such as cracking, when sudden expansion or shrinkage ensues.

A feature of this invention is the double-inclined or double-wedge clamp device used in connection with the flanges  $d$  and bolts  $f$ , for quickly loosening the two mold-sections, either to permit the extreme expansion of metal that ensues when all the parts are highly heated or to allow the ingot-casting to be removed from the mold. The object of making these devices double is to provide for the mold being reversed end for end or turned upside down.

The double-wedge clamp device comprises two movable bars or drop-bars, G, one at each narrow side of the mold-section. Each drop-bar G is provided on one side with one or more double-inclined blocks,  $h$ , the inclination of which is in the direction of the length of the bar. The two highest parts,  $h'$ , of the inclination are at the upper and lower end, and the lowest part,  $h''$ , of the inclination is at the



center between the said two high ends. The double-inclined blocks (see Fig. 8) are partly divided up and down the center by a slot,  $f'$ , which also opens entirely through the bar G.

5 Upon each bolt  $f$  is a loose wedge,  $k$ , the highest part,  $k'$ , of the inclination of which is at the center, and from thence it inclines or tapers both ways to the two thin ends  $k^2$ . The double wedge  $k$  has at its center an elongated  
10 bolt-hole,  $f^2$ , (see Fig. 9,) whereby when it is in position on the horizontal bolt  $f$  its center point,  $k'$ , will be below the center of said bolt, and the nut  $o$ , in contact with the straight or flat side of the wedge, will bear mostly on the  
15 upper part, and thereby keep the upper incline or upper wedge part in contact with the block  $h$ . By virtue of the elongated bolt-hole the double wedge  $k$ , when the mold is reversed end for end, may drop on the bolt  $f$ , so as to  
20 bring its other incline in the same relative position on the bolt. It is not essential, however, for the wedge  $k$  to have an elongated bolt-hole. The loose double wedge has a lug,  $l$ , at one or both inclined ends, and its double-  
25 inclined side confronts the double-inclined block  $h$ , and the lugs  $l$  on the wedge occupy the slot  $f'$  on the block and prevent the wedge  $k$  from turning on the bolt.

In consequence of the repeated heating and  
30 cooling the cast-metal mold-sections A B are liable to crack and burst open. Therefore to provide against injury to the ingot in the event of the mold cracking each cast-metal section has cross-bars H and longitudinal  
35 bars H' of wrought metal embedded in its sides. The ends of each wrought-metal bar are bent to a position at right-angles with the bar and penetrate the cast metal, while the bars between the said ends are partly exposed.  
40 It is obvious the bars, instead of being partly exposed, may be entirely concealed in the body of the cast metal. If the mold-sections crack, these wrought bars serve to prevent a separation of the parts.

45 Shield-plates I are provided to lie on top of the mold, as shown in Figs. 1, 2, and 5, and are secured in position by the lift-ears herein-after referred to.

Two detachable lift-ears, J, are provided  
50 for lifting the mold endwise to allow the ingot to drop out, and also to lift the drop-bar G and loosen the clamps. Each lift-ear is so constructed and attached to the mold as to accomplish these two ends. Each lift-ear fits loosely  
55 in two grooves,  $n$ , one of which is on each flange,  $d$ , of the mold near the end, the two grooves  $n$  are on sides of the flange which confront each other, and the lower end of the ear is too thick to enter the said grooves.  
60 Each ear J is attached to a cross-bar,  $r$ , which extends horizontally across the separating-space between the two flanges and loosely occupies a slot,  $s$ , in each flange, as shown in Fig. 3. This slot  $s$  extends in a direction up  
65 and down, and normally the ends of the cross-bar  $r$  rest in the lower end of the said slots. Therefore upon lifting the ears J the cross-bar

$r$  will be raised in the slots. This construction of grooves  $n$  and a lower end on the ear too thick to enter said grooves causes a portion of the lifting-strain to come directly on  
70 said thick lower end, and thereby relieves the cross-bar and prevents it from bending. The ears are detachable, and have position at the uniting edges  $c$  of the two mold-sections,  
75 and the cross-bar which secures each ear occupies a slot in different mold-sections. Thereby when the mold is lifted the two sections are free to spread apart and allow the ingot to drop out. One end of each cross-bar  
80  $r$  has a projecting point,  $r'$ , and each end of the drop-bars G has a hole,  $t$ , and the said projecting point occupies one of these holes. The parts are so proportioned and arranged that the double-inclined block  $h$  will be resting  
85 against or crowded down on the wedge-block  $k$  at the same time that the cross-bar  $r$  is seated in the lower end of the slots  $s$ . When the hooks  $u$  on a chain,  $u'$ , are engaged with the lift-ears J, as in Fig. 13, the first effect of  
90 lifting is to raise the drop-bars G a certain distance—that is to say, until the center part,  $h^2$ , of the blocks  $h$  have position coincident with the center part,  $k'$ , of the other blocks,  $k$ —whereupon the clamp device  $f h k$  is relaxed  
95 sufficient to allow the two sections A B of the mold to separate or slightly spread apart, so that the ingot is loose in the mold, and then the second effect of continued lifting by the ears J is to raise the mold, upon doing which  
100 the ingot will drop out.

The shield-plates I, before described, have a slot,  $v$ , which is occupied by the lifting-ears J. These latter secure the plates in position, and  
105 said plates prevent the molten metal from reaching the grooves  $n$  and cross-bar  $r$ , where the ears are attached.

The narrow sides of the mold are provided with two lift-bars,  $w$ , the ends  $x$  of which fit loosely in the flanges  $d$ . These lift-bars are  
110 curved at the center, and serve, as shown in Fig. 14, to receive the hooks  $u$  of a chain,  $u'$ , whereby the mold may be lifted sidewise. This is frequently necessary.

Molds of this class burn or become damaged  
115 at the bottom first, and when one end has become injured to such an extent as to be no longer serviceable for the bottom I provide, by the construction here shown of the clamp  
120 device, for reversing the mold end for end, or turning it upside down. To do this it is simply necessary to lay the mold down on its flat side, draw out the cross-bar  $r$ , and detach the lift-ears J, and then attach them to the other  
125 end, which may then be raised. Upon reversing the mold the drop-bar G and clamp devices  $f h k$  adjust themselves automatically.

Having described my invention, I claim and desire to secure by Letters Patent of the United States—

1. A mold for ingots, made in two sections, A and B, separable on opposite sides, and each section provided on each of its uniting edges with an angular groove and tongue, and one



section having on the outer side, where the said groove is outermost, a wrought-iron lug or pin, *p*, projecting horizontally and in contact with the tongue of the next section, for the purpose set forth.

2. A mold for ingots, made in two sections, A and B, separable on opposite sides, and each section provided on its separable sides with flanges *d*, in combination with a double-wedge clamp consisting of a block, *h*, next to the flange *d*, said block inclining from the highest part at each end *h'* to the center lowest part, *h''*, between the said ends, and having a central slot, *f'*, a bolt, *f*, and a loose wedge, *k*, mounted on the said bolt, whereby the mold may be reversed end for end or turned upside down, and yet the clamp will work effectually, as set forth.

3. The combination of an ingot-mold having two flanges, *d*, each provided on the side which confronts the other, and near the end of the mold, with a vertical groove, *n*, and having a slot, *s*, below said groove, and a detachable lift-ear, J, having a portion of each edge occupying one of said grooves, and having the lower end too thick to enter the grooves, and provided with a cross-bar whose ends occupy the said slots, for the purpose set forth.

4. The combination of an ingot-mold in two sections, A and B, separable on opposite sides, and detachable lift-ears J, secured at the uniting edges of each side by a cross-bar, which occupies a slot in different mold-sections, for the purpose set forth.

5. The combination of an ingot-mold made in two sections, A and B, and each section provided on its separable side with a flange, *d*, having a slot, *s*, and a space between the said flanges of the two sections, wedge-clamps, each consisting of two inclined blocks confronting each other, and a bolt through the said flanges and inclined blocks, a drop-bar, G, to which one of the inclined blocks of each clamp is attached, and said bar provided with a hole, *t*, and a lift-ear, J, attached to the mold by a cross-bar, *r*, loosely occupying the said flange-slots, and having one end entered in the hole on the drop-bar, for the purpose set forth.

In testimony whereof I affix my signature in the presence of two witnesses.

JOHN SABOLD.

Witnesses:

JOHN E. MORRIS.

JNO. T. MADDOX.