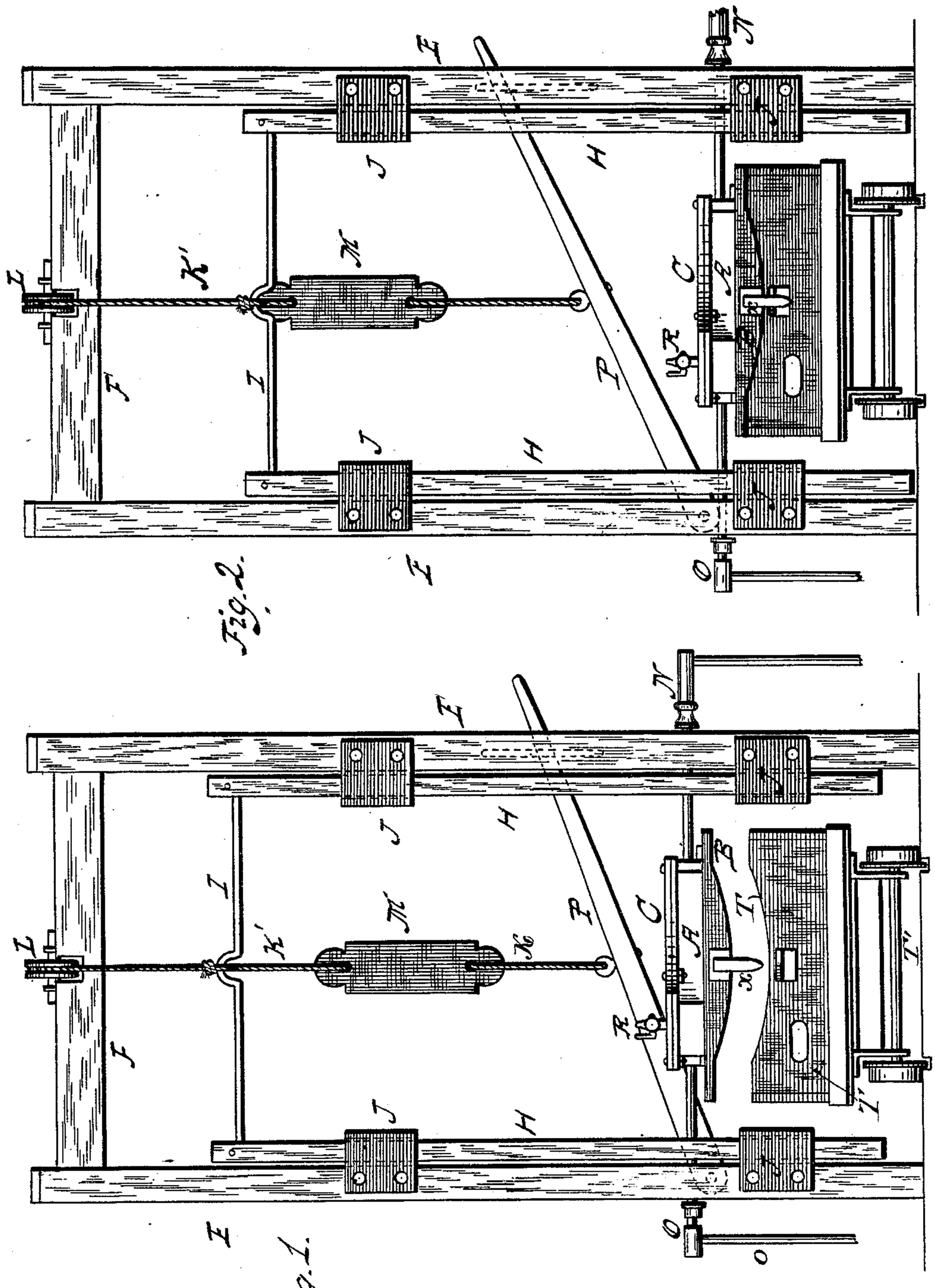
3 Sheets—Sheet 1.

W. A. REID.

Apparatus for Producing Chilled Castings.

No. 231,499. **Patented Aug. 24, 1880.**



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3 Sheets—Sheet 2.

W. A. REID.

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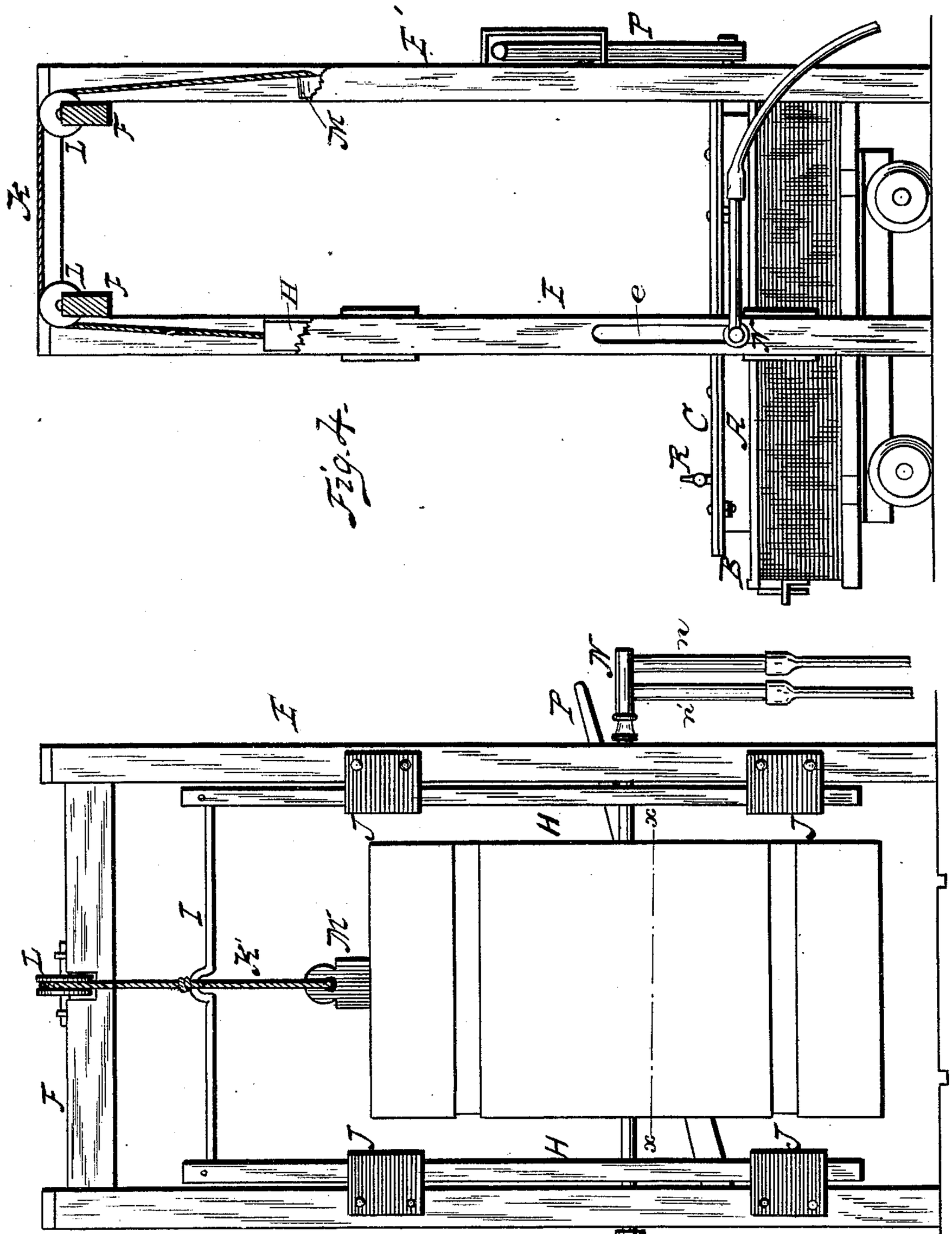

Fig. 4.

Fig. 3.

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Fig. 5.

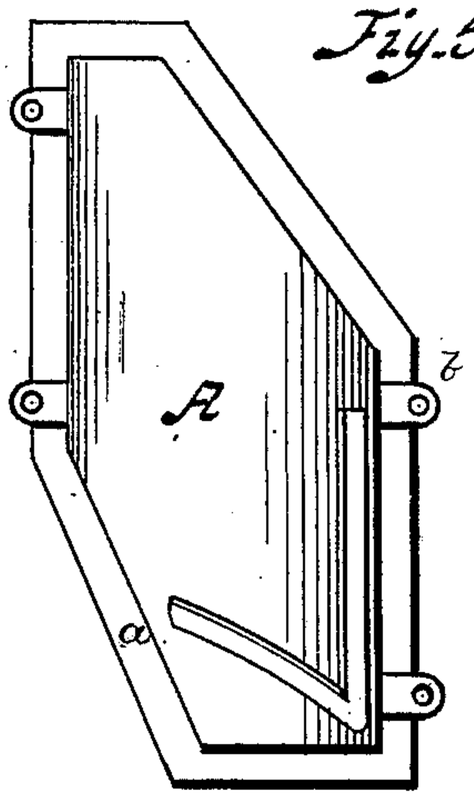


Fig. 6.

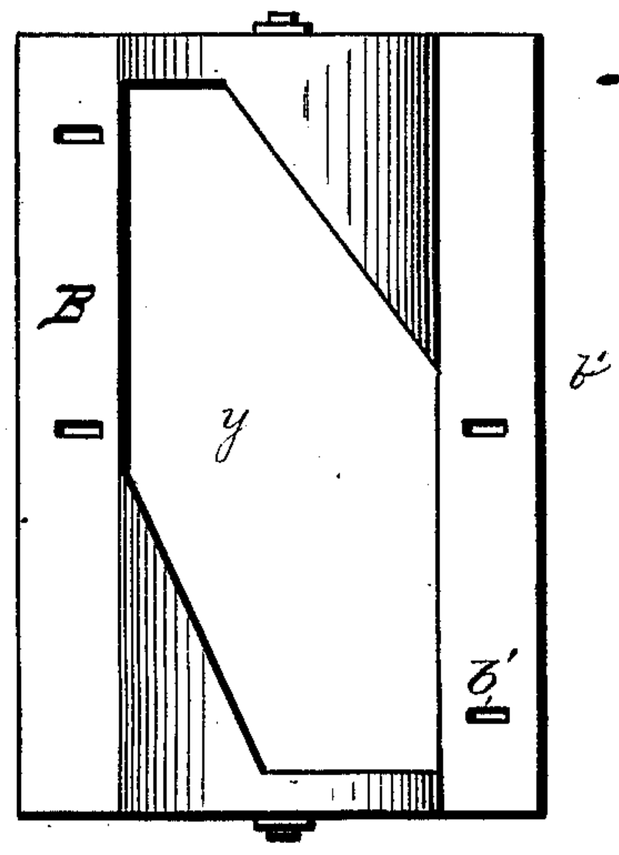


Fig. 11.

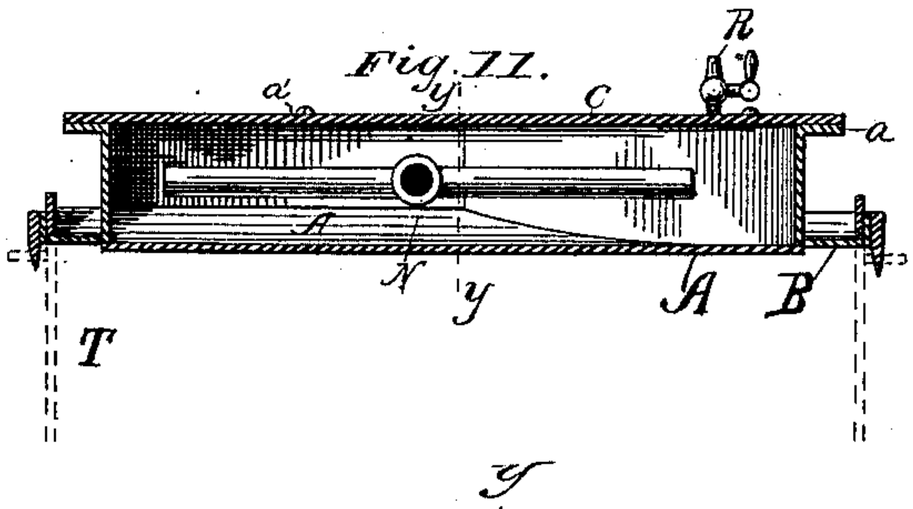


Fig. 16.

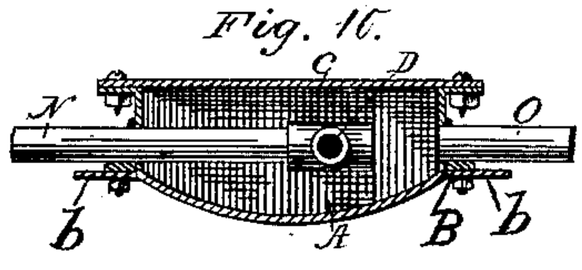


Fig. 7.

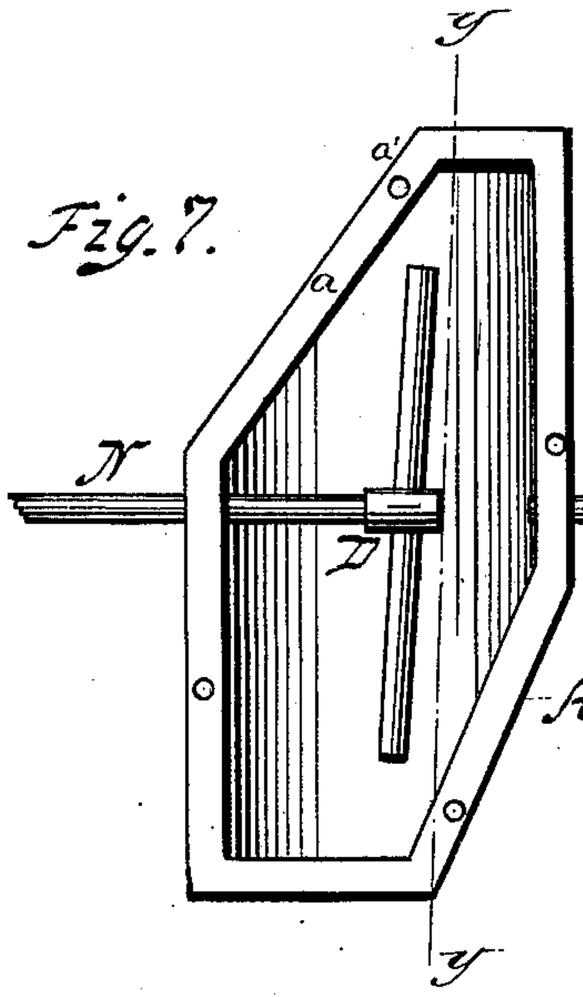


Fig. 9.

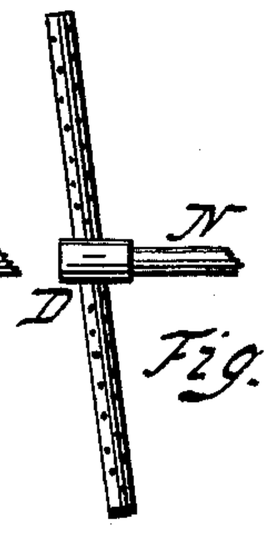
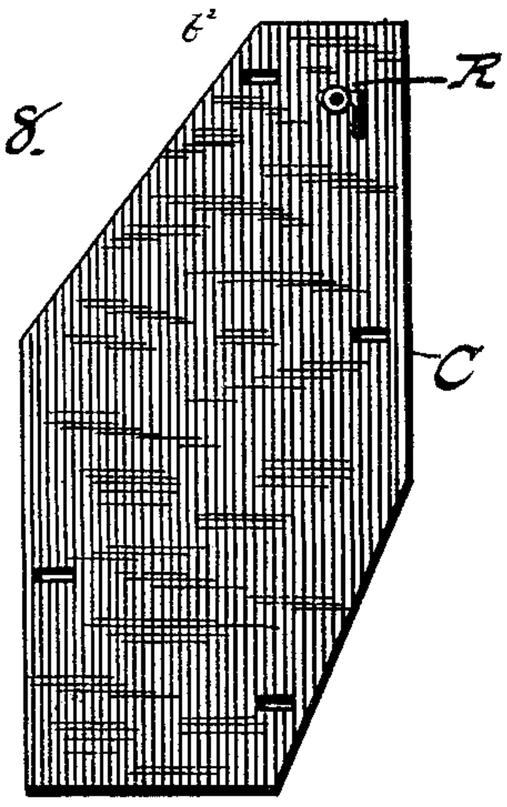


Fig. 8.



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UNITED STATES PATENT OFFICE.

WILLIAM A. REID, OF RACINE, WISCONSIN, ASSIGNOR TO WM. S. BUFFHAM, THOMAS DICKINSON, GEORGE GORTON, AND THOMAS H. DAVIS.

APPARATUS FOR PRODUCING CHILLED CASTINGS.

SPECIFICATION forming part of Letters Patent No. 231,499, dated August 24, 1880.

Application filed January 5, 1880.

To all whom it may concern:

Be it known that I, WILLIAM A. REID, of Racine, in the county of Racine and State of Wisconsin, have invented a new and useful Improvement in Apparatus Used in the Process of Producing Chilled Castings, of which the following is a specification.

My invention relates to that class of apparatus employed in making castings which are chilled on one side only, in which the chill is formed of a pan or chamber to which an attemperating medium is supplied; and my invention consists, first, in constructing the cope and chill of separate pieces of cast metal and uniting them together by screw-bolts passing through elongated holes; second, in the perforated pipe or pipes placed within the chill-chamber, contiguous to the bottom thereof, to which the attemperating medium (steam and water) is supplied alternately or simultaneously, as desired, through a single supply-pipe; third, in supporting the chill-chamber upon hollow trunnions journaled in a vertically-movable frame; fourth, in the main frame and the mechanism for raising and lowering the chill-chamber; fifth, in details of construction hereinafter more particularly described and claimed.

In the accompanying drawings, which form a part of this specification, Figure 1 is a front elevation, showing the cope raised from the drag. Fig. 2 is a front elevation, showing the cope in position upon the drag. Fig. 3 is also a front elevation, showing the flask in vertical position ready to receive the molten metal. Fig. 4 is a side elevation with a portion of the main frame broken away to more clearly show the elevating mechanism. Figs. 5, 6, and 8 show, respectively, the chill, the flange, and the cover detached from each other. Fig. 7 is a plan of the chill-chamber with the cover removed, showing the trunnion and the distributing-pipe. Fig. 9 is a detail view of the under side of the distributing-pipe, showing the perforations therein. Fig. 10 is a section on line *y y* of Fig. 11, and Fig. 11 is a longitudinal section of the cope and flange.

The main or supporting frame is composed of the four upright posts E E′, secured together by the cross-pieces F. The posts E have slots *e* in them, through which the hollow trunnions pass, and in which they move when the cope is raised and lowered. The post E′ is provided with a loop, in which one end of the lever P plays, the other end of the lever being pivoted to the opposite post. A rope or chain, K, attached to this lever is fastened to one end of the counterpoise M. Fastened to the other end of the counterpoise M is the rope or chain K′, which passes over the pulleys L, journaled in the cross-pieces F, and attaches to the cross-rod I of the vertically-movable frame, which latter is composed of this cross-rod I and the upright pieces H. This frame moves in the stationary boxes J, secured to the upright posts E, when operated by the lever.

The cope is formed of three pieces of cast-iron. The chill proper, A, is cast in the form of a pan, with the outside of its bottom shaped to correspond with the outline of the article or thing to be cast, (in this instance, the mold-board of a plow,) and it is provided with a flange, *a*, having perforations *a′*, and also with perforated lugs or ears *b*.

The flange B is cast in the form shown clearly by Fig. 6 of the drawings, with the opening *y* to fit the chill, and with elongated slots *b′*. It is also provided with the guide-catch *x*. (Shown in Fig. 1.)

The cover C is cast in the form shown in Fig. 8, to fit the chill A, and is also formed with elongated slots *b″*, and it is provided with the petcock R near its upper end. These parts, when secured together, form the cope, which is suspended, as shown in Figs. 1 and 2, in the frame by means of the hollow trunnions N and O, which pass through the slots *e* in the upright posts E and through the parts H of the movable frame, in which latter they take their bearings.

The trunnion N is provided at its outer end with two supply-pipes, *n n′*, which are connected by flexible pipes to steam and water supplies, to be located at any convenient place, suitable cocks being provided at the point where the flexible pipes connect with said supplies to turn on or cut off the flow, as desired. The other or inner end of this trunnion passes through to the inside of the chill-chamber, where it is provided with the cross-pipe D,

which is perforated in its under side with numerous small holes.

By means of the trunnion N and pipes *n n'* both water and steam or other attemperating mediums can be supplied to the chill-chamber through a single pipe entering the said chamber.

The trunnion O acts as the single overflow-pipe, which conveys the water from the chill-chamber and conducts it away through the pipe *o*, attached to it outside of the frame.

The drag T is of ordinary construction and need not be described. It is shown in the drawings as being placed upon the truck T', which should be of a height relative to the vertically-movable frame to permit the cope to swing clear of the drag when the former is raised by the lever and frame, and to rest upon the drag when lowered.

In operation the drag is moved by the truck under the cope, and the latter is let down upon the drag. These parts are then secured together by the catch *x*, or by other suitable means, and the whole raised by bearing down upon the lever P. It is obvious, the flask being thus suspended, that it can be brought to any angle most convenient for pouring in the molten metal. Before pouring the metal into the flask the attemperating mediums should be let into the chill-chamber to secure the proper temperature of the chill, which, preferably, should be done by first turning on the steam to heat the chill. Subsequently, and a short time before as well as during the pouring of the metal, the water is turned on; but, as above stated, this order is not absolutely necessary. The steam and water may be turned on simultaneously and the flow continued before, during, and after the pouring of the metal, as circumstances may require, the purpose in both cases being to insure rapid circulation or agitation of the water. If the chill be first heated by the steam and the water be then turned on, this result is produced by the sudden formation of steam in the chamber. If the steam and water are admitted simultaneously, this result is produced by the force of the flow of steam. When the molten metal is poured in, however, the intense and sudden heat imparted to the chill will cause it to expand rapidly. This expansion, and also the subsequent contraction of the chill by cooling, is accommodated by the elongated slots through which the bolts pass to secure to it the outside flange, B, and the cover C. The flange B and the cover C, being separate pieces of metal and remote from the intense heat to which the chill is subjected, do not confine the chill rigidly and cause it to warp and crack, as would be the case if these parts were composed of a single piece of metal, but, on the contrary, act rather as re-enforcements of the chill and tend to prevent warping and cracking thereof. By this means not only is a more durable chill produced, but a more even casting results from its use. Furthermore, the attemperating mediums, being forced into the chill-chamber in jets and against a wide surface where the greatest heat is produced by the metal, equalizes the temperature of the chill-surface and causes an equal chilling effect throughout the whole surface of the casting.

I am aware that hollow chill-blocks having journals with suitable supports, being capable of rocking in their bearings, and tubular journals in connection with hollow chill-block, one of which journals serves as an inlet to the separate pipes for the supply of steam and water as tempering mediums, the other tubular journal serving as an endless escape-pipe, have heretofore been employed, and therefore I do not claim such, broadly; but

What I do claim is—

1. A chill formed of a single piece of metal and provided with lugs or ears, in combination with a surrounding re-enforcing flange provided with elongated slots, the flange being secured to the chill by bolts, substantially as and for the purposes set forth.

2. A chill made of a single piece of metal in the form of a pan and provided at its upper edge with a flange, in combination with a cover provided with elongated slots and secured to the chill by bolts, as and for the purposes set forth.

3. The cope formed of the chill A, the surrounding flange B, and the cover C, of separate and independent pieces of metal, substantially as and for the purposes described.

4. The chill A, made in the form of a pan and provided with the flange *a* and the lugs *b*, in combination with the cover C, provided with the elongated holes *b''*, and the surrounding flange B, provided with the elongated holes *b'*, secured together by bolts, substantially as described.

5. The cope having a chamber and provided with the hollow trunnions, in combination with the vertically-movable frame, substantially as described.

6. The cope having the hollow trunnions journaled in the vertically-movable frame, in combination with the stationary frame, the rope or chain K K', the counter-weight M, and the lever P, substantially as described.

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