

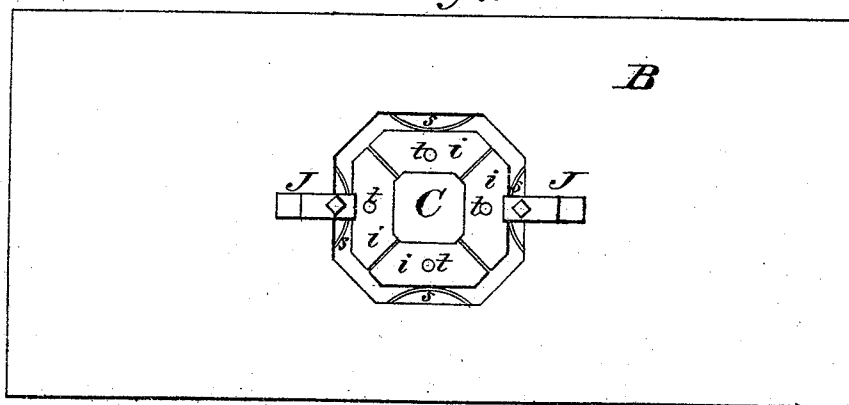
2 Sheets--Sheet 1.

No. 120,467.

Patented Oct. 31, 1871.



*Fig. 2*



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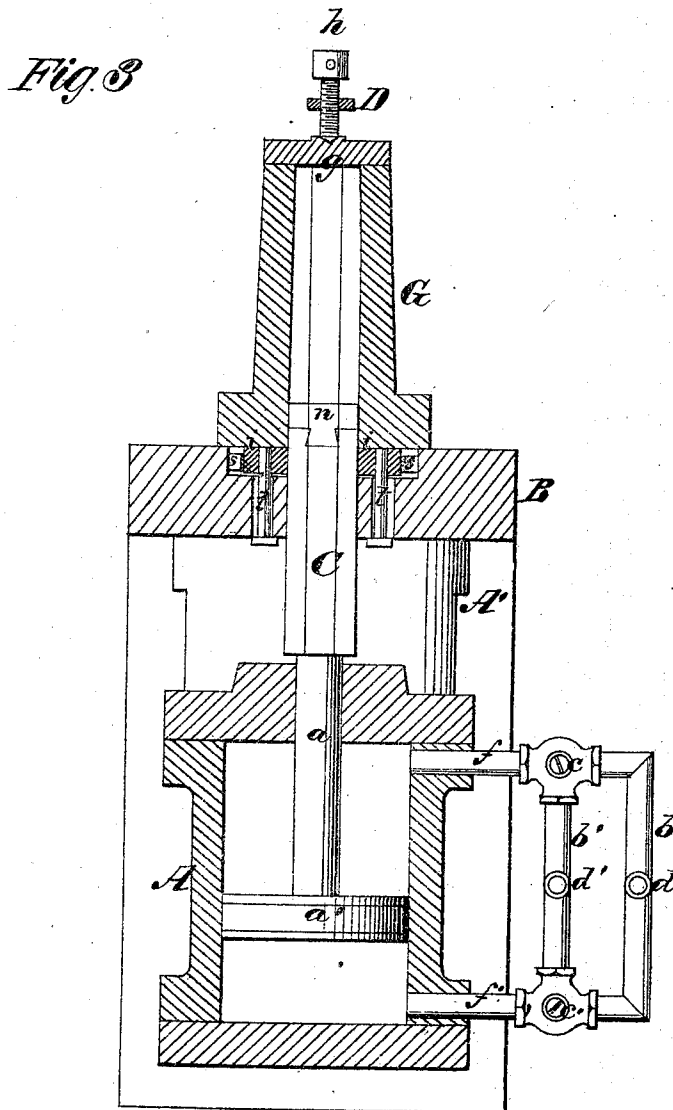
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2 Sheets--Sheet 2.

Improvement in Pressing Cast Metal.

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# UNITED STATES PATENT OFFICE.

JOHN BLAKE TARR, OF FAIRHAVEN, MASSACHUSETTS.

## IMPROVEMENT IN PRESSING CAST-METALS.

Specification forming part of Letters Patent No. 120,467, dated October 31, 1871.

*To all whom it may concern:*

Be it known that I, JOHN BLAKE TARR, of Fairhaven, in the county of Bristol and State of Massachusetts, have invented certain new and useful Improvements in the Pressing of Metal; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing making part of this specification, in which—

Figure 1, Plate 1, is an elevation of the front of my press. Fig. 2, Plate 1, is a top view of the press with the mold removed. Fig. 3, Plate 2, is a section taken vertically and transversely through the center of the press and the mold.

This invention relates to certain novel improvements which are applicable to the pressing and condensation of metal while in the mold in a liquid or semi-liquid state. My invention is an improvement on the ingot-mold presses hitherto secured to me by Letters Patent of the United States, which improvement is designed: First, to facilitate the pouring of the metal into the mold, and also to prevent the metal from adhering to the interior of the mold by combining a movable mold with a press in such manner that the plunger of the latter operates from below upward, as will be hereinafter explained. Second, to prevent that portion of the mold-bed through which the plunger moves and is guided from leaking the melted metal, and at the same time prevent the parts from binding and working hard in consequence of unequal expansion and contraction of the mold-bed and follower, as will be hereinafter explained.

The following description of my invention will explain its construction and operation:

There are several objections to presses for condensing melted metal in molds wherein the plungers are arranged to work into the upper ends of the molds. One objection is the inconvenience of pouring the metal from the ladles, owing to the pressing device being in the way; and the other objection is the loss of time and labor attending the removal of adhering metal from the interior of the molds, the adhesion being caused by pressing downward upon an inert body of metal. Another objection is owing to the unequal expansion of the pressing-plunger and the guide or stuffing-box through which this plunger moves, which causes the plunger to bind and work hard. In the accompanying drawing

I have represented a single press and mold, but in carrying my invention into effect a number of these presses may be employed, and arranged either in a straight line or in the arc of a circle concentric to the axis of motion of the crane which is used for carrying the ladles. The cylinder A of the press is firmly secured to an open head, A', which latter is bolted to the under side of a bed-plate, B, mounted upon walls of masonry. Within the cylinder A works a solid piston, a', the rod a of which passes up through the top cylinder-head, and has rigidly secured to it a plunger, C, shown in Figs. 2 and 3. The plunger C, which may be cylindrical or prismatic, passes up through the mold-bed B, and may have a removable cap, n, on its upper end, which can be taken off when worn out and another substituted. Into the upper side of the mold-bed B, and concentric to the axis of the plunger C, a recess is made, into which is applied a sectional collar composed of radially-movable sections *iii*, which are held down in place by bolts *t* that pass through oblong radial slots made vertically through the bed B. The inner edges of the sections *i* are fitted snugly against the sides of the plunger C and held up by means of springs *s*, as shown in Figs. 2 and 3. This expansible collar is designed to prevent any of the metal which is poured into the mold G escaping at the bottom thereof around the plunger, and also to accommodate itself to the expansion and contraction of the plunger, so that the latter will always work freely without leaking. The top surfaces of the sections *i* are not quite flush with the top surface of the mold-bed B. There is not, however, sufficient space left between the base of the mold G and the said collar-sections to permit leakage when the mold is confined down in its place on the bed B. The mold G is flanged at its base, and confined down in its place on bed B by means of brackets and screw-fastenings J J. The top of the mold is provided with a tightly-fitting cover, *g*, which is confined down in place by means of a screw, *h*, which is tapped through the center of bail D, the hooked ends of which are received beneath shoulders *e* on the sides of the mold. The mold-chamber is tapered slightly from above downward nearly to its lower end, so as to facilitate the removal of the ingot after it is sufficiently cool. The pressing is performed by means of a hydrostatic pump, not shown in the drawing, with which the cylin-

der A communicates by means of a pipe, which I will now describe. Two pipes,  $f f'$ , are applied respectively above and below the piston  $a'$ . These pipes have vertical pipes  $b b'$  connected to them, from which latter pipes  $d d'$  lead off, the pipe  $d$  leading to the pump and the pipe  $d'$  leading into an elevated tank in the neighborhood of the pump. At the junction of the vertical pipe  $b'$  with the two horizontal pipes  $f f'$  three-way cocks  $c c'$  are applied, for regulating the direction of the currents into and out of the cylinder A. When the mold G is supplied with metal and the cover  $g$  secured down in place thereon, the cock  $c$  is turned so as to form a communication between the cylinder A above the piston and the outlet-pipe  $d'$  through the medium of the pipe  $b$ , cock  $c'$ , and pipe  $f'$ . Now, when pressure is applied and the fluid enters the cylinder below the piston, the fluid above the piston will escape freely through pipe  $d'$ . When it is desired to draw down the plunger C the cock  $c'$  is turned so as to cut off from the pipe  $b$  and form a communication between the cylinder below the piston and outlet-pipe  $d'$  through the medium of pipe  $f'$ , and the cock  $c$  is turned so as to cut off from outlet-pipe  $d'$  and form a communication between the inlet-pipe  $d$  and the cylinder A above the piston, through the medium of pipes  $b$  and  $f$ .

During the act of condensing the metal in the mold G by my improved press the body of metal will be lifted and condensed against the cover  $g$  and sides of the mold. By thus moving upward the mass of metal I have discovered that it will not adhere to the sides of the mold. I should here remark that I do not quite fill the molds G; hence I allow space for lifting the metal, as above

stated. After one ingot is formed and condensed it is removed from the bed B and another mold substituted, so that the operation of filling the molds and condensing the metal therein can be conducted rapidly and with very little labor. By arranging the pressing apparatus beneath the mold-bed it will be seen that a clear space is left for obtaining freedom of access to the molds for both filling and removing them. The mold-bed may be level with the floor of the foundry and the pressing apparatus located in a pit below the floor. The valves  $c c'$  are brought down within convenient reach of the attendant.

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

1. The cylinder and plunger, arranged below the mold-bed B and combined with a movable mold, substantially as described.

2. The cylinder A and its open head  $A'$ , arranged below the mold-bed B, substantially as described.

3. Pipes  $f f' b b' d d'$  and three-way cocks  $c c'$ , combined with the cylinder A of the press, substantially as described.

4. The combination of an expansible collar with the plunger C and mold G, substantially as described.

5. The arrangement of an expansible plunger-collar on the upper side of a mold-bed, having a pressing apparatus arranged beneath it, substantially as described.

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Witnesses:

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