(No Model.)

# J. A. BRINELL.

## MOLD FOR CASTING PIPES.

No. 373,551. Patented Nov. 22, 1887.

Fig. 1

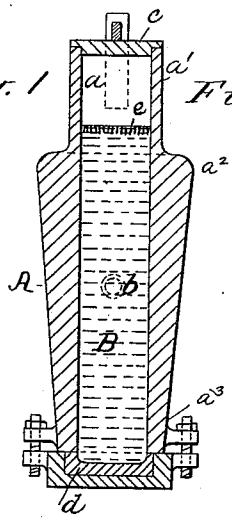



Fig. 2

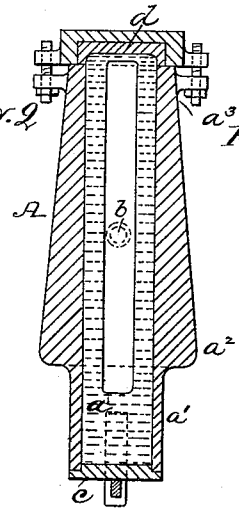



Fig. 3

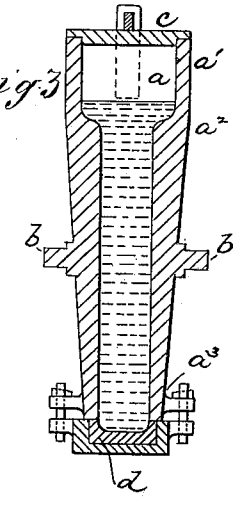



Fig. 4

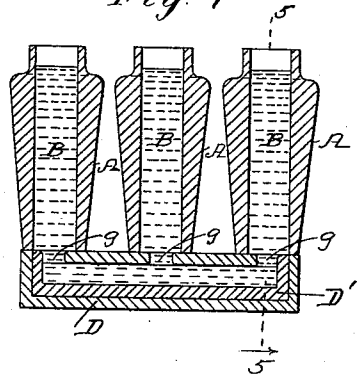



Fig. 5

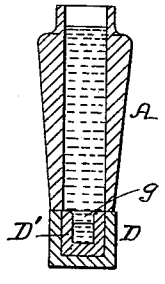
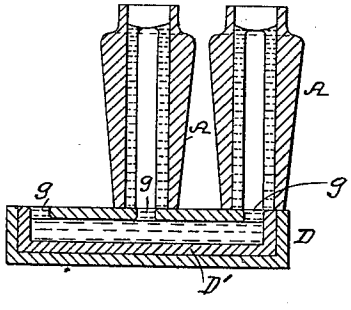



Fig. 6




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# UNITED STATES PATENT OFFICE.

JOHAN AUGUST BRINELL, OF FAGERSTA BY VESTANFORS, SWEDEN.

## MOLD FOR CASTING PIPES.

SPECIFICATION forming part of Letters Patent No. 373,551, dated November 22, 1887.

Application filed April 20, 1887. Serial No. 235,438. (No model.)

*To all whom it may concern:*

Be it known that I, JOHAN AUGUST BRINELL, civil engineer, a citizen of the Kingdom of Sweden, residing at Fagersta by Vestanfors, Sweden, have invented certain new and useful Improvements in Molds for Casting Pipes, Tubes, &c.; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

When molten metal is cast in a thick metal mold or "chill," that portion of the metal in contact with or adjacent to the said mold or chill will be cooled first and become hard or set, while the metal in the interior of the mass is still in a molten state. Consequently, if the mold or chill be of cylindrical form interiorly and a mass of molten metal be poured therein, when the outer portion next the wall of the chill becomes set the still molten inner portion may be poured out, and a cylindrical tube will thus be formed.

My invention relates to molds for casting pipes according to the above method; and the object of the invention is to provide for the even or equalized cooling of the metal throughout the entire length of the pipe, and to provide a thin-walled chamber to receive the still molten metal when the mold is inverted.

My invention will be fully described hereinafter, and its novel features carefully defined in the claims.

In the annexed drawings I have shown the form of mold or chill I employ in carrying out my invention.

Figure 1 is a vertical longitudinal section of the mold or chill as it stands when the mold is receiving the molten charge, and Fig. 2 is a similar view of the same mold inverted as when the molten portion of the mass is being poured out. Fig. 3 is a similar view to Fig. 1, illustrating a slight modification that will be hereinafter explained. Figs. 4, 5, and 6 illustrate a slight change as to the manner of filling and emptying the molds.

Referring first to Figs. 1 and 2, A represents the mold or chill, and B the molten metal therein. This mold is provided with a chamber, *a*, at its upper end, having thin walls *a'*, and the lower portion of the mold, which is destined to form the pipe-blank, has walls that are quite thick, so that they may rapidly absorb the heat from the molten mass adjacent and cool it until it solidifies. As the metal at the top will not be in contact with the mold so long as that first poured in and at the bottom, I make the walls of the mold thicker at the upper part, $a^2$, than at the lower part, $a^3$. This is clearly illustrated in all the figures.

The mold is or may be provided with trunnions *b b*, for convenience of inverting it. It has a cap-plate or removable cover, *c*, and its bottom *d* may be of refractory clay, which will not abstract the heat from the molten metal so rapidly as metal.

The operation is as follows: While the cover *c* is off molten metal B is poured into the mold until it rises up to about the point indicated in Fig. 1. The metal in contact with and adjacent to the walls of the mold will chill or solidify, and when this shall have taken place the mold will be inverted, as seen in Fig. 2. The still molten metal will now flow out into chamber *a*, leaving the solid portion in the form of a tube. When sufficiently cooled and shrunk, the mass may be removed from either end of the mold and the solid mass at its end sawed off.

As the metal is apt to cool on the top in some cases, and thus prevent the fluid mass from being poured out by inverting the mold, I may enlarge or widen the chamber *a*, as indicated in Fig. 3. This trouble is apt to arise in the manufacture of slender pipe-blanks. In lieu of this widening of the chamber *a*, or in addition to this, the surface of the molten metal may be covered with coal-dust, slag, or mineral wool, or other like non-conducting material, as seen at *e* in Fig. 1. In some cases, also, I may line the walls of the chamber *a* with refractory clay to avoid too rapid abstraction of the heat.

In Figs. 4, 5, and 6 I have shown an arrangement of the molds whereby the formation of tubes may be effected without the necessity of inverting them. I may employ two or more molds in this way; but I have here shown three. Fig. 4 is a vertical section through the axes of the three molds when full of molten metal. The trough D, on which the molds

rest, is in longitudinal section. Fig. 5 is a transverse section on line 5 5 in Fig. 4. Fig. 6 is a similar view to Fig. 4, but showing only two of the molds in place.

The trough D may be of metal, and have within it a box, D′, of fire-clay or similar refractory material. This box has an aperture, *g*, in its top for each mold A, and these molds are set on end on the box, with their lower open ends respectively arranged over said apertures. The molten metal is now poured into the mold, and it rises in all the molds to the same level, as shown in Fig. 4. After the outer layer of metal has become sufficiently chilled or solidified one of the molds is lifted off, when the liquid metal will flow out of all three of the molds and overflow the trough D. In filling the molds placed as in Fig. 2 the metal should be poured into the middle one. Care should be taken in using the box and trough that the mass of metal therein does not chill or harden before it can be emptied.

Having thus described my invention, I claim—

1. A metal mold, A, for casting tubes or pipes, having its walls graduated in thickness from top to bottom, being thickest at the top, substantially as set forth.

2. A metal mold, A, for casting tubes or pipes, having a chamber, *a*, with a thin wall, *a′*, at its top, and having its walls graduated in thickness from top to bottom, being thickest at the top.

3. A metal mold, A, for casting tubes or pipes, having trunnions *b*, whereon it is inverted, having a chamber, *a*, with thin walls *a′* at its upper end, and having a removable cover, *c*, substantially as set forth.

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

JOHAN AUGUST BRINELL.

Witnesses:

NERE A. ELFWING,

ERNST SVANQVIST.