No. 714,692. Patented Dec. 2, 1902.

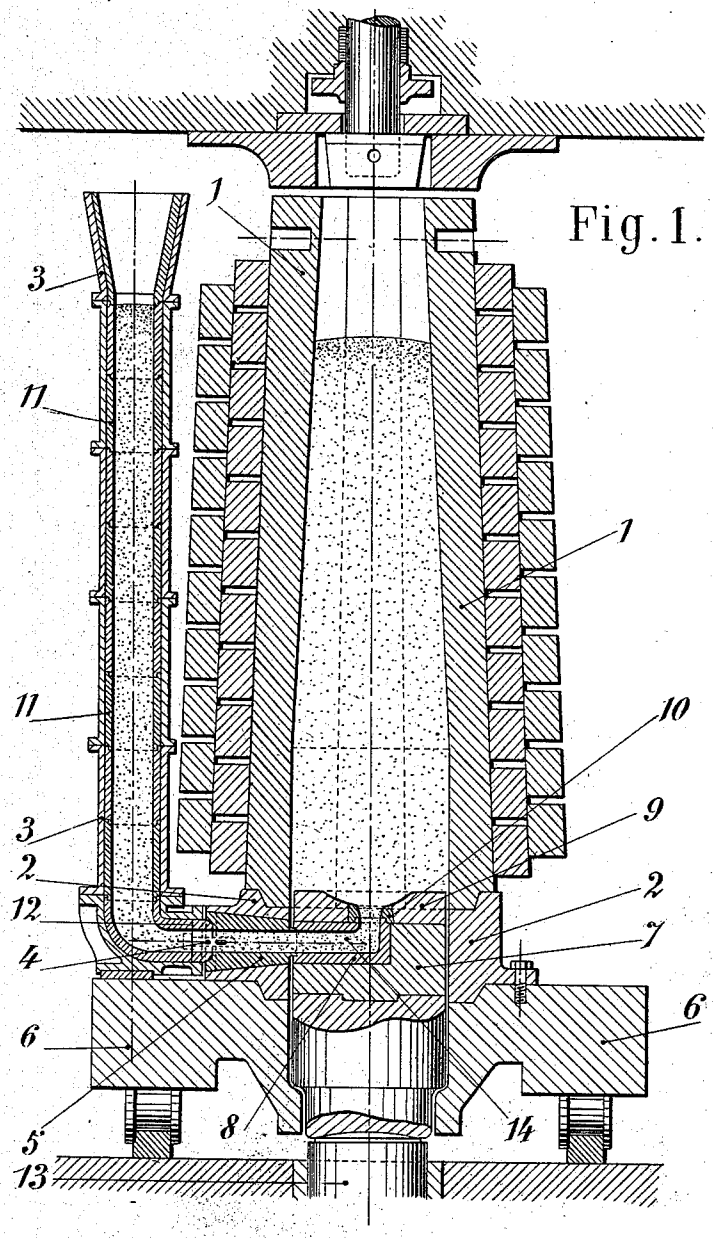
H. HARMET.

PRESS FOR COMPRESSING LIQUID STEEL IN CONICAL INGOT MOLDS.

(Application filed July 8, 1902.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.



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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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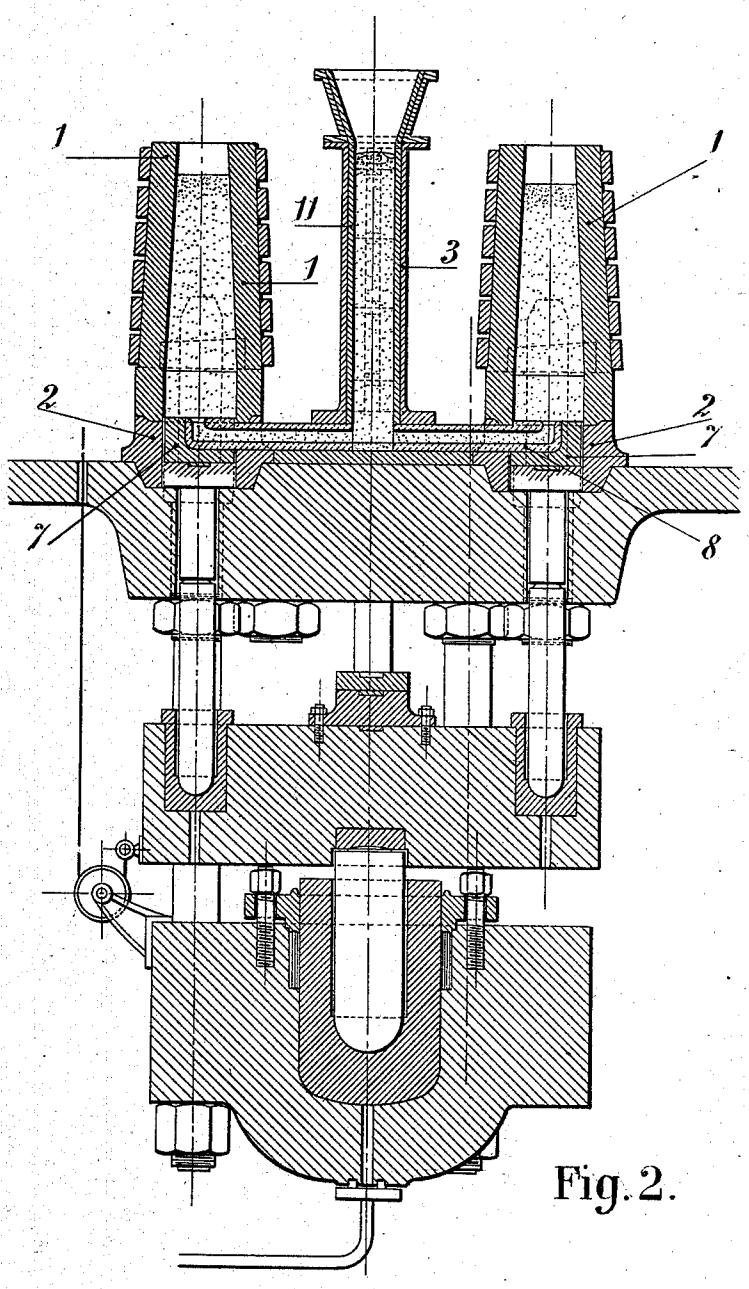

Fig. 2.

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UNITED STATES PATENT OFFICE.

HENRI HARMET, OF ST. ETIENNE, FRANCE.

PRESS FOR COMPRESSING LIQUID STEEL IN CONICAL INGOT-MOLDS.

SPECIFICATION forming part of Letters Patent No. 714,692, dated December 2, 1902.

Application filed July 8, 1902. Serial No. 114,760. (No model.)

To all whom it may concern:

Be it known that I, HENRI HARMET, a citizen of the Republic of France, residing at St. Etienne, Le Marais, Loire, France, have invented a new and useful Improvement in Presses for Compressing Liquid Steel in Conical Ingot-Molds, which improvement is fully set forth in the following specification.

This invention has for its object improvements in presses for compressing liquid steel in conical ingot-molds.

Up to the present steel has been compressed in conical ingot-molds by pouring the metal directly into the top of the ingot-mold and in compressing a single ingot per press.

According to this invention the metal flows into the ingot-mold through the bottom of the same, the metal being then compressed by means of a movable bottom. Four ingots may thus simultaneously be compressed by a single press by means of any suitable mechanical arrangements.

Causing metal to flow into the ingot-mold through the bottom is not novel; but my invention consists in supplying metal through a bottom which when the ingot-mold is filled is moved and also in the special arrangement of the bottom, which allows the steel to be compressed in the conical ingot-mold from bottom to top.

My invention consists in the arrangement which allows the metal to flow in axially at the bottom of the ingot-mold without the walls being unequally heated and in which the bottom through which the metal flows is, as has been stated, movable in the interior of the ingot-mold. The ingot is compressed in the conical ingot-mold by causing it to advance from the bottom toward the top, the ingot-mold being stationary. The pipe through which the metal passes to the bottom of the ingot-mold is sheared as soon as compression commences and remains full of metal. For this object the ingot-mold is divided into two parts: first, the "ingot-mold," properly so called; second, a base or lower portion upon which it rests and through which metal flows to the movable bottom. The bottom is housed in the base, and when the mold is full of metal it is pushed upward by the compressing-ram, the inlet-pipe being sheared. This arrangement is applicable to large or small ingot-presses.

In the annexed drawings, Figure 1 shows an arrangement applicable to large ingots. Fig. 2 shows a multiple press for the compression of small ingots.

In the figures, 1 is the "ingot-mold," properly so called.

2 is the base or lower portion, through which the metal passes. It is connected to the vertical pipe 3 by key-bolts 4 and is protected against the heat of the liquid steel by the hollow brick 5.

6 is the truck, to which the base 2 is bolted.

7 is the movable bottom, which is hollowed to form a continuation of the hole formed in the base 2. The brick 8 protects the bottom 7 against heat and forms a continuation of the brick 5 for the inlet of metal. In the case of large ingots it is well to place above the bottom 7 a second bottom 9, protecting the joint between 1 and 2. The brick 10, provided, as shown, with brick cones, makes the filling-hole which remains contiguous to the bottom of the ingot of a shape which facilitates the discharge of the ingot from the mold.

11 is a protective lining, of brick, protecting the metal pipe 3.

12 is a brick lining protecting the elbow.

The passages having the refractory linings 11 12 5 8 10 are connected the one to the other in such a manner that no particle of liquid metal can pass out through the joints.

With the arrangements shown the ingot-mold is filled from the bottom. When the metal is at the required height, the truck 6 is placed beneath the press, and the ram 13 rising pushes 7, which shears the outlet from the pipe 14, the rupture taking place at the joint between the bricks 5 and 8. The ingot is compressed in the conical ingot-mold, as usual.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. In presses for compressing liquid steel in a conical mold, an ingot-mold formed in two parts, the ingot-mold properly so called

and the base, the said base being provided with a lateral passage for the inlet of the liquid metal, the said passage coinciding when metal is flowing in with a passage formed in the movable bottom which is housed in the base, the said bottom being capable of upward movement by the action of the press by which it is actuated at the moment of compression.

2. In a device of the character described, an ingot-mold comprising an upper conical portion forming the mold proper and a base portion, a lateral passage arranged in said base and forming an inlet for the liquid metal to the mold, a bottom for the mold proper arranged to move vertically in said base, a passage arranged in said bottom and coinciding with the lateral passage in the base when the bottom is in its lowermost position, and means for elevating the bottom into the mold proper, whereby the inlet to the mold may be sheared during the compression of the ingot in the mold.

3. In a device of the character described, a group of conical ingot-molds arranged to be fed by separate inlet-pipes from a reservoir of liquid metal in combination with a movable bottom for each mold arranged to form a continuation of the inlet-pipes when the bottoms are in their lowermost position and means for elevating the bottoms simultaneously into the molds, whereby the inlet-pipes may be sheared during the compression of the ingots in the several molds.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

HENRI HARMET.

Witnesses:
ANTOINE CROZIER,
HASTINGS BURROUGHS.