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B. NADALL & M. BARR.

METAL POT MECHANISM OF CASTING MACHINES.

(Application filed Dec. 10, 1898.)

(No Model.)

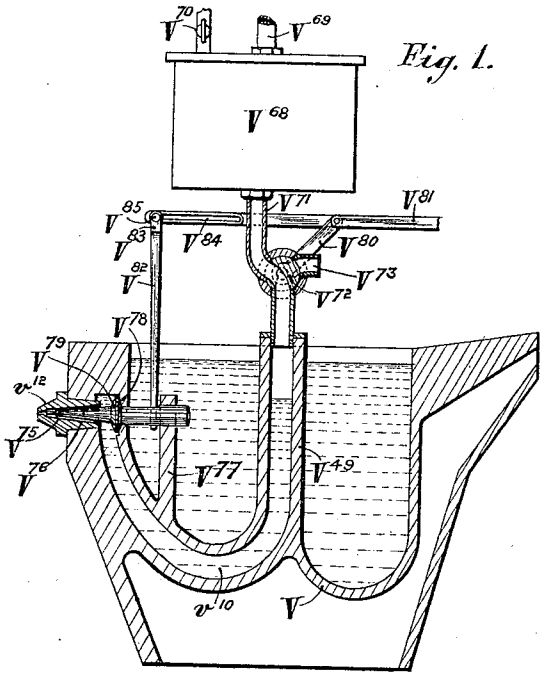


Fig. 1.

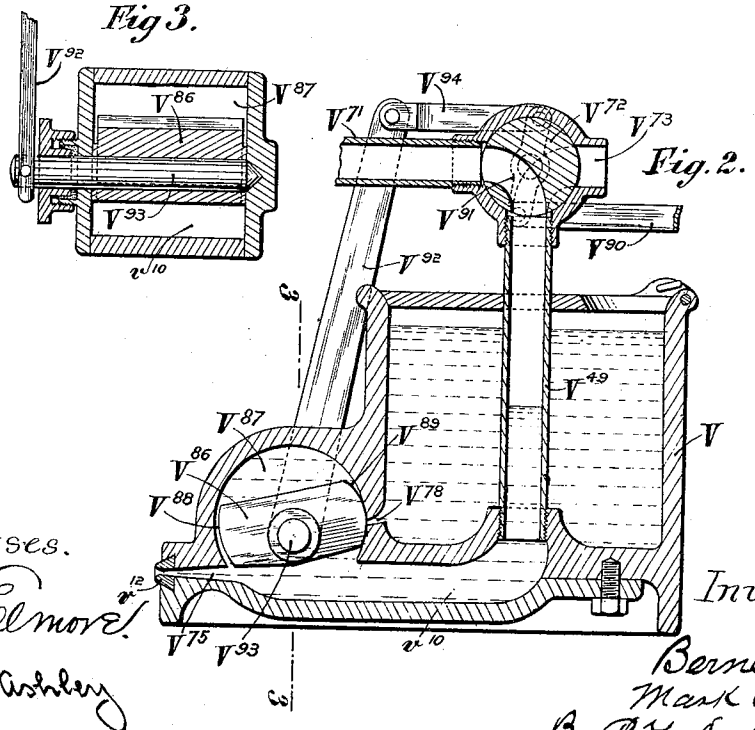


Fig 3.

Fig. 2.

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UNITED STATES PATENT OFFICE.

BERNE NADALL AND MARK BARR, OF BROADHEATH, ENGLAND, ASSIGNORS TO THE MERGENTHALER LINOTYPE COMPANY, OF NEW YORK, N. Y.

METAL-POT MECHANISM OF CASTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 629,459, dated July 25, 1899.

Application filed December 10, 1898. Serial No. 698,849. (No model.)

To all whom it may concern:

Be it known that we, BERNE NADALL, a citizen of the United States of America, and MARK BARR, a subject of the Queen of Great Britain and Ireland, residing at Broadheath, in the county of Chester, England, have invented certain new and useful Improvements in the Metal-Pot Mechanism of Casting-Machines; and we 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.

The present invention relates to improvements in the metal-pot mechanism of casting-machines in which the injection of the metal is effected by a body of compressed air instead of by a piston. It is especially applicable to the casting mechanism of linotype-machines.

Referring to the accompanying drawings, Figure 1 is a sectional elevation showing the mechanism in the act of ejecting metal. Fig. 2 is a sectional elevation of a modification, and Fig. 3 is a section taken along the line 3 3 of Fig. 2.

Referring to Fig. 1, V^{68} is a chamber kept charged by any suitable means with air through a supply-pipe V^{69}. The air is maintained at a suitable pressure in that chamber, any increase beyond the desired degree being prevented by a safety-valve V^{70}.

V^{71} is a delivery-pipe leading from the air-chamber V^{68} to the cylinder V^{49} of the metal-pot V. The top of the latter is open to the air.

V^{72} is a three-way cock in the pipe V^{71}, adapted to open and shut it and to also establish at stated intervals a connection between the cylinder V^{49} and the open air through an exhaust-port V^{73}.

The path of the metal from the cylinder V^{49} to the delivery-nozzle v^{12} is through a throat v^{10} and a port V^{75}. The said throat starts from the bottom of the cylinder V^{49} and rises up to nearly the top of the metal-pot side, where it is closed across its top, as shown. The port V^{75} extends from the said top of the throat v^{10} to the nozzle v^{12} and is preferably conical in cross-section, its diameter diminishing in the direction of the nozzle. It is controlled by a correspondingly-shaped spindle-valve V^{76}, adapted to work to and fro in a suitable guide V^{77}. There is combined with the said port V^{75} and spindle V^{76} a second port V^{78}, situated in the side of the throat v^{10} and axially coincident with the conical port V^{75}, and a valve V^{79}, likewise on the spindle V^{76} and adapted to control the said port V^{78}. The two valves V^{76} and V^{79} are so positioned with reference to each other that when one of the two ports V^{75} V^{78} is open the other one is shut. Further, the cock V^{72}, already described, is so connected with the pair of valves V^{76} and V^{79} that when the port V^{75} is open the pipe V^{71} is also open and that when the port V^{78} is open the pipe V^{71} is shut and the cylinder V^{49} is open to the air through the port V^{73}. The connection illustrated consists of a half-crank V^{80}, fast on the plug of the cock V^{72}, a bar V^{81}, to which the outer end of the half-crank V^{80} is pivoted, a rod V^{82}, fast by its bottom end to the spindle of the valve V^{76} by having the said end passed through that spindle and standing up above the top of the metal-pot V far enough for its forked top V^{83} to embrace the said bar V^{81}, a longitudinal slot V^{84} in the bar V^{81}, and a pin V^{85}, passed through both the forked end V^{83} and the slot V^{84}, and which latter is wide enough to allow of the slotted portion of the bar V^{81} to move freely to and fro over it.

The respective levels of the metal in the metal-pot V and in the cylinder V^{49} clearly indicate the expelling action of the compressed air upon the metal in the latter. The bar V^{81} is worked to and fro by any suitable means. The drawings show it at the end of its motion to the right hand, which motion has shut the port V^{73} and opened the pipe V^{71} by turning the cock V^{72} through an arc of ninety degrees. During the greater part of that motion the slot V^{84} was sliding over the stud V^{85}; but the closed left-hand end of that slot engaged the pin V^{55} just before the motion ceased and so closed the port V^{78} and opened the port V^{75}. Metal is next ejected by the air-pressure above it in the cylinder V^{49} through the nozzle v^{12} so long as the port V^{75} remains open. To stop ejection, the bar V^{81} is moved back into its original position, closing the pipe V^{71}, opening the port V^{73}, and sliding the slot V^{84} over the stud V^{85}. The right-hand end of that slot engages the pin V^{85}, closes the port

V^{75}, and opens the port V^{78} at the same moment that the cock V^{72} completes the closure of the pipe V^{71}, so that all the metal assumes one and the same level in the cylinder V^{49}, in the metal-pot V around it, and in the throat v^{10}.

According to the modification illustrated in Figs. 2 and 3 the two valves V^{76} V^{79} are replaced by a diaphragm-valve V^{86}, reciprocating about its axis in a chamber V^{87}. The left-hand edge V^{88} and the chamber are concentric with each other, the opposite edge V^{89} is struck from a different center, while the diaphragm itself oscillates about an axis concentric with neither. The eccentricity of each end V^{88} V^{89} increases in the opposite direction to that in which it approaches the side of the chamber V^{87} to make tight contact with it, so that they contact with an abrading action adapted to clean the chamber side and maintain a tight working fit with it. The chamber V^{87}, valve V^{86}, nozzle v^{12}, port V^{78}, and throat v^{10} are all illustrated as near the bottom of the metal-pot V instead of near the top, the throat v^{10} being horizontal for that purpose instead of upwardly bent, as in Fig. 1; but this change of position does not affect the present invention and is only to facilitate the molding and casting of the pot V, the chamber V^{87}, and the throat v^{10}.

The connection between the three-way cock V^{72} and the exhaust-port V^{73} on the one hand and the diaphragm-valve V^{86} on the other consists of a bar V^{90}, a lever V^{91}, fast on the plug of the cock V^{72} and pivotally connected by one arm to the bar V^{90}, and a lever V^{92}, fast by one end to the axle V^{93} of the diaphragm-valve V^{86} and pivotally connected by its opposite end to one end of a link V^{94}, which has its opposite end pivotally connected to the other arm of the lever V^{91}. The parts are shown in the metal-ejecting position, the motion of the bar V^{90} to the left hand having opened the delivery-pipe V^{71}, shut the exhaust-port V^{90}, and moved the end V^{89} of the diaphragm-valve V^{86} down over the port V^{78}, thereby shutting it. To stop the ejection of metal, the bar V^{90} is moved to the right, thereby opening the exhaust-port V^{73}, shutting the delivery-pipe V^{71}, reversing the diaphragm-valve, whereby the end V^{89} gradually leaves the chamber side and the opposite end V^{88} comes in contact with it to shut the port V^{75}.

We claim—

1. The combination with the metal-pot of a casting mechanism of compressed-air chamber; cylinder; delivery-pipe between the two; exhaust-port on the said pipe to the open air and three-way cock controlling the said delivery-pipe and port; throat or a chamber communicating with the said cylinder; port from said throat or chamber to the nozzle; port from the metal-pot to the said throat or chamber and valve adapted to control the two last-mentioned ports and a connection between the said cock and exhaust-port on the one hand and the device for controlling the throat or chamber ports on the other, adapted to keep the delivery-pipe and port and port to nozzle open and the exhaust-port and the port from the metal-pot closed and vice versa.

2. The combination with the metal-pot of a casting mechanism, of compressed-air chamber; cylinder; delivery-pipe between the two; exhaust-port from the said pipe to the open air; three-way cock controlling the said delivery-pipe and port; throat from the cylinder to the nozzle; port between the throat and the said nozzle; port between the throat and the metal-pot; valves adapted to control the said ports respectively; and a connection between the three-way cock and the port to the open air on the one hand and the said valves on the other, adapted to keep the delivery-pipe and port from throat to nozzle open and the exhaust-port and the port between the throat and the metal-pot closed and vice versa.

3. The hereinbefore-described combination of diaphragm-valve and valve-chamber, the ends of the diaphragm being worked in arcs eccentric to the valve-chamber, their eccentricity increasing in the opposite direction to that in which they respectively approach the side of the said chamber.

4. In a linotype-machine, the combination of the following elements: A metal-pot having a throat through which the metal is delivered; a valve controlling the delivery of metal from the body of the pot into said throat; means for delivering air under pressure into the throat to expel the metal; a valve controlling the admission of said air, and connections whereby said valves are operated to permit the admission of metal and air to the throat alternately, whereby the throat is alternately filled and emptied.

5. In a linotype-machine, a melting-pot having a throat for the delivery of the metal therefrom and an opening for the admission of molten metal from the body of the pot into the throat, and a valve acting to close said throat and opening alternately.

6. In a linotype-machine, a melting-pot provided with a throat for the delivery of molten metal therefrom, a valve for the admission of molten metal to said throat, and means for admitting compressed air to expel the metal, said elements constructed and arranged to operate substantially as described and shown.

In testimony that we claim the foregoing as our joint invention we have signed our names in presence of two subscribing witnesses.

BERNE NADALL.
MARK BARR.

Witnesses:
JOHN L. WORTHINGTON,
WILLIAM H. BURLING.