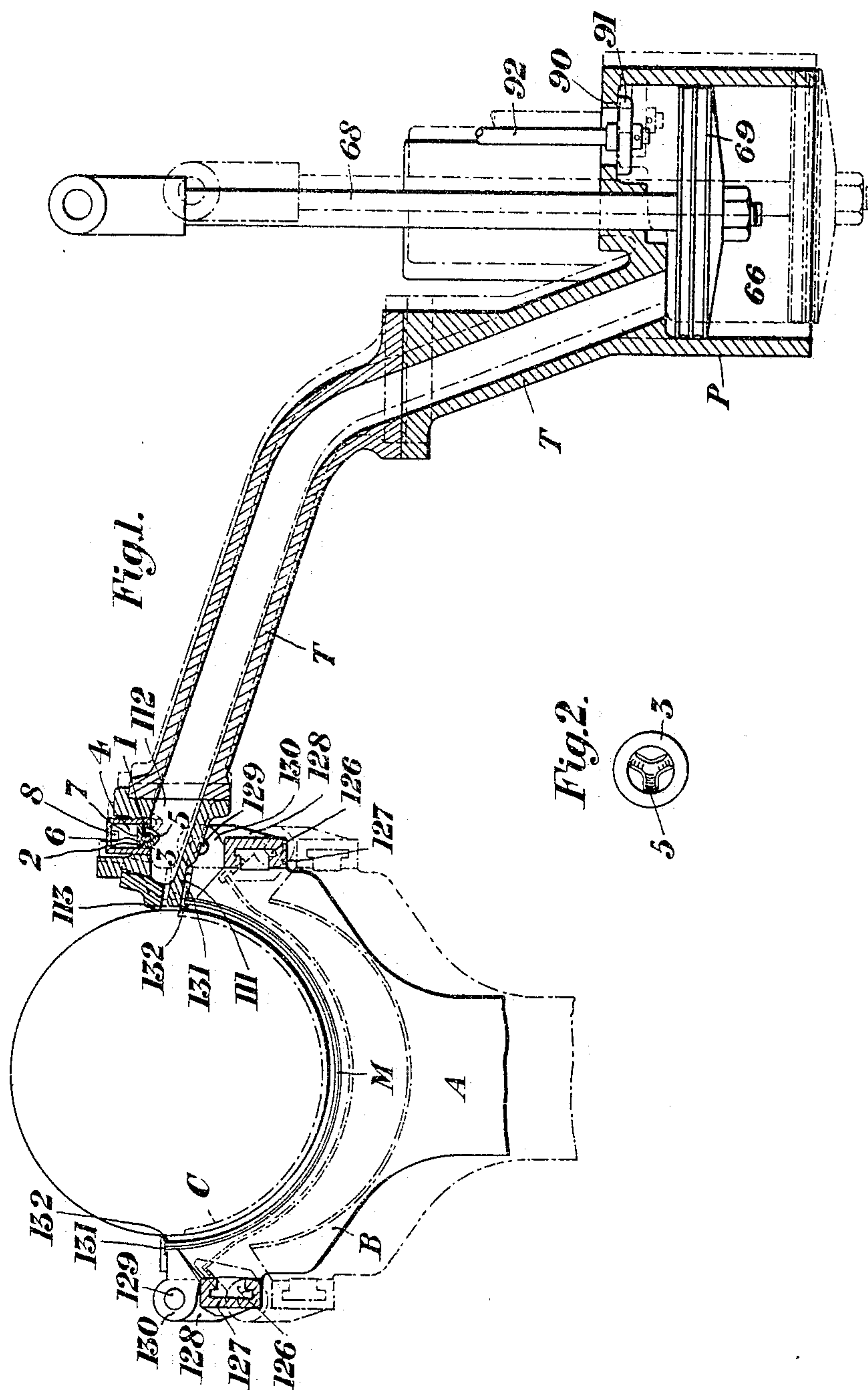


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F. J. WICH.  
METAL PUMP.

APPLICATION FILED APR. 30, 1903.



Witnesses  
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# UNITED STATES PATENT OFFICE.

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## METAL-PUMP.

SPECIFICATION forming part of Letters Patent No. 782,299, dated February 14, 1905.

Application filed April 30, 1903. Serial No. 155,063.

*To all whom it may concern.*

Be it known that I, FERDINAND JOHN WICH, of The Linotype Works, Broadheath, Altrincham, in the county of Chester, England, have invented certain new and useful Improvements in Metal-Pumps; 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 ap-  
10 pertains to make and use the same.

This invention relates to improvements in metal-pumps specially applicable to stereo-plate-casting machines such as that described in the specification of British Letters Patent  
15 No. 2,525, February 8, 1900, and known to the printing trade as the "autoplate-machine." Taking this machine as typical of the class of machines to which the present invention relates, experience with the said machine  
20 has shown that after the casting-chamber has been filled with metal the metal in the nozzle of the delivery-pipe sets, whereupon the return or down stroke (generally a quick one) of the pump-piston establishes a vacuum in  
25 the pipe, and the continuance of the stroke against this vacuum strains the machine. Then when the nozzle and the segmental back that carries the matrix are moved away from the core or cylinder air rushes through the  
30 nozzle into the delivery-pipe with great force, mixes with the molten metal therein, and forces some of it out through the nozzle onto the newly-cast stereoplate, the matrix, and the adjacent parts, doing more or less damage and  
35 preventing the working of the machine being proceeded with until the mischief has been remedied.

The invention consists in means for preventing the mischief above described. These  
40 are illustrated in the accompanying figures, of which—

Figure 1 is a vertical sectional elevation through the casting mechanism; and Fig. 2, a plan, on an enlarged scale, of the bottom plate  
45 of the valve-cage.

To facilitate the comprehension of the invention, the parts that are reproduced from the previous patent are called by the names and

indicated by the same references as are used in the specification of that patent.

B is the segmental back, and C the core or cylinder, the arc-shaped space between them being the casting-chamber or mold for the auto-plate or turtle.

M is the matrix or indented flong. It lies upon the concave surface of the segmental back B, to which it is held by two clamping devices, one in front and one behind the back and core. Each device consists of a bar 130, fast on a shaft 129, pivoted in ears 128, (the two illustrated conceal the fellow-ears, respectively, behind them,) a clamping-strip 131, having a turned-down lip 132, a slide 127, carrying the respective ears 128, and a fixed guide 126 for the slide 127.

66 is the pump-cylinder; 68, the piston-rod; 69, the pump-piston; T, the throat from the cylinder; 111, the nozzle of the throat, adapted to fit metal-tight against the core C; 112, the chamber between the throat T and the nozzle 111, and 113 the L-shaped outlet-passage from the latter into the casting-chamber. The top corner of the pump-cylinder 66 has an orifice in it to one side of the piston-rod 68, and 90 is a valve-seating around its edge. 91 is an induction-valve controlling the said orifice, and 92 is its rod.

All the parts just described are reproduced from the previous patent already mentioned. The means for supplying metal to the pump-cylinder 66 and working the valve 90 and piston 69 are both omitted from the figure, because they are not affected by the present invention. The segmental back B, pump P, throat T, and nozzle 111 have all an intermittent reciprocating motion to and from the casting position illustrated by the full lines of Fig. 1 to that illustrated by the dot-and-dash lines of the same figure and in which the pump is at rest, the metal-supply valve to the pump open, and the matrix clear of the newly-cast autoplate. This intermittent motion and the means for imparting it are both as heretofore and need not be described here, because they are not affected by the present invention, and the reader is referred to the specification



of the prior patent for any particulars thereof which he may desire.

The present invention consists in the combination with the intermediate chamber 112 of a valve adapted to open the said chamber to the air as soon as the pump-piston starts on its return stroke and to be floated up by the rising metal to close it again during the working stroke of the said piston. The combination includes any type of valve that will act in the way just described; but a ball-valve in a cage projecting downward for a suitable distance into the chamber 112 and having its seat above the latter is preferred.

1 is the ball-valve inclosed in the cage formed by the two plates 2 and 3. Both these plates are screwed into the mouth of an inverted cup 4, which is connected with the intermediate chamber 112 by having its mouth screwed down through the top thereof. The bottom plate 3 of the two plates is dished in and has a spider bottom 5, this bottom being far enough below the plate 2 to allow of the play of the valve 1 between the bottom 5 and the valve-seating 6. This seating is in the plate 2 and is higher than the roof of the chamber 112.

7 is the air-port between the valve-cage and the interior of the cup 4, and 8 the port between the said interior and the outer air.

The action of the invention is as follows: At the moment when the pump-piston 69 starts on its upward or working stroke to lift metal up the throat T and force it through the nozzle 111 into the casting-chamber both the metal-supply valve 91 and the valve 1 are open. The rise of the piston 69 closes the valve 91. As soon as the metal above the piston 69 has been raised to about the level of the chamber 112 the nozzle 111 and the parts connected with it are moved up toward the core C into the position shown by the full lines of Fig. 1. The segmental back B, with the matrix M in position upon it, is next moved up to the core C. The pump-piston 69 continues to rise, the metal consequently rising in the chamber 112, expelling the air before

it through the port 7 and floating the valve 1 up to its seating 6, closes it, thereby preventing the escape of metal through the port 7. The piston 69 continues to rise and fills the casting-chamber. When the casting operation has been completed, the pump-piston 69 starts on its return or downward stroke. The metal in the nozzle 111, chamber 112, and throat T, follows it, and the valve 1 drops onto the spider-bottom 5, thereby opening the said nozzle, chamber, and throat to the air, which flows into them freely through the port 7 and the spider-bottom 5, thereby effectually obviating the formation of any vacuum in the same. As soon as the piston 69 has reached the bottom of its stroke, the segmental back B, with the matrix M and the newly-cast auto-plate or turtle on it, are moved downward from the core C, the nozzle 111 and the parts connected therewith to the rear into the position illustrated by the dot-and-dash lines in Fig. 1, and as the access of air into the chamber 112 and throat T was established before the nozzle 111 started from the core C there could not be any rush of air inwardly through the nozzle 111.

I claim—

In a machine of the class named, the combination of a mold; a pump-nozzle adapted to be moved up to the said mold to make metal-tight contact therewith; a pump adapted to feed metal through the nozzle into the mold by its lifting stroke; a throat connecting the pump-cylinder with the nozzle; a port between the throat and the outer air; and a valve controlling the said port adapted to close it against the escape of metal by being floated up to its seat by the rise of metal in the throat, and to open it to admit air into the throat when the metal descends in the said throat.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

FERDINAND JOHN WICH.

Witnesses:

ERNALD SIMPSON MOSELEY,  
MALCOLM SMITHURST.