Aug. 27, 1957 F. J. PRUCHA ET AL 2,803,861

POURING MECHANISM FOR CASTING MOLTEN METAL AND THE LIKE

Filed May 10, 1955 2 Sheets-Sheet 1

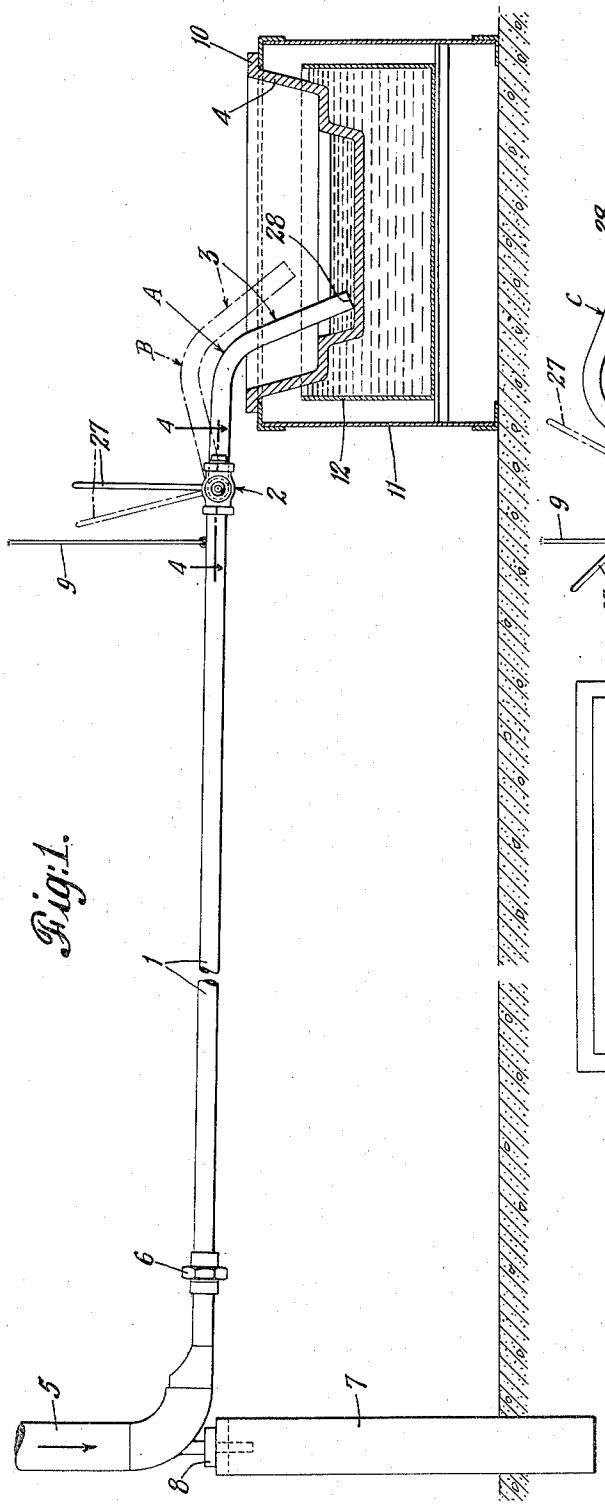


Fig. 1.

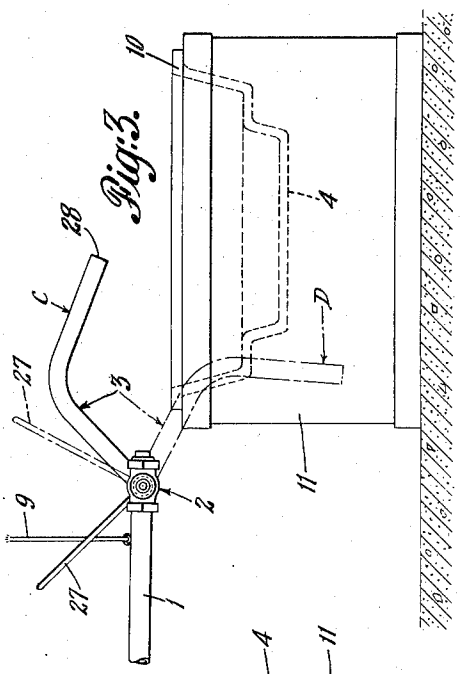


Fig. 3.

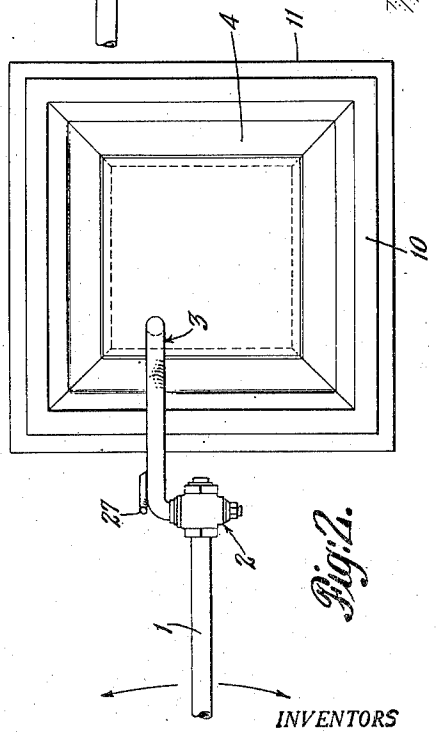


Fig. 2.

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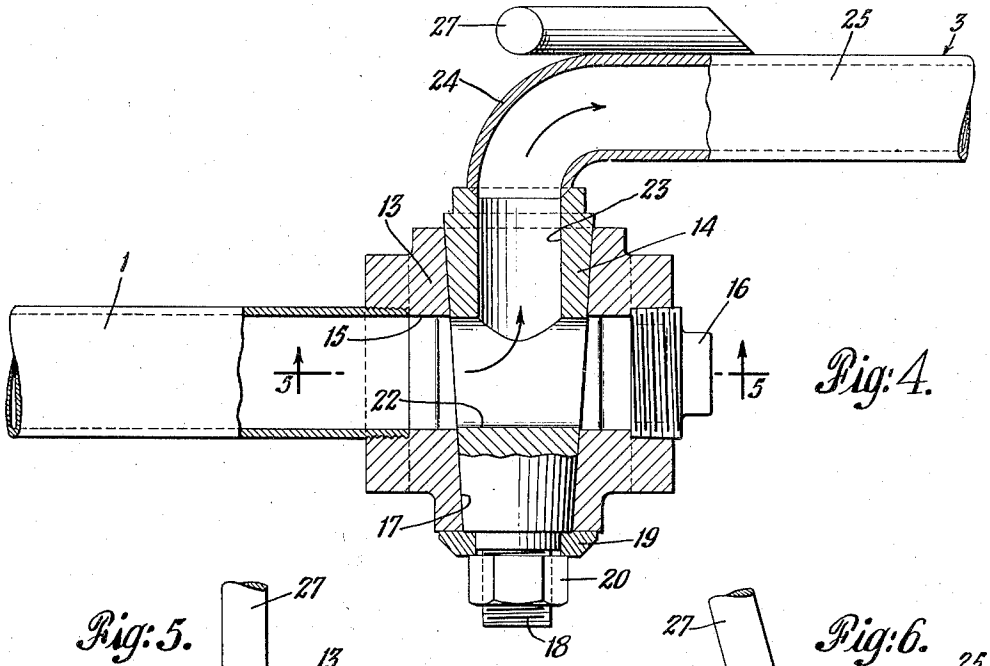


Fig: 4.

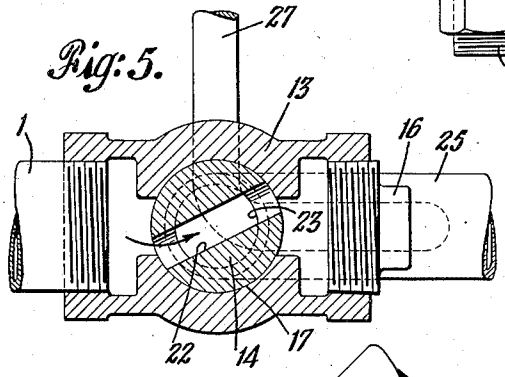


Fig: 5.

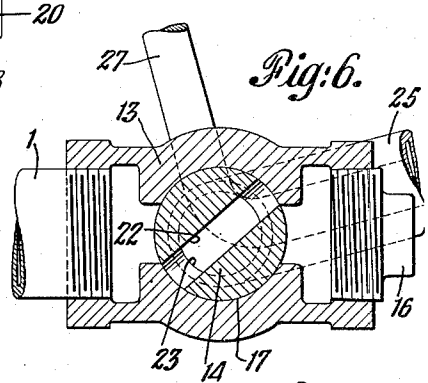


Fig: 6.

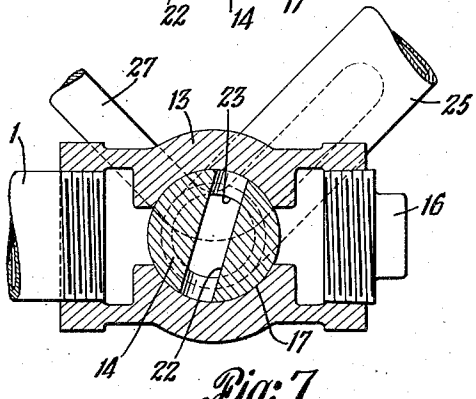


Fig: 7.

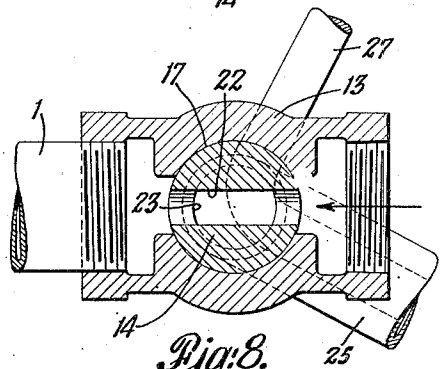


Fig: 8.

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POURING MECHANISM FOR CASTING MOLTEN METAL AND THE LIKE

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Application May 10, 1955, Serial No. 507,204

2 Claims. (Cl. 22—79)

This invention relates to pouring mechanism for casting molten metal and the like. More particularly, it relates to pouring mechanism provided with an improved stop-cock means for casting such material and especially for casting relatively low melting metals such as lead.

The general object of the invention is to provide pouring mechanism which is simple and inexpensive in construction and efficient in operation.

Another object is to provide in such mechanism an improved stop-cock arrangement which will permit a submerged stream of the material to be poured into a mold at a controlled rate, thereby reducing turbulence and oxidation in the material to be cast.

A further object is to provide pouring means which is easily moved into and out of pouring position with respect to a mold.

Another object is to provide pouring mechanism with improved clean-out features. Other objects and advantages will become apparent from the following more detailed description.

The invention is further illustrated in the accompanying drawings which illustrate the preferred form thereof. It should be understood, however, that the drawings are given for purposes of illustration and that the invention in its broader aspects is not limited thereto.

In the drawings:

Fig. 1 is a side elevation, partly in section, showing the pouring mechanism in position over an open top mold.

Fig. 2 is a top view of Fig. 1.

Fig. 3 is generally similar to Fig. 1 but showing the spout in the raised and in the clean-out positions.

Fig. 4 is a view of the stop-cock taken along 4—4 of Fig. 1 in the direction of the arrows.

Fig. 5 is a view taken along line 5—5 of Fig. 4 in the direction of the arrows, showing the stop-cock in the open position "A" of Fig. 1.

Fig. 6 is similar to Fig. 5 showing the stop-cock in position "B" of Fig. 1.

Fig. 7 is also similar to Fig. 5 showing the stop-cock in position "C" of Fig. 3.

Fig. 8 is likewise similar to Fig. 5 showing the stop-cock in position "D" of Fig. 3.

Referring now to Figs. 1 through 3, there is shown molten metal supply pipe 1 provided at one end with a stop-cock 2, with a spout 3 attached to the latter for pouring molten metal, such as lead, into mold 4. Molten metal may be supplied to pipe 1 from a suitable source (not shown) by means of conduit 5 which may be removably attached to pipe 1 as by a conventional threaded joint 6. As shown, conduit 5 may be rotatably mounted on post 7 by means of swivel 8 so as to move the spout 3 over and away from the mold 4. The pipe 1 may also be supported by rod 9 attached to the pipe and to a suitable overhead structure (not shown).

The mold or molds 4 may be water cooled and may be provided with flanges 10 which rest upon a frame 11 with the bottom and at least part of the mold sides

immersed in water contained in tank 12. A series of molds may be arranged in an appropriate circle about post 7 for casting a plurality of ingots; the pipe 1 being rotated about the post to position the spout 3 over the respective molds.

The details of the stop-cock construction are shown in greater detail in Fig. 4. The stop-cock comprises the casing 13 and the rotary plug 14. The casing is provided with a straight passage 15 and is mounted at one end of the passage upon the pipe 1, with the passage aligned with the pipe. The other end of the passage is provided with a removable closure 16. The casing may be provided with threads at each end of the passage adapted to receive corresponding threads on the end of pipe 1 and on the closure 16 respectively.

The casing is also provided with a seat 17 adapted to receive the plug 14, with the axis of the latter transverse to and passing through the passage 15. Preferably, the seat 17 is conical in shape and forms a conical passage through the casing. The rotary plug 14 is likewise conical with a taper corresponding to that of the seat 17. Preferably also, the plug 14 extends through the casing and is provided with a threaded shank 18 on its narrower end; the shank being adapted to receive washer 19 and nut 20. A snug fit between the plug 14 and the seat 17 is maintained regardless of wear, by appropriately tightening the nut on the shank 18. The axis of the plug 14 and the seat therefor are advantageously disposed in a horizontal plane as shown in Fig. 4.

The plug 14 is also provided with a cross passage 22 located in the plug so as to move into and out of communication with the casing passage 15 upon rotation of the plug about the latter's axis. Plug 14 is further provided wtih an axial passage 23 which communicates with the cross passage 22. The spout 3 is axially connected to the plug 14 in communication with the axial passage 23.

Preferably, the spout 3 has the curved construction shown in Figs. 1, 3 and 4. It is adapted to move into and out of the mold 4 in a vertical plane about the casing by providing a bend 24, usually of about 90°, at a position adjacent to the spout's connection to the plug; the bend leading into the straight portion 25 of the spout. The spout may also be provided with handle 27 for moving the spout and the plug attached thereto, into various positions during the pouring operation. Advantageously, the handle is disposed with its axis in a plane parallel to that of the portion 25 and is attached to the latter so as to form therewith an angle, usually of about 90°. Advantageously also, the distribution of the weight of the handle and its angle with respect to the spout is such, taken with the friction between the plug 14 and the seat 17, as to maintain the spout in the position "*d*" shown in Fig. 3 when the spout is moved to this position.

In the operation of the pouring mechanism, the pouring position of the spout is determined by its edge 28 resting upon the bottom of the mold, as shown in position "*a*" in Fig. 1. In this position substantially all the metal is delivered to the mold as a submerged stream. In addition, the spout is attached to the plug 14 so that, while in position "*a*," the stop-cock is only partially open, as shown in Fig. 5. Advantageously, while in this position, the stop-cock is not more than about one-half open, i. e., not more than about one-half of the cross sectional area of cross passage 22 in plug 14 is in communication with the straight passage 15 in the casing 13. Preferably, the stop-cock is about one-quarter open.

The feature of having the stop-cock only partially open while the spout is in the pouring position permits the metal to be introduced into mold 4 at a controlled rate, thereby preventing too rapid a flow of molten metal into the mold, whereby turbulence and oxidation of the metal

during casting is reduced. At the same time, this feature permits the use of dimensions in passages **15** and **22** of the stop-cock which are sufficiently large to facilitate cleaning.

The spout remains in the pouring position until the mold **4** is filled; then it is readily and easily rotated about the plug **14** by means of handle **27** to raise the spout to the position "*c*" in Fig. 3 where it is clear of the mold. When the spout is in position "*c*," the cross passage **22** in the plug is in the closed position shown in Fig. 7. Thereafter the pouring mechanism may be removed to the right or left about the post **7** on the swivel **8**, as shown in Figs. 1 and 2, in order to move the spout **3** from its position over the mold and, if desired, to a position over another mold. When the metal in the mold is solidified, the ingot is removed in any desired manner. While moving the pouring mechanism in this manner, the spout is held in position "*c*" by the friction between the plug **14** and seat **17** and the weight of the handle **27**.

The feature of the partially opened stop-cock in the pouring position again comes into play when the spout is raised to position "*c*" in Fig. 3 or when it is lowered from this latter position to the pouring position "*a*" of Fig. 1. In thus raising or lowering the spout, it passes through position "*b*" indicated in Fig. 1. In position "*b*," the end **28** of the spout is removed from the bottom of the mold by only a relatively short distance. However, in this position the cross passage **22** in the plug **14** is in the entirely closed position shown in Fig. 6. This insures the spout being in a low position while molten metal is flowing into the mold, and thus minimizes the free fall of metal into the mold. Thus, exposure of the pouring stream to atmospheric oxidation is reduced to a minimum. In addition, turbulence of the molten metal in the mold is further reduced, thereby further reducing oxidation of the metal.

If at any time it becomes desirable or necessary to clean pipe **1** or the stop-cock—for example, due to material freezing therein, this may be accomplished by moving the pouring mechanism from its position over the mold and lowering the spout to position "*d*" shown in Fig. 3. This brings the cross passage **22** into complete alignment with passage **15** in casing **13**, as shown in Fig. 8. The closure **16** may then be removed so that the stop-cock and the pipe **1** may be cleaned readily and easily.

It will thus be seen that the invention affords a pouring mechanism which is simple and inexpensive to construct. It likewise permits a submerged stream of the material to be poured into a mold at a controlled rate with a minimum of turbulence and exposure to atmospheric air, thereby providing an efficient pouring operation.

What is claimed is:

1. In a lead pouring mechanism, a mold, a supply pipe adapted to supply said mold with molten lead, a stop-cock connected to the discharge end of said supply pipe, said stop-cock comprising a casing having a first passage communication with said supply pipe, a second casing passage adapted to receive and seat a rotary plug, said second passage communicating with said first passage and being generally transverse to the latter, a rotary plug disposed and seated in said second casing passage, said plug having a cross passage capable of being moved into and out of communication with said first casing passage upon rotation of the plug in the second casing passage, an axial passage in said plug communicating with said cross passage, and a spout communicating with said axial plug passage for delivering molten lead from said plug to said mold, said spout being connected to and rotatable with said plug, the axis of the discharge end of said spout being generally transverse to said axial plug passage, the linear dimension of said spout being such that the discharge end of the spout is capable of being moved to a position closely adjacent the mold bottom when the spout is rotated about said casing, the disposition of said spout on said plug in relation to said cross plug passage being such as to provide a spout pouring position upon rotating the spout about the casing in which the discharge end of the spout is in close proximity to the bottom of said mold and said cross plug passage is in partial communication with said first casing passage whereby substantially all of the molten lead supplied to said mold is delivered thereto as a submerged stream thereby reducing turbulence and oxidation of the molten lead in the mold during casting.

2. In a lead pouring mechanism, an open top mold, a supply pipe adapted to supply said mold with molten lead, a stop cock connected to the discharge end of said supply pipe, said stop-cock comprising a casing having a straight transverse passage therethrough aligned with and communicating at one end with said supply pipe, said casing having a removable passage closure at the other end of said passage, a conical passage in said casing communicating with said first passage and adapted to receive and seat a conical plug, the axis of said conical passage being transverse to and passing through the axis of said first passage, a rotary plug disposed and seated in said conical passage, said plug having a straight cross passage therethrough, the center of said cross passage being approximately in alignment with the axis of said first casing passage, said cross passage being movable into and out of communications with said first casing passage upon rotation of said plug in the conical casing passage, an axial passage in said plug communicating with said cross passage, a spout communicating with said axial plug passage for delivery of molten lead from said plug to said mold, said spout being connected to and rotatable with said plug, the axis of the discharge end of said spout being generally transverse to said axial plug passage, the linear dimension of said spout being such that the discharge end of the spout is capable of resting in the bottom of the mold when the spout is rotated about said casing, the disposition of said spout on said plug in relation to said cross plug passage being such as to provide a spout pouring position upon rotation of the spout about the casing in which the discharge end of the spout is resting upon the bottom of the mold and in which pouring position said cross plug passage is partially in communication with said first casing passage whereby substantially all of the molten lead supplied to said mold is delivered thereto as a submerged stream thereby reducing turbulence and oxidation of the molten lead in the mold during casting, said disposition of the spout on said plug providing a closed position upon rotating the spout to remove the discharge end thereof from the mold in which position said cross plug passage is wholly out of communication with said first casing passage, said disposition of the spout on said plug providing a clean-cut position upon further rotation of the spout about the casing in which position said cross plug passage is in full communication with said first casing passage whereby upon removal of said straight passage closure cleaning of said supply pipe is facilitated, and means for moving said supply pipe to move said spout into and out of registry with said mold.

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