Jan. 3, 1933. M. J. NEMES 1,893,436

STOPPER OPERATING MECHANISMS FOR LADLES

Filed March 19, 1931

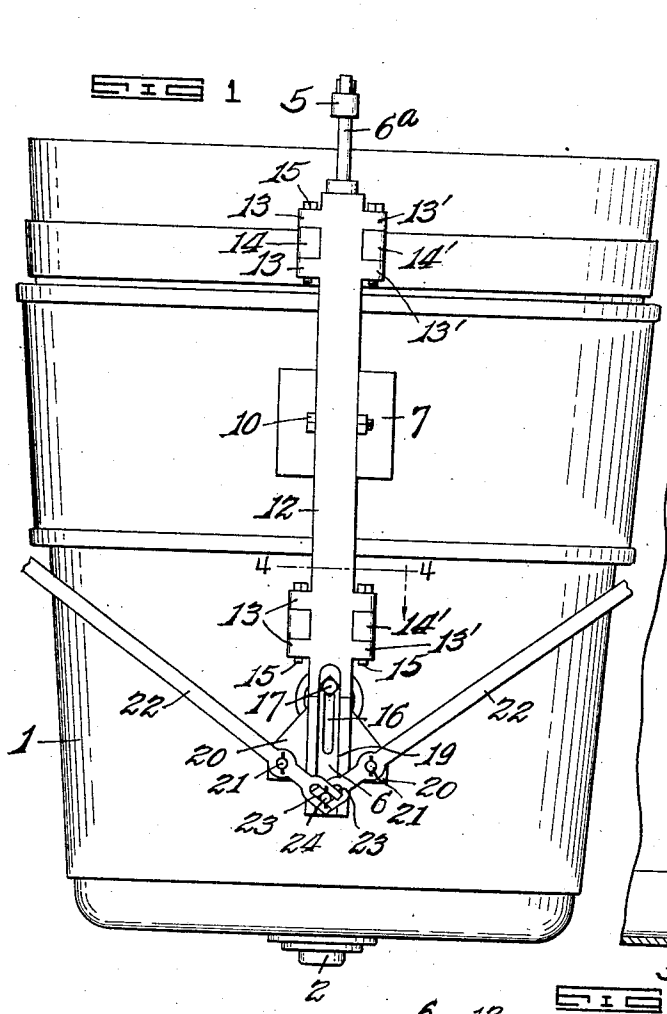


FIG 1

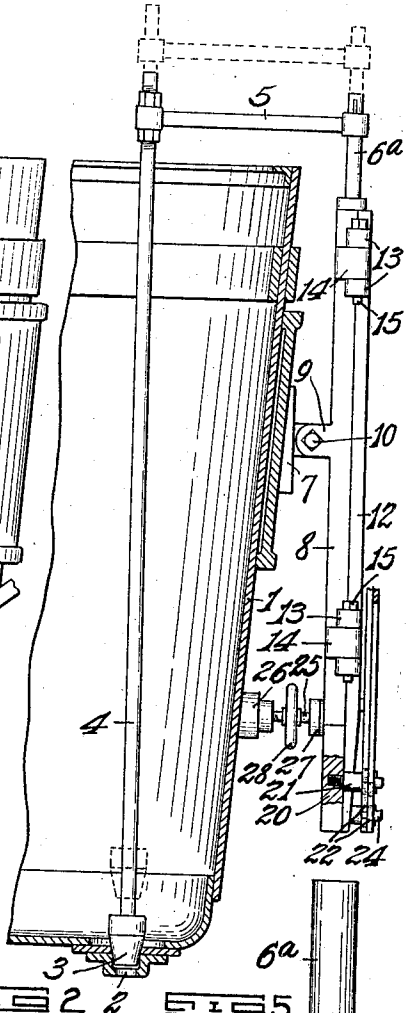


FIG 2

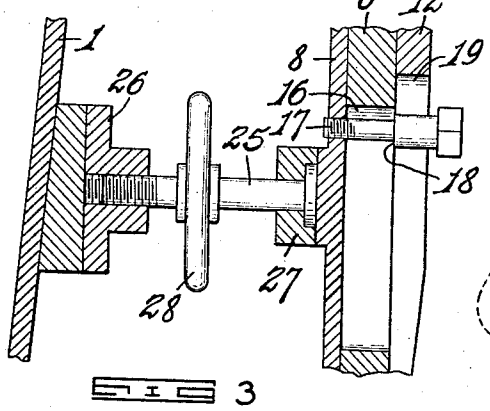


FIG 3

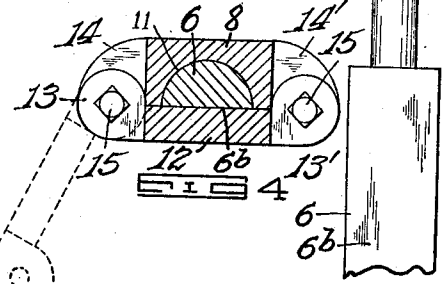


FIG 4

FIG 5

INVENTOR

Mike Julian Nemes

BY

M. E. Ducelaf

ATTORNEY

Patented Jan. 3, 1933 1,893,436

UNITED STATES PATENT OFFICE

MIKE JULIAN NEMES, OF STEUBENVILLE, OHIO, ASSIGNOR OF ONE-THIRD TO WM. A. HAMILTON, OF STEUBENVILLE, OHIO

STOPPER OPERATING MECHANISMS FOR LADLES

Application filed March 19, 1931. Serial No. 523,779.

This invention relates broadly to ladles of the type employed in the making of steel, and more specifically to mechanism for operating the stoppers of such ladles.

The primary object of the invention is to provide, in association with a ladle, novel and improved mechanism for effecting lowering and elevating movements of the stopper with respect to the orifice or nozzle through which the molten metal is poured from the ladle.

A further object is to provide a stopper operating mechanism, or rig, embodying an improved form of housing for the vertically shiftable rod by means of which is supported the stopper and the stopper-carrying stem, said housing affording convenient access for removal and replacement of said rod as occasion requires.

In describing the invention in detail, reference is herein had to the accompanying drawing, in which—

Figure 1 is a side elevation of a steel ladle, showing in front elevation my invention applied thereto;

Figure 2 is a partial vertical section of said ladle, showing the invention in side elevation;

Figure 3 is an enlarged vertical detail section showing the stopper aligning mechanism;

Figure 4 is an enlarged section on line 4—4, Fig. 1; and—

Figure 5 is an enlarged front elevation of the upper end portion of the shift rod.

Referring to said drawing, 1 designates generally a ladle of the character commonly employed for receiving and transferring molten steel and other metals to molds, said ladle having in the bottom thereof a delivery port or nozzle 2 through which the metal is poured.

Vertically movable into and out of closing relation to the delivery port 2 is a stopper 3 carried on the lower end of a vertically disposed rod or stem 4 which, in turn, is carried by the inner end of a horizontally disposed arm 5, commonly termed a "goose neck." Said arm is mounted at its outer end upon the reduced or shaft-like upper end portion 6^a of a vertical shift-rod 6 which is shiftable vertically for effecting lowering and elevating movements of the stopper relative to said delivery port.

The shift-rod 6 has a substantial midlength portion thereof closely encased by and longitudinally shiftable in a housing provided therefor which is pivotally mounted intermediate its ends at a side of the ladle, as upon a bracket 7. Said housing comprises an upright body 8 which carries, or has formed integral therewith, intermediate its upper and lower ends an inwardly directed arm 9 mounted upon a pivot pin or bolt 10 carried by said bracket 7. Provided in the outer face of and extending throughout the length of said body 8 is a channel 11 of approximately semi-cylindrical form adapted for the reception of the adjacent side of the body portion of the shift-rod 6.

Suitably mounted upon and complementing said body 8 in the formation of the shift-rod housing is a face plate 12 which may either be completely or partially removable relative to said body. By preference and as herein shown, said face plate has hinged relation at one of its lateral edges with said body, having hinge lugs or members 13 articulated with and pivoted to corresponding lugs 14 formed on said body 8, thus to render said plate movable on its hinges into and out of complemental closing relation to said body.

A similar hinged relation between said body and said face plate may be provided at the opposite side of the housing by the provision of lugs 13′ and 14′, thus not only to afford means for effectively securing said edge to the body 8, but also to render it possible, in opening the housing, to utilize either set of hinges according as it is desired to swing said face plate toward one side or the other. To open the housing the pivot pins 15 of one or the other of the two sets of hinges are withdrawn, thereby rendering said face plate free to swing to open position, as indicated in dotted lines in Fig. 4.

The purpose had in view in rendering the shift-rod 6 removable is to permit straightening thereof in the event that it should become bent to the extent that elevation and lowering

thereof is prevented or can be effected only with difficulty.

Provided in the lower end portion of the shift rod is a longitudinal slot 16 through which extends the reduced inner end portion of a shouldered adjusting bolt 17. Following seating of the stopper 3, said bolt may be adjusted to seat its shoulder 18 in binding relation to said rod at opposite sides of said slot for maintaining said stopper against chance withdrawal. The slot 16 possesses such length that the required shifting movements of the shift rod may be effected without removal of said bolt. The lower end of the face-plate 12 is also provided with a slot 19 through which the outer end portion of said bolt protrudes, as shown.

The lower end portion of the body 8 of the housing for the shift rod has opposite laterally extending wings 20 in each of which is mounted a pin 21, and pivotally mounted upon each of said pins is an intermediate portion of a hand lever 22 which is adapted to be manually operated to effect elevating and lowering movements of said shift rod.

Each of said levers has in its inner end portion a slot 23 in which is received a lift-pin 24 that has its inner end fixed in the shift rod. As is obvious, downwardly directed force applied manually to either or both of said levers tends to elevate the shift rod and thus, through the intermediacy of the arm 5 and stem 4, to effect withdrawal of the stopper 3 from the delivery port or nozzle 2.

Interposed between the lower part of the shift-rod housing and the adjacent wall of the ladle is mechanism for adjusting the position of said housing for disposing the stopper and its stem in accurately alined relation to the delivery port. Said mechanism comprises a horizontally disposed screw, or a shaft 25 having a screw-threaded end operatively engaged with the screw threads of a socketed bracket 26 fixed upon the side of the ladle. The opposite end of said screw 25 is swiveled in a bracket 27 carried by the adjacent face of the body 8 of the housing, as shown. A hand wheel 28 fixed on said shaft affords means whereby said shaft may be rotated to rock the housing on its pivotal mounting for effecting the required adjustment.

While the body of the shift rod 6, in the preferred form herein shown, is of semi-cylindrical form, presenting a flat face 6^b against which the inner face of the face-plate 12 seats when the latter occupies its closed position, it is manifest that said rod may have other suitable form.

What is claimed is—

A mounting for the shift rod of the stopper of a ladle including an elongated member having a longitudinal socket which opens through a side face of the member for receiving the rod, means to support said member on a ladle, a second member for engagement with said side face of the first member and complemental thereto for providing a bearing for the rod, means on opposite sides of the members for hingedly and removably connecting each side of the second member to the first member, said hinging means being independent of each other and each including a removable hinge pin so that upon selective removal of either pin the second member may be swung away from the first member on either of its sides.

In testimony whereof, I affix my signature.

MIKE JULIAN NEMES.