J. W. BROWN, JR.

METAL POURING APPARATUS FOR CASTING PLANTS.

APPLICATION FILED MAY 6, 1910.

1,034,970. Patented Aug. 6, 1912.

2 SHEETS—SHEET 1.

Fig. 1.

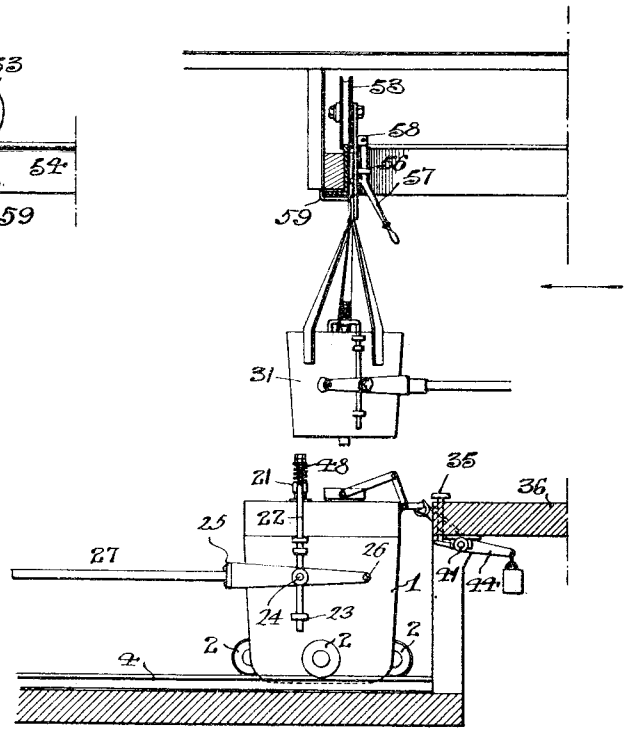


Fig. 4.

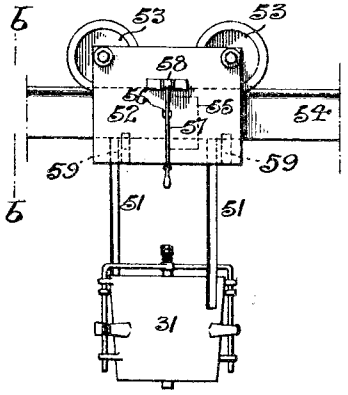
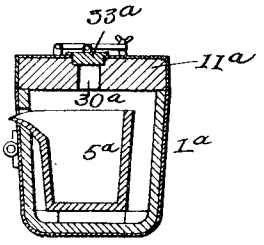


Fig. 6.



Witnesses.—

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2 SHEETS—SHEET 2.

Fig. 2.

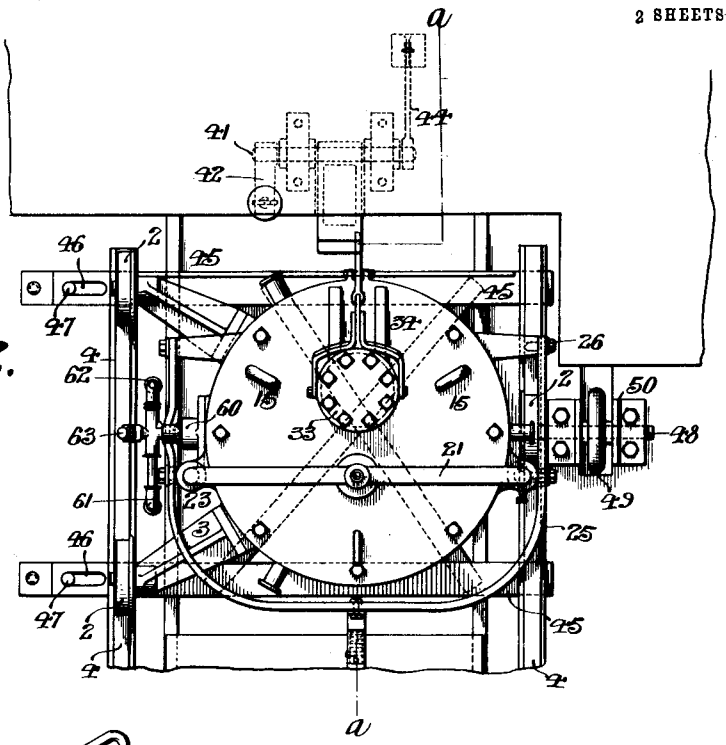

Fig. 5.

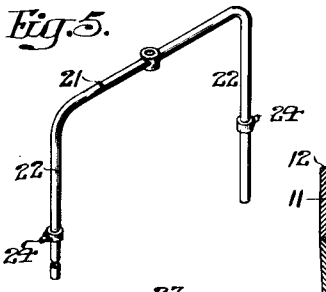

Fig. 3.

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UNITED STATES PATENT OFFICE.

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METAL-POURING APPARATUS FOR CASTING PLANTS.

1,034,970. Specification of Letters Patent. Patented Aug. 6, 1912.

Application filed May 6, 1910. Serial No. 559,774.

To all whom it may concern:

Be it known that I, JOHN WILSON BROWN, Jr., a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Metal-Pouring Apparatus for Casting Plants, of which the following is a specification.

My invention relates to certain improvements in the means for carrying and pouring the metal used in casting.

The invention is particularly adapted for use in connection with the continuous casting apparatus such as shown and described in the application for patent filed by me on the eighth day of January, 1910, under Serial No. 537,076, although it will be understood that it can be used in other apparatus, especially those in which the flask is carried by an intermittently movable conveyer.

The object of my invention is to so construct the pouring ladle and the carrying ladle that a large quantity of the molten metal can be quickly and accurately handled, and the molten metal in the pouring ladle kept at the proper temperature during the pouring process.

The invention also relates to certain improvements in means whereby the pouring ladle can be readily removed when repairs are needed and another ladle quickly substituted for it.

In the accompanying drawings:—Figure 1, is a view showing my improved pouring ladle with the carrying ladle located directly above it and in position to discharge its contents into the pouring ladle; the section being taken on line *b*—*b*, Fig. 4; Fig. 2, is a plan view of the pouring ladle; Fig. 3, is a sectional view on the line *a*—*a*, Fig. 2; Fig. 4, is a side view of the carrying ladle; Fig. 5, is a perspective view of the stopper bail, and, Fig. 6, is a view of a modification.

1 is the pouring ladle, in the present instance supported by three wheels 2; two of the wheels being on one side and mounted in bearings on brackets 3, while the other wheel is mounted at the center on the other side. Four wheels may be used, if desired.

4, 4 are the tracks upon which the wheels are mounted and upon which the pouring ladle can be moved from its position to one side, in the event of its being injured so that another pouring ladle can be placed in its stead.

The pouring ladle is made, in the present instance, of an inner crucible 5 and an outer shell 6. There is a space 7 between the crucible and the shell so as to allow for products of combustion from a gas or oil burner to play around the crucible to keep it hot. In the present instance the shell is made of a metallic casing 8, a fire clay lining 9 and an asbestos filling 10.

11 is the cover of the ladle, also having a metallic casing 12, clay lining 13 and a filling of asbestos 14. Eyes 15 are secured to the cover so that a crane hook can be readily coupled to the eyes for the purpose of lifting the cover off the ladle.

Extending through the cover of the ladle is a stopper 16, which seats itself against a nipple 17 in the bottom of the crucible 5, and in the casting directly under this nipple is an opening 18. When the stopper is raised the metal will freely flow through the nipple and through the opening 18 into the pouring hole 19 of the mold 20, which is located directly under the ladle.

The stopper is reduced at its upper end and passes through a cross head 21. On each end of this cross head are depending arms 22, which pass through guides 23 in the shell 6 and have pins 24 which are swiveled on a yoke frame 25 pivoted at 26. This yoke frame has a handle 27 by which the valve can be operated.

A spring 28 is mounted between a head on the stopper and the cross head, so that, in the event of the stopper sticking in the bottom, a pressure can be exerted which will first compress the spring and then lift the stopper.

The stopper is preferably provided with a projection 29 which enters a nipple 17 so as to insure the stopper properly seating itself against the nipple.

In the cover 11 is an opening 30 through which the crucible can be supplied with molten metal; this opening is directly above the crucible and the carrying ladle 31 can be moved to position directly over the opening 30, as indicated in Fig. 1. The valve of this carrying ladle can be actuated so as to

allow the molten metal to discharge from the carrying ladle through the opening directly in the crucible 5.

The stopper of the carrying ladle may be actuated by any suitable mechanism, but I have shown in the drawings mechanism similar to the operating mechanism of the stopper of the pouring ladle.

33 is a cap for closing the opening 30, and this cap is adapted to slide on ways 34 and is actuated by a treadle 35 on a fixed floor 36 of the building. Pivoted to the cover 11 is a lever 37, and one arm of this lever is connected to the cap by a link 38, while the other arm of the lever enters a jaw 39, when in the position illustrated in Fig. 3, of a weighted arm 40 which is pivoted on a shaft 41. On one end of this shaft is an arm 42 directly under the tappet 43 and on the other end of the shaft 41 is a weighted lever 44, so as to normally hold the cap in its closed position, as illustrated in full lines, Fig. 3. When the foot is placed upon the tappet 43 the cap is moved over to the position shown by dotted lines in Fig. 3. By this construction the ladle can be moved away from the floor and placed back in position, or a new ladle placed in position, and one arm of the lever 37 will aline with the jaw 39 of the arm 40.

When the ladle is used in connection with a continuous casting apparatus, where the flasks are connected together in an endless chain, I mount the rails 4 upon ties 45, as shown in Fig. 2, and these ties are slotted at 46, in the present instance, and pins 47 project through the slots from base plates and attached to the frame, consisting of the rails 4 and ties 45, is a screw 48 and on the screw is a handled nut 49 confined between bearings 50, so that on turning the handled nut the pouring opening in the ladle can be adjusted so as to aline positively with the pouring opening in the molds, as in molding machines of the continuous type the flasks may differ in size and this difference in size will throw the pouring opening to one side or the other, but by having the rails adjustable, as shown, the outlet opening in the ladle can always be brought into line with the pouring opening.

The carrying ladle 31 in the present instance is hung by rods 51 from a trolley 52 having wheels 53 which are adapted to an overhead track 54, and this track leads from the cupola furnace to a point above the pouring ladle and, in plants where there are a number of pouring ladles, the track extends over all of these ladles so that one carrying ladle can supply molten metal to all of the pouring ladles.

In order to bring the carrying ladle quickly in alinement with the opening 30 of the pouring ladle, I provide a stop 55 on the rail against which comes in contact a pin 56 on a lever 57 pivoted at 58 to the trolley so that when the pin is in contact with the stop 55 the mouth of the pouring ladle is in line with the opening in the carrying ladle.

In order to prevent the ladle swaying while being carried, I provide angle clips 59 which rest back of the rail, as shown in Fig. 4, so that while the ladle can be moved rapidly from one point to another it cannot sway and cause the ladle to spill.

In order to keep the molten metal in the pouring ladle hot, I provide a burner 60 which is connected to a gas or oil pipe 61 and an air supply pipe 62, and a valve 63 is provided for regulating the flow of gas through the burner. When the gas is ignited the flame and products of combustion will play over and around the crucible.

It will thus be seen that I provide an apparatus for pouring molten metal especially adapted for continuous casting machines, in which the carrying ladle can be brought quickly and accurately in line with the pouring ladle so as to discharge its contents into the pouring ladle, and that this single carrying machine can feed any number of pouring ladles, and that the metal in the pouring ladle is kept in a heated condition by the flow of products of combustion around the crucible.

The stopper can be quickly and accurately operated so as to discharge any quantity of metal desired into the pouring opening of the flask.

In Fig. 6, I have illustrated a modification of my invention applied to a tilting ladle. 1^a is a pouring ladle provided with a cover 11^a, having a central opening 30^a, which is closed by a cap 33^a. The spout of the crucible 5^a extends through an opening in the casing of the ladle, as shown.

I claim:

1. The combination of a pouring ladle having a casing, a crucible within the casing, a channel for products of combustion surrounding the crucible, the crucible having a pouring opening, a casing having an opening alining with the pouring opening in the crucible, a plug arranged to close said pouring opening, and means for supplying heat to the ladle.

2. The combination of a pouring ladle, a crucible within the ladle, said crucible having a pouring opening, a stopper for the said opening, a cover secured to the ladle, said cover having an opening directly above the opening for the introduction of the molten metal, a sliding cap for the said opening, a two-armed lever having one arm connected to the cap, and operating means connected to the other arm for opening and closing the cap.

3. The combination of a pouring ladle having wheels, a track for said wheels, a

cover for said ladle, said cover having an opening, a sliding cap for said opening, a lever for moving the cap to its open or closed position, a treadle mechanism having an arm, with an open jaw in line with one of the arms of the lever so that, on the movement of the ladle on the track, the lever can be moved into or out of the jaw.

4. The combination of a pouring ladle having a cover, said cover having an opening, a sliding cap for the opening, a lever pivoted to the cover and having one arm connected to the cap, a shaft, an arm on the shaft connected to the other arm of the lever, a weighted arm, a tappet arm on the shaft, and a tappet in line with the arm so that when the tappet is depressed the cap will be opened.

5. The combination of a pouring ladle, a frame carrying the pouring ladle, a flask under the ladle, and means for adjusting the pouring ladle and its flame so as to bring the pouring opening of the ladle in line with the pouring opening of the flask.

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

JOHN WILSON BROWN, JR.

Witnesses:
WM. E. SHUPE,
WM. A. BARR.