C. E. HOPKINS.

STEREOTYPE METAL CONVEYER.

APPLICATION FILED JAN. 7, 1913. RENEWED JAN. 14, 1919.

1,313,895. Patented Aug. 26, 1919.

2 SHEETS—SHEET 1.

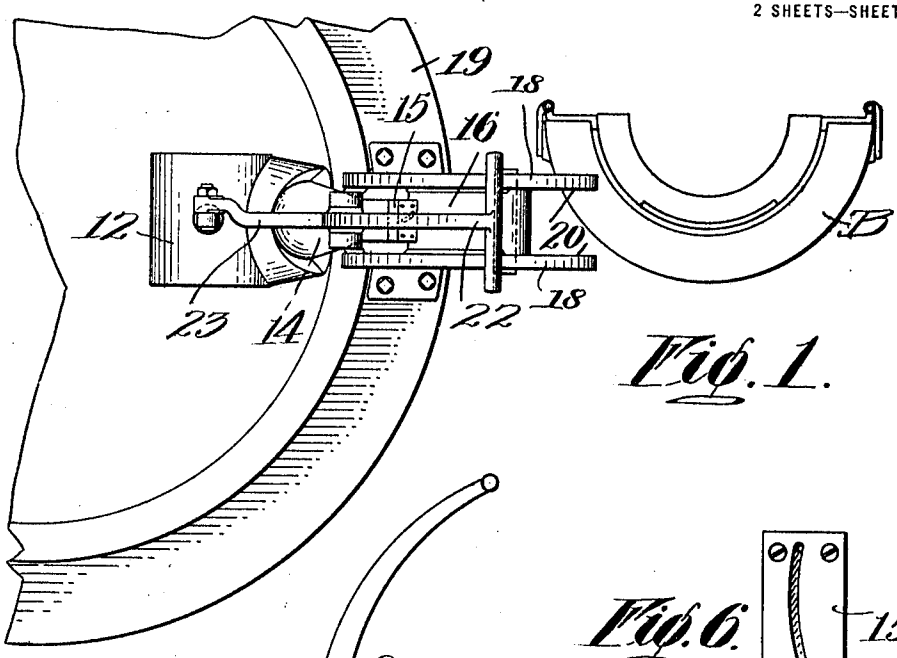


Fig. 1.

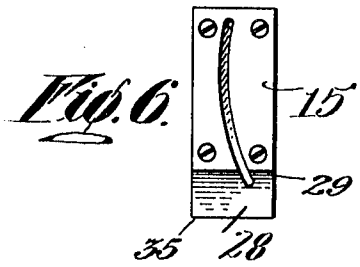


Fig. 6.

Fig. 2.

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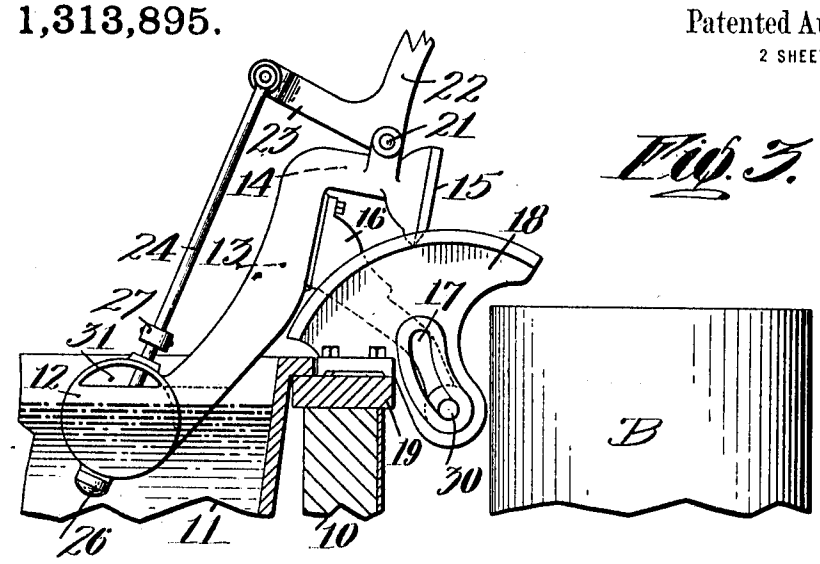


Fig. 3.

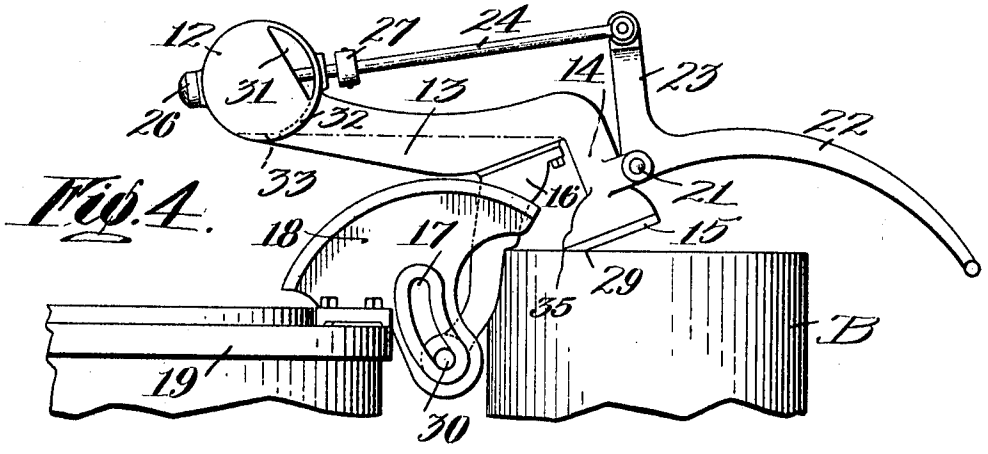


Fig. 4.

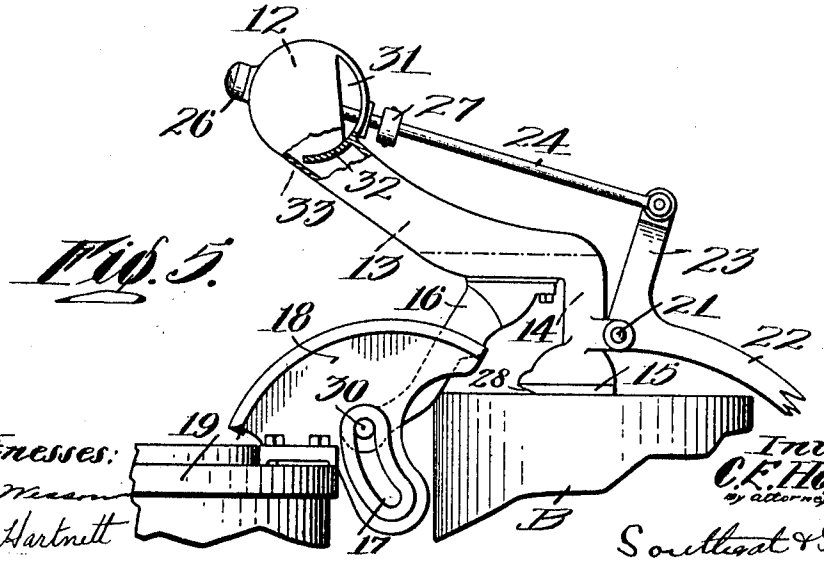


Fig. 5.

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UNITED STATES PATENT OFFICE.

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STEREOTYPE-METAL CONVEYER.

1,313,895. Specification of Letters Patent. Patented Aug. 26, 1919.

Application filed January 7, 1913, Serial No. 740,615. Renewed January 14, 1919. Serial No. 271,164.

To all whom it may concern:

Be it known that I, CHARLES E. HOPKINS, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented a new and useful Stereotype-Metal Conveyer, of which the following is a specification.

My invention principally refers to stereotype plate casting and its object is to provide a simple mechanical conveying means, for transporting molten metal by the action of gravity having all the advantages of a metal pump without its disadvantages, which consist in high cost of construction and the necessity of taking out the piston and pump chamber every little while to clean and repair.

I am aware that mechanical ladles for stereotype plate casting purposes have been invented, but so far as I know none have ever met the requirements necessary in casting perfect stereotyping plates.

Owing to the mold surface used for reproducing type faces on stereotype printing plates being formed of paper, it is necessary to use a metal that fuses at a very low temperature; naturally such metal has to be handled very quickly, and in the old days when hand ladles were in general use, it was considered necessary to pour a ladleful as rapidly as possible. In reality it was not a matter of getting "it in all at once" but of pouring a very steady and quick stream, and holding the ladle down close to the open mouth of the casting chamber.

Certain well known changes in working conditions have brought forth the metal pumps, which have superseded the hand ladle. One of the pump's chief advantages was the inclosing, and thereby protecting the molten metal from atmospheric changes during its passage from the metal pot to the casting chamber, as well as delivering it through a nozzle, alined with the open mouth of the casting chamber and shaped so as to conform with the chamber's opening. These advantages I retain in their full force by my invention.

All the mechanical ladles I have seen illustrated have been open at the top; therefore on pulling the ladle from the metal it carried more or less dross along with the metal into the discharge spout. One object of this invention is to provide against this defect and prevent the entrance of dross formed on the surface of the molten metal in the melting pot. Another object is to provide an inclosed chamber so as to keep the metal from contact with the outer air during its entire travel. Further objects of the invention are to prevent the possibility of dross, should it enter, advancing into the mold through the vents during the operation of filling; to provide, by means of overflow, measuring gages, for regulating the quantity of metal entering the mold; and to provide for overcoming a great deal of the leverage otherwise necessary in conveying the metal. In my present construction as the conveyer is being elevated out of the pot, the metal begins to move along the same toward the center of gravity until the nozzle of the conveyer reaches a second pivot point in which position practically all the metal has passed out of the receiving portion of the conveyer. At this point the conveyer changes its pivot from a long swing to an abrupt one from the nozzle. This action is naturally sudden and instantly causes the metal to rush ahead, down and out through the nozzle opening, and into the chamber of the casting box.

Reference is to be had to the accompanying drawings, in which—

Figure 1 is a plan of a preferred form of the invention.

Fig. 2 is a side elevation of the conveyer, positioned in a melting pot and furnace, which are shown in section, also the rear side of a casting box.

Fig. 3 is a similar view showing the valve or intake closed and the conveyer raised partly out of the metal with the overflow vents exposed above the drossy surface of the metal.

Fig. 4 is a side view showing the conveyer turned out of the pot and resting on its two pivot points. It also shows by dotted lines the position of the metal in the conveying chamber.

Fig. 5 is a similar view showing the conveyer turned to the pouring or discharge position and the metal line dotted in, and

Fig. 6 is a front elevation of the discharge outlet.

Referring to the drawings 10 indicates a furnace in which is suspended a melting pot 11, both of which are old in the art.

Suspended over the melting pot by brackets is the conveyer in the form of a bodily movable receptacle which comprises three

principal elements, *i. e.* receiving chamber, conveying chamber, and discharge chamber, all formed in one casting.

As shown in Fig. 2 the conveyer is supported with its receiving chamber 12 extending down into the pot 11, the conveying chamber 13 extending vertically above, and the discharge chamber 14 nearly horizontal; and the nozzle 15 extending toward the casting box B.

The conveyer is supported by a bracket 16 pivoted so as to operate between two brackets 18 fixed to the furnace rim 19. To the conveyer is pivoted at 21 the operating lever 22 having a projecting arm 23 to which is attached a rod 24 which operates through an opening in the top of the receiving chamber 12, and down through the intake 25 located in the lower face of the receiving chamber. To the lower end of this rod 24 is fixed a plunger 26; also fast on the rod 24 is a stop collar 27 for engaging and pushing down the receiving chamber when being positioned in the metal.

It will be seen that the receiving chamber 12 is made barrel shape, and the conveying chamber 13 is curved so as to form a receptacle, when the conveyer is horizontal, or resting on its two pivot points 29 and 35. (See Fig. 4).

As stated the conveyer is attached to one end of the bracket 16 the opposite end being supported by a pin 30 which acts as a pivot and operates in two curved cam ways 17—17 formed in the brackets 18—18. These brackets 18—18 are positioned so that their two contiguous faces 20—20 engage and support the conveyer bracket 16 against any lateral movement of the conveyer.

In operating the conveyer the operator pulls down on the lever 22 which action first moves the intake plunger 26 into closed position against the face of the intake 25, as the movement of the lever continues downward the conveyer is lifted through the intake plunger's engagement with the receiving chamber intake and the plunger's connections with the lever. As soon as the movement of the conveyer begins the metal in the conveying chamber 13 (which of course extends above the surface of that in the pot) moves down and out of overflow vents or measuring gages 31. The overflowing continues until the conveyer is moved into or near the position shown in Fig. 3, above the surface of the metal in the pot, the bottom straight line of the vents 31 being positioned so that just the quantity required remains in the receiving chamber. During this period of overflowing any dross that may have entered the receiving chamber through the vents is washed out.

Continuing the downward movement of the lever the receiver is gradually elevated to the position shown in Fig. 4 with the bevel 28 formed on the nozzle 15 engaging the top surface of the casting box B positioned as aforesaid. In this position the conveying chamber is practically horizontal and practically all the metal has receded from the receiving chamber owing to its elevation in this position being greater than that of the conveying chamber. In this position the conveyer rests upon the two pivot points 29 and 35.

The conveyer, as stated, is now in the position shown in Fig. 4 and the metal practically all in the conveying chamber and above the pivot 35. As the downward movement of the lever is continued the conveyer changes its pivoting point from 35 (in the brackets 18) to the nozzle which is in engagement with the top of the casting box. And as the pivoting continues the pin 30 moves up the cam grooves 17—17 formed in the brackets 18—18. This second pivoting is purposely made a quick action, so as not only to get the nozzle in proper position over the casting box chamber, but to cause the metal to choke up the discharge chamber 14 and act as a force in ejecting the metal through the nozzle 15 and into the casting chamber of the box.

After all the metal has been discharged from the conveyer the movement of the lever is reversed, during which the receiving chamber comes into contact with the metal in the pot as shown in Fig. 3, and owing to the main weight of the conveyer resting on the pivot 35, the receiving end will float until the collar 27 on the rod 24 engages with the top of the receiving chamber. This action pushes the plunger 26 free from the intake whereupon the metal rushes into the receiving chamber and fills it sufficiently to close the space 33 below the baffler 32 before the chamber is sunk sufficiently to allow the metal to flow in through the vents 31.

The baffler 32 is formed by the wall of the receiving chamber 12 extending below the top to near the bottom wall of the conveying chamber, allowing only a narrow opening 33 for the passage of metal.

Although I have illustrated and described a preferred embodiment of the invention, I am aware that many modifications can be made therein without departing from the scope of the invention as expressed in the claims. Therefore I do not wish to be limited to all the details of construction herein shown and described, but what I do claim is:—

1. As an article of manufacture, a device for conveying molten metal by the action of gravity, movable into and out of the molten metal and having a transverse receiving chamber adapted to be submerged in the molten metal and provided with a valved intake at the bottom thereof.

2. As an article of manufacture a bodily

movable device for conveying molten metal by the action of gravity having a receiving chamber adapted to be moved into and submerged in the molten metal and provided with an intake at the bottom thereof, and having a wall at the opposite end separating it from the rest of the device, said wall having an outlet.

3. As an article of manufacture, a bodily movable device for conveying molten metal by the action of gravity having a receiving chamber adapted to be submerged in the molten metal and provided with an intake at the bottom thereof, having an outlet, and a separate depressed conveying chamber between the intake and outlet, adapted when in one position to receive and hold the charge of metal from the receiving chamber.

4. As an article of manufacture, a device for conveying molten metal having a receiving chamber adapted to be submerged in the molten metal and provided with an intake, having an outlet, and a separate conveying chamber between the receiving chamber and outlet, said conveying chamber having a capacity for receiving the entire charge of metal from the receiving chamber and delivering it to the outlet.

5. As an article of manufacture, a device for conveying molten metal having a receiving chamber adapted to be submerged in the molten metal and provided with an intake at the bottom thereof, having an outlet at the opposite end, a conveying chamber between the receiving chamber and outlet, and a transversely enlarged discharge chamber located at an angle to the conveying chamber for first receiving the charge of metal therefrom and then discharging it into a mold.

6. As an article of manufacture, a device for conveying molten metal having a receiving chamber adapted to be submerged in the molten metal and provided with an intake at the bottom thereof, having an outlet at the opposite end, and a conveying chamber between the intake and outlet, said device being mounted to move from receiving to discharging position, and the conveying chamber being arranged to receive and hold the entire charge of metal while the device is in an intermediate position.

7. As an article of manufacture, a device for conveying molten metal having a receiving chamber adapted to be submerged in the molten metal and provided with an intake at the bottom thereof, said chamber having a vent opening for discharging surplus metal, whereby the chamber will always be filled with the same quantity of metal when completely submerged.

8. As an article of manufacture, a device for conveying molten metal having a receiving chamber adapted to be submerged in the molten metal and provided with an intake at the bottom thereof, having an outlet at the opposite end, and a conveying chamber between the intake and outlet, said receiving chamber having a baffle plate between it and the conveying chamber.

9. In a molten metal conveyer, an inclosed chamber, mechanical means for admitting and thereafter confining metal in said chamber, said chamber having a free outlet located at a fixed distance above said means, a nozzle, means for moving the conveyer to measure the quantity of metal by the outlet and thereafter discharge the measured metal through said nozzle.

10. In a molten metal conveyer an inclosed chamber, means for admitting metal to said chamber, means for permitting all but a predetermined amount of metal to escape from said chamber, a tubular extension, and means for moving the conveyer to eject metal through said tubular extension.

11. In a molten metal conveyer, the combination of an inclosed chamber having an extension provided with a nozzle outlet, a mechanically controlled inlet to the receptacle, and an outlet for discharging all over a predetermined amount of molten metal from the chamber, with means for moving the receptacle to a position in which its supply of molten metal will be discharged through the said nozzle.

12. In a device for conveying molten metal to a mold, the combination of a movable receptacle having a chamber adapted to be submerged in a body of molten metal and having an inlet at the bottom through which metal may enter it, a valve for controlling said inlet, a handle for moving the receptacle, and means for connecting said valve with the handle.

13. In a device for conveying molten metal to a mold, the combination of a movable receptacle having a chamber adapted to be submerged in a body of molten metal and having an inlet at the bottom through which metal may enter it, a valve for controlling said inlet, a handle for moving the receptacle, and means for connecting said valve with the handle, and for closing the valve when the handle is operated to raise the receptacle out of the body of molten metal.

14. In a device for conveying molten metal to a mold, the combination of a movable receptacle having a chamber adapted to be submerged in a body of molten metal and having an inlet at the bottom through which metal may enter it, a valve for controlling said inlet, a handle for moving the receptacle, and means for connecting said valve with the handle, and for opening the valve when the handle is operated to force the receptacle into a body of molten metal.

15. In a casting apparatus the combination of a casting chamber, means for main-

taining a supply of molten metal, a pivotally mounted conveyer provided with means for receiving a supply of metal from beneath dross formed on the metal's surface, a baffler for preventing the said dross from entering the discharge outlet of said conveyer, and means for moving the conveyer so the discharge outlet will aline with the casting chamber and discharge its supply of metal into said chamber.

16. In a casting apparatus the combination with a melting pot and a casting box, of a conveyer having an intake, a measuring gage, and a discharge outlet, means for moving the conveyer into the melting pot to receive a charge of metal through said intake and thereafter close said intake, and for moving the conveyer to discharge surplus metal through the measuring gage and thereafter cause the remaining metal to be discharged through the outlet into the casting box.

17. In a casting apparatus, a melting pot, a casting chamber positioned at one side of said pot, a metal conveyer comprising a receiving chamber, a conveying chamber and a discharge chamber, each of the latter two chambers having a capacity as great as that of the receiving chamber, and means for moving the said conveyer so as to elevate the receiving chamber above the discharge chamber and aline the latter with the intake of the said casting chamber.

18. In a metal pouring device, the combination of a receiving chamber adapted to be projected under the supply of the molten metal and having an inlet at the bottom for receiving the metal and provided with an outlet or gage at the top by which the surplus metal can be discharged when the device is raised above the surface of molten metal, a depressed conveying chamber connected with the receiving chamber at a point at the bottom of the receiving chamber when in position to discharge into the conveying chamber, said conveying chamber having a capacity for receiving all the metal from the receiving chamber and holding it temporarily, and an enlarged nozzle in position for thereafter receiving the metal from the conveying chamber.

19. In a device for pouring metal, the combination of a receiving chamber having means for receiving metal therein at a point below the surface of the metal into which it is submerged, and having means for discharging the surplus metal whereby it will receive a predetermined and definite quantity of metal, means whereby said receiving chamber can be raised out of the molten metal, a conveying chamber fixed to said receiving chamber and located in position to receive the metal therefrom when the receiving chamber is raised entirely out of the molten metal, the capacity of said conveying chamber below the point at which the metal is discharged into it from the receiving chamber being sufficient to receive all the metal raised into the receiving chamber.

20. In a casting apparatus, the combination with a mold, of a device for pouring metal into the mold comprising a receiving chamber, a pivot on which the chamber can swing, a nozzle for engaging said mold, and means whereby when the nozzle engages the mold said pivot and receiving chamber can swing about the nozzle as a center to bring the nozzle into pouring position.

In testimony whereof I have hereunto set my hand, in the presence of two subscribing witnesses.

CHARLES E. HOPKINS.

Witnesses:

BLODEVEN W. JONES,

JOHN D. ALBIES.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."