June 14, 1932. W. T. ENNOR 1,862,787

POURING TROUGH

Filed July 27, 1931

Fig. 1.

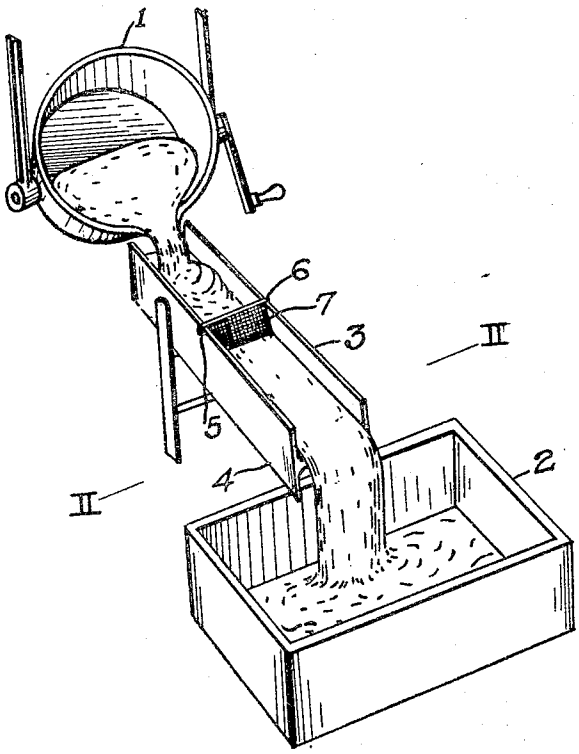


Fig. 3.

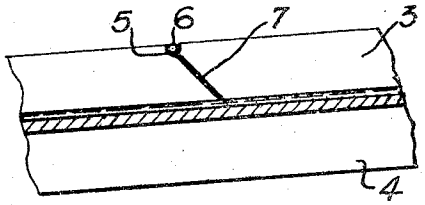


Fig. 2.

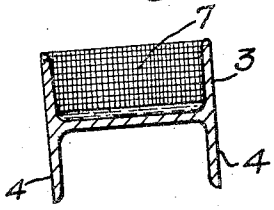


Fig. 5.

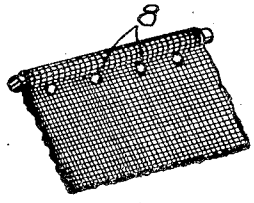


Fig. 4.

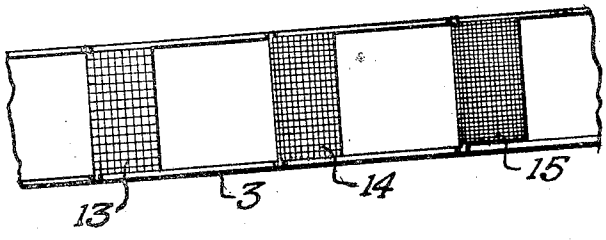


Fig. 7.

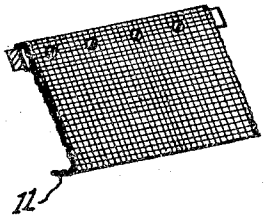


Fig. 6.

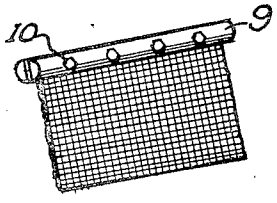
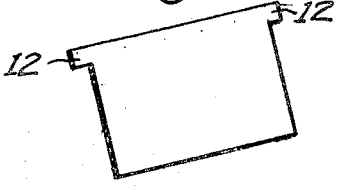


Fig. 8.



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UNITED STATES PATENT OFFICE

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POURING TROUGH

Application filed July 27, 1931. Serial No. 553,316.

This invention relates to pouring troughs for use in the transfer of molten metal, and more particularly to an arrangement for skimming the metal to remove impurities floating on the top of the molten stream as it flows through the trough.

In the transfer of molten metal various arrangements have heretofore been proposed for holding back the slag, dross, and impurities, but these have not been wholly satisfactory for various reasons as for example those which impose too great a restriction upon the flow of the metal. Where no skimming arrangement is provided, the impurities flow on into the mold or receptacle into which the metal is being poured, which is obviously undesirable. For instance, in the casting of ingots, it is essential that the quantity of impurities flowing into the mold along with the metal be kept to the lowest possible minimum.

It is an object of the present invention to provide an improved form of skimming arrangement for trapping or holding back the surface dross floating on the top of metal being transferred from a furnace to a ladle or mold, or from a ladle to a mold or other receptacle.

A more particular object of my invention is to provide a skimming arrangement for the purposes indicated which can be mounted in a pouring trough. A further object is to provide a skimming device which is simple in form, easy and cheap to manufacture, and which can be readily replaced without interfering with the flow of the molten metal.

A specific object is to provide a combined pouring trough and skimmer.

Further objects and advantages of my invention will appear in the accompanying description when taken in connection with the drawing in which:

Fig. 1 is a perspective view showing my invention applied to an arrangement for transferring metal from a ladle into a mold or other receptacle;

Fig. 2 is a transverse section through the pouring trough taken on the line II—II of Fig. 1;

Fig. 3 is a fragmentary longitudinal section through the pouring trough;

Fig. 4 is a fragmentary plan view of a pouring trough showing a modified form of my invention in which a plurality of skimming devices have been employed;

Fig. 5 is a perspective view of a modified form of skimmer;

Fig. 6 is a perspective view of a further modification;

Fig. 7 is a perspective view of a still further modification; and

Fig. 8 is a perspective view of a modification in which the skimmer consists of a flat piece of sheet metal.

For purposes of illustration I have depicted the application of my invention to the transfer of molten metal from a ladle 1 to a mold 2 by means of a pouring trough 3. The pouring trough 3 may be of any desired form but I have found that an I-beam or H-beam may conveniently be employed. The trough 3 shown in the drawing is of such a form, the upper flanges serving to form the sides of the trough and the lower flanges 4 serving to strengthen the trough against bending which may be caused by unequal expansion of the sides and bottom of the trough, the molten metal being always in contact with the bottom of the trough but being in contact with a portion only of the sides of the trough, depending upon the level of the metal flowing through the trough.

The trough 3 is provided with notches 5 to receive the ends of an oscillatory rod or bar 6 to which is secured a skimmer which may consist of a wire gauze or screen 7. This screen may be attached in any convenient manner as for example by being folded over the rod and secured by means of bolts or rivets 8 as shown in Fig. 5; or by being clamped between the halves of a split rod as by means of bolts 10 as shown in Fig. 6.

In the modification of Fig. 7 the lower depending edge of the skimmer has been bent over as at 11 to more effectively hold back the dross. This form is particularly advantageous where the depth of the dross on the metal is relatively great.

In the modification of Fig. 8 a sheet metal

blank is shown in place of a wire gauze or screen. This blank is formed with laterally extending ears 12 at the top edge thereof which are designed to lie in the grooves 5 of the trough to pivotally support the skimmer therein.

The shape of the skimmer 7 should correspond closely to the interior configuration of the trough 3 and should preferably be of such weight that it will float on the top of the flowing metal, thus retaining or removing the surface dross while permitting the smooth flow of the metal underneath the lower edge of the skimmer.

The weight of the skimmer and its length from the point of support to the lower depending edge may be selected with respect to certain variables, such as the inclination of the pouring trough, depth of surface dross, and surface tension of the metal.

It may be found advantageous in some cases to provide a series of skimmers, as shown in Fig. 4, of varying weight, the skimmer 13 nearest the point of ingress of the metal being the heaviest, the skimmer 15 nearest the point of egress of the metal being the lightest, and skimmer 14 being of an intermediate weight. In some cases it may further be found advantageous to vary the coarseness of the wire screen employed in such a series of skimmers, the mesh increasing in fineness in the direction of flow of the metal.

In all of the forms of my invention an essential characteristic of the skimmer is that it is oscillatable about an axis lying above the surface of the flowing metal and is arranged to automatically compensate for increase or decrease in the metal flow so that its lower depending edge will always float at or near the surface of the metal, thus avoiding impedance of the flow of the metal while at the same time insuring that the dross is prevented from flowing into the mold.

It is to be understood that the particular forms of my invention which have been described for purposes of illustration do not define the limits of the invention inasmuch as various changes may be made without departing from its spirit or scope.

I claim:

1. In apparatus for the transfer of molten metal, a skimming member and means for pivotally supporting said member so that its lower edge will be substantially at the surface of the flowing metal.

2. In a pouring trough, means for skimming the dross from flowing molten metal comprising a member pivotally supported above the flowing molten metal and having its depending edge resting substantially at the surface of the metal.

3. In an apparatus for the transfer of molten metal, means for skimming the dross from the flowing molten metal comprising a plurality of skimming members pivotally supported above the level of the metal and having their depending edges supported substantially at the surface of the flowing molten metal, said skimming members being of varying weights and arranged in a gradient of weight decreasing in the direction of metal flow.

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