

G. L. FORT.
HEATING DEVICE FOR METAL MELTING CRUCIBLES.
APPLICATION FILED JULY 18, 1917.

1,279,682.

Patented Sept. 24, 1918.

Fig. I

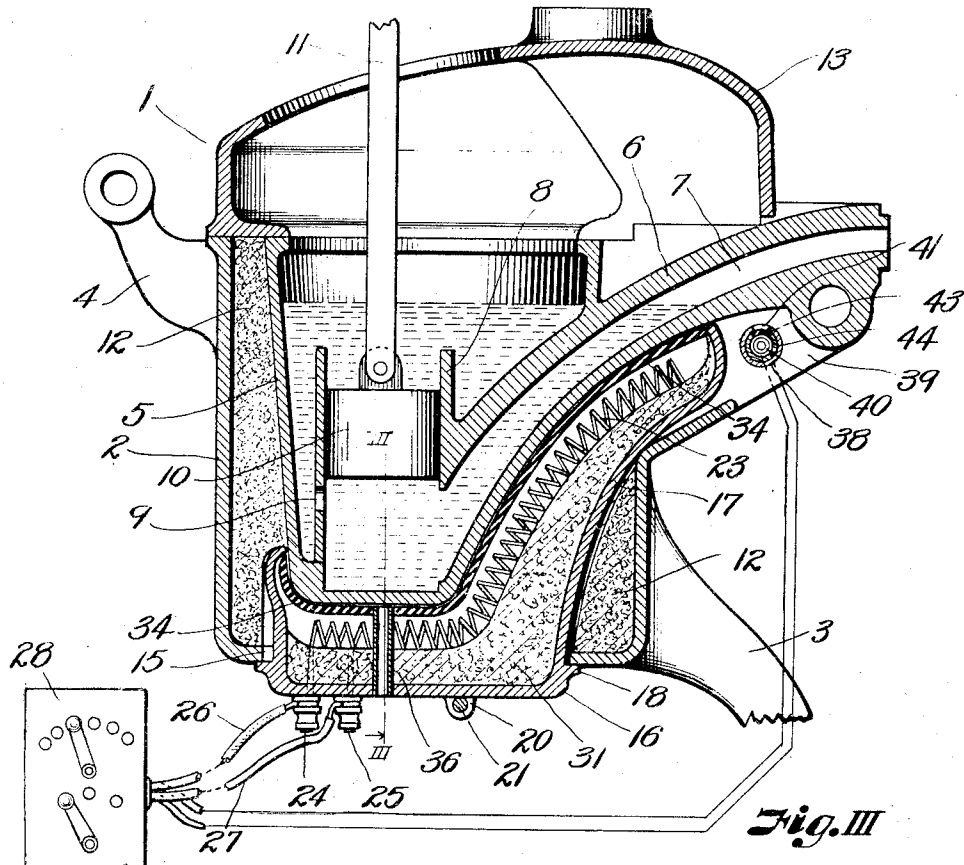
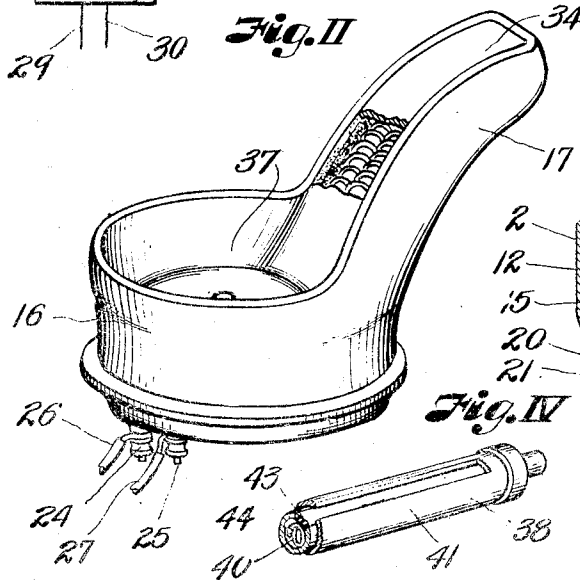
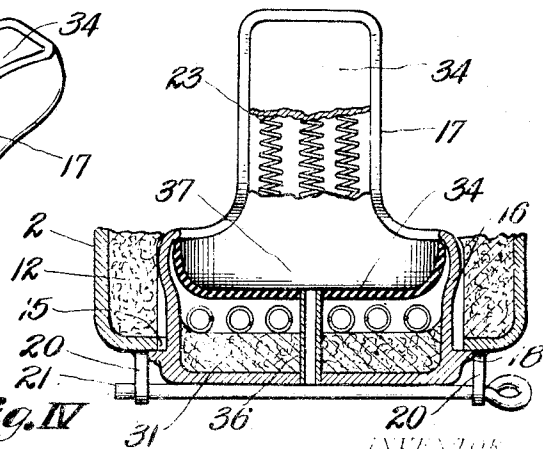


Fig. IV



INVENTOR
George L. Fort
BY *Arthur L. Brown*
ATTORNEY

UNITED STATES PATENT OFFICE.

GEORGE L. FORT, OF KANSAS CITY, MISSOURI, ASSIGNOR TO FORT-IFIED MANUFACTURING COMPANY, OF KANSAS CITY, MISSOURI.

HEATING DEVICE FOR METAL-MELTING CRUCIBLES.

1,279,682.

Specification of Letters Patent. Patented Sept. 24, 1918.

Application filed July 18, 1917. Serial No. 181,265.

To all whom it may concern:

Be it known that I, GEORGE L. FORT, a citizen of the United States, residing at Kansas City, in the county of Jackson and

5 State of Missouri, have invented certain new and useful Improvements in Heating Devices for Metal-Melting Crucibles; and I do declare the following to be a full, clear, and exact description of the invention, such as
10 will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of
15 this specification.

My invention relates to heating devices for metal melting pots such as are used in linotype, and like machines, for supplying molten metal to the type molds, the principal object of the invention being to provide
20 an electrical device of this character whereby heat may be applied to the crucible and along the delivery spout so as to readily melt the metal and insure a free flow of
25 metal from the crucible to the molds.

A further object of the invention is to so construct the device that it may be used interchangeably with gas, gasoline or other heaters, such as are ordinarily used with
30 pots of this character, without necessitating any change in the usual construction of the crucible.

In accomplishing this object, I have provided improved details of structure, the preferred forms of which are illustrated in the accompanying drawings, wherein:
35

Figure I is a transverse vertical section of a metal melting pot equipped with a heating device constructed according to the present invention.
40

Fig. II is a detail perspective view of the device removed from the crucible.

Fig. III is a sectional view of the heating device on the line III—III, Fig. I.

45 Fig. IV is a perspective view of a portion of the crucible mouthpiece heating unit.

Referring more in detail to the drawings:

1 designates a metal melting pot of a type commonly used and forming a component
50 part of linotype or like machines and which comprise an outer casing or jacket 2, having legs 3 at its opposite sides whereby the pot is pivotally supported so that it may be moved by suitable rocker mechanism (not
55 shown) to and from the type mold, to de-

liver molten metal thereto; the rocker mechanism being attached to arms 4 which extend rearwardly from near the top of the casing 2.

Located within the outer casing 2, and spaced therefrom, is a crucible 5, having an upwardly and outwardly curved spout or throat 6 extending from its base, provided with a channel 7 which opens from a well 8 in the base of the crucible. The well 8 has
60 ports 9 therein which is fed from the body of the crucible, and is provided with a piston 10 adapted for actuation by a rod 11 to force molten metal from the well outwardly through the throat channel 7.
65

The space between the crucible 5 and casing 2, except where the heating element is located, is filled with heat resisting packing 12, such as asbestos, and the casing and crucible are covered by a cap 13 to prevent
70 loss of heat from the crucible and thereby avoid loss in efficiency of the heating unit employed.

At its base, the casing 2 is provided with an opening 15 through which a heating device may be inserted into and removed from the casing, the device embodying the present invention being so constructed that it may be supported in functional position by the same means that are used to support the
80 ordinary standard gas, or other heating devices.

The crucible here shown is of the type in general use and at the lower end is rounded off to present a maximum amount of heating surface, the spout being exposed on its under side so that it may be heated to retain the metal therein in molten condition until it is delivered into the mold.
90

In order to secure the best results, the heating device is so made that when it is placed in position it will fit closely about the exposed, rounded end of the crucible and will extend along the under side of the throat 6 as far as the construction of the
100 casing 2 will permit.

The heating device in its preferred construction, comprises a metallic housing 16, preferably of a cup like character and having an upwardly and outwardly curved
105 trough portion 17 extending from one side; the cup and spout being of such size and shape that they will receive and closely fit about the exposed under surface of the crucible and spout, so that heat generated by a
110

heating unit (presently described) located within the cup and trough portion cannot possibly escape except through the crucible, thereby affording maximum efficiency of the heating device.

The housing cup is of such size that when in position it fills the opening 15 in the casing and is provided adjacent its base, with a peripheral flange 18, which seats against the casing, about the opening, to properly locate the heater and prevent any escape of heat through the opening.

To hold the heating device in place, the casing 2 is provided, at opposite sides of the opening 15, with downwardly extending, apertured ears 20, adapted for receiving a cross rod 21 which may be extended beneath the base of the cup 16 and through the ears 20 to support the cup in functional position; the rod being removable from the pot. In this instance the cross rod and ears constitute the same means employed to support the standard gas or gasoline burners ordinarily used for heating crucibles of this character.

Located within the housing cup and extending along the trough is a heating unit 23, preferably comprising a series of wire coils, the terminals of which are extended to binding posts 24-25, at an accessible point in the base of the housing, and to which are also attached the circuit wires 26-27 that lead to a rheostat 28 through which an electric current may be delivered to the heater from wires 29-30.

The heating unit is located at the open side of the housing adjacent the heating faces of the crucible and spout, and in order to prevent the escape of heat through the base of the housing, I partially fill the cup and spout with a layer of heat insulating material 31, which not only serves to prevent the escape of heat, but also supports the heating unit.

Located between the exposed face of the crucible and the coils of the heating unit is a sheet of insulating material 34, shaped to closely fit the rounded end of the crucible and throat and separating the heating coils from the crucible to prevent short circuiting but which is conductive to heat so that the effectiveness of the heating unit is not impaired by its use.

To those familiar with linotypes and such metal crucibles, it is known that, due to the intense heat at which the metal is used and the pressure to which it is subjected when delivered to the mold, the metal is sometimes forced through the pores of the crucible in the form of tiny short threads, which in time constitute a considerable accumulation of metal on the exterior of the crucible, especially at its base below the well, where the pressure is applied. In order

to drain metal accumulating in this manner from the crucible so that it will not effect the usefulness of the heater, I extend a drainage tube 36 through the cup which opens at its upper end into a basin 37 formed by the insulation sheet 34 for receiving the lower end of the crucible; and which, at its lower end, opens to the exterior of the base of the cup.

With this drainage arrangement the metal forced through the crucible into the basin is drained by the tube from the heating device.

In order to effectively heat the extreme delivery end of the throat, I provide a tubular heating element operating independently of the crucible heating element, comprising a tube 38 that is located beneath the delivery end of the throat and adapted for support at its opposite ends in the side walls 39 that are extended from the jacket or casing 2 to inclose the throat 6.

Inclosed within the tube 38 is a heating coil 40, which is electrically connected, through the rheostat 28, with the circuit wires 29-30 so that heat may be supplied, as in the housing 16, in the degree desired. The tube is provided along its upper side with a slot 41, so that heat may be delivered therefrom directly to the under side of the throat; the slot being closed by insulation material 43 of the same composition as that of the sheet 34, and the coil insulated from the tube by a casing of insulating material 44.

In using the heating unit, assuming that it is constructed as described, the crucible heater is placed in functional position by inserting the extended portion 17 within the opening 15 and beneath the throat 6. The body of the housing is then seated within the opening so that the flange 18 rests against the base of the jacket and the entire heater is secured in its functional position by inserting the cross rod 21 through the apertured ears 20. The mouthpiece heating tube 38 is then placed in its functional position, and the heating coils of both devices connected through the rheostat to the circuit wires 39-40.

When an electric current is closed through the coils the degree of heat delivered therefrom may be regulated by moving the rheostat levers to the different stations thereon, so that proper heat is supplied to the crucible and in a like manner to the mouthpiece.

It will be seen that by providing separate means of control for the crucible and mouthpiece heating units, the latter may be brought up to the desired temperature without an excess of temperature in the crucible.

It is also apparent that as the heating unit is entirely independent of the metal pot, it may be easily removed therefrom if desired so to do, and gas, gasoline, or other heat-

ing means inserted and used without alteration of any part of the metal pot or either type of heater, and that the same supporting parts are employed for supporting both types of heaters.

Having thus described my invention, what I claim as new therein and desire to secure by Letters-Patent, is:

1. In a metal pot, a casing having an opening in its lower portion, a crucible located within the casing and provided with a delivery spout, and a heating device removably projectable through the opening in said casing and comprising a body part and extension adapted to lie along the crucible and its delivery spout.

2. In a metal pot, a casing having an opening in its lower portion, a crucible located within the casing and provided with a delivery spout, and a heating device removably projectable through the opening in said casing and comprising a body part and extension adapted to lie along the crucible and its delivery spout and comprising a heating element and a cover of heat conductive insulation.

3. In a metal pot, a crucible having an upwardly curved delivery spout leading from its lower portion, a casing spaced from and inclosing the crucible and its spout and having an opening in its base and an electrical heating device adapted for insertion into and removal from the casing through said opening comprising a housing having a cupped face adapted for receiving the lower portion of the crucible and its spout, a heating element located within the housing and means non-conductive to electricity, disposed between the heating element and the crucible.

4. The combination with a melting pot comprising a melting crucible having an upwardly and outwardly curved delivery spout leading from the base thereof and a casing spaced from and inclosing said crucible and spout having a base opening therein, of an electric heating device comprising a cup like housing, adapted for insertion into and removal from said casing through said base opening and for receiving the lower end of said crucible and having an extended portion curved correspondingly to and closely fitting the said spout, heating coils located within said housing and extended portion, and means for controlling an electric circuit through the coils.

5. The combination with a melting pot comprising a crucible having an upwardly and outwardly curved delivery spout extending from the base thereof and a casing inclosing and insulated from the crucible and spout, having a base opening therein, of an electrical heating device comprising a cup like housing adapted for insertion into and removal from said casing through said open-

ing and having a flange thereon for seating against the base of said casing about the periphery of said opening; said housing being adapted when in functional position to receive the lower end of the crucible and provided at one side with an extended portion for fitting the under side of said spout, heating coils disposed within the housing body and extended portion adjacent the crucible parts, insulating material disposed between the housing and coils, and means for controlling an electric circuit through the coils.

6. In a metal pot, a crucible, having a rounded lower end and an upwardly and outwardly curved delivery spout extending therefrom, a casing insulated from the crucible and spout and having a base opening therein, an electrically controlled heating device adapted for application to and removal from the casing through said opening, comprising a cup like housing having a peripheral flange for seating against the base of said casing about said opening and having an open face adapted to receive the lower end of the crucible and having an extended, trough-like housing at one side extending along and closely fitting said spout, a heating element located within the housing cup, heat conductive means, non-conductive to electricity, interposed between the heating element and crucible and means for controlling an electric circuit through the heating element.

7. In a metal pot comprising a crucible, a heating unit having a cupped portion adapted for receiving a portion of said crucible and a drainage tube extending from the base of said cupped portion to the exterior of said unit for the purpose set forth.

8. The combination with a melting pot comprising a crucible having an upwardly and outwardly curved delivery spout leading from the base thereof and a casing spaced from and inclosing said crucible and spout having a base opening therein, of an electrical heating device comprising a cup like housing adapted for insertion and removal from said casing through said base opening and for receiving the lower end of said crucible and having an extended portion curved correspondingly to and closely fitting the said spout, a tubular coil housing located adjacent the mouth of said spout, heating coils located within the first named housing and extended portion and the tubular housing, and means for separately controlling an electric circuit therethrough.

9. The combination with a melting pot having a delivery spout, a casing inclosing said pot and spout, and means for heating said pot consisting of a heating unit removably mounted in said casing adjacent the mouth of said spout; said heating unit comprising a tubular housing having a longi-

tudinal opening along the upper side, a heating coil located in said housing and means for controlling an electric circuit through the said coil.

- 5 10. In a metal pot, a crucible, a casing spaced from and inclosing the crucible and having a base opening therein, an electrical heating device adapted for removable application to the crucible through said opening and comprising a cup like housing for
10 receiving the lower end of the crucible, a

heating element located in the housing adjacent the crucible, a layer of material non-conductive of electricity, interposed between the crucible and heating element, and
15 a drainage tube extending through the cup and said material and opening at its opposite ends adjacent the lower end of the crucible and to the exterior of the cup, for the purpose set forth.

20 In testimony whereof I affix my signature.
GEORGE L. FORT.

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