

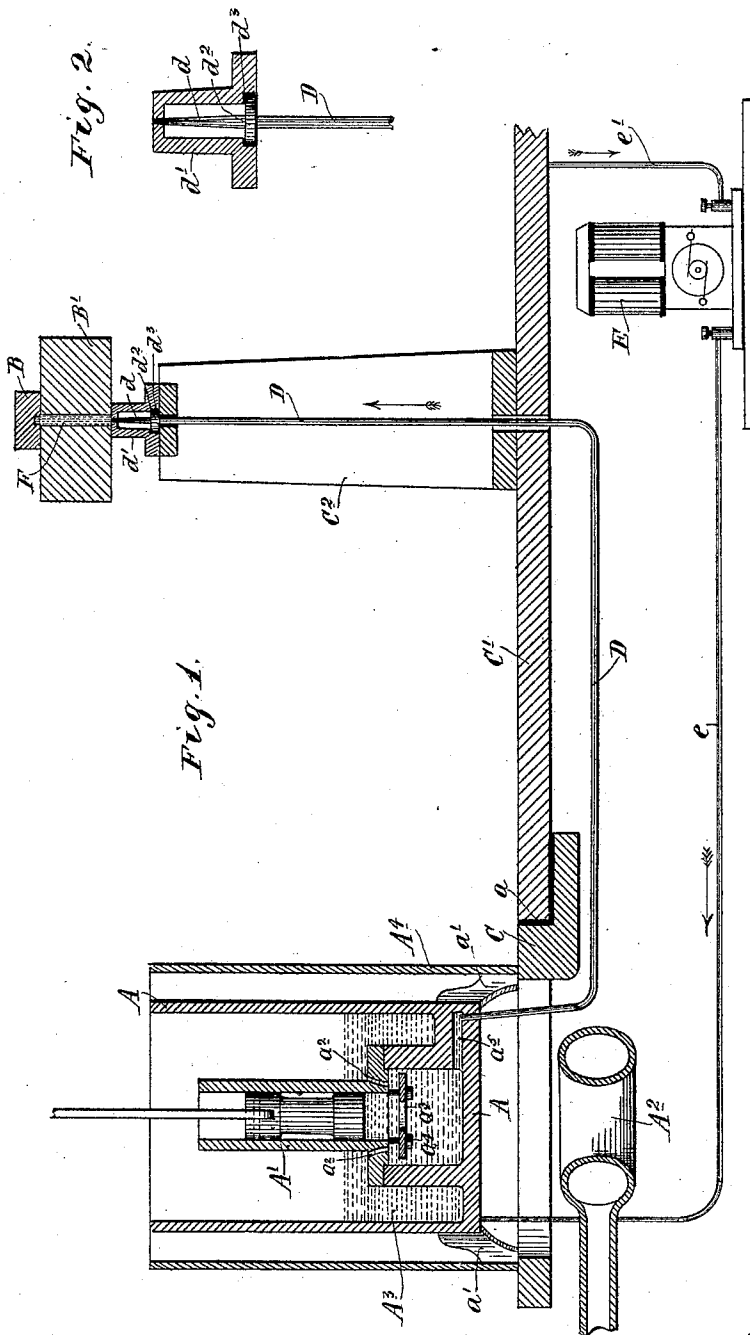
(No Model.)

G. A. GOODSON.

APPARATUS FOR CASTING MOLTEN MATERIAL.

No. 530,479.

Patented Dec. 4, 1894.



Witnesses.
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UNITED STATES PATENT OFFICE.

GEORGE A. GOODSON, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR TO THE GOODSON TYPE CASTING AND SETTING MACHINE COMPANY, OF SAME PLACE.

APPARATUS FOR CASTING MOLTEN MATERIAL.

SPECIFICATION forming part of Letters Patent No. 530,479, dated December 4, 1894.

Application filed February 23, 1893. Serial No. 463,303. (No model.)

To all whom it may concern:

Be it known that I, GEORGE A. GOODSON, a citizen of the Dominion of Canada, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Apparatus for Casting Molten Materials; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to apparatus for casting molten materials.

While capable of general use, for the purpose of casting molten materials, my invention was especially designed to facilitate the casting of types, linotypes or other forms of stereotype bars or plates.

The preferred form of my invention is illustrated in the accompanying drawings, wherein like letters refer to like parts.

Figure 1 is a vertical or sectional elevation, showing my invention as applied to a type or stereotyping casting apparatus. Fig. 2 is a detail in section, on a large scale, of certain parts shown in Fig. 1.

A represents a melting-pot, equipped with a force pump A', and A² is a burner, applied to the said melting pot, for reducing type-metal A³ therein into a molten condition.

B represents a metallic type matrix; and B' part of a mold, through which a type is cast into said matrix.

C C' are sections of a metallic bed-plate or supporting table; and C² is an upright metallic standard or bracket, for supporting the mold and some of the other parts.

D is a metallic tube or pipe, for conducting the molten metal from the melting-pot to the mold. The pipe or metal conductor D terminates in a pointed nozzle *d*, which is held properly centered by a metallic yoke-like bracket *d'*. This nozzle piece *d* has electrical contact with the bracket *d'*, at the point of the nozzle, and is further held in place by a collar *d²* projecting from said nozzle and insulated from the said bracket *d'* by a suitable insulation *d³*. With the construction shown, the upper surface of the bracket *d'* forms the bottom of the type mold. The me-

tallic yoke *d'*, in consequence of its large cross section, as compared with the nozzle *d* and the tube D, offers but little resistance to the current. In practice, this metallic bracket *d'*, is made of such cross section, that the current will have no perceptible heating effect upon the same; and hence while the nozzle *d* is hot to its very tip, the yoke or bracket *d'*, the top of which forms the bottom of the type mold, will be cold.

E represents a dynamo, adapted to the production of a low tension or quantity current.

e is the outgoing conductor, leading from the dynamo to the receiving end of the metal conductor D, the connection, as shown, being made through the melting-pot A. By this means, the current is supplied to the pipe D and the molten metal therein; and the return branch of the circuit is formed by the metallic yoke *d'*, bracket C² bed section C' and return-wire *e'*. The bed sections C and C' are insulated from each other, as shown at *a*. The electric connections might, of course, be otherwise applied, and the quantity or low tension current be secured from any suitable source. The only essential point is, that the current should be directly or indirectly applied to the conductor D or the molten metal therein.

It will be noted, that the metal-pot A and the mold B', are located at a considerable distance apart. This separation of the melting-pot from the mold and its connected parts is very desirable, in this class of machines, in order to prevent the heat of the melting-pot from interfering with the proper action of the mold and its connected mechanism. If the melting-pot be near the mold, the mold will quickly become so hot that it will not properly chill the type, and the casting must be slow. Molds which are used for casting type of different width of face, must be composed of several parts, working together with close joints under fine adjustment. If the melting pot be near the mold, it is difficult, and almost impossible, to proportion and arrange the parts of the mold and its connected mechanism, so as to properly do the work, under the expansion and contraction occasioned by the variable amount of heat from the melting-

pot. Hitherto, however, so far as I am aware, no means have been provided, which would permit the melting-pot to be located at a point remote from the mold and yet deliver the molten metal to the mold, at the proper temperature. In order to obtain a good type, it is absolutely necessary, that the molten metal should enter the mold at a certain definite temperature, the range of which is very small. I was led to make my invention to meet the above necessities in type casting and stereotyping machines; and have found, by actual practice, that I can locate the melting pot at any desired distance, however remote, from the mold, and yet conduct the molten metal from the melting pot through the pipe D, or any suitable liquid conductor, and deliver the same to the mold at any desired exact temperature. By properly regulating the quantity of current, the molten metal will come from the nozzle end of the pipe D, at a uniform temperature. If the metal enters the pipe D from the melting pot, at too high a temperature, its temperature will be reduced in passing through the pipe D to the proper degree; and if, on the other hand, the molten metal as it enters the pipe D is not sufficiently hot, its temperature will be raised to the proper point by the action of the electric current. This method works with such perfection, that, if the pointed nozzle *d* and its supporting yoke *d'* be made of the proper relative proportions, the type F may be cast without any gates. In other words, the line of demarkation between the hot metal in the tip of the nozzle and the chilled metal forming the type F, is so complete that no gate need be produced; and is as marked to the touch as the incandescence, at the terminals of the carbon filament of an incandescent lamp is to the eye. The mold is therefore kept cool; and the type may be cast at a greatly increased rate of speed. Otherwise stated, I find by actual experience, that with my apparatus, I can conduct molten metal to any desired distance, and at any desired temperature. The process is of special service, in the above referred to machines; and the current is applied to the purpose, under special advantages, in view of the fact that the molten metal itself, as well as the pipe through which it is conducted, are good conductors for the current.

It should be understood, that while shown and described as an improvement in stereotype casting apparatus, my invention may be readily applied to apparatus for casting various other molten moldable materials, such, for example, as lead, wax, &c. It will also be understood, that various alterations, in the details of the construction and arrangement of the parts of the apparatus may be made, without departing from the spirit of my invention.

The material to be cast, in the form of molten metal, suitable for casting types, is shown at A³ in the vessel A. The said vessel is also shown as provided with an outside housing A⁴.

It should be noted that the melting pot A is supported in the casting A⁴ by projecting feet *a'*, resting upon the section C of the bed plate.

The cylinder of the pump A' is provided with inlets *a*² controlled by an annular gravity valve *a*³, working on fixed guides *a*⁴ below the piston of the pump. The cylinder well is provided with a passage *a*⁵, in communication with the tube D. On the up-stroke of the pump piston, atmospheric pressure will force the molten metal into the cylinder well through the inlets *a*², the valve *a*³ lowering on its guides *a*⁴. On the initial part of the down stroke of the pump piston, the reaction from the molten metal within the well, will force the valve *a*³ into its uppermost position and close the inlets *a*². Thereupon, the full pressure of the piston will become available and force the metal from the well through the passage *a*⁵ and the tube D, into the mold.

Of course, a pump of any other suitable construction might be substituted for that shown; or pressure might be otherwise rendered available to force the molten metal through the tube D, and make the cast. The yoke-like bracket *d'* forms the mouth piece to the mold B', the top of the bracket serving as the mouth wall of the type mold. The said pump is, of course, a form of mechanism for controlling the discharge of molten metal into the mold B, but it must be obvious that other forms of mechanism might be employed; in fact the phrase "mechanism for controlling the discharge" as used in certain of the following claims, is intended to cover any and all forms of devices for controlling the discharge of molten metal into the mold. The pump-form of controlling mechanism, however, is preferred, for the reason, among others, that after positively forcing the metal through the pipe into the mold on the down-stroke with a sudden impulse, there is a slight back-suction or tendency to form a partial vacuum on the return stroke which serves to keep the joint between the nipple and mold clean and prevent slobbering of metal at that point.

What I claim, and desire to secure by Letters Patent of the United States, is as follows:

1. The combination with a mold, of a melting pot for containing the material to be cast, a tube leading from said melting pot to said mold, means for controlling the discharge of molten material into the mold and connections for applying an electric current to heat said material, while in transmission through said tube to said mold, substantially as described.

2. The combination with a mold, of a melting pot for containing a supply of molten metal, a tube leading from said melting pot to said mold, means for controlling the discharge of molten material into the mold and electric connections applied to close both the tube and the molten metal therein into an electric circuit, substantially as and for the purpose set forth.

3. The combination with a stereotyping mold, of a melting-pot for containing a supply of molten metal, a tube leading from said melting pot to said mold, means for controlling the discharge of molten material into the mold and connections for applying an electric current to heat said metal, while in transmission through said tube, said electric connections being so arranged that the current will be conducted to the very outlet tip of the tube, at the mouth of the mold, but will be returned without passing through the mold, whereby the metal may be delivered to the mold throat at any desired exact temperature and the mold itself will be unaffected by the heat from the melting pot or tube, substantially as described.

4. The combination with a mold, of a vessel for containing the material to be cast, a metallic tube leading from said vessel to said mold, a contact piece, of relatively small resistance as compared to said tube, electrically connected with the tube and forming one wall of the mold, and means for applying an electric current to said tube, whereby the material to be cast may be kept hot to the very mouth of the mold while the said contact piece and the mold will remain cold, substantially as described.

5. The combination with the stereotyping mold, of the vessel for containing molten type metal, the force pump in said vessel, the metallic tube leading from said vessel to said mold, and electric connections for applying a current of electricity to said tube, substantially as and for the purpose set forth.

6. In a type casting machine, the combina-

tion with the type face matrix B and the mold B', of the casting-pot A with the force pump A² remote from said mold, a source of electricity, the tube D with the nozzle *d* leading from said melting pot to said mold and electrically connected with said source of electricity, for the outgoing branch of the circuit, and the bracket *d'* forming the mouth-piece of the mold having electrical contact with said tube nozzle only at the mouth of the mold and provided with connections to form the return branch of the electric circuit, substantially as described.

7. The combination with a mold, of a vessel for containing the material to be cast, a force pump in said vessel, a tube leading from said vessel to said mold, and connections for applying an electric current to heat said material to be cast, while in transmission through said tube, substantially as described.

8. The combination with a mold, of a melting pot for containing the material to be cast, a tube leading from said vessel to said mold, connections for applying an electric current to heat said material to be cast, while in transmission through said tube, and mechanism for controlling the discharge of molten material into the said mold, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE A. GOODSON.

Witnesses:

JAS. F. WILLIAMSON,
EMMA F. ELMORE.