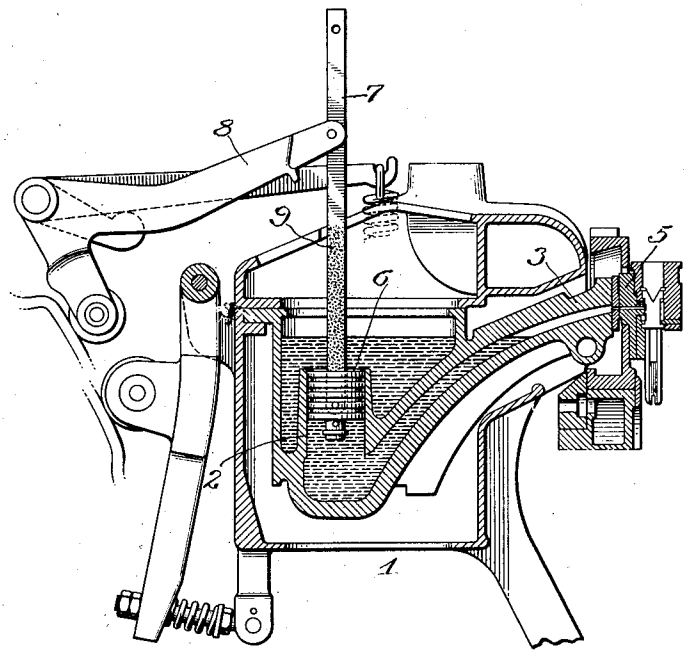
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METHOD OF TREATING METAL PARTS TO PREVENT ADHESION OF MOLTEN METAL AND COMPOSITION OF MATTER EMPLOYED THEREIN

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METHOD OF TREATING METAL PARTS TO PREVENT ADHESION OF MOLTEN METAL AND COMPOSITION OF MATTER EMPLOYED THEREIN

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The object of the present invention is to prevent the adhesion of molten metal to metal parts, and the invention finds one of its applications in connection with the operation of plunger rods in metal pots for the ejection of molten metal therefrom, more particularly in the casting of type bars, types, and like typographical elements.

In the operation of the casting mechanism of linotype machines, for instance, the molten type metal contained in the so-called "metal pot" is ejected therefrom into the slug casting mold by means of a plunger operating in a well of the pot, this plunger being carried at the lower end of an actuating rod, usually made of steel, which extends upwardly through the body of molten metal and is connected above the pot to appropriate power devices operating to move the plunger rod up and down in the successive slug casting operations.

In practice, it has been found that, in the repeated up and down movements of the steel plunger actuating rod through the molten type metal, the latter adheres to the rod and cools and hardens on contact with the air. The hardened metal accumulating and building up on the rod, in the repeated operations of the plunger, forms a body or shell on the rod above the surface of the metal, which body eventually attains such proportions that in the descent of the plunger rod, it strikes the surface of the molten metal and causes the same to splash. This action not only detracts from the efficiency of the slug casting operation, but in addition the splashed metal is thrown out upon adjacent parts of the mechanism, and aside from endangering the operators and others who might be near the machine, it necessitates the stopping of the machine and entails a considerable loss of time in removing the splashed metal from the machine parts and in freeing the rod of the accumulated mass of hardened metal. This latter operation has heretofore been accomplished by detaching the plunger rod from its actuating mechanism and removing the same from the metal pot, and then chipping or scraping or otherwise dislodging the accumulated metal, and finally replacing the clean rod and connecting it in operative relation to the actuating parts as before. Such practice has been the cause of much trouble, annoyance, and loss of time.

The present invention overcomes these and other objections and is directed to a novel method of treating the steel plunger rod, so as to prevent the adhesion of the molten metal thereto, as well as to a novel composition of matter employed in effecting such treatment; all as will be fully described in the detailed specification to follow.

The figure of the drawing is a sectional elevation of such portions of the casting mechanism of a linotype machine as will be necessary for an understanding of the invention.

The drawing illustrates certain portions of the casting mechanism of a linotype machine, to aid in a proper understanding of the utility of the invention, in which drawing 1 designates a metal pot formed with a well 2 therein, and having a discharge spout 3 leading from the well and adapted to deliver molten metal into a mold 5. The ejection of the molten metal from the pot is effected by means of a plunger 6 movable up and down in the well 2 and operated by a rod 7 extending upwardly from the plunger through the body of molten metal and connected above the pot to suitable actuating mechanism, including a lever 8 adapted to be operated to move the plunger up and down in the successive slug casting operations.

As before explained, the molten metal in the pot in the operation of the plunger 6, adheres to that portion of the surface of the plunger rod 7 which is alternately above and below the level of the molten metal. The adhering metal, when brought into contact with the air, cools and hardens and rapidly builds up on the rod in the form of the objectionable body, before alluded to.

According to the present invention, such accumulation of the metal on the plunger rod is prevented, by subjecting that portion of the same which becomes immersed in the molten metal, to a treatment which will cause to be formed thereon, a protective covering or coating to which the molten metal will not adhere. Such covering or coating may consist of different materials and ingredients, but I have found best suited for the purpose the employment of a composition consisting of a metallic oxide and a suitable vehicle or carrier, which composition on being rubbed or otherwise applied to the surface of the rod and subjected to a baking heat, will form on the rod a closely adherent film or covering possessing the necessary characteristics.

While, as will hereinafter appear, various and different metallic oxides, and various and different vehicles or carriers, may be employed in the composition, I have found as very satisfactory and desirable in carrying out the invention, a composition consisting of a lead oxide and a carrier or vehicle of beeswax; and of the different lead oxides which may be employed, such as lead suboxide, lead monoxide (litharge), lead tetroxide,

and lead peroxide, I prefer to employ lead monoxide or litharge in the proportions of about 87½% of the oxide and 12½% of the beeswax.

In preparing the composition, the lead oxide in finely divided or powdered form is mixed with the beeswax, which may be brought to the melting point, or even to the boiling point, and the mixture having been stirred, it is poured into molds and allowed to cool to form cakes of the composition.

The plunger rod to be coated is heated slightly, and its surface is rubbed over with a cake of the composition, thereby forming a thin coating, and the coated rod is then subjected to sufficient heat to cause the coating to become baked and adhere to the rod in the form of a protective covering or film 9, as shown in the drawing, said coating, as before explained, having the property of preventing the adherence of the molten type metal to the rod. The application of such baking heat may be conveniently effected by submerging the rod, after it is first rubbed with the block of treating composition, in the molten type metal in the metal pot at ordinary casting temperature (about 550° F.) and leaving it there a few minutes. This will cause the primary coating to set and adhere to the surface of the rod in the form of a protective film, as above described.

In compounding a composition in which the other lead oxides are used, the ingredients would be treated in the same way as above explained, the only difference being in the relative proportions of the oxides and beeswax, such proportions being dependent upon the ability of the beeswax to take up the different oxides. For instance, in making a composition employing lead peroxide, the proportions of the composition would be about 70% of the oxide and 30% of beeswax.

In making up the foregoing compositions, good results have been obtained by the addition of a small amount of common salt (sodium chloride). For example, in the case of a composition including litharge and beeswax, the proportions would be as follows:

	Per cent
Litharge	81
Beeswax	12½
Salt	6½

Just what effect the salt produces is not exactly known, although it does seem to improve the results obtained in certain cases. However, it has been definitely ascertained that the use of salt is not absolutely essential.

I have found that the composition may be made up with perhaps the most desirable and satisfactory results by utilizing as the metallic content, the dross that collects on the surface of the molten type metal in the pot. In such dross, mixed lead oxides largely predominate, as will be shown from the following typical analysis:

	Percent
Lead oxides	72.71
Antimony	10.69
Tin	7.02
Iron	0.11
Zinc	0.19
Sulphur	0.04
Oxygen (as oxides)	9.04

In using this dross, it is first skimmed from the surface of the molten type metal and is then ground to a fine powder, and the powdered dross is added, with or without common salt, to molten beeswax in the proportions of (when using salt) dross 81.25%, beeswax (cera falva) 12.5%, salt (sodium chloride) 6.25%; or if no salt is employed, then in the proportions of 81.25% dross and 18.75% beeswax. This mixture with the beeswax heated to a temperature of about 370° F. is then stirred and poured into molds and allowed to cool, thereby producing cakes of the composition, as hereinbefore described. This composition is applied to the rod to be treated in the manner before described, with the result that there is formed on the rod, an adherent covering or film having the property of preventing the adhesion thereto of the molten metal of the bath.

While, as above explained, I have found the use of lead oxides as satisfactory in forming the metallic ingredient of the composition, the invention is not to be limited to lead oxides, since other metallic oxides may be employed with good results, such for instance as the oxides of antimony, tin, zinc, manganese, bismuth, copper, iron, titanium, calcium, magnesium, chromium, nickel, cobalt or aluminium; and also while for the purposes of the invention I have found beeswax as being the most satisfactory non-metallic ingredient of the composition, the invention is not limited to the use of beeswax, since other forms of waxes may be used with good results, such as carnauba wax, japan wax, or spermaceti. These waxes differ in melting point from the melting point of beeswax, but a mixture of carnauba with one of the others could be made to melt at about 67° C. (the melting point of beeswax) if this should be found necessary. Also, instead of the employment of the different waxes mentioned as constituting the non-metallic ingredients of the composition, various forms of resins may be employed, the purpose of this non-metallic ingredient of the composition being to act as a vehicle or carrier for the metallic oxide content, which vehicle on being subjected to the baking heat, after the surface application of the composition of the rod, will melt or become fused and will act to cause the cementing or adherence of the metal oxide to the rod, as a film or covering.

It is believed that the property of the coating in preventing adhesion of the molten type metal is due to the fact that the presence of the metallic oxide in the coating destroys the affinity of the same for the molten type metal. This theory seems to be borne out by the fact that the dross, which as before stated may be utilized in preparing the coating composition, has by the very reason of its separation from the metal bath as "dross", lost its affinity for the metal of the bath.

While in the foregoing description, the invention has been described in the particular detailed manner of the practice of the same and in the make-up of the composition which will answer the purposes of the invention, it will be understood that these details may be variously changed by the skilled mechanic without departing from the spirit of the invention; and it will be further understood that the invention is not limited in respect to the method or the composition, except insofar as such limitations are specified in the claims.

Having thus described my invention, what I claim is:

1. The method of treating the plunger rod of a metal pot of a typographical casting machine to prevent the adherence of the molten type metal to said rod, which comprises applying to said rod a coating containing lead oxide.

2. The method of treating the plunger rod of a metal pot of a typographical casting machine to prevent the adherence of the type metal to said rod, which comprises applying to said rod a coating containing type metal dross.

3. The method according to claim 2, characterized by the fact that the type metal dross is applied to the rod in powdered form in admixture with a suitable carrier.

4. The method according to claim 2, characterized by the fact that the type metal dross is applied to the rod in powdered form in admixture with a wax carrier.

5. The method of treating the plunger rod of a metal pot of a typographical casting machine to prevent the adherence of the molten type metal to said rod, which comprises applying to said rod a coating containing a material selected from the group consisting of lead oxides and type metal dross.

6. The method according to claim 5, characterized by the fact that the material is an oxide of the type metal.

7. The method of treating the plunger rod of a metal pot of a typographical casting machine to prevent the adherence of the molten type metal to said rod, which comprises applying to the rod a coating consisting of a composition of a material selected from the group consisting of lead oxides and type metal dross and a suitable carrier, and subjecting the coated rod to heat to fuse the carrier and thereby bake the coating thereon.

8. The method according to claim 7, characterized by the fact that the carrier therein mentioned is a wax.

9. The method according to claim 7, characterized by the fact that the carrier therein mentioned is beeswax.

10. The method according to claim 7, characterized by the fact that the material therein mentioned is a lead monoxide and that the carrier is beeswax.

11. The method according to claim 7, characterized by the fact that the rod is heated before the application of the coating composition.

12. The method according to claim 7, characterized by the fact that the heating of the coated rod is effected by immersing the same in molten type metal.

13. The method of treating the plunger rod of a metal pot of a typographical casting machine to prevent the adherence of molten type metal to said rod, which comprises applying to said rod a coating containing lead monoxide.

14. The method of treating the plunger rod of a metal pot of a typographical casting machine to prevent the adherence of the type metal to said rod, which comprises applying to the rod a composition consisting of powered type metal dross and wax, and subjecting the applied composition to heat to form a protecting coating on the rod.

15. A new composition of matter for use in preventing the adherence of type metal to the plunger rod of the metal pot of a typographical casting machine, comprising type metal dross and a suitable carrier.

16. A new composition of matter, consisting of type metal dross, beeswax, and sodium chloride.

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