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HEATING METAL MELTS

Filed May 3, 1929

Fig. 1.

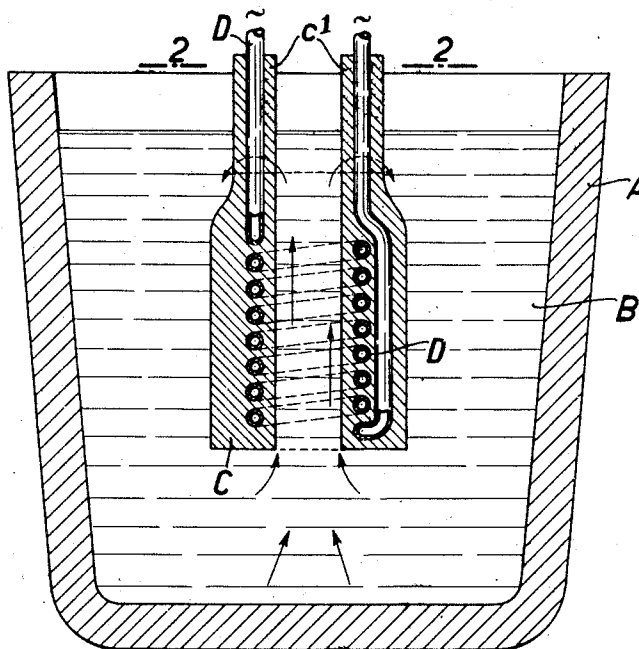
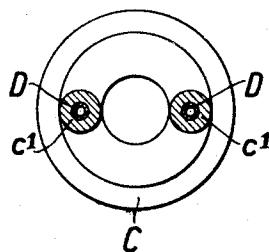


Fig. 2.



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HEATING METAL MELTS

Application filed May 3, 1929, Serial No. 360,261, and in Germany May 18, 1928.

The invention relates to a new device intended to heat a mass of molten metal or alloy within a ladle, more particularly a steel melt, which device affords peculiar advantages in service. According to the invention a heating element is provided which can be dipped in the melt.

In order that the invention can be more easily understood a device intended to heat a ladle as used in steel works is illustrated as an embodiment of the invention and by way of example in the accompanying drawing in which

Figure 1 is a vertical section through the ladle and the heating device dipped in the content thereof, and

Figure 2 is a section on line 2—2 of Figure 1, seen from the top.

Referring to these figures, A denotes the ladle filled with a molten steel alloy B tapped from the furnace and still in liquid state. By means of a suitable appliance (not shown) a body C is dipped in the ladle which body is intended to heat the steel melt therein. The body C is made of a refractory and electrically non-conductive material, e. g. concrete, and substantially has the shape of a hollow cylinder. On its top front face the body C carries two diametrically opposed extensions c^1 . A spirally wound electric coil D is embedded in the body C in the manner to be seen from the drawing which coil is formed in a manner known in itself e. g. by a copper pipe through which cooling water is conducted while the heating device is in operation. The coil D is adapted to be connected e. g. to an alternating current main of high frequency (e. g. of 8000 cycles).

In operation the body C c^1 the coil D of which has been connected to the high frequency main is dipped in the steel melt B by means of a suitable appliance (not shown) and left in this position as long as the melt should be heated. Under the action of the high frequency current flowing through coil D an induction current of high amperage is generated in the steel melt B by which the latter is both powerfully heated and agitated, see the arrows, Figure 1, that indicate the direction of agitation. This heating of the

steel melt within the ladle has the effect of foreign bodies, such as oxydes, slag constituents, etc., still therein having a longer time the opportunity to rise to the surface and to go over into the slag, than it would be the case, if no supplemental heating of the melt would take place within the ladle. A further advantage of the described device consists in the fact of the steel melt being agitated owing to the indicated manner of being heated and of the portions first near the bottom of the ladle of the melt rising to the surface and thus having the opportunity to more easily give off their (gaseous and non-gaseous) foreign bodies to the slag. Consequently the use of the described device still affords the advantage of the melt very satisfactorily being liberated of gases the degree of which liberation can be increased still by the heating of the ladle being performed in an evacuated space. Furthermore the notable advantage is afforded of the device being enabled to be used without any difficulty in connection with the ordinary ladles used in iron works. When additions such as deoxidizing means are to be added to the melt finally the advantage is given of these additions quickly and uniformly being distributed on the melt owing to its being eddied due to the induction heating.

I claim:—

1. A device for heating a metallic melt in a ladle comprising a body, a longitudinal passage extending from the bottom of the top of said body, a passage extending from the upper end of said first passage to the exterior of said body, means to suspend said body in a ladle with said second passage below the level of the melt in said ladle, and a coil embedded in said body and adapted to be fed by alternating current.

2. A device for heating a metallic melt in a ladle comprising a body, extensions on the upper end of said body, said extensions being spaced apart so as to provide passages between said extensions, a passage extending from the bottom to the top of said body and communicating with said first named passages, a coil embedded in said body and adapt-

ed to be fed with alternating current, said extensions being adapted to suspend said body in the metallic melt with said first named passages below the level of said melt.

5 The foregoing specification signed at Cologne, Germany, this 19th day of April, 1929.

ADOLF FRY.

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