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METAL TRANSFER

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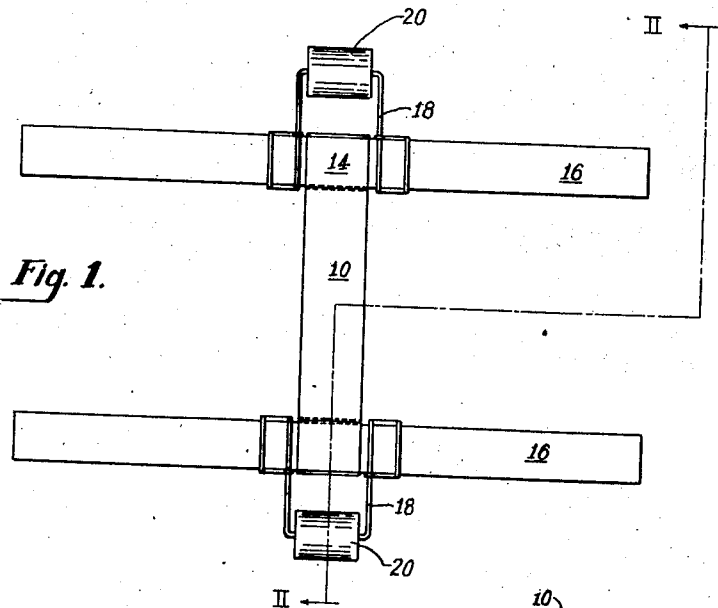
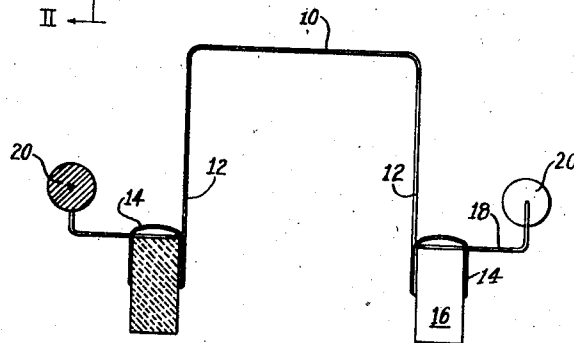
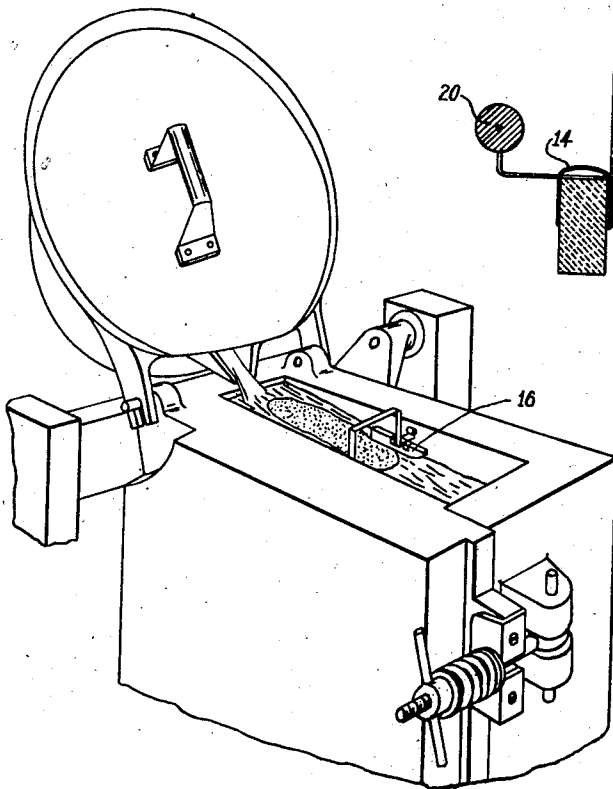


Fig. 3.

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METAL TRANSFER

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4 Claims. (Cl. 22—1)

This invention relates generally to the transfer of molten metal. It relates especially to a device particularly efficacious for the entrainment of dross while molten metal is being transferred from one container to another, as for example, from a crucible to a mold.

In casting metals, it is desirable that the amount of metal oxide or dross which accumulates on the surface of the melt and which might be undesirably introduced into the mold with the metal be kept at a minimum. This is particularly true in casting so-called sheet ingots because when such ingots are rolled into sheet any oxide inclusions on the rolling surface cause defects in the rolled sheet. A substantial percentage of aluminum and aluminum base alloy sheet ingot is cast today in what is known as tilt molds and, in following the practice of this type of casting, the first metal which enters the mold immediately becomes covered with a film of oxide that tends to adhere to the bare mold where it touches the same. As pouring progresses, the film of oxide thickens slightly and, unless its movement is confined, tends to be pulled down onto the rolling surface of the ingot because of adherence to the mold wall in the lowering of the mold to its normal vertical position. The wide flat opposed surfaces of the ingot which come in contact with the rolls are generally referred to as the rolling surfaces of an ingot.

Another factor affecting the tendency of the film to pull over onto the rolling surfaces instead of floating on top of the molten metal within the mold until pouring is finished is the slight variations in stream flow or agitation of the stream flow which causes the film of oxide to break and portions of it to float over against the walls of the mold. The presence of patches of oxide on the rolling surfaces of an ingot contribute to the promotion and formation of blisters and slivers on the rolled product.

Observation of the behavior of this film of oxide has disclosed that it possesses a certain degree of tenacity which could be employed advantageously in anchoring the film against uncontrolled movement. Proceeding from this premise and realizing the need in the art for something which would effectively prohibit any movement of the above discussed film of oxide onto the rolling surface of an ingot, I have invented a device the primary object of which is to provide a means for preventing the flow of oxide film to any place where its ultimate inclusion would undoubtedly be deleterious. A further object of my invention has been to pro-

vide a device which would require no manual adjustment during the metal transfer operation but would remain in operative position at all times.

The invention proposes to accomplish these and other objects which will be apparent from the following description and claims. Further, attainment of these objects will be accomplished in an economical manner by the use of apparatus simply constructed and easily kept in operating order. To facilitate an understanding of my invention, reference is made to the following description of the drawing in which

Fig. 1 is a plan view of my improved device;

Fig. 2 is a vertical sectional view taken on line II—II of Fig. 1;

And Fig. 3 is a perspective view of a conventional tilt mold and pouring ladle with my improved device in its relative position at the end of a pour.

With reference to the drawing in which like reference numerals have been used to designate like parts, there is provided a structure or framework consisting of a bridge 10 from which depend the parallel legs 12. At their lower ends the members 12 are bent back upon themselves for a short distance and then further formed as best shown in Fig. 2, thereby resulting in the U-shaped clip members 14. The structure thus far described may be constructed of any suitable material, but I have found that any strip stock such as spring steel or aluminum is quite acceptable for the purpose. Within the U-shaped members 14 are placed the floats 16. These may be made from any refractory material capable of withstanding the heat of molten metal upon which these members rest while in operation. One material which has been used with success in casting aluminum ingots is asbestos fiber board. The floats may be of any shape but preferably of any generally rectangular shape and should not be so long that they will interfere with the casting operation. The bottom of the floats may be flat or curved upwardly at one or both ends so that they assume the configuration of a pontoon.

Provision has been made to prohibit the float members from touching the sides of the mold during casting operations by having mounted upon each float a guide roll which projects outwardly beyond the float. The rolls are carried by the bridge-like members 18 which have been shaped as best shown in Figs. 1 and 2. Rolls 20 may be made of any suitable material that is fairly light of weight so that they will not submerge the floats 16 into the molten metal.

The device just described has been partic-

ularly efficacious in the casting of tilt mold aluminum ingots, although there is no reason why it may not be as equally useful in casting ingots in other types of molds, or in casting even other shapes of ingots. In operation with a tilt mold the anchoring device is placed inside the mold a short distance from the bottom while the mold is in a horizontal position. At the start of the pour a film of oxide is immediately formed on the metal surface. The device, being within the mold, floats on the surface of the metal and the film of oxide attaches or anchors itself generally between the floats of the device. As pouring continues and the mold is lowered so that it generally assumes a vertical position, the anchoring device floating on top of the metal gradually rises to the top of the mold. During this operation the floating anchor device functions to prevent side-wise motion of the film, thereby keeping the same from floating over onto the rolling surfaces of the ingot. There seems to be no apparent buildup of oxide film between the parallel floats other than the normal thickening of the same which would occur if my device was not used. Once the film of oxide has anchored itself to and between the floats there is no appreciable movement of the film between the floats, the floats and the anchored film retaining the same relative position. Reference to Fig. 3 will disclose an area of oxide film close to the point where the metal enters the mold at the pouring corner, this film having been held in place and floated to the head of the ingot by the device of the invention.

While the invention has been described hereinabove with reference to said embodiments

thereof which are now preferred, it will be understood that it may be otherwise embodied without departing from the spirit of the invention or the scope of the appended claims.

I claim:

1. Apparatus for entraining surface film on metal being cast in a metal container which comprises a plurality of float members held in spaced relationship by a bridge member to which said float members are attached.

2. Apparatus for entraining surface film on metal being cast in a mold comprising a plurality of parallel float members, a member bridging said float members and secured thereto, and guide means for keeping said apparatus relatively centered within the mold with respect to the sides of said mold.

3. Apparatus for restraining movement of surface film on metal being cast in a mold comprising a structure having a pair of vertically extending legs, float members secured to and being held in spaced parallel relationship to one another by said legs, and means carried by and extending outwardly from each said float member for positioning said apparatus within the mold.

4. Apparatus for restraining movement of surface film on metal being cast in a mold comprising a structure having a pair of vertically extending legs, float members secured to and being held in spaced relationship to one another by said legs, and means carried by and extending outwardly from each said float member for positioning said apparatus within the mold.

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