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W. E. SCHMERTZ

2,453,643

METAL TEEMING

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FIG. 1.

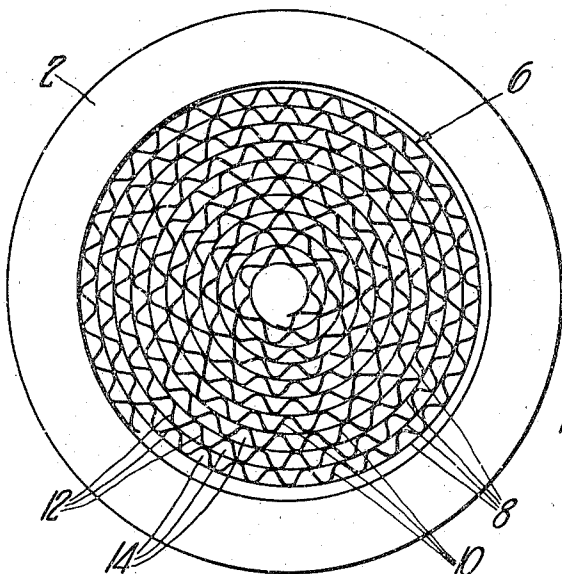


FIG. 3.

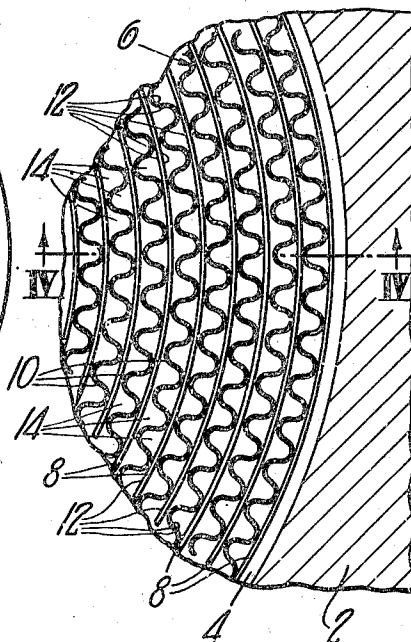


FIG. 2.

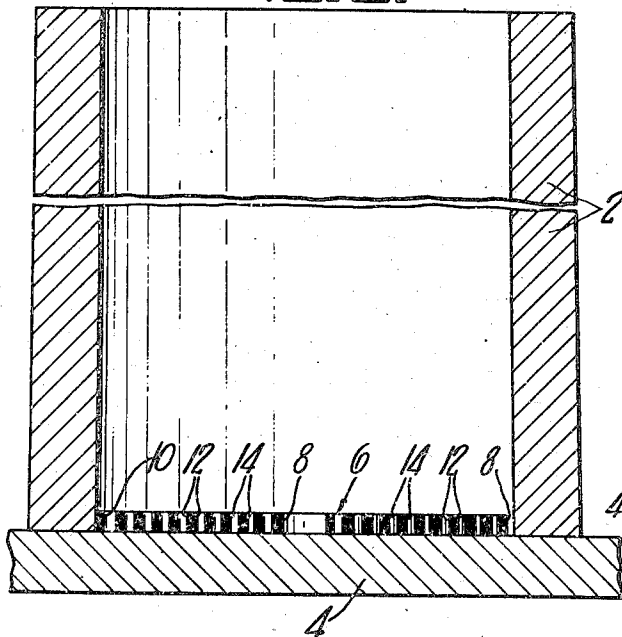
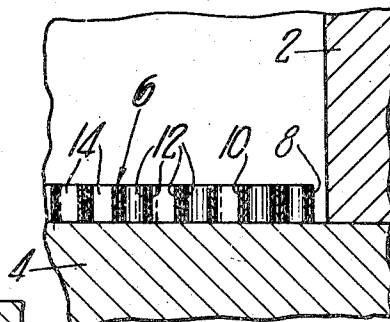


FIG. 4.



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UNITED STATES PATENT OFFICE

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METAL TEEMING

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1 Claim. (Cl. 22—139)

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This invention relates to improvements in means for teeming metal and more particularly to means for protecting the ingot mold bottom or stool used in casting steel ingots.

In steel making, the molten steel is ordinarily teemed directly into the top of the mold. Since such molds may be six to ten feet or more in height, the stream of molten metal hits the mold bottom or stool with considerable force and the impact thereof causes a concave erosion of the stool surface, resulting in a convex bottom or knob on the ingot. This makes handling of the ingot difficult and prevents the ingot from standing upright in the soaking pit furnaces. As a result, the ingots contact one another or the pit wall causing uneven heating, and also in the latter case, damage to the furnace. In addition, the erosion of the stool frequently causes the ingot to become welded to the stool or what is known as a "stool sticker." Such direct teemed ingots are also subject to "stool leakers" when the molten metal runs out between the mold bottom and the stool over the sides of the ingot cars. This makes removal of the molds difficult, the metal itself is difficult to remove from the stool and cars, and creates a hazardous condition for the workmen.

It is accordingly an object of this invention to provide means for protecting ingot mold stools from erosion by the molten metal in direct teeming.

It is a further object to prevent "stool stickers" and "stool leakers."

It is another object to provide improved means for teeming ingots.

It is a still further object to provide a chill mat for ingot mold stools.

The foregoing and further objects will become apparent from the following specification in conjunction with the attached drawing, wherein:

Figure 1 is a plan of an ingot mold showing my improved chill mat disposed therein in position for teeming;

Figure 2 is a vertical section of Figure 1;

Figure 3 is an enlarged fragmentary view of Figure 1; and

Figure 4 is an enlarged fragmentary view of Figure 2.

Referring more particularly to the drawing, the numeral 2 designates an ingot mold resting on

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an ingot mold stool 4. Disposed on the mold stool is the chill mat 6 of my invention.

The chill mat 6 is a spiral of closely spaced convolutions 8 of steel strip separated by a corrugated spacer strip 10, likewise formed of strip metal. Such arrangement provides a multiplicity of chill surfaces 12 and spaces 14. The gauge or thickness of the strip metal, the depth of the mat, and the size of the openings, are correlated to chill molten metal teemed thereon and substantially prevent erosion of the stool surface. I have found that 30 to 35 gauge steel strip, $\frac{5}{8}$ " wide, closely spaced will meet the foregoing requirements.

In use, the chill mat 6 is placed directly on the mold stool 4 prior to teeming. At the start of the teeming operation, the stream of molten metal impinges upon the chill mat and is broken up into a number of fragments by the large number of exposed steel edges, which fragments are quickly chilled by contact with the chill surfaces so that they "freeze" almost immediately. This prevents the stream of molten metal from striking the stool and likewise the outward flow of the metal, which together with the impact erodes the stool is effectively prevented. In addition, stopping the outward flow prevents "mold stickers" and "leakers." The mat also tends to prevent splashing of the metal onto the mold surfaces which causes poor surface quality of the ingot. Frequently inspection of the bottom of ingots cast with my chill mat has shown areas where the molten metal has not reached the stool at all but was completely frozen by the chill surfaces. Since the chill mat is not rendered molten but tends to retain its form and is discarded with the bottom discard, the metal of which the mat is formed does not have to have exactly the same characteristics as the metal teemed thereon.

While I have shown and described one specific embodiment of my invention, it will be understood that this embodiment is merely for the purpose of illustration and description and that various other forms may be devised within the scope of my invention, as defined in the appended claim.

I claim:

A chill mat for ingot mold stools comprising a coil formed of a plurality of spaced convolutions of solid sheet steel and spacers formed of solid

corrugated sheet steel disposed between said convolutions, said convolutions and the corrugations of said corrugated sheet being closely spaced to form openings sufficiently small to break up a stream of molten steel teemed thereon into small particles and chill the same sufficiently to solidify them and thereby prevent the stream of molten steel from striking the mold stool under the mat, the steel of said convolutions and spacers substantially retaining its identity and shape in the bottom portion of an ingot teemed thereon.

WILLIAM E. SCHMERTZ.

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