

April 10, 1928.

M. R. TREMBOUR

1,665,515

SINK HEAD TOP

Filed Jan. 19, 1926

2 Sheets-Sheet 1

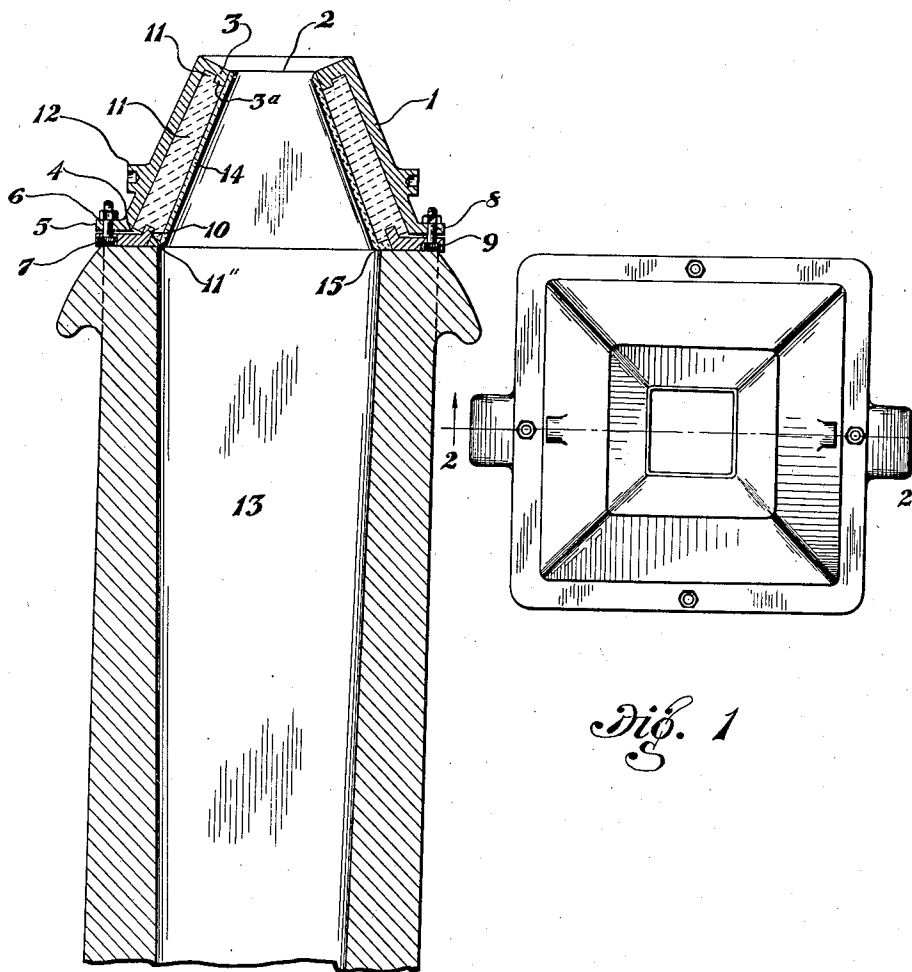


Fig. 1

Fig. 2

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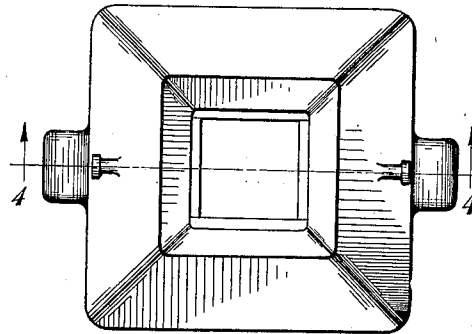
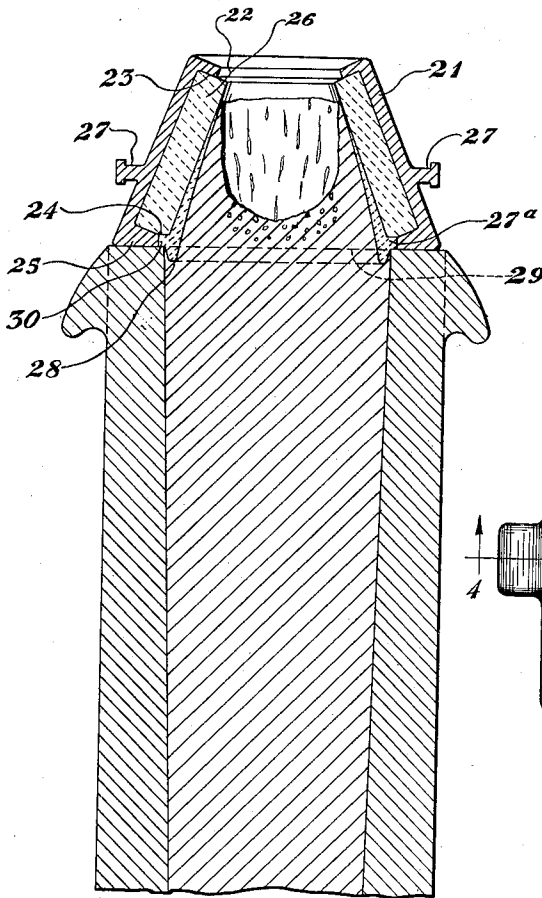


Fig. 3

Fig. 4

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UNITED STATES PATENT OFFICE.

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SINK-HEAD TOP.

Application filed January 19, 1926. Serial No. 82,209.

The invention relates to sinkhead tops for use on ingot molds for the purpose of reducing the pipe or shrinkage cavity usually formed in ingots during the cooling process in the ingot molds.

Sinkhead tops sometimes include a brick placed upon the top of an ordinary cast iron ingot mold, the brick being shaped so as to form an extension of the mold chamber.

As a rule this brick is not purposely heated, but is put on the mold at whatever temperature the brick may have as a result of its immediate environment.

The heat conductivity of the brick walls being lower than that of the cast iron mold, when molten metal is poured into the ingot chamber to fill the ingot and brick sinkhead chambers, the metal remains liquid in the sinkhead chamber until the main body in the ingot chamber has solidified.

Such brick sinkhead tops are ordinarily used but once, since they usually crack from the heat of the molten metal, and are, in fact, as a rule bound by wires to withstand even a single heat.

In addition to brick sinkhead tops, other types of sinkhead tops have been used, which include sand, slag or similar refractory material rammed into a frame and dried, and usually found satisfactory for a single heat only; since part of such refractory material usually sticks to the metal surface of the ingot and the drying or slightly baked sand, slag or refractory mixture is too weak to withstand the stresses and strains caused therein when such a sinkhead top is lifted off the ingot.

The objects of the present improvements are to reduce the cost of using brick sinkhead tops, by providing a construction that may be easily stripped from the ingot without being materially damaged and which may be repetitively used many times with only a small amount of patching between pours; and to provide a sinkhead top convenient to make and use.

These and ancillary objects are attained by the use of an external metallic frame for the sinkhead top, a permanent refractory

lining for the frame which may be hard baked fire-brick or a rammed and hard baked refractory mixture, such as is used for the manufacture of hard bricks or any mixture, which upon baking will become hard enough to withstand rough handling and heating and cooling without cracking, and a renewable inner lining for the permanent refractory lining to protect the permanent lining from the action of molten metal and to make a tight joint between the sinkhead top and the mold.

This renewable inner lining for the sinkhead top usually must be patched or renewed after each pour and is therefore preferably made of a material which may be coated upon the permanent lining while the latter is still hot, in order to dry thoroughly the renewable lining.

The renewable lining is preferably adapted for convenient application by a brush or trowel for protecting the permanent lining and sealing the joint between the sinkhead and ingot mold.

Practical embodiments of the invention are illustrated in the accompanying drawings forming part hereof, in which—

Figure 1 is a top plan view of one form of the improved sinkhead as in use upon an ingot mold;

Fig. 2, a vertical cross section thereof as on line 2—2, Fig. 1;

Fig. 3, a top plan view of a modified form of the invention as in use upon an ingot mold; and

Fig. 4, a fragmentary vertical cross section thereof as on line 4—4, Fig. 3, indicating in cross section a cooled ingot poured therein.

Similar numerals refer to similar parts throughout the drawings.

The improved sinkhead illustrated in Figs. 1 and 2 includes a metallic frame 1 for resting on the upper edge of the ingot mold, which frame may be made of solid cast iron or steel and which is preferably in the form of a tapered tube having a relatively small top opening 2 provided with an inwardly and downwardly extending angular periph-

eral flange 3, and a bottom opening 4 larger than the top opening 2 and provided with an outwardly extending peripheral flange 5 having apertures 6 therein for removable connection with a bottom flange ring 7 by means of bolts 8 passing through the apertures 6 of the tube bottom flange and countersunk apertures 9 in the flange ring.

The flange ring 7 is provided with an upwardly extending peripheral leg 10 and the top flange 3 is provided with a downwardly extending peripheral leg 3^a. Permanent fire brick lining 11, provided with upper and lower rabbeted ends 11' and 11'' may thus be removably secured by legs 3^a and 10 interfitting with the end rabbets of the firebrick.

Upon a horizontal axis located approximately at the center of gravity of the sinkhead top, a pair of socket trunnions 12 are provided for convenient handling and turning over of the sinkhead top in use and for inspection and repair.

The permanent fire brick lining 11, as above described, forms a tapering tubular continuation of the mold 13. The insides of this permanent hard fire brick lining are coated all over with a renewable lining 14 to protect the permanent lining from the destructive action of molten metal, and also to make a tight joint as at 15 between the sinkhead top and the mold.

This renewable inner lining which may be patched or renewed after each heat, is preferably made of material adapted for coating with a brush or trowel upon the permanent lining while the latter is still hot in order to dry thoroughly the renewable lining.

The renewable lining is preferably of a sufficiently refractory nature so as not to fuse or flux at all, but a less refractory material may be used by spreading the same upon the inside of the permanent lining in layers sufficiently thick so that any surface fusing of the renewable lining and adhesion to the ingot metal will not cause a fusing through the renewable lining to the permanent lining.

The renewable lining material is also preferably adapted to become sufficiently hard by drying to resist crumbling tendencies, but at the same time remain soft enough under the influence of the heat of the ingot metal to allow for the stripping of the sinkhead top with its permanent lining without injury to the latter.

Clay, plumbago, magnesite, chrome-ore, with or without a suitable binder, such as waterglass, are perfectly suitable for use as material for the renewable lining, but it has been found that a renewable lining mixture including fine silica sand and/or cement and/or finely ground brick-bats, preferably silica brick-bats, and dilute waterglass, is a cheap and satisfactory combination.

This mixture is coated upon the insides of the permanent lining with a brush or trowel, while the sinkhead top is still hot enough to evaporate all the moisture, then some of the mixture is spread on the bottom edge and under side of the permanent lining, leveling off with the bottom flange ring, and the sinkhead top is then immediately, and preferably while the mixture on the bottom side is still plastic, placed upon the mold, thus making a perfect joint, and left to dry in place.

The modified sinkhead top illustrated in Figs. 3 and 4 includes a metallic frame 21 which may be of solid cast iron or steel, and which is preferably in the form of a tapered tube having a relatively small top opening 22 provided with an inwardly extending peripheral flange 23, and a bottom opening 24 larger than the top opening 22 and provided with an inwardly extending peripheral flange 25.

The inwardly extending top and bottom peripheral flanges 23 and 25 are adapted to maintain permanent fire brick lining 26 inside the metal frame.

Upon a horizontal axis located approximately at the center of gravity of the sinkhead top, trunnions 27 are provided for convenient handling and turning over of the sinkhead top in use and for inspection and repair.

A renewable lining 27 of a material similar to the above described material for the lining 14 and applied in a similar manner, is provided for the inside of the permanent lining 26.

The depth of the renewable lining 27 tapers from a minimum near the top opening of the sinkhead top to a maximum at the joint between the sinkhead top and the mold and projects downward as at 28 below the horizontal level 29 of the joint, and outward as at 30 between the top of the ingot mold and the permanent lining 26 which preferably extends inward beyond the bottom peripheral flange as at 30.

This arrangement of the renewable lining is provided for affording maximum protection to the bottom part of the permanent lining and to form a tight joint between the ingot mold and the sinkhead top.

I claim:—

1. A sinkhead top for ingot molds, including a metal frame for resting on the upper edge of the ingot mold, permanent refractory lining for the frame, and a renewable inner lining for the permanent refractory lining.

2. A sinkhead top for ingot molds, including a metal frame for resting on the upper edge of the ingot mold, permanent refractory lining for the frame, and a renewable inner lining for the permanent refractory lining, the inner lining having a maximum

cross section at the lower edge of the sinkhead top for resting upon the ingot mold.

3. A sinkhead top for ingot molds including a metal frame for resting on the upper edge of the ingot mold, permanent refractory lining for the frame, and a renewable inner lining for the permanent refractory lining, the permanent lining extending for a portion of the length of the frame, and the renewable lining extending over the permanent lining and upon the portions of the frame not provided with the permanent lining. 10

In testimony that I claim the above, I have hereunto subscribed my name.

MAX R. TREMBOUR.