

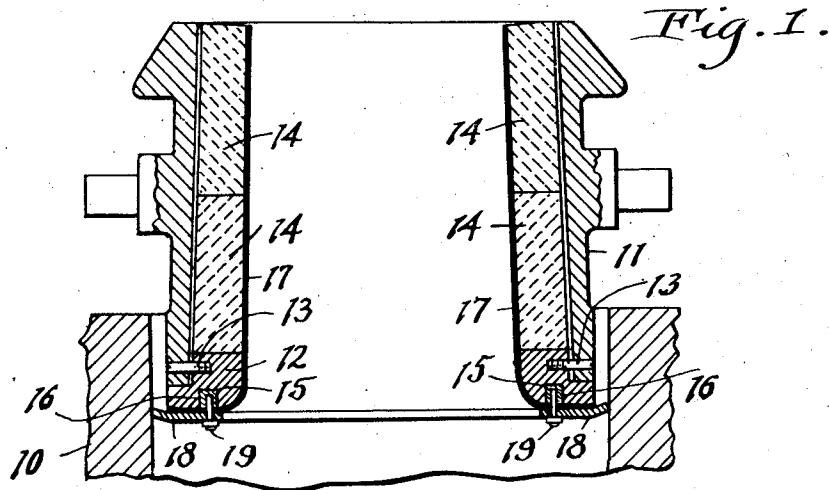
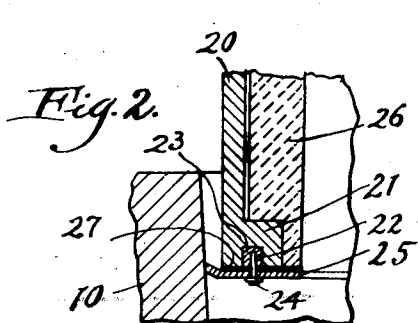
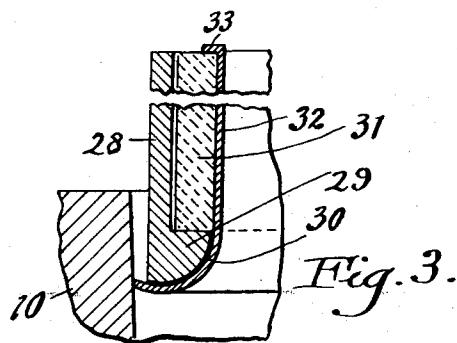
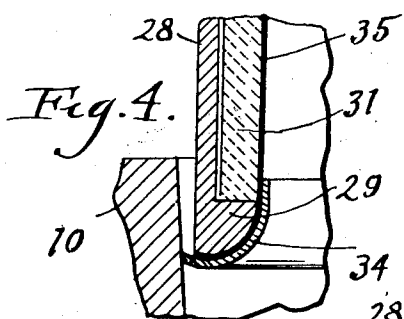
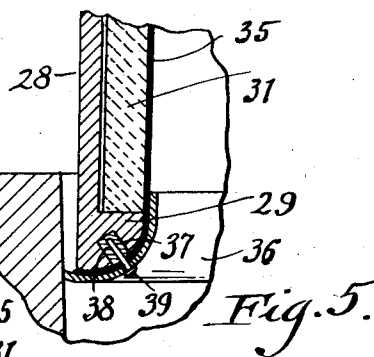
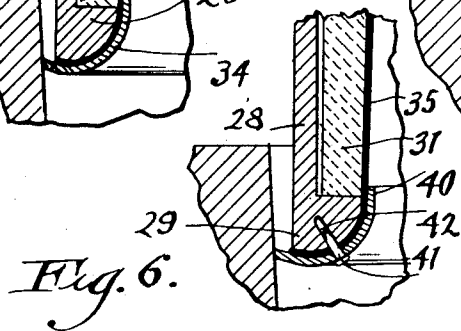
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1,921,731

HOT TOP

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UNITED STATES PATENT OFFICE

1,921,731

HOT TOP

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11 Claims. (Cl. 22—147)

This invention relates to improvements in hot tops, particularly improvements over the constructions covered by our patents No. 1,804,204, and No. 1,804,207, dated May 5, 1931.

5 The present invention has to do primarily with means for temporarily supporting a lower lining element, and with means for establishing a cleavage surface between the lower end of the hot top casing and the lower lining element, it being
10 intended that said lower lining element shall adhere to the ingot when the hot top is stripped therefrom.

One of the objects of the invention therefore is the provision, in a hot top embodying a metallic casing, of a plug set into a downwardly opening hole in the casing for the reception of a headed fastening, by means of which the plug is caused to retain the lining until the plug fails by the action of the heat from the molten metal.
20 Instead of employing a separate headed fastening we may in some cases provide a headed projection upon the plug itself.

Another object is the provision of means for establishing a cleavage surface between the
25 metallic casing and a lower lining element, particularly where the latter element is sheet metal.

Other objects and features of novelty will appear as we proceed with the description of those embodiments of the invention which, for the
30 purposes of the present application, we have illustrated in the accompanying drawing, in which

Figure 1 is a vertical sectional view through a hot top and a fragment of an ingot mold, illustrating one embodiment of the invention.

35 Figs. 2 to 6 inclusive are similar views of a more fragmentary nature, illustrating modifications of the invention.

In the drawing we have indicated at 10 a fragment of an ingot mold of the big-end-up type.
40 In Fig. 1 there is shown a metal casing 11 which consists of a casting having a plain inner surface, that is one without an inner integral ledge. In this embodiment of the invention we provide a separable and replaceable ledge 12 which is
45 annular and preferably in a single piece. It is removably supported upon the casing by suitable means. In the illustrated case this means takes the form of pins 13 which extend through smooth holes in the casing 11 and have threaded inner extremities which are screwed into tapped
50 holes in the ledge member. This ledge supports the upper lining of the hot top which is illustrated herein as consisting of two tiers of refractory blocks 14.

55 At intervals in the lower face of the ledge 12

we form sockets 15, opening downward, into which plugs 16 may be driven. These plugs are of some material which will be charred or destroyed by the heat of the molten metal at each pouring operation. We have found that wood
60 is a suitable material for this purpose.

Prior to each pouring operation the entire inner and lower surface of the hot top, that is the blocks 14 and the ledge 12, may be covered with a comparatively thin layer of parting material
65 17 preferably in the form of a plastic coating. The operator then places an annular lower lining element 18 over the lower end of the hot top casing and drives nails or other headed fastenings 19 into the plugs 16, thereby securely hold-
70 ing the lining element 18 onto the hot top in a temporary manner. This lining element is extended beyond the outer surface of the ledge 12 and hot top casing and is adapted to contact with the inner wall of the ingot mold and to wipe the
75 latter as the hot top is lowered into the mold, thereby preventing the flow of molten metal upwardly around the exterior wall of the hot top. The latter feature of the construction is however covered by our Patent No. 1,804,207, dated May
80 5, 1931.

In the form of the invention illustrated in Fig. 2, the casing 20 is provided with an integral internal ledge 21 having therein downwardly opening holes 22 for the reception of plugs 23
85 into which headed fastenings 24 may be driven in order to retain an annular lining element 25. In this form of the invention the lower ends of the upper lining blocks 26 are rabbeted to receive the ledge 21, the lower surfaces of the ledge and lining blocks being flush, and both being covered by the temporary lower lining strip 25. Parting material 27 is preferably interposed between the ledge and upper lining on the one hand and the lower lining strip 25 on the other.
90

In the construction of Fig. 3 there is a metal casing 28 having an integral ledge 29. An upper refractory lining 31 is supported upon the ledge 29. Prior to each casting operation the rounded surface of the ledge 29 is covered with parting
100 material 30 and thereafter the entire lower and inner surfaces of the hot top are covered with a temporary lining element 32 of sheet material, preferably metal. We prefer to form this lining in one piece and to insert it into the hot top from the lower end, and thereafter to bend over integral lugs or tabs 33 against the upper ends of the lining elements 31, by means of which the temporary lining is releasably held in position.
105 When the ingot is poured the lining 32 tends to

adhere to the ingot, and when the hot top is stripped therefrom the lugs or tabs 33 readily give way.

The form of the invention illustrated in Fig. 4 is quite similar to that of Fig. 3, but differs in the respect that the temporary lining member 34 extends upwardly only a little way beyond the joint between the ledge 29 and the upper lining elements 31, but far enough to prevent molten metal from entering that joint. The annular lining element 34 is made of one piece of material, preferably sheet metal, having considerable resilience. It is so formed that when it is pushed into the hot top from the lower end thereof it tends to expand and grip the hot top frictionally. Before it is placed in position however, the operator may cover the inner surface of the lining element 31 and the inner and lower curved surface of the ledge 29 with a suitable parting material 35.

In the construction of Fig. 5 the temporary annular lining element 36, of a form substantially identical with the element 34 of Fig. 4, but not necessarily resilient or in a single piece, is supported by means similar to those illustrated in Figs. 1 and 2, that is to say the ledge 29 is provided with a series of downwardly opening holes 37 for the reception of plugs 38, and nails or other headed fastenings 39 are driven through the lining 36 into the plugs 38, thereby securely retaining the lining in a temporary fashion.

In Fig. 6, which is similar to Figs. 4 and 5, there is an annular temporary lining element 40 which is supported from the ledge 29 by readily fusible metal plugs 41 which are driven through the lining 40 into holes 42 of suitable size in the ledge 29. When the heat of the molten metal strikes the plugs 41 they melt or weaken, and thereby permit the hot top to be readily separated from the lining 40, which adheres to the ingot.

In the foregoing description we have necessarily gone somewhat into detail in order to explain fully the particular embodiments of the invention herein illustrated, but we desire it to be understood that such detail disclosures are not to be construed as amounting to limitations except as they may be included in the appended claims.

Having thus described our invention, we claim:

1. In a hot top, a lining for the lower end thereof, and means for releasably attaching said lining to the hot top comprising plugs set into downwardly opening holes in the lower end of the hot top, said plugs having depending projections adapted to support said lining.

2. In a hot top, a lining for the lower end thereof, means for releasably attaching said lining to the hot top comprising plugs set into holes in the lower end of the hot top, and headed fastenings extending through said lining into said plugs.

3. In a hot top, a lining for the lower end thereof, means for releasably attaching said lining to the hot top comprising wooden plugs set

into holes in the lower end of the hot top, and headed fastenings extending through said lining into said plugs.

4. In combination, a hot top, a lining for the lower end thereof, said lower end having downwardly opening holes therein at spaced intervals, and means for releasably attaching said lining to the hot top comprising plugs set into said holes, said lining being attached to said plugs and said plugs being adapted to fail when subjected to the heat of the molten metal.

5. In combination, a hot top, a protective lining therefor, and a layer of parting material interposed between said lining and said hot top proper to form a cleavage surface when the hot top is stripped from the ingot.

6. In combination, a hot top, a protective lining therefor, and a coating of plastic parting material interposed between said lining and said hot top proper to form a cleavage surface when the hot top is stripped from the the ingot.

7. In a hot top having a lower metallic portion, a lining therefor, means for releasably attaching said lining to said metallic portion adapted to fail when the hot top is stripped from the ingot, and a layer of parting material interposed between said lining and said metallic portion to form a cleavage surface when the hot top is stripped from the ingot.

8. In combination, a hot top, a sheet metal lining therefor extending beneath the lower end of the hot top as a protection against the heat of the molten metal, and a layer of parting material interposed between said lining and said hot top proper to form a cleavage surface when the hot top is stripped from the ingot.

9. In a hot top having a lower metallic portion, a sheet metal lining therefor extending beneath the said metallic portion and up along one side thereof, and a layer of parting material interposed between said lining and said metallic portion to form a cleavage surface when the hot top is stripped from the ingot.

10. In a hot top adapted to extend downwardly into an ingot mold, a casing, lining material covering the lower end thereof adapted to protect the same and facilitate stripping said casing having vertical openings extending upwardly from its lower end surface, and securing means for said lining extending into said openings, said means being adapted to fail when the hot top is stripped from the ingot.

11. In a hot top, a metal casing having a lower inwardly extending ledge for the support of lining elements, a lower lining covering the inner and lower surfaces of said ledge and the lower end of said casing, said ledge having upwardly extending holes therein spaced around the hot top, and fusible metal fastenings set into said holes, said fastenings being of a size to frictionally engage the walls of said holes when driven through said lower lining into said holes.

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