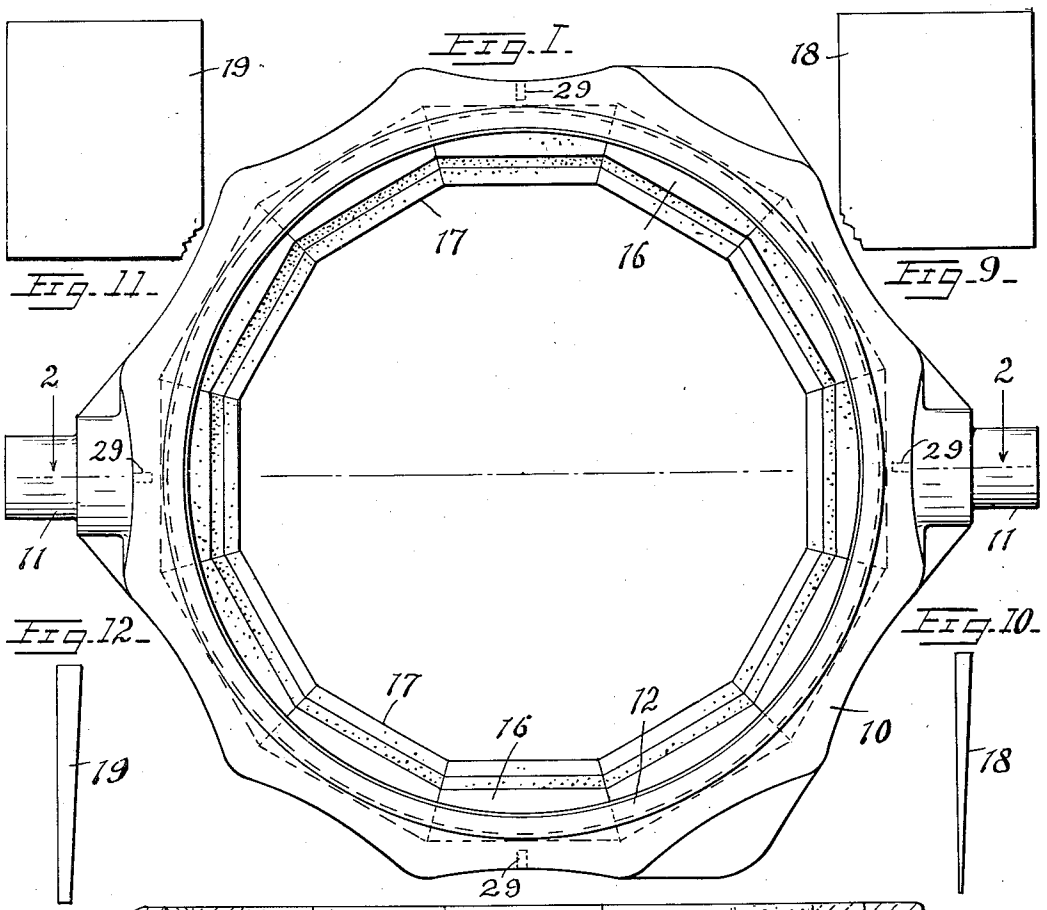
Feb. 27, 1934. W. M. CHARMAN ET AL 1,949,292

HOT TOP

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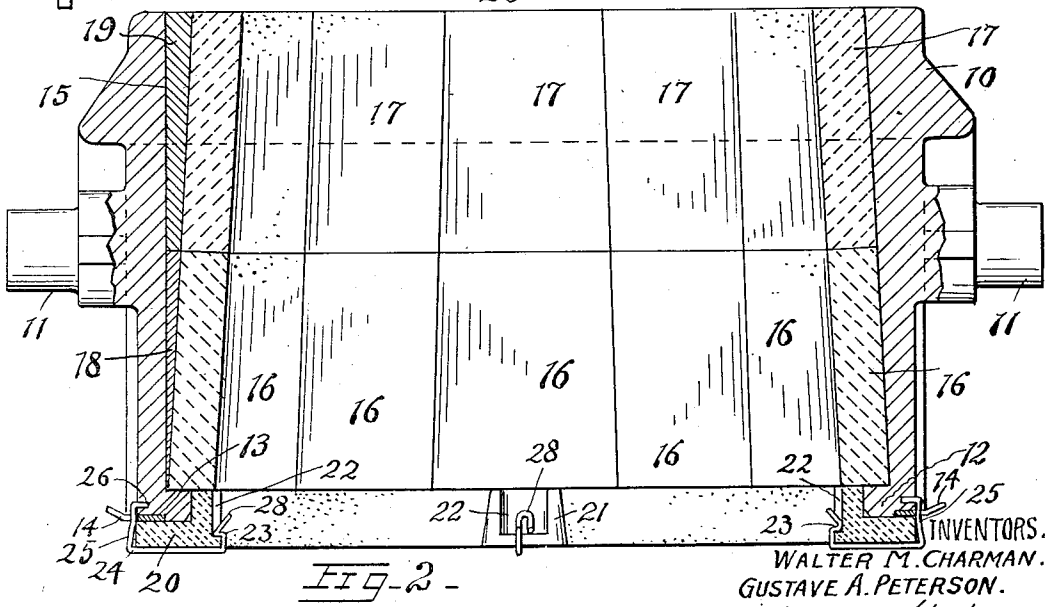


Fig. 2.

INVENTORS.
WALTER M. CHARMAN.
GUSTAVE A. PETERSON.
Kerr Hudson & Kent attys.

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HOT TOP

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Fig. 3.

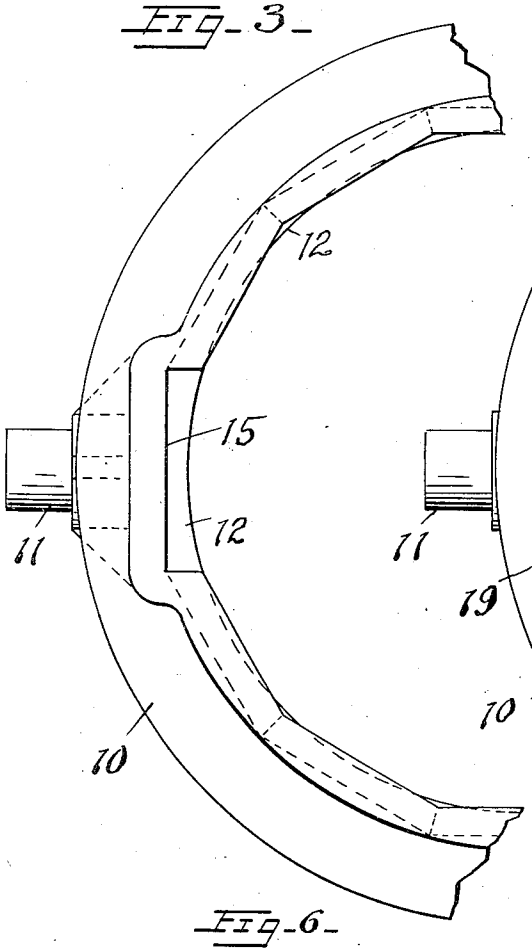


Fig. 4.

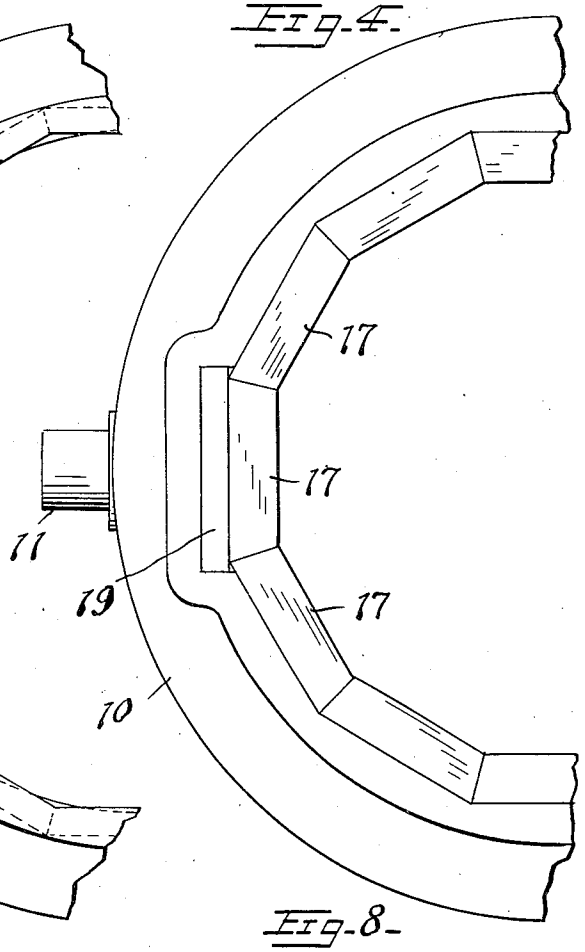


Fig. 6.

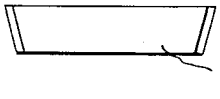


Fig. 8.

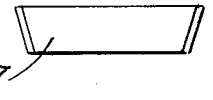


Fig. 5.

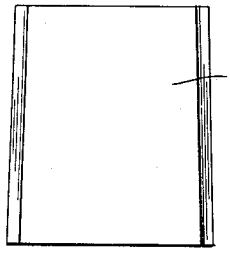
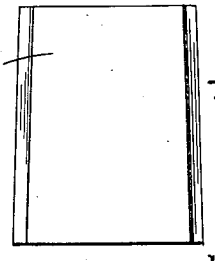


Fig. 7.



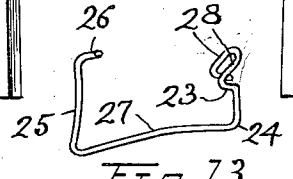


Fig. 13.

INVENTORS.
WALTER M. CHARMAN
GUSTAVE A. PETERSON.
Kerr Hudson & Kent
attys

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UNITED STATES PATENT OFFICE

1,949,292

HOT TOP

Walter M. Charman and Gustave A. Peterson, Cleveland Heights, Ohio; said Peterson assignor to The Ferro Engineering Company, Cleveland, Ohio, a corporation of Ohio

Application February 15, 1932. Serial No. 592,886

11 Claims. (Cl. 22—147)

This invention pertains to hot tops for ingot molds, relating particularly to means for facilitating the assembly into the casing of the semi-permanent upper lining elements, and a means for temporarily attaching the lower lining element or bottom ring.

One of the objects of the invention is the provision of means permitting the assembly into a casing with an upwardly tapered inner surface, of correspondingly tapered lining blocks which may be inserted into the casing from above, the lining blocks having beveled interengaging surfaces, and the casing having a recess formed therein, wide enough to receive one of the blocks, and located slightly to the rear of the final position of the block, so that the last block of a course may be introduced through the recess and then pushed inwardly into engagement with the blocks on either side thereof, whereby all of the blocks of the course are locked in place in the casing.

Another object of the invention is the provision of suitable means for filling up the said recess after the lining blocks are all in place.

A further object is the provision of means for firmly securing in place the bottom ring of the hot top, which means shall be susceptible of quick and easy installation.

Other objects and features of novelty will appear as we proceed with the description of that embodiment of the invention which, for the purposes of the present application we have illustrated in the accompanying drawings, in which

Figure 1 is a bottom plan view of a hot top embodying the invention, with the bottom ring removed.

Fig. 2 is a vertical diametrical section of the same, taken substantially on the line 2—2 of Fig. 1 and showing the bottom ring in position.

Fig. 3 is a fragmental top plan view of the casing alone.

Fig. 4 is a similar view with the lining blocks in position.

Figs. 5 and 6 are inside elevational and top plan views, respectively, of one of the semi-permanent lining blocks of the lower course.

Figs. 7 and 8 are similar views of one of the blocks of the upper course.

Figs. 9 and 10 are side and edge elevational views, respectively, of a wedge used for filling up the recess formed in the casing behind the key block of the lower course.

Figs. 11 and 12 are similar views of the wedge block for the upper course, and

Fig. 13 is a perspective view of one of the spring wire clips for securing the bottom ring of the hot top to the casing.

The casing 10 of the hot top is preferably a casting, made in a single piece. It may be provided with trunnions 11 for easy handling, and has an inwardly extending ledge 12 at its lower end running entirely around the casing. As shown in the drawings, this ledge is circular and is preferably provided with a rabbet 13 along its lower outer surface, in order that a wiper strip 14 may be set therein flush with the lower surface of the ledge.

The inner surface of the casing is provided with a series of flats, twelve of them being shown in the present instance. These flats are inclined inwardly toward the top, as clearly shown at the right hand side of Fig. 2, and their edges are likewise inclined toward each other toward the top of the casing. Obviously a curved wall could be substituted for the polygonal wall herein disclosed, the outer surfaces of the lining blocks being then correspondingly curved.

The inner surface of the casing, as a whole, is therefore tapered upwardly. There is, however, one exception to this general conformation and that is, that a recess 15 is formed at one point of the inner surface, extending from the top of the casing down to the ledge 12, this recess being as wide or a trifle wider than the width of the flats at their lowest and widest points.

In order to keep the recess 15 as small as possible, and thereby to depart as little as possible from the thickness of the balance of the casing wall, we form the outer surface of the recess vertical, as illustrated at the left hand side of Fig. 2, whereby the recess has a wedge shape.

In order that the semi-permanent lining of the hot top above the ledge 12 may be positively locked in place, the several lining blocks which go to make up this part of the lining are formed on their rear or outer surfaces to fit more or less precisely the flats heretofore mentioned. This gives them an upward taper in so far as their side edges are concerned. The latter edges are also beveled off along planes extending through the axis of the hot top. As a consequence, these lateral edges present interengaging surfaces which, when all of the blocks of a course are in position, serve to lock them securely in place. The lining above the ledge 12 may be made in a single course, if desired, but we prefer, for practical reasons, to form it in two courses, the blocks 16 of the lower course being all alike when the hot top is designed for use with a mold which approaches the circular form, as does that with which the

hot top illustrated herein is to be used. The upper course is made up of a series of identical blocks 17 which, however, are somewhat smaller than the blocks 16.

The last block of the lower course to be put into position is lowered into the recess 15. This block is herein called the key block merely to differentiate it from the other blocks of the course with which it is identical in form and size. The other blocks of the course are held in place in the meantime by the workmen. Inasmuch as the recess 15 is at least as wide as the widest part of the key block, that is the rear lower edge thereof, no difficulty will be encountered in getting the block into the recess and lowering it into the same until its lower edge rests on the ledge 12. It is then necessary merely to push it inward far enough to engage the edges of the blocks adjacent thereto on either side. Where a wedge-shaped recess is employed, as in the case illustrated, this is done by rocking the upper end of the block inwardly. Thereafter a filler plate or wedge 18 is lowered into the recess behind the key block, in order to hold the same in interengaging relation with the blocks on either side thereof, whereby all of the blocks of the course are locked in place.

The wedge 18 is preferably made of metal, although other refractory materials could be employed if desired. Furthermore, the means for filling the recess after the key block is in position need not necessarily be a preformed filler, as loose or plastic material can be packed into the recess if desired.

After the lower course of the lining is completely assembled, the blocks 17 of the upper course are inserted, one at a time, until all but the key block is in place, after which that block is lowered into the recess and pushed inwardly, as in the case of the lower course, and then a filler plate or wedge 19 is mounted in position in the recess behind the key block. The hot top is then ready for use, except for the parts which must be replaced after every heat.

The temporary parts just referred to include the wiper strip 14, previously mentioned, which may be made in one or a plurality of pieces, and also a lining for the inner and bottom sides of the ledge 12. This latter lining is preferably made in one piece, called the bottom ring. Such a ring is shown at 20 in Fig. 2. This ring is formed at intervals along the inner walls thereof with bosses 21, having sockets 22 therein presenting horizontal shoulders that are adapted to be engaged by shouldered grips 23 on spring wire clips 24. Each of these clips has an outer vertical portion 25 which may be bowed inwardly slightly, and which ends in an angular extremity 26 that is adapted to fit into a hole 29 drilled in the outer wall of the casing 10 just a short distance above the lower end thereof. The horizontal portion of clip 24 is also bowed upwardly, as indicated at 27. The inner extremity beyond the grip 23 is bent up at an angle and then provided with a return bend to form cam fingers 28.

When the ring 20 is to be assembled upon the hot top the latter is generally turned up side down, the ring put in position, and the clips attached one at a time. The workman first inserts the angular end portion 26 of the clip into one of the holes 29 in the casing, a slot being provided in the wiper strip 14 to receive the vertical portion 25 of the clip. At this time the cam fingers 28 will rest against the lower face of the ring 20. The workman then presses inwardly upon the vertical portion 25 of the clip and at the same time exerts pressure to straighten out the bowed horizontal portion 27 of the clip. The fingers 28 are thereby pushed toward the inner wall of the ring and cammed over the corner thereof and snapped into the socket 22. When the other clips have been set in position in the same way, the attachment of the bottom ring to the casing will be found to be very secure indeed.

It will be appreciated that the bosses 21 and notches 22 might, of course, be applied to the outer or to the lower surface instead of to the inner surface of the ring 20, but we much prefer to carry the clip around to the inner surface, as illustrated in the drawings. When the hot top is in use the molten metal weakens or destroys these clips, so that when the hot top is stripped from the ingot the ring 20 is left behind.

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 detailed 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 metal casing tapered upwardly and adapted to receive upwardly tapered lining blocks, said casing comprising means for supporting said blocks and having in its inner wall a recess of a size sufficient to receive one of said blocks somewhat behind the final position of the block, and means adapted to be inserted into said recess behind the block to crowd the latter forward into position, whereby all of the lining blocks are locked in place.

2. In a hot top, a metal casing having upwardly tapered inner walls, lining blocks adapted to fit the said walls, and having interengaging edges, means for supporting said blocks, said casing having in its inner wall a recess of a size sufficient to receive a key block somewhat behind the final position of the latter, said key block and the next adjacent block on each side thereof having interfitting beveled edges, and means adapted to be inserted into said recess behind said key block to crowd the latter forward into final position, whereby all of the lining blocks are locked in place.

3. In a hot top, a metal casing having upwardly tapered inner walls, upwardly tapered lining blocks adapted to fit the inner walls of said casing, means for supporting said blocks, said blocks having beveled contacting edges, said casing having in its inner wall a recess of a size sufficient to receive one of said lining blocks somewhat behind the final position of the latter, and means adapted to be inserted into said recess behind said last named block to crowd the latter forward into final position, whereby all of the lining blocks are locked in place.

4. In a hot top, a metal casing having upwardly tapered inner walls and an inwardly directed ledge at its lower end, upwardly tapered lining blocks formed to fit said inner walls and supported upon said ledge, said blocks having beveled contacting edges, said casing having in its inner wall a recess with a vertical outer surface, said recess being of sufficient size to receive one of said lining blocks somewhat behind the final position of the latter, and a wedge-shaped filler plate adapted to be inserted into said recess with its thin end down, whereby the last named lining

block is held forward in position to lock all of said lining blocks against movement.

5. In a hot top, a metal casing having upwardly tapered inner walls, a course of upwardly tapered lining blocks formed to fit the said inner walls and supported upon the casing, an upper course of upwardly tapered lining blocks formed to fit said inner walls above said first named lining course, said last named blocks having beveled contacting edges, said casing having in its inner wall a recess of a size sufficient to receive one of said last named lining blocks somewhat behind the final position of the latter, and means adapted to be inserted into said recess behind said last named block to crowd the latter forward into final position, whereby all of the lining blocks of said upper course are locked in place.

6. In a hot top, a metal casing having upwardly tapered inner walls and an inwardly directed ledge at its lower end, two courses of upwardly tapered lining blocks formed to fit the said inner walls, the lower of said courses being supported upon said ledge and the upper course being supported upon the lower course, said casing having in its inner wall a recess extending down to said ledge, said recess being of a size sufficient to receive one of said lower course lining blocks, whereby the latter may be lowered into place somewhat behind its final position and then moved inwardly to lock all of the blocks of the course in place, and whereby the last block of the upper course may be lowered into place somewhat behind its final position and then moved inwardly to lock all of the blocks of its course in place, and means for filling up said recess.

7. In a hot top, a casing having small holes in its outer surface near the lower end thereof, a bottom lining mounted on the lower end of the casing, and wire clips having angular ends fitted within said holes and having fingers in resilient clamping relation with said bottom lining.

8. In a hot top, a casing, a bottom lining mounted on the lower end of said casing, said lining being formed with sockets on its inner surface, said casing having holes in its outer surface near the lower end thereof, and wire clips having ends fitted into said holes, said clips extending around the outer and lower sides of said lining and having fingers resiliently engaging said sockets.

9. In a hot top, a casing, a bottom lining mounted on the lower end of said casing, said lining being formed with sockets on its inner surface, said casing having holes in its outer surface near the lower end thereof, and spring wire clips having angular ends fitted into said holes, each of said clips extending around the outer and lower sides of said lining and upwardly for a short distance along the inner surface thereof, said clip having a reverse bend in that portion which engages the lower surface of the lining, and having a finger resiliently engaging one of said sockets.

10. In a hot top, a casing member, a bottom lining member, and spring wire clips clamping the lining to the casing, one of said members having holes therein and the other having sockets therein, and each of said clips having an angular end fitted within one of said holes and having a finger at its opposite end resiliently engaging one of said sockets.

11. In a hot top, a metal casing member having an internal ledge, a series of upwardly tapered lining blocks with inwardly beveled side edges mounted in said casing and supported upon said ledge, said casing having in its inner wall a recess of a size sufficient to receive one of said blocks somewhat behind the final position of the block, means inserted into said recess behind the block to crowd the latter forward into position, whereby all of the lining blocks are locked in place, a bottom lining member covering the surface of said ledge which is exposed when said first named lining blocks are in position, and spring wire clips clamping the bottom lining member to the casing member, one of said members having holes therein and the other having sockets therein, and each of said clips having an angular end fitted within one of said holes and having a finger at its opposite end resiliently engaging one of said sockets.

WALTER M. CHARMAN.
GUSTAVE A. PETERSON.