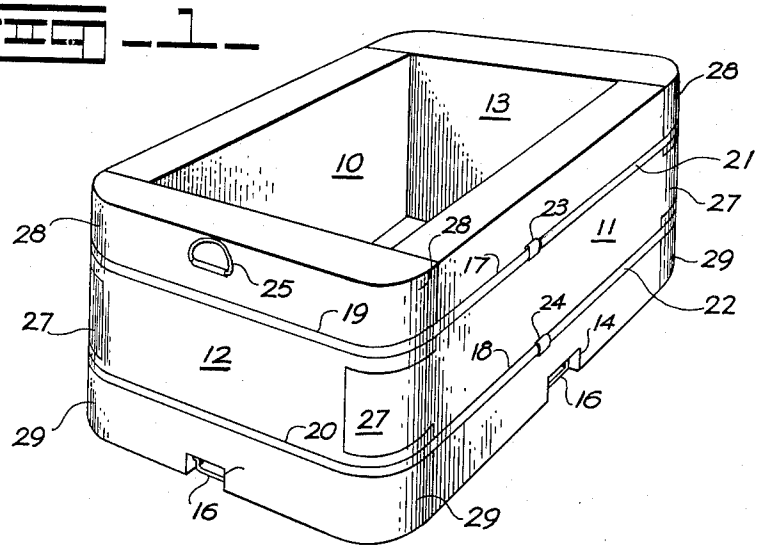
Sept. 10, 1963 M. D. LA BATE 3,103,046

CONSUMABLE HOT TOP

Filed June 1, 1961

FIG. 1



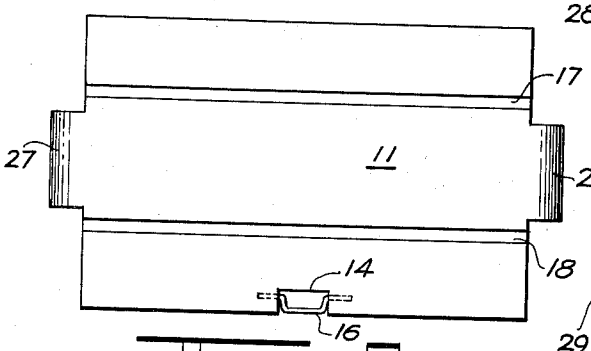


FIG. 2

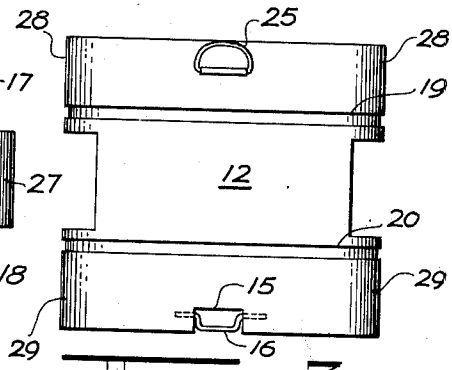


FIG. 3

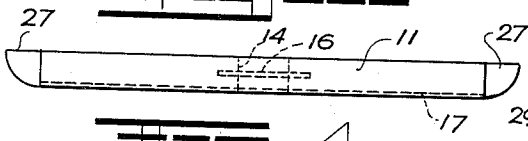


FIG. 4

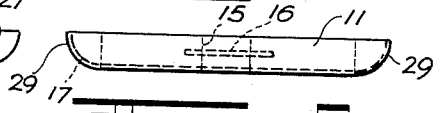
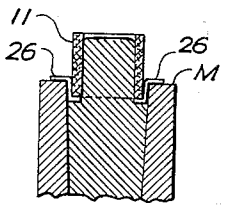


FIG. 5



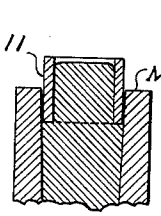


FIG. 6

FIG. 7

INVENTOR.

Micheal Donald LaBate

BY

W. B. Hartman

ATTORNEY.

United States Patent Office 3,103,046 Patented Sept. 10, 1963

3,103,046

CONSUMABLE HOT TOP

Micheal Donald La Bate, Kay St., Wampum, Pa.

Filed June 1, 1961, Ser. No. 114,170
2 Claims. (Cl. 22—147)

This invention relates to a hot top as used in casting ingots of molten metal and more particularly to a hot top formed of material that will retain the molten metal until it chills and sets and then burns away leaving only an ash residue thereby eliminating the necessity of removing the hot top from the cast ingot.

Consumable hot tops heretofore proposed in the art have been ineffective in use in that they did not always hold the molten metal adequately and more particularly their use required the molten metal to be within a limited temperature range. The consumable hot top disclosed herein overcomes these problems in that it provides a construction that will maintain its shape during the pouring of molten metal therein, the chilling of the molten metal therein and most importantly will retain its position on the ingot mold at all times until it is completely consumed.

The principal object of the invention is the provision of a consumable hot top meeting the foregoing problems and specifically comprising a device that will retain its position on an ingot mold and hold molten metal poured therein until the molten metal has set and then burn away.

A further object of the invention is the provision of a consumable hot top that may be quickly formed of a plurality of parts and held in assembled relation by bands which like the hot top are also consumable.

A further object of the invention is the provision of a consumable hot top formed of material most suitable for total granulation and/or consumption.

A still further object of the invention is the provision of a consumable hot top incorporating consumable material adopted to produce a temperature when burning less than that of the hot metal contained in the hot top.

A further object of the invention is the provision of a consumable hot top that will effectively receive and hold liquid metal at temperatures as high as 3400° F. while retaining its original shape and physical characteristics without permitting the liquid metal to escape so that the metal can solidify normally.

A still further object of the invention is the provision of a hot top that is of totally consumable and/or destructive nature that can be produced and successfully used on ingot molds without regard for the density of metal poured.

A still further object of the invention is the provision of a consumable hot top that will prevent the formation of hanger cracks and pipes in ingots poured therein.

The consumable hot top disclosed herein comprises an improvement in the art relating to hot tops used on ingot molds for receiving liquid metal such as iron and steel. In the formation of iron and steel ingots it has long been customary to place a ceramic hot top on the ingot mold and which ceramic hot top receives and holds the uppermost portion of the ingot being poured and delays the cooling action of the metal so as to permit the metal in the ingot mold to chill and solidify without the formation of cracks or piping. The present hot top is formed of material which will contract as the metal does and be totally consumed shortly after the metal therein has solidified.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being the intention to cover all changes and modifications of the example of the invention herein chosen for purposes of the disclosure, which do not constitute departures from the spirit and scope of the invention.

The invention is illustrated in the accompanying drawing, wherein:

FIGURE 1 is a perspective view of a consumable hot top formed in accordance with the invention.

FIGURE 2 is a plain view of one portion of the hot top shown in FIGURE 1.

FIGURE 3 is a plan view of another portion of the hot top shown in FIGURE 1.

FIGURE 4 is a top plan of the portion shown in FIGURE 2.

FIGURE 5 is a top plan view of a portion shown in FIGURE 3.

FIGURE 6 is a cross sectional elevation with parts broken away showing the consumable hot top positioned on an ingot mold.

FIGURE 7 is a view of the consumable hot top positioned partially within an ingot mold.

By referring to the drawings and FIGURE 1 in particular, it will be seen that a consumable hot top has been disclosed which comprises a pair of oppositely disposed elongated side sections **10** and **11** and a pair of oppositely disposed end portions **12** and **13**. The side portions **10** and **11** are duplicates and the end portions **12** and **13** are duplicates and they are all formed of material which will be totally consumed and/or disintegrate shortly after the solidifying of an ingot poured therein. The side and end portions **10**, **11**, **12** and **13** of the consumable hot top are formed of material which includes ingredients that will burn and ingredients that will disintegrate to a fine powder held in a normal mix by a suitable binder. Several different variations in the mixture are possible within the scope of the invention. An example of a desirable mix will comprise a batch including 40 lbs. of sawdust, 140 lbs. of raw dolomite, and 80 lbs. of sodium silicate as a binder. This basic mixture may be altered by substituting an equal quantity by weight of small sized wood chips, rice hulls or wheat kernels for the sawdust. A still further variation forming a suitable mix comprises substituting sintered granulated blast furnace slag or finely ground fired clay (grog) for the raw dolomite in equivalent weights. It has also been determined that the resin urea-formaldehyde in the amount of 50 lbs. by weight can be used as a binder rather than the 80 lbs. of sodium silicate. It will occur to those skilled in the art that a number of variations in the mix of the consumable hot top material are therefore possible.

In forming a hot top in accordance with this invention, a basic mixture of the above-mentioned ingredients is made, for example, of sawdust, dolomite and sodium silicate and the respective side sections **10** and **11** and end portions **12** and **13** of the hot top are formed thereof by molding the same therefrom. This mixture tends to dry and set and forms a reasonably durable structure capable of the intended use. By referring to FIGURES 2 and 3 of the drawings, it will be seen that the bottom sections of each of the side portions **10** and **11** and end portions **12** and **13** have been notched as at **14** and **15** respectively and that metal clips **16**, **16** have been positioned across the notches **14** and **15**. Each clip includes a pair of vertical legs integrally connected at their lower ends by a central or bight portion aligned with the lower edges of the respective side or end portions and with the upper ends of the legs having integral outwardly extending flanges embedded in the adjacent material so as to form windows through which molten metal will flow and solidify.

Transversely extending grooves **17**, **18** and **19**, **20** are formed in the side and end portions respectively and on the same horizontal plane so that when a hot top is formed

as shown in FIGURE 1 from two of the side portions **10** and **11** and two of the end portions **12** and **13** the grooves **17** and **18** and **19** and **20** extend completely around the hot top. Sections of stainless steel strapping **21** and **22** are then positioned around the hot top in the grooves **17**, **18**, **19** and **20** and their ends together in tightened relation by clips **23** and **24** as so known in the art.

Metal handles **25** may be installed in the upper sections of the end portions **12** and **13** to facilitate handling the completed hot top and it will therefore be seen that the hot top has been disclosed in FIGURE 1 in completed ready-to-use form and that the wall portions thereof are formed of a consumable mixture as hereinbefore described. The hot top thus formed has the vertical seams in the inside corners thereof sealed with a mixture of grog (finely ground fired clay) and water applied in an approximate thickness of ⅛ inch.

The ends of the side portions **10** and **11** have single extensions **27**, **27** thereon midway between their upper and lower edges and the ends of the end portions **12** and **13** each have a pair of spaced extensions **28**, **28** and **29**, **29**, thereon adjacent their upper and lower edges respectively. The mutual engagement of these extensions prevents relative vertical movement of the side and end portions **10**, **11** and **12** and **13**.

In FIGURES 4 and 5 of the drawings, top plan views of the side and end sections **11** and **12** may be seen and in FIGURE 6 the hot top shown in FIGURE 1 is shown in cross section in reduced scale positioned on an ingot mold M by a plurality of Z-bars **26**, **26** and an ingot is shown poured therein. The hot top will retain its position on the ingot mold M by reason of the notches **14** and **15** and clips **16** forming windows which act to anchor the mold and prevent it from floating on the molten metal as the same fills the hot top. The first molten metal to enter the notches **14** and **15** flows through the windows defined thereby with the metal clips **16**, **16** and touches the ingot mold M and chills and solidifies thereby anchoring the hot top satisfactorily to the ingot to prevent floating.

In FIGURE 7 of the drawings, the hot top disclosed herein is shown positioned partially within an ingot Mold M and the molten metal is shown poured therein. In both FIGURES 6 and 7, the molten metal has been poured, the metal engaging the walls of the ingot and the walls of the hot top has chilled and formed its initial set and the remaining metal is still molten. It will be understood that as the metal cools and solidifies, the consumable hot top will begin to burn and that by the time the metal in

the hot top area has solidified, the hot top will have disintegrated including the steel bands which held it in assembled relation. It will thus be seen that a consumable hot top has been disclosed which meets the several objects of the invention, and having thus described my invention, what I claim is:

1. A hot top adapted to telescopically fit within the top of a mold comprising a walled structure of consumable material having a vertically extending axial passage therethrough, said walled structure having upper and lower peripheral edges surrounding the ends of said passage, a plurality of peripherally spaced notches formed in said lower edge and extending upwardly therefrom, each of said notches defined by a pair of opposing upwardly extending side wall surfaces and a top wall surface extending between the upper ends of said side wall surfaces, a U-shaped metal clip located in each notch comprising a pair of spaced legs connected by a bight portion, the legs of each clip extending parallel to and lying flat against the side wall surfaces of their respective notch, the bight portion of each clip extending across the bottom of its respective notch in alignment with said lower edge, and said bight portion spaced below the top wall surface of its respective notch, the upper end of each leg having an integral flange extending horizontally outwardly through one of said side wall surfaces and embedded in said consumable material, each clip being spaced a substantial distance inwardly from the outer peripheral surface of said walled structure so that it will not become fused to the mold during use.

2. A hot top as defined in claim 1, wherein said walled structure comprises four rectangular blocks arranged in a box-like configuration, interlocking tongues and grooves formed on the ends of said blocks, and consumable band means extending around said wall structure urging said blocks together.

References Cited in the file of this patent

UNITED STATES PATENTS

1,454,740	Howard et al.	May 8, 1923
1,501,655	Gathmann et al.	July 15, 1924
1,945,880	Charman	Feb. 6, 1934
2,272,018	Nicholas	Feb. 3, 1942
2,416,836	McGill	Mar. 4, 1947
2,925,637	Edmonds et al.	Feb. 23, 1960
2,946,103	Vallak	July 26, 1960