Nov. 9, 1965 B. F. ANTHONY 3,216,069

MAKE UP MACHINE OR APPARATUS FOR HOT TOPS

Filed Oct. 24, 1962 2 Sheets-Sheet 1

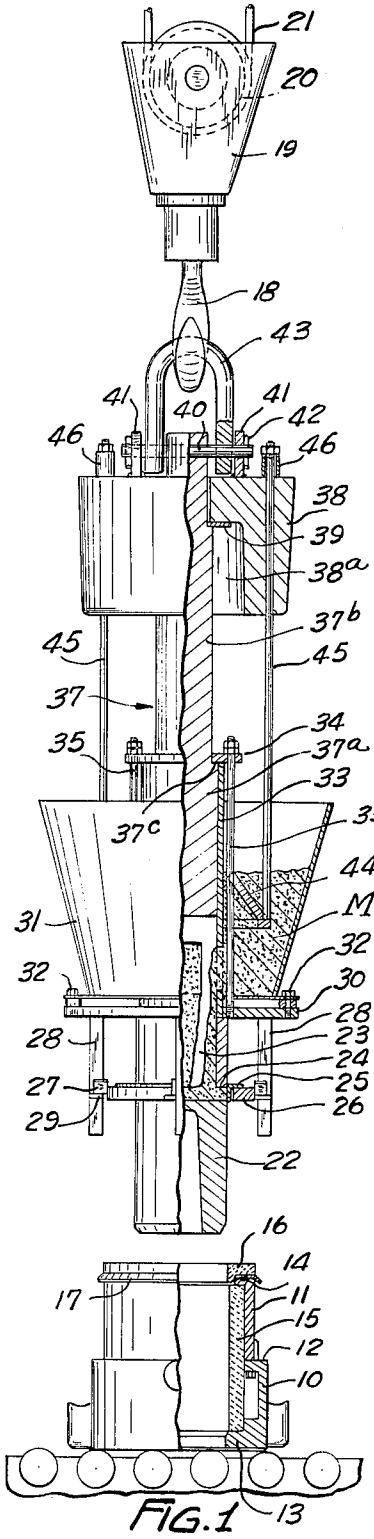


FIG. 1

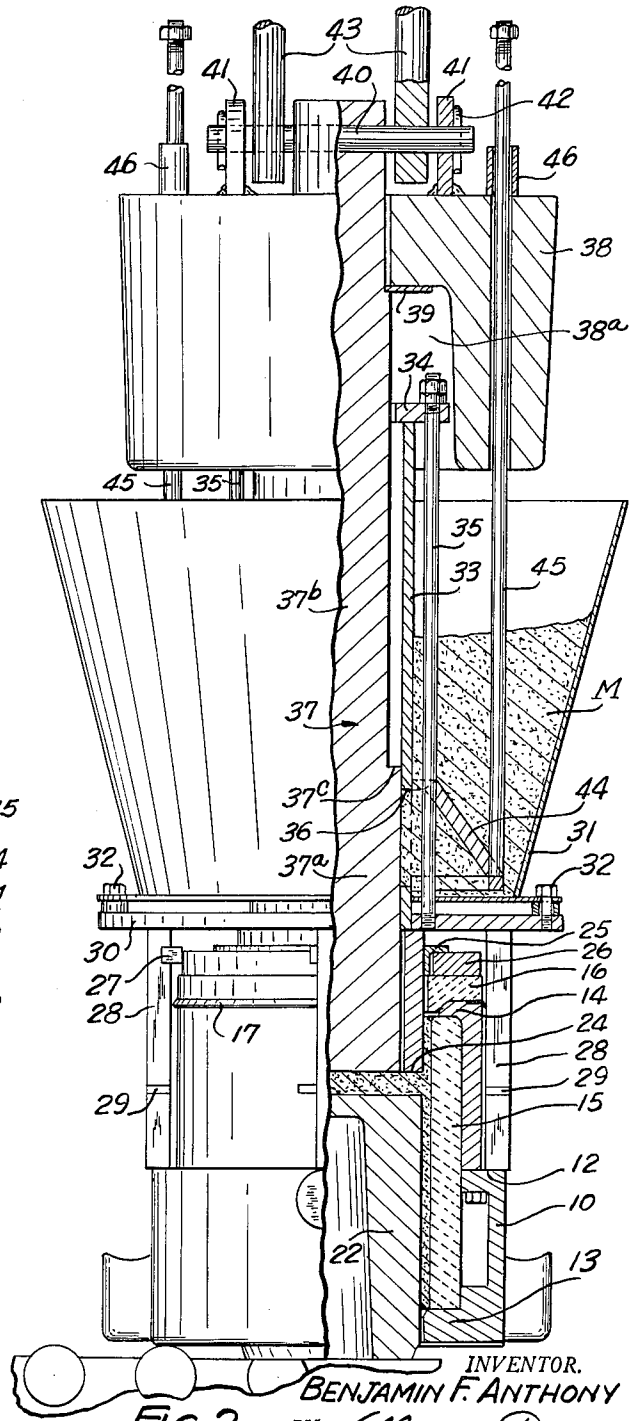


FIG. 2

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FIG. 4

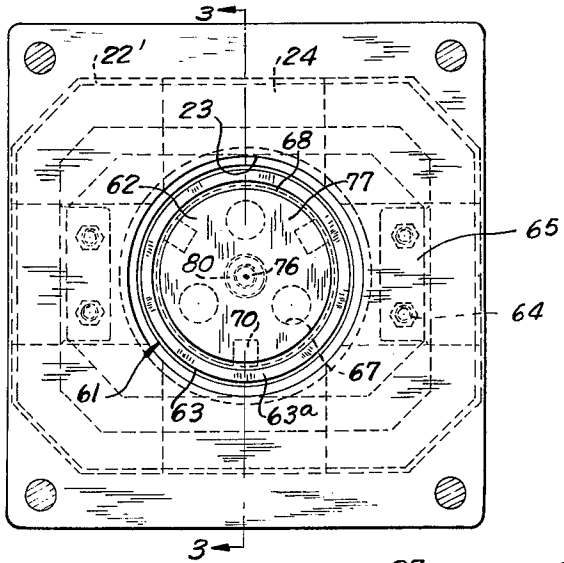
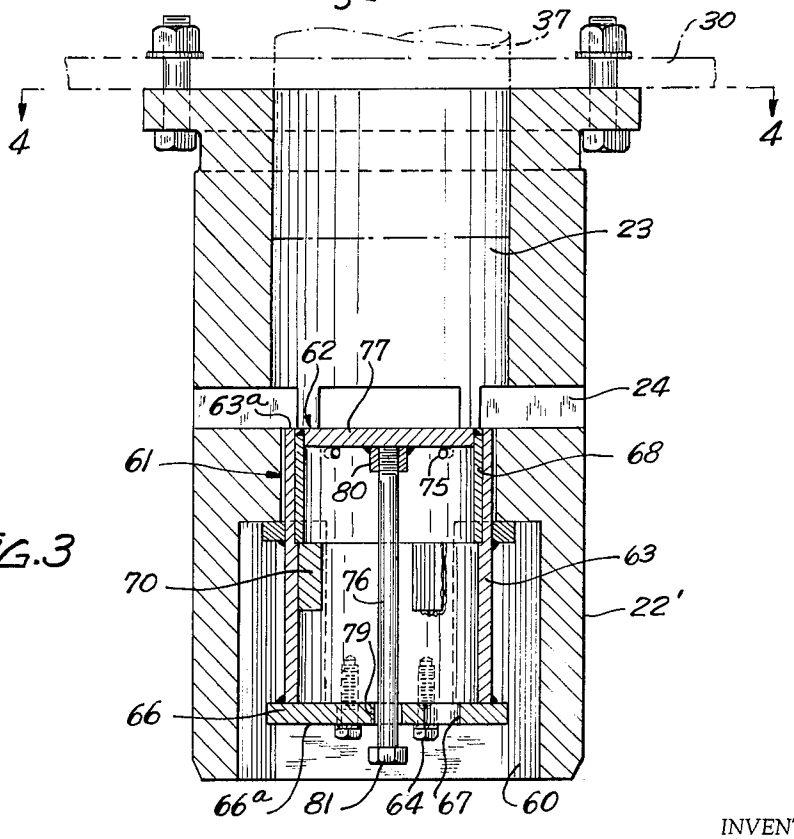


FIG. 3



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MAKE UP MACHINE OR APPARATUS FOR HOT TOPS

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10 Claims. (Cl. 22—9)

This invention relates to a make up machine for hot tops.

It is common practice, in pouring molten steel into ingot molds, to use a hot top which is associated with the upper end of the mold and the molten metal is poured into the mold, filling the mold and also filling to a desired extent the hot top.

The molten metal in the hot top forms upon the ingot a sinkhead which, while the metal is molten, feeds the shrinkage cavity which usually forms along the central axis of the ingot as it solidifies, all as is well understood in the art.

A well known form of hot top is the composite "floating" type hot top which comprises an outer metallic casing of such dimension as to fit within the upper end of the mold and having upon its inner walls a refractory lining. On the lower end of the metallic casing a refractory bottom ring is supported by means of frangible attaching clips and this bottom ring prevents the molten metal of the ingot from coming in contact with the metallic casing and also it serves as a parting means to provide for the easy removal of the hot top from the sinkhead of the solidified ingot.

It is usual to apply to the inner surface of the refractory lining of the hot top a coating to protect the refractory lining and/or to facilitate the stripping of the hot top from the sinkhead of the solidified ingot.

In hot tops wherein the refractory lining is formed of insulating firebrick which are fragile and porous but highly insulating, it is necessary to provide on the inner walls of such refractory lining a veneer of predetermined thickness for the purpose of affording protection for the lining and to enable the latter to stand up under the thermal shock of the teeming temperatures of the molten steel which range from 2700° F. to 3000° F.

A hot top of the character last referred to is known as a low volume hot top and such a hot top is disclosed in the Charman et al. United States Patent 2,833,008, issued May 6, 1958.

The protective veneer for a low volume hot top can be applied manually by mortaring the fictile veneer onto the refractory lining, but this is a tedious operation and it is difficult to have the veneer of uniform thickness. Apparatus has been developed for applying the veneer to the refractory lining of the hot top so as to obtain uniform thickness for the veneer and to facilitate the preparation of the hot top for a pouring operation. Apparatus of this type is shown in Anthony Patent 2,896,266, issued July 28, 1959, and also in the Withee et al. Patent 2,988,793, issued June 20, 1961.

The apparatus heretofore used for applying the fictile veneer has been power operated apparatus located in a fixed location and the hot tops are brought to the apparatus by suitable means such as a mechanical conveyor system. This requires expensive mechanical conveyor equipment and installation may be justified in instances requiring the preparation of large numbers of hot tops, but not where a relatively few hot tops are to be prepared. There are hot topping operations in the industry where only a limited number of low volume hot tops requiring the application of the fictile veneer are used and in such instances the conveyor mechanization referred to would not be justified from the standpoint of capital investment and available space. Although in these instances hand application of the veneer could be resorted to; this is messy, irregular, time-consuming and arduous.

The present invention contemplates a hot top make up machine or apparatus for applying fictile veneer to the refractory lining of the hot top and which machine or apparatus is mobile and can be moved readily by simple means into operative position with relation to the hot tops to be prepared, rather than moving the hot tops by complicated mechanical conveyor mechanism into position relative to the apparatus or machine.

The invention also contemplates a mobile apparatus or machine as referred to where gravity is utilized to move the mandrel into the hot top and to force fictile material from the mandrel.

The present invention also contemplates a hot top make up machine including a mandrel having a cavity for receiving veneering material, a ram movable into and out of the cavity to force the veneering material from the cavity, and a venting means to vent the cavity to a source of pressure upon withdrawal of the ram from the cavity to thereby substantially prevent the veneer from being sucked off of the hot top upon withdrawal of the ram.

The apparatus or machine contemplated by the invention includes a mandrel for insertion in the hot top and a ram movable relative to the mandrel to apply the veneer and is simple and relatively inexpensive in its construction, efficient in operation and effects time saving in the preparation of the hot tops with the veneer applied by the machine having a substantially uniform thickness.

The apparatus or machine contemplated by the invention is ideal for those instances where a small number of low volume hot tops are to be prepared, since its use obviates the necessity of bringing the hot tops to the machine or apparatus, as above referred to, as the machine or apparatus readily is brought to each hot top.

However, it will be understood that the machine or apparatus contemplated by the invention is not limited in its use to those installations where only a few hot tops are prepared, but also can be used in larger installations wherein a relatively great number of hot tops are to be prepared for pouring operations.

The apparatus or machine embodying the invention has many inherent advantages as will become evident during the following detailed description of an embodiment thereof which is illustrated in the accompanying drawing forming a part of this specification and wherein,

FIG. 1 is a view partly in elevation and partly in section and shows the apparatus or machine suspended above the hot top prior to the insertion of its mandrel into the hot top to apply the fictile veneer to the refractory lining thereof,

FIG. 2 is a view partly in elevation and partly in section and shows the apparatus after the veneer has been applied to the refractory lining of the hot top and in position where the ram of the apparatus or machine is in its maximum inserted veneer applying position in the mandrel,

FIG. 3 is a sectional view of a modified mandrel for use in the apparatus of FIG. 1 and taken approximately on section line 3—3 of FIG. 4, and

FIG. 4 is a top sectional view of the structure shown in FIG. 3 taken approximately on section line 4—4 of FIG. 3.

In FIG. 1 the hot top is shown inverted, in preparation position, and resting upon a support which can be of any suitable construction as, for instance, a roller support or the conventional hot top preparation stand such as that shown in FIG. 1 of the above mentioned Withee et al. Patent 2,988,793.

The hot top shown in the drawing is of the low volume type and, as shown, comprises a metal casing formed of

two sections 10 and 11 secured together by suitable means such as securing bolts, all as well understood in the art. The section 10 is of greater outside dimensions than the section 11 and hence an external ledge 12 is provided on the hot top casing at the junction between the sections 10 and 11. The sections 10 and 11 at their free ends are provided respectively with inwardly extending lips or flanges 13 and 14. These lips or flanges 13 and 14 support the refractory lining 15 of the hot top which, in the case of a low volume hot top, is of porous, light weight, fragile insulating brick, as distinguished from hard, dense, high quality firebrick.

The conventional refractory bottom ring 16 engages the end of the hot top and is held in position against the end of the casing section 11 and the end of the refractory lining 15 by suitable frangible attaching clips, not shown, but well understood in the art. As is usual, a metal wiper strip 17 may be mounted intermediate the refractory bottom ring 16 and the casing of the hot top or may be assembled into the ring to form a unitary assembly therewith.

The apparatus or machine embodying the invention is shown suspended from the hook 18 of a block 19 mounting a sheave 20 around which extends the cable 21 connected to a suitable crane (not shown as it is known in the art), whereby the machine or apparatus can be transported by the crane into aligned position over the hot top that is to receive the veneer and then lowered into veneer applying position in the hot top or raised therefrom. The crane may be an overhead crane of the monorail (hand or power operated) bridge or equivalent type for raising and lowering the hook 18. It will be apparent that the crane may operate over suitable tracks so that it may be used where needed and that it may also be a crane such as a boom crane mounted in a vehicle.

The machine or apparatus comprises a mandrel 22 of such outside dimensions that when inserted into the hot top a clearance space of the desired thickness for the veneer is provided between the periphery of the mandrel 22 and the inner wall of the refractory lining 15 of the hot top. This clearance space, for example, may be such that the veneer will have a thickness of the order of one-half (½) inch. The mandrel 22 is provided with an upper cavity 23 and this cavity 23 communicates with the exterior of the mandrel by the provision of a plurality of ports 24 spaced around the periphery of the mandrel and of a number sufficient to provide for the required extrusion of the fictile veneer material from the cavity 23 to the clearance space between the mandrel 22 and the refractory lining 15 of the hot top when the veneer is being applied.

The ports 24 when the apparatus or machine is in the raised position shown in FIG. 1 are covered by an angle member or members 25 carried by a floating ring 26 which surrounds the mandrel 22 and is free to move axially thereof. The floating ring 26 mounts on its circumference guide lugs 27 which are slidable on stabilizing legs 28. The stabilizing legs 28 are provided with stop projections 29 the upper surfaces of which are engaged by the lugs 27 to limit movement of the floating ring 26 downwardly relative to the mandrel 22 and the stabilizing legs 28 toward the lower or free ends of said legs. When the lugs 27 engage the projection 29 the ports 24 are covered by the angle member or members 25. The mandrel 22 and the upper ends of the stabilizing legs 28 by suitable means are secured to or united with a base plate 30 to depend therefrom and the base plate is provided with a central opening for a purpose later to be explained.

A hopper 31 is secured to and mounted on the upper side of the base plate 30 by bolts 32 adjacent the bottom of the hopper. A cylinder 33 extends centrally and vertically of the hopper 31 and its lower end is located in the central opening in the base plate 30 and is adjacent the upper end of the mandrel 22. An external retainer ring 34 is secured to cylinder 33 at its upped end and extends outwardly therefrom and tie rods 35 pass through the retainer ring 34 and are screwed into the base plate 30 to secure the cylinder 33 in position on the base plate.

The cylinder 33 is provided with a number of ports 36 placing the interior of the cylinder in communication with the interior of the hopper 31. An elongated ram 37 is mounted for movement upwardly and downwardly within the cylinder 33 and the upper cavity 23 of the mandrel 22. The ram 37 at its lower end has a portion 37*a* of large diameter which slidably interfits the cylinder 33, while its upper portion 37*b* is of smaller diameter and hence an external shoulder 37*c* is provided at the junction of the portions 37*a* and 37*b* of the ram. The retainer ring 34 extends inwardly of the cylinder 33 to fit closely about the ram portion 37*b* and to close the upper end of the cylinder 33.

The upper end of the portion 37*b* of the ram 37 extends centrally through and is connected to a weight or mass 38 which is provided with a downwardly facing counterbore 38*a* of such diameter as to be capable of receiving the retainer ring 34, tie rods 35 and the upper end of cylinder 33. The weight or mass 38 is clamped to the ram between a shoulder plate 39 located at the inner end of said counterbore 38*a* and the upper end of the ram by pin extending through said upper end of the ram and through parallel ears 41 projecting upwardly from the upper side of the mass or weight 38. The pin 40 is held in the ears 41 by suitable means such as the cotter pins 42. The legs of a clevis 43 are carried by the pin 40 intermediate the ram and the ears 41 and said clevis is carried by the hook 18 of the block 19 that is connected to the crane.

A conical pusher ring 44 is located in the hopper 31 and is secured to the lower ends of tie rods 45 which pass through openings in the mass or weight 38 and collars 46 on the upper end of said weight or mass. The operation of the machine or apparatus embodying the invention and heretofore described will now be set forth.

Assuming the hot top that is to receive the veneer is in inverted position on a suitable preparation support or stand and the crane to which the hook 18 is connected has moved the machine or apparatus to the position shown in FIG. 1, at which time the mandrel 22 is spaced above the bottom ring 16 of the hot top and in alignment with the interior of the latter. Also assuming all remnants of veneer from a previous pouring operation have been removed and the hopper 31 contains fictile refractory veneer material M, it will be noted that the mandrel ports 24 are covered by the angle 25 of the floating ring 26 and the guide lugs 27 connected to said ring are in engagement with the projections 29 of the stabilizing legs 28. Also, as shown in FIG. 1, the conical pusher ring 44 is in raised position in the hopper 31 and the fictile veneer material M that is in the upper cavity 23 of the mandrel has flowed therein by gravity through the ports 36 of the cylinder 33, or is there as residue from a prior operation of the machine. The crane operator now lowers the block 19 to insert the mandrel 22 into the hot top. As the mandrel 22 is lowered into the hot top the floating ring 26 engages the bottom ring 16 of the hot top and thereafter said floating ring 26 is stationary while the mandrel 22 and stabilizing legs 28 move relatively to the floating ring 26 and thus the ports 24 in the mandrel are uncovered or opened. The downward movement continues until the free ends of the stabilizing legs 28 engage the external shoulder 12 of the hot top casing and further downward movement of the base plate 30 and hopper 31 is arrested. At this time the mandrel 22 is in the position shown in FIG. 2. If the hot top is supported by a stand, the free end of the legs 28 may be constructed to engage the stand rather than the shoulder 12 of the hot top.

The weight or mass 38 and ram 37 continue their lowering or downward movement relative to the now stationary mandrel with the shoulder 37*c* of the ram moving out of contact with the retainer ring 34 at the upper

end of the cylinder 33. This further movement of the ram 37 causes it to enter the upper cavity 23 in the mandrel 22 and to force the fictile veneer material M that is in said cavity outwardly therefrom through the mandrel ports 24 to fill with veneer material the clearance space between the now stationary mandrel 22 and the refractory lining 15 of the hot top.

During the initial part of this further movement of the ram 37 the flow of veneer material from the hopper 31 through the cylinder ports 36 and into the upper cavity 23 of the mandrel is aided by the downward movement of the conical pusher ring 44 which tends to move downwardly by gravity in the hopper 31 as the weight 38 is lowered relative to the hopper 31, it being observed that the weight 38 and collars 46 on its upper end may move downwardly relative to the tie rods 45.

When the ram 37 is in its most lowered position and the mandrel 22 is in the position shown in FIG. 2, the ram 37 due ot its own weight and that of the weight or mass 38 has under the force of gravity exerted pressure on the fictile material in the mandrel cavity 23 sufficient to force said material through the mandrel ports 24 to completely fill the clearance space between the mandrel 22 and the refractory lining 15 of the hot top and thus provide a protective veneer for said lining of the desired uniform thickness. When this has occurred the operator raises the block 19 and clevis 18 to move the ram 37 upwardly. During the first part of the upward movement the collars 46 on the weight 38 pick up the nuts on the upper ends of the tie rods 45 and cause the conical pusher ring 44 to move upwardly with the ram. The raising movement of the ram continues until the shoulder 37*c* of the ram 37 again contacts and picks up the retainer ring 34 and thereafter the continued upward movement results in the cylinder 33, hopper 31, base plate 30, mandrel 22 and stabilizing legs 28 moving unitarily upwardly with the ram 37 and weight 38 until the mandrel 22 has been withdrawn from the interior of the hot top. During this upward movement of the mandrel 22 the floating ring 26 remains stationary until the ports 24 are opposite the ring and the stop projections 29 on the stabilizing legs 28 contact the lugs 27 connected to the floating ring 26 to cause the ring to move with the mandrel 22 so that the ports will be kept closed as the mandrel is withdrawn. The fictile veneer applied to the hot top as thus described can now be dried by suitable means known in the art.

FIGS. 3 and 4 illustrate a modified mandrel 22' for use in hot top make up machines and particularly adapted for use with the hot top make up machine illustrated in FIG. 1. The modified mandrel 22' is described hereinbelow, and the same reference numerals used to designate parts of the apparatus of FIG. 1 are used to designate corresponding parts of the apparatus shown in FIGS. 3 and 4.

The mandrel 22', is provided with an upper cavity 23 which communicates with the exterior of the mandrel by the provision of a plurality of ports 24 spaced around the periphery of the mandrel. The fictile veneer material is received in cavity 23 and forced therefrom through ports 24 by a ram 37 moveable into the upper cavity 23 as described above in connection with FIGS. 1 and 2.

A lower cavity 60 is provided in the mandrel 22', and means is preferably supported therein for resisting movement of the veneer material from the inner wall of the hot top by atmospheric pressure upon withdrawal of the ram. This means, preferably and as illustrated, comprises vent means 61. The vent means 61 functions to communicate the cavity 23 with the atmosphere or other suitable source of pressure when the ram 37 is moved upwardly in the cavity 23 relative to the mandrel 22'. In the absence of a means for resisting movement of the veneer material from the inner wall of the hot top such as the vent means 61, when the ram moves upwardly in the cavity 23 and vacuum is created in the cavity 23 tending to draw the material forming the veneer on the inner wall of the hot top from the wall which may result in a pattern of recesses in the veneer layer matching the delivery ports 24 of the mandrel 22', which recesses have to be subsequently hand patched. The vent means 61 provides a resistance to movement of the veneer material by in part providing a passage for air to flow into the cavity 23 when the ram moves upwardly therein and thus minimizes formation of the aforementioned vacuum and thus substantially eliminates or minimizes the amount of veneer material drawn off of the inner wall of the hot top when the ram is moved upwardly in the cavity 23.

The vent means 61 includes a piston 62 slidable vertically in a cylinder 63. The cylinder 63 is suitably bolted in the lower cavity 60 of the manderl 22' by bolt means 64 which are threaded into projections 65 formed integral with the mandrel 22'. The cylinder 63 is provided with a bottom plate 66 having a plurality of passageways 67 therethrough communicating the atmosphere, which functions as a pressure source, with the interior of the cylinder 63.

The piston 62 comprises a movable sleeve member 68 positioned in cylinder 63. The sleeve member 68 is open at its lower end to communicate the interior of the sleeve member with the interior of the cylinder 63. A plurality of retaining stops 70 are suitably secured to the interior of the cylinder 63 and engage the lowermost end of the sleeve member 68 and support it in its lowermost position, as shown in FIG. 3. A plurality of ports 75 are provided in the periphery of the sleeve member 68 adjacent the upper end thereof, as viewed in FIG. 3 for a purpose to be described hereinbelow. The ports 75 are positioned so that they are located within the cylinder 63 so as to be blocked thereby when the piston 62 is in its lowermost position suported by stops 70. The upper end of the sleeve member 68 is closed by cover plate 77 suitably secured to the upper end of the sleeve member.

A piston rod 76 is secured at one end to the plate 77 and extends through the sleeve 68, cylinder 63, and an opening 79 in the bottom plate 66 of cylinder 63. The rod 76, as shown in FIG. 3, is in the form of a bolt threaded at one end into a boss 80 welded to the plate 77 and having a stop or bolt head 81 secured to the other end projecting beyond the plate 66. The head 81 has an outside dimension larger than the opening 79 through which the piston rod 76 extends.

The sleeve 68, as aforementioned, is slidable in the cylinder 63 and is movable vertically until the head 81 on the end of the rod 76 engages the undersurface 66*a* of the bottom plate 66. When the piston head 62 moves the aforementioned distance the ports 75 are located above the uppermost end 63*a* of the cylinder 63 and communicate the cavity 23 with the interior of the cylinder 63, which in turn, as aforedescribed, is in communication with the atmosphere through the provision of the openings 67 in the bottom plate 66 thereof. In this position the ports 75 in the preferred and illustrated embodiment are located substantially in a plane containing the ports 24 of the mandrel so that venting occurs adjacent the ports 24. It will be noted that the piston 62 is smaller in diameter than the cavity 23 so as to provide a clearance space between the periphery of the piston and the side walls of cavity 23. Also, the inside diameter of cylinder 63 is such as to closely fit the piston and block the ports therein.

The operation of the venting means 61 should be apparent from the above description. When the ram 37 which forces the veneer material from the cavity 23 through the openings 24 is moving downwardly in the cavity 23 the plate 77 of the venting means 61 functions as the bottom of the cavity 23. When the ram moves a slight distance upwardly in the cavity 23 a slight vacuum is created on the upper side of the plate 77. This vacuum is not great enough to suck any appreciable amount of veneer from the hot top. This vacuum, however, does provide an unbalance of forces on the plate 77, and

atmospheric pressure in the cylinder **63** and sleeve member **68** acts upon the underside of the plate **77** and causes the sleeve member **68** to move upwardly, as the ram is raised, until the head or stop **81** on the end of the piston rod **76** engages the undersurface **66***a* of the plate **66**. In the event it is found necessary to move the piston head prior to when the atmospheric pressure will move it, a suitabe spring can be positioned beneath the piston head biasing the piston toward the ram. When the piston head moves upwardly, the ports **75** communicate with the cavity **23**, connecting the cavity **23** to atmospheric pressure and thus as the ram continues to move upwardly atmospheric pressure will be maintained in the cavity **23**. Moreover, the positioning of the piston head adjacent the ports **24** adds to the resistance of the emplaced veneer to being sucked off the inner wall of the hot top by restricting or partially blocking movement thereof, and for practical purposes no veneer material will be sucked from the lining of the hot top. Preferably, the vent means is located as shown so that the venting occurs adjacent the ports **24**.

While the above described venting means **61** is very effective to prevent the sucking of the veneer material from the hot top, a suitable blocking member movable to block ports **24** may function for this same purpose without the necessity of venting. Also, such a blocking member need not completely block the ports **24** for movement of a blocking member into position adjacent ports **24** adds to the resistance of the emplaced veneer to being moved off the inner wall of the hot top by atmospheric pressure. In this connection any blocking member which moves vertically into the mandrel cavity will function as a vacuum limiting means which limits the vacuum created by movement of the ram out of the mandrel cavity. Moreover, such a blocking member or the venting piston head **62** above described could be operated by power means either before the ram withdraws or during withdrawal of the ram, although as should be apparent from the above description such a power means is not necessary.

The foregoing description brings out that the apparatus or machine of the present invention provides a ram movable by gravity to apply the veneer material and also that the apparatus or machine is mobile and can be moved into position over the hot top as distinguished from the necessity of moving the hot top into operative position with respect to the machine.

The machine or apparatus of the invention is admirably suitable because of low costs for use in those situations where only a relatively few hot tops are to be prepared, but is is also useful in a situation wherein a great many of the hot tops are to be prepared.

Although a preferred embodiment of the invention has been illustrated and described herein, it will be understood that the invention is susceptible of various modifications and adaptations within the scope of the appended claims.

Having described my invention, I claim:

1. A machine for applying veneer to the inner surface of a hot top having a central opening therethrough comprising, a mandrel adapted to be positioned in said central opening in the hot top by movement and having a cavity for receiving fictile veneer material and ports placing said cavity in communication with the central opening in the hot top, a ram movable into and out of said cavity to force material from said cavity, means providing movement of said mandrel into said hot top and movement of said ram into said mandrel cavity to force the veneer material from said cavity through said ports, a floating member surrounding said mandrel and provided with means closing said mandrel ports, means operatively connecting said mandrel and floating member for unitaray movement together, and means providing for movement of said floating member relative to said mandrel to cause opening of said ports prior to movement of said ram relative to said mandrel.

2. A machine for applying veneer to the inner surface of a hot top having a central opening therethrough comprising a mandrel adapted to be lowered into said central opening in the hot top, said mandrel being provided with a cavity for receiving fictile veneer material and ports placing said cavity in communication with the central opening in the hot top, a ram movable into and out of said cavity, means operatively connecting said mandrel and ram and providing lowering movement of said mandrel and ram together under the action of gravity until the mandrel is inserted into said hot top and held against movement and including means on the ram providing continued lowering movement of said ram relative to said mandrel under the action of gravity into said mandrel cavity to force the veneer material from said cavity through said ports, a hopper for the fictile veneer material operatively interconnected with said mandrel and movable unitarily therewith and communicating with said mandrel cavity, and a pusher member movable downwardly in said hopper under the action of gravity during relative downward movement between said ram and mandrel to force veneer material from the hopper into the mandrel cavity.

3. A machine for applying veneer to the inner surface of a hot top having a central opening therethrough comprising a mandrel adapted to be lowered into said central opening in the hot top, said mandrel being provided with a cavity for receiving fictile veneer material and ports placing said cavity in communication with the central opening in the hot top, a ram movable into and out of said cavity, means operatively connecting said mandrel and ram and providing lowering movement of said mandrel and ram together under the action of gravity until the mandrel is inserted into said hot top and held against movement and including means on the ram providing continued lowering movement of said ram relative to said mandrel under the action of gravity into said mandrel cavity to force the veneer material from said cavity through said ports, a floating member surrounding said mandrel and provided with means closing said mandrel ports, and means operatively interconnecting the mandrel and said floating member for unitary movement together, and means providing for movement of said floating member relative to said mandrel to open said ports prior to movement of said ram relative to said mandrel.

4. A machine for applying veneer to the inner surface of a hot top having a central opening therethrough comprising a mandrel adapted to be received in said central opening in the hot top, said mandrel being provided with a cavity for receiving fictile veneer material and ports placing said cavity in communication with the central opening in the hot top, a ram receivable in said cavity, means supporting said ram and mandrel for relative movement to relatively reciprocate the cavity and ram to force said veneer material from said cavity into contact with the inner surface of the hot top and to relatively retract the ram and cavity, and vent means operatively associated with said mandrel and ram and responsive to the pressure in said cavity for venting said cavity to the atmosphere upon relative retraction of said ram and cavity, said vent means comprising a cylinder supported by said mandrel and having means communicating the interior of the cylinder with a source of air pressure, a piston slidably mounted in said cylinder and provided with port means communicating the exterior of the piston with the interior of the cylinder and blocked by said cylinder when said ram and cavity move relatively to force the material from said cavity and communicating with said cavity upon relative retraction of said ram and cavity thereby connecting said mold cavity with a source of air pressure.

5. A machine for applying veneer to the inner surface of a hot top structure having a central opening therethrough comprising a mandrel adapted to be lowered into said central opening in the hot top structure into a position wherein the periphery thereof is in a spaced

relation with the walls of the hot top structure, said mandrel being provided with a cavity for receiving fictile veneer material and ports placing said cavity in communication with the space between the periphery of the mandrel and the walls of the hot top structure, a ram movable into said cavity to force the fictile veneer material therefrom and then movable from said cavity, means for holding said mandrel and ram above said hot top structure and movable to allow lowering movement thereof under the action of gravity, and means operatively connecting said mandrel and ram and providing lowering movement of said mandrel and ram together under the action of gravity until the mandrel is inserted into said hot top structure and held against movement and providing continued lowering movement of said ram relative to said mandrel under the action of gravity into said mandrel cavity to force the veneer material from said cavity through said ports including cooperating parts on said mandrel and ram which are engaged when said mandrel and ram move together and which separate when said ram lowers relative to said mandrel.

6. A machine for applying veneer to the inner surface of a hot top as defined in claim **5** further including a weight secured to the upper end of said ram to produce gravity pressure on said ram during its downward movement relative to said mandrel to force material from said cavity into said central opening to form a layer of veneer on the side walls thereof.

7. A machine for applying veneer to the inner surface of a hot top structure as defined in claim **5** wherein said means for holding said mandrel and ram above said hot top structure comprises a device for bodily moving the machine laterally into alignment with the hot top structure to receive the veneer material.

8. A machine for applying veneer to the inner surface of a hot top structure having a central opening therethrough comprising a mandrel adapted to be lowered into said central opening in the hot top structure, said mandrel being provided with a cavity for receiving fictile veneer material and ports placing said cavity in communication with the central opening in the hot top structure, a ram movable into and out of said cavity, means operatively connecting said mandrel and ram including a shoulder on said ram and a part on said mandrel engageable with said shoulder and supporting said mandrel on said ram, means for holding said mandrel and ram above the hot top structure and operable to allow lowering movement of said ram under the action of gravity, said mandrel being lowered with said ram due to the interconnection therebetween until the mandrel is inserted into said hot top and held against further lowering movement, and weight means on said ram for effecting lowering movement of the ram under the action of gravity relative to the mandrel to force the veneer material from the cavity through said ports and with said shoulder on said ram lowering away from said part, and said cam upon retraction from said cavity moving relative to said mandrel until said shoulder on said ram engages said part on said mandrel and on further retraction effecting withdrawal of the mandrel from said central opening of said hot top structure.

9. A machine for applying veneer to the inner surface of a hot top structure having a central opening therethrough comprising a mandrel adapted to be lowered into said central opening in the hot top structure, said mandrel being provided with a cavity for receiving fictile veneer material and ports placing said cavity in communication with the central opening in the hot top structure, a ram movable into and out of said cavity, means operatively connected to said ram to provide for raising and lowering movement thereof, means operatively connecting said mandrel and ram and providing lowering movement thereof together until the mandrel is inserted into said hot top and held against further lowering movement and providing for continued lowering movement of the ram relative to the mandrel to force the veneer material from the cavity through said ports including a shoulder on said ram and a part on said mandrel engageable with said shoulder and supporting said mandrel on said ram and providing for sliding movement of said ram relative to said mandrel in a vertical direction, and said shoulder on said ram moving away from said part during lowering of the ram relative to the mandrel, said shoulder on said ram engaging said part on said mandrel upon retraction of said ram from said cavity and on further retraction effecting withdrawal of the mandrel from said central opening of said hot top structure.

10. A machine for applying veneer to the inner surface of a hot top structure having a central opening therethrough comprising a mandrel adapted to be received in said central opening in the hot top structure with the periphery thereof spaced from the inner walls of said hot top structure, said mandrel being provided with a cavity for receiving fictile veneer material and ports placing said cavity in communication with the space between the walls of the mandrel and the periphery of the hot top, a ram receivable in said cavity, means supporting said ram and mandrel for relative movement to relatively reciprocate the cavity and ram to force said veneer material from said cavity into contact with the inner walls of the hot top structure and to relatively retract the ram and cavity, and means operatively associated with said mandrel and ram for providing resistance to movement of the veneer material from the inner walls of the hot top structure through said ports by atmospheric pressure upon relative retraction of said ram and cavity including support means on said mandrel and a member supported by said support means and movable from a retracted position relative to said mandrel to a position wherein at least a portion thereof lies in a plane containing said ports upon relative retraction of said mandrel and ram.

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