Sept. 20, 1960 A. G. MAZARAKIS 2,952,886

APPARATUS FOR SETTING HOT TOPS IN INGOT MOLDS

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FIG. 1

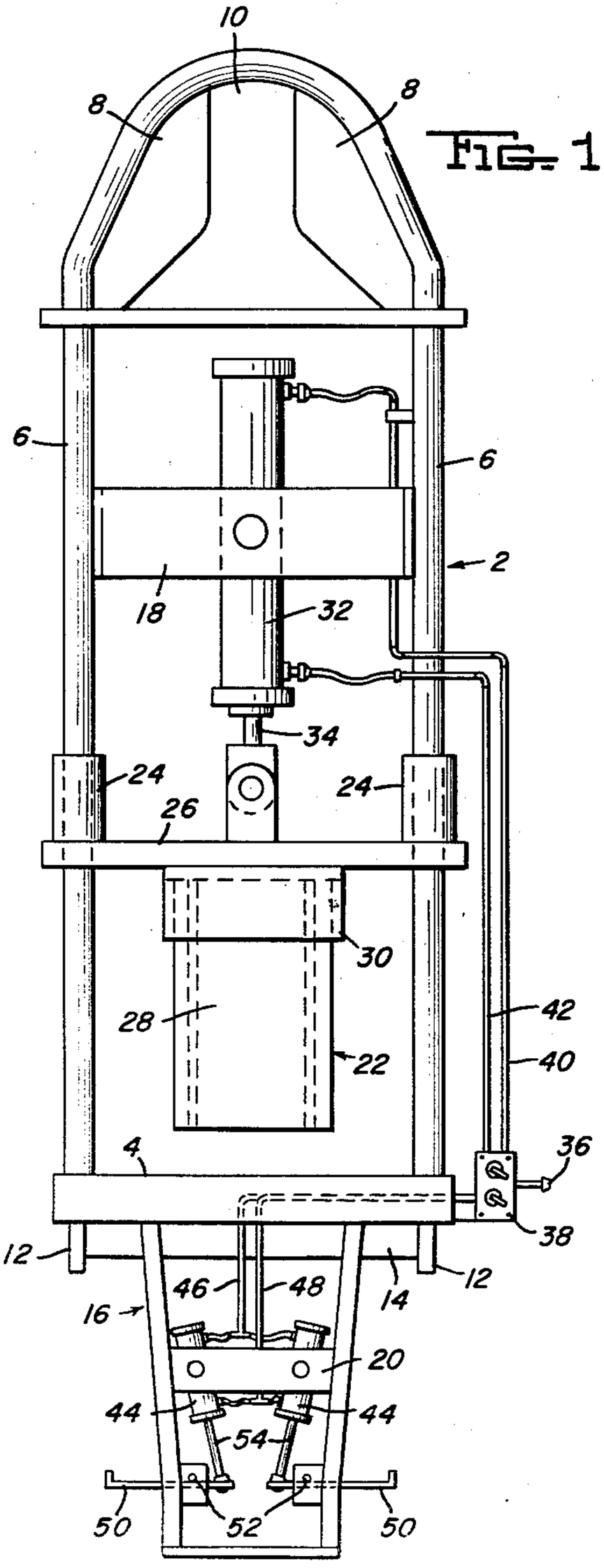
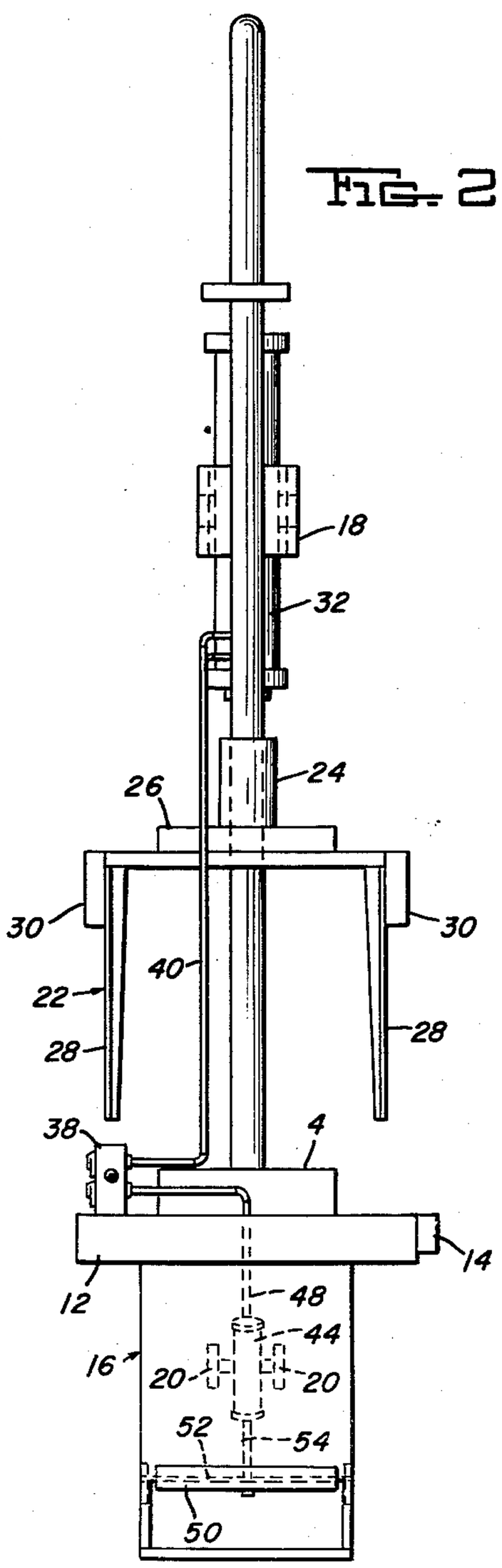


FIG. 2



INVENTOR
ARTHUR G. MAZARAKIS
By Donald G. Dalton
Attorney

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FIG. 3

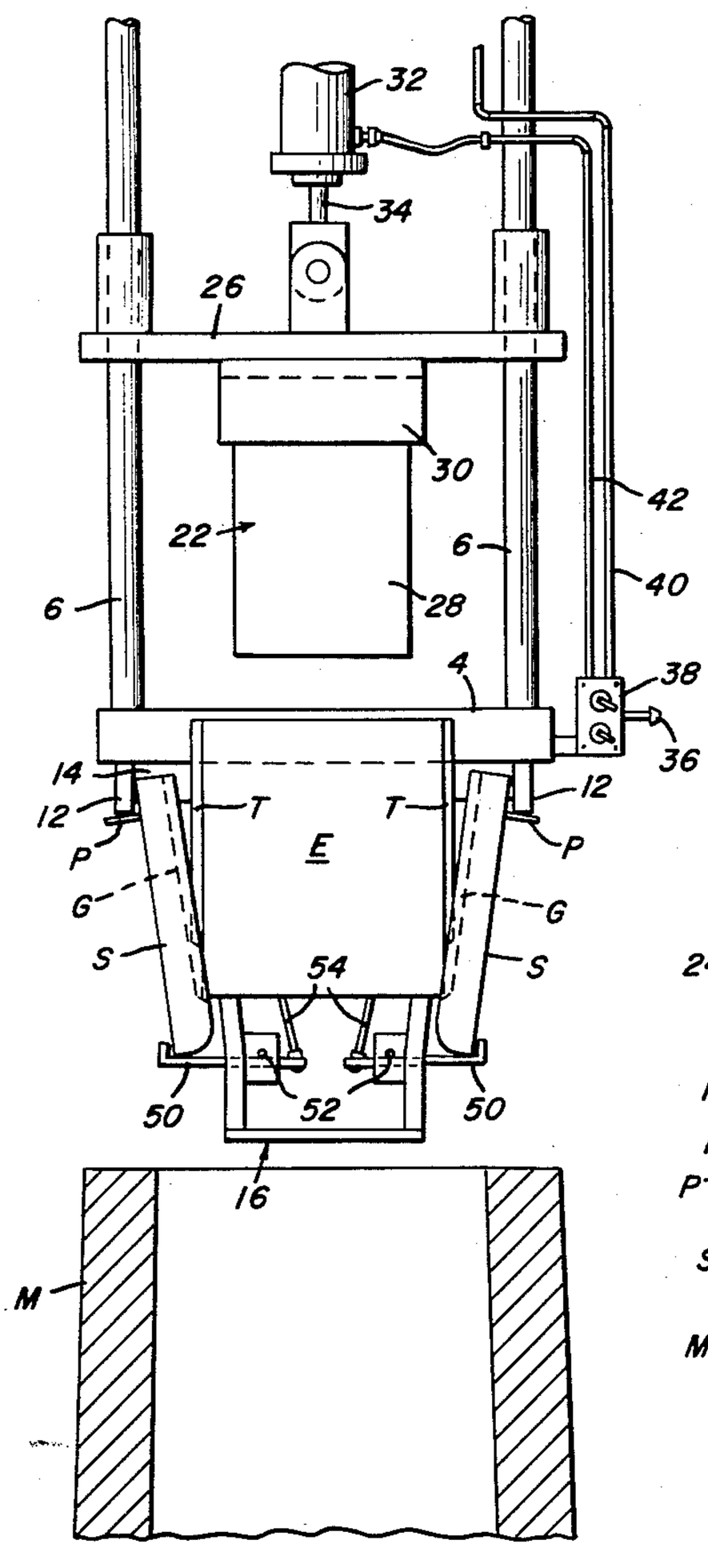
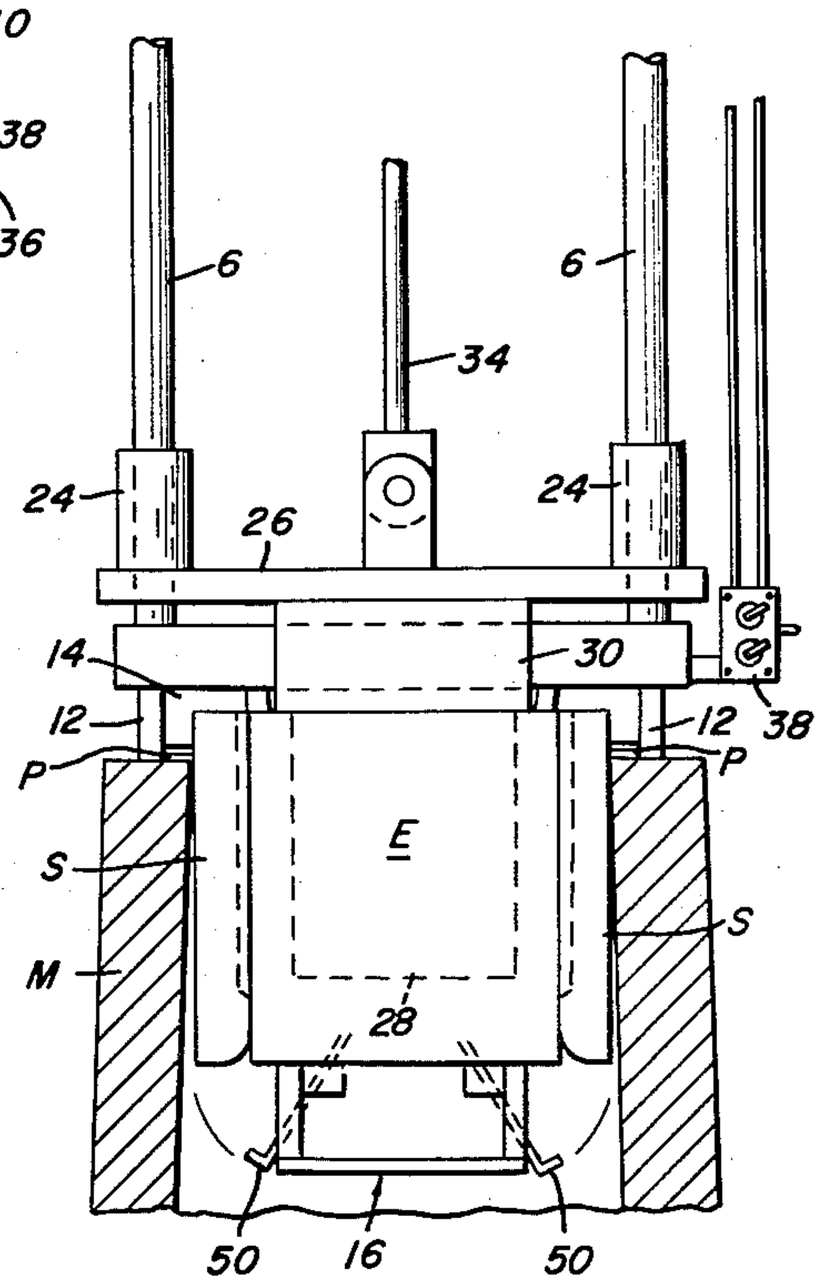


FIG. 4



INVENTOR
ARTHUR G. MAZARAKIS
By Donald G. Dalton
Attorney

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APPARATUS FOR SETTING HOT TOPS IN INGOT MOLDS

Arthur G. Mazarakis, Hubbard, Ohio, assignor to United States Steel Corporation, a corporation of New Jersey

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11 Claims. (Cl. 22—31)

This invention relates to apparatus for setting hot tops in ingot molds and more particularly to setting sectional hot tops such as shown in the copending Marburg application Serial No. 581,181, filed April 27, 1956, now Patent No. 2,900,685, granted August 25, 1959. While specifically adapted for handling sectional hot tops, the apparatus may also be used for one piece hot tops. Hot tops, particularly sectional hot tops, are difficult to insert in the ingot mold since the slabs of the hot tops are heavy and difficult to handle. A crew of three or more men is necessary to manually fit the hot top into the ingot mold. The crew must work on top of the ingot mold where they are exposed to very hazardous conditions. To minimize the hazards, expensive safety devices such as portable platforms, ladders or hanging steps are used. Thus a great deal of labor and time is required to set the hot top.

It is therefore an object of my invention to provide apparatus for mechanically inserting a hot top into a mold.

Another object is to provide such apparatus which enables the hot top to be set in place quickly with little danger of breakage.

These and other objects will be more apparent after referring to the following specifications and attached drawings, in which:

Figure 1 is a side elevation of the hot top setting apparatus;

Figure 2 is an end elevation of the setting apparatus of Figure 1;

Figure 3 is an enlarged view of the lower part of Figure 1 showing the hot top slabs about to be inserted within the mold; and

Figure 4 is a similar view showing the hot top slabs inserted in the mold.

Referring more particularly to the drawings, the reference numeral **2** indicates the frame of my machine. The frame consists of a cross bar **4** intermediate the height of the frame from which a bar **6**, shaped in the form of an inverted **U**, extends vertically upwardly. Reinforcing plates **8** are welded to the top of the bar so that an opening **10** is provided to receive a crane hook. A pair of retainer bars **12** is fastened to the bottom of cross bar **4** at opposite ends thereof. A stop bar or positioning member **14** extends between the bars **12** at one end thereof. A box-like platen **16** extends downwardly from the bar **4**. Cross members **18** are fastened to and extend between the vertical legs of the bar **6**. Cross bars **20** extend between the sides of the platen **16** intermediate the height thereof. The parts so far described as making up the frame **2** are welded or otherwise fastened together. An upper platen **22** is slidably mounted on bars **6** by means of bushings **24**. A cross member **26** extends between the bushings **24** and supports spaced plates **28** which extend downwardly therefrom. A bar **30** is fastened to the outside of each plate **28** adjacent the top thereof so as to provide horizontal shoulders. A hydraulic motor **32** is pivotally

mounted on the plates **18** with its piston rod **34** connected to the cross member **26**. Fluid from source **36** is supplied to motor **32** through control valve **38** and conduits **40** and **42**. A pair of hydraulic motors **44** are pivotally mounted on the cross plates **20**. Fluid is supplied thereto from source **36** through valve **38** and conduits **46** and **48**. A pair of hinged supports **50** are mounted on platen **16** by means of pivot pins **52**. The inner ends of the supports **50** are connected to piston rods **54** of the hydraulic motors **44**.

In operation, the bottoms of side slabs S are placed on the supports **50** with their tops thereof resting against retainer bars **12** and one vertical edge thereof resting against the top bar **14**. Tongues T of end slabs E are then placed in grooves G of the side slabs S as shown in Figure 3. The canted position of the side slabs S prevents the end slabs E from falling into place until the device is lowered into mold M to the depth shown in Figure 4. When so lowered, the hinged supports **50** are rotated so that their outer ends move downwardly as shown. This is done by means of valve **38** which controls flow of fluid through conduits **46** into the tops of the hydraulic motors **44**. The end slabs E then slide into position and the upper platen **22** is moved downwardly by fluid flowing through conduit **40** into the top of hydraulic motor **32**. This causes the plates **30** to bear against the top of end pieces E forcing them downwardly so as to wedge the slabs S and E into final position against the walls of mold M. A crane then moves the apparatus upwardly out of the mold. It will be seen that the retainer bars **12** limit the distance that the hot top is inserted into the mold. Pins P on the side slab S also aid in supporting the hot top on the mold. It will be understood that the retainer bars **12** may be vertically adjustable so as to adjust for depth of insertion of the hot top and bars **12** and **14** may be adjusted horizontally to handle different sizes of hot tops.

While one embodiment of my invention has been shown and described, it will be apparent that other adaptations and modifications may be made without departing from the scope of the following claims.

I claim:

1. Apparatus for inserting a hot top into an ingot mold comprising a frame including a bottom platen of such size to be receivable within the mold, a pair of supports pivotally mounted on opposite sides of said platen adjacent the bottom thereof and extending outwardly therefrom, means for moving said supports around their pivots from a generally horizontal extended position outwardly of said platen to a retracted position, said supports being adapted to receive the bottom edge of said hot top when in extended position, an upper platen slidably mounted on said frame, said upper platen including a pair of opposed downwardly extending plates and a horizontal shoulder on the outside of each of said plates adjacent the top thereof, said shoulders being adapted to engage the top of said hot top, and means for moving said upper platen in a vertical path.

2. Apparatus for inserting a hot top into an ingot mold comprising a frame including a bottom platen of such size as to be receivable within the mold, a pair of supports pivotally mounted on opposite sides of said platen adjacent the bottom thereof and extending outwardly therefrom, means for moving said supports around their pivots from a generally horizontal extended position outwardly of said platen to a retracted position, said supports being adapted to receive the bottom edge of said hot top when in extended position, and a pair of retainers mounted on said frame one above each of said supports to limit lateral movement of said hot top.

3. Apparatus for inserting a hot top into an ingot mold comprising a frame including a bottom platen of such size as to be receivable within the mold, a pair of supports pivotally mounted on opposite sides of said platen adjacent the bottom thereof and extending outwardly therefrom, means for moving said supports around their pivots from a generally horizontal extended position outwardly of said platen to a retracted position, said supports being adapted to receive the bottom edge of said hot top when in extended position, a pair of retainers mounted on said frame one above each of said supports to limit lateral movement of said hot top, an upper platen slidably mounted on said frame, said upper platen including a pair of opposed downwardly extending plates and a horizontal shoulder on the outside of each of said last named plates adjacent the top thereof, said shoulders being adapted to engage the top of said hot top, and means for moving said upper platen in a vertical path.

4. Apparatus for inserting a hot top into an ingot mold comprising a frame including a bottom platen of such size as to be receivable within the mold, a pair of supports pivotally mounted on opposite sides of said platen adjacent the bottom thereof and extending outwardly therefrom, means for moving said supports around their pivots from a generally horizontal extended position outwardly of said platen to a retracted position, said supports being adapted to receive the bottom edge of said hot top when in extended position, a pair of retainers mounted on said frame one above each of said supports to limit lateral movement of said hot top, and a positioning member located at one end of each of said retainers to limit lateral movement of said hot top.

5. Apparatus for inserting a hot top into an ingot mold comprising a frame including a bottom platen of such size as to be receivable within the mold, a pair of supports pivotally mounted on opposite sides of said platen adjacent the bottom thereof and extending outwardly therefrom, means for moving said supports around their pivots from a generally horizontal extended position outwardly of said platen to a retracted position, said supports being adapted to receive the bottom edge of said hot top when in extended position, a pair of retainers mounted on said frame one above each of said supports to limit lateral movement of said hot top, a positioning member located at one end of each of said retainers to limit lateral movement of said hot top, an upper platen slidably mounted on said frame, said upper platen including a pair of opposed downwardly extending plates and a horizontal shoulder on the outside of each of said plates adjacent the top thereof, said shoulders being adapted to engage the top of said hot top, and means for moving said upper platen in a vertical path.

6. Apparatus for inserting a four-piece hot top into an ingot mold comprising a frame including an intermediate cross member and a platen attached to and extending downwardly from said cross member, said platen being of such size as to be receivable within the mold, a pair of supports pivotally mounted on opposite sides of said platen adjacent the bottom thereof and extending outwardly therefrom, means for moving said supports around their pivots from a generally horizontal extended position outwardly of said platen to a retracted position, said supports being adapted to receive the bottom edge of two opposed hot top pieces when in extended position, and a pair of retainers mounted on said frame one above each of said supports, said retainers being adapted to prevent outward movement of the tops of said opposed hot top pieces.

7. Apparatus for inserting a four-piece hot top into an ingot mold comprising a frame having an intermediate cross member and a platen attached to and extending downwardly from said cross member, said platen being of such size as to be receivable within the mold, a pair

of supports pivotally mounted on opposed sides of said platen adjacent the bottom thereof and extending outwardly therefrom, means for moving said supports around their pivots from a generally horizontal extended position outwardly of said platen to a retracted position, said supports being adapted to receive the bottom edge of two opposed hot top pieces when in extended position, a pair of retainers mounted on said frame one above each of said supports, said retainers being adapted to prevent outward movement of the tops of said opposed hot top pieces, an upper platen slidably mounted on said frame, said upper platen including a pair of opposed downwardly extending plates and a horizontal shoulder on the outside of each of said plates adjacent the top thereof, said shoulders being adapted to engage the tops of the hot top pieces positioned between the said two opposed hot top pieces, and means for moving said upper platen in a vertical path.

8. Apparatus for inserting a four-piece hot top into an ingot mold comprising a frame including an intermediate cross member and a platen attached to and extending downwardly from said cross member, said platen being of such size as to be receivable within the mold, a pair of supports pivotally mounted on opposite sides of said platen adjacent the bottom thereof and extending outwardly therefrom, means for moving said supports around their pivots from a generally horizontal extended position outwardly of said platen to a retracted position, said supports being adapted to receive the bottom edge of two opposed hot top pieces when in extended position, a pair of retainers mounted on said frame one above each of said supports, said retainers being adapted to prevent outward movement of the tops of said opposed hot top pieces, and a positioning member located at one end of each of said retainers to limit transverse movement of said two opposed hot top pieces.

9. Apparatus for inserting a four-piece hot top into an ingot mold comprising a frame including an intermediate cross member and a platen attached to and extending downwardly from said cross member, said platen being of such size as to be receivable within the mold, a pair of supports pivotally mounted on opposite sides of said platen adjacent the bottom thereof and extending outwardly therefrom, means for moving said supports around their pivots from a generally horizontal extended position outwardly of said platen to a retracted position, said supports being adapted to receive the bottom edge of two opposed hot top pieces when in extended position, a pair of retainers mounted on said frame one above each of said supports, said retainers being adapted to prevent outward movement of the tops of said opposed hot top pieces, a positioning member located at one end of each of said retainers to limit transverse movement of said two opposed hot top pieces, an upper platen slidably mounted on said frame, said upper platen including a pair of opposed downwardly extending plates and a horizontal shoulder on the outside of each of said plates adjacent the top thereof, said shoulders being adapted to engage the tops of the hot top pieces positioned between the said two opposed hot top pieces, and means for moving said upper platen in a vertical path.

10. Apparatus for inserting a four-piece hot top into an ingot mold comprising a frame including an intermediate cross member and a platen attached to and extending downwardly from said cross member, said platen being of such size as to be receivable within the mold, a pair of supports pivotally mounted on opposite sides of said platen adjacent the bottom thereof and extending outwardly therefrom, means for moving said supports around their pivots from a generally horizontal extended position outwardly of said platen to a retracted position, said supports being adapted to receive the bottom edge of two opposed hot top pieces when in extended position, a pair of retainer bars attached to the bottom of said

cross member at opposite ends thereof one above each of said supports, said retainers being adapted to prevent outward movement of the tops of said opposed hot top pieces, a positioning member located at one end of each of said retainer bars to limit transverse movement of said two opposed hot top pieces, a pair of spaced legs attached to and extending upwardly from said cross member, an upper platen slidably mounted on said legs, said upper platen including a pair of opposed downwardly extending plates and a horizontal shoulder on the outside of each of said plates adjacent the top thereof, said shoulders being adapted to engage the tops of the hot top pieces positioned between the said two opposed hot top pieces, and means for moving said upper platen in a vertical path.

11. Apparatus for inserting a four-piece hot top into an ingot mold comprising a frame including an intermediate cross member and a platen attached to and extending downwardly from said cross member, said platen being of such size as to be receivable within the mold, a pair of supports pivotally mounted on opposite sides of said platen adjacent the bottom thereof and extending outwardly therefrom, means for moving said supports around their pivots from a generally horizontal extended position outwardly of said platen to a retracted position, said supports being adapted to receive the bottom edge of two opposed hot top pieces when in extended position,

a pair of retainer bars attached to the bottom of said cross member at opposite ends thereof one above each of said supports, said retainers being adapted to prevent outward movement of the tops of said opposed hot top pieces, a positioning bar extending between said retainer bars at one end thereof to limit transverse movement of said two opposed hot top pieces, a pair of spaced legs attached to and extending upwardly from said cross member, an upper platen slidably mounted on said legs said upper platen including a pair of opposed downwardly extending plates adapted to move downwardly between said retainer bars and a horizontal shoulder on the outside of each of said plates adjacent the top thereof, said shoulders being adapted to engage the tops of the hot top pieces positioned between the said two opposed hot top pieces, and means for moving said upper platen in a vertical path.

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