March 17, 1970 G. F. RUEGSEGGER 3,500,514

MACHINE FOR MANUFACTURING CONCRETE PIPE FITTINGS

Filed May 9, 1967

Fig. 1

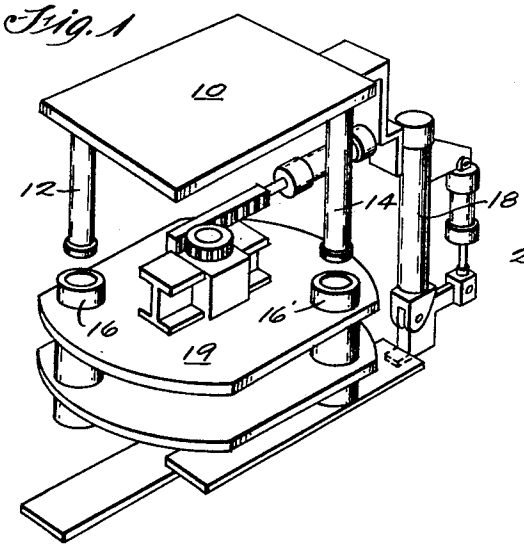


Fig. 2

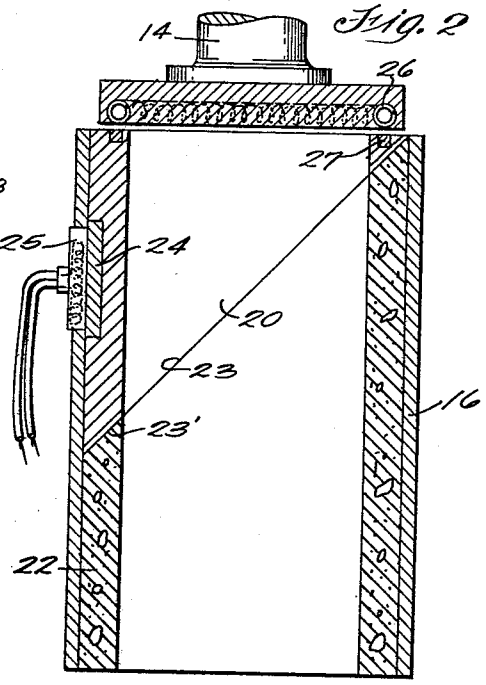


Fig. 3

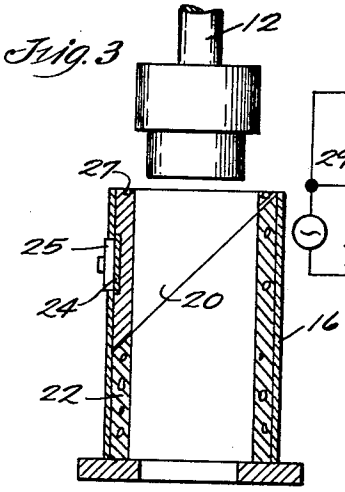


Fig. 4

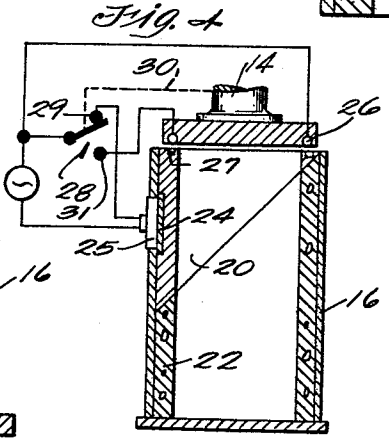


Fig. 5

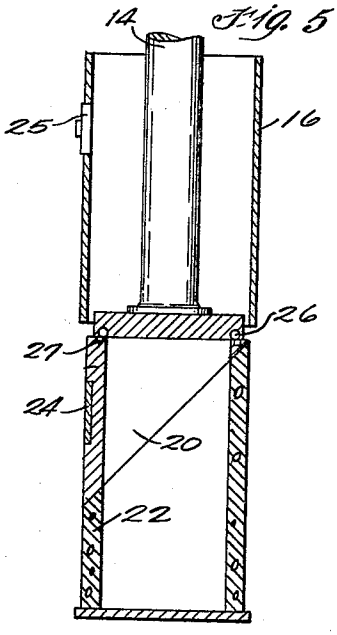
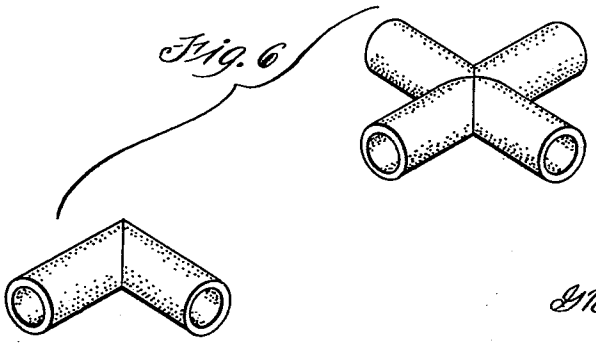


Fig. 6



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MACHINE FOR MANUFACTURING CONCRETE PIPE FITTINGS

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Int. Cl. B28b 21/06, 21/90
U.S. Cl. 25—30 7 Claims

ABSTRACT OF THE DISCLOSURE

The present disclosure pertains to an automatic drain tile making machine which employs vertically reciprocal packer heads and push-rods to form a tile within a mold and to eject the formed tile onto a pallet by axially moving the push-rods through the mold. The machine is provided with a plurality of molds which are fixed to a turntable so as to permit simultaneous molding and ejection during each vertical cycle of a head which carries the packer heads and push-rods.

The molds employed are of regular cylindrical shape and are capable of producing concrete pipes of regular square-ended contour. The irregular contour at one end of the pipes is obtained by providing an insert in the top portion of the mold during the molding opertaion. The insert is cylindrical in its end view and is of equal wall thickness as the intended tile. Its top edge is even and square to the axis of the mold; however its lower edge is contoured to complement the desired end contour of the pipe to be produced. Because of the insert, the tile which is formed by the packer head in a known manner will have an irregular contour as described above.

An electro-magnet which is provided at the mold sidewall releasably maintains the insert in the upper mold position during the molding operation and during rotation of the turntable. In ejecting the tile, the push-rod moves against the top edge of the insert at which time the first electro-magnet is deenergized and a second electro-magnet, provided in the lower face of the push-rod, takes over. As the push-rod progresses downwardly the insert moves with it and in turn pushes the formed tile onto a pallet. On the return stroke the push-rod carries the insert back to its original position at which point the second electro-magnet is deenergized and the first magnet is energized to retain the insert in its original position.

RELATED APPLICATION

This application for a patent is co-pending with my application entitled "Machine for Making Concrete Pipes," Ser. No. 637,190, filed simultaneously with the present application and showing the automatic tile making machine for which the disclosed mold and apparatus is particularly designed.

BACKGROUND OF THE INVENTION

This invention relates to the apparatus and method for automatically producing concrete pipes which have one end shaped irregularly so as to adapt the pipes for assembly into T, L or similar sections.

The field of invention encompasses concrete pipe making machines and particularly machines for making concrete pipe T, L and other types of irregular sections.

The prior art in this field consists of either complicated and specially designed molds for producing concrete pipes with irregular end sections, or it merely consists of the method of producing regular square ended pipes and subsequently sawing one end of the pipes to the desired contour.

SUMMARY

The principal object of the present invention is to provide a mold design which will be well suited for the production of ordinary concrete pipe as well as for the production of concrete pipe having an irregularly shaped end.

The heart of the invention resides in the provision of an insert within the mold and of a mechanism which will be capable of maintaining the insert at the top of the mold during the molding operation and of permitting the insert to reciprocate within the mold during the ejection of the tile from the mold.

DESCRIPTION OF DRAWINGS

Other objects and advantages will be pointed out in, or be apparent from the description and claims, as will obvious modifications of the embodiment shown in the drawings, in which:

FIG. 1 is a perspective view of the tile molding machine employing the present invention;

FIG. 2 is a cross-sectional view of a mold containing the insert and being positioned underneath a push-out rod;

FIG. 3 is a cross-sectional view of the mold with the parts being shown as required during the molding operation;

FIG. 4 is a similar cross-sectional view with the parts being shown at the start of the ejection cycle;

FIG. 5 is a similar view showing the parts at the lowermost position of the cycle; and

FIG. 6 shows various sections which can be manufactured by the molding machine and process embodying the present invention.

The illustrated mold is designed for use in an automatic drain tile making machine as shown in FIG. 1. The machine has a vertically movable head frame **10** which carries one or more packer heads **12** and push-out rods **14**. As the head descends from its uppermost position the packer heads enter one set of molds **16** to form drain tile in the known manner and the push-out rods enter the other set of molds **16'** to eject the molds onto a pallet which is carried by arms **18** which are fixed to the head frame. At the lowermost position the loaded pallet is deposited upon a conveyor and on the upstroke an empty pallet is picked up by the arms. As the head frame reaches its uppermost position the tile in molds **16** is fully formed and thereafter the turntable **19** is moved through 180° whereafter the above-described cycle is repeated.

The operation described so far can produce regular tile having both ends square to the axis of the tile.

In order to provide a tile which may be used to form an L joint, one end of the tile must be at 45° to the axis of the tile. In order to produce such tile an insert **20** is removably placed within the mold **16** and is maintained in the upper position of the mold, as shown in FIG. 3, during the cycle in which the packer head forms a tile within the mold. Since the insert is equal in thickness to the tile **22**, the top edge **23** of the tile will assume a contour complementary to the bottom contour **23'** of the insert.

The insert is preferably made of brass and it has smooth inside and outside sidewalls so as to permit easy movement within the mold and so as to avoid any accumulation of concrete. It is provided with a metallic magnetizable insert **24** which is in alignment with an electro-magnet **25** fixed to the sidewall of the mold **16**. The magnet **25** is energized during the molding cycle and has a sufficient field to maintain the insert fixed during this cycle. It is also energized during the 180° movement of the turntable to thereby prevent the weight of the insert from exerting a downward force on the tile.

When the mold has been moved in alignment with the

push-out rod **14**, the latter moves downwardly and comes in contact with the top edge of the insert. At this time a control circuit (FIG. 4) deenergizes the magnet **25** and energizes an electro-magnet **26** provided on the lower face of the push-out rod. The magnet **26** has a sufficient field to hold the insert which is provided with a metallic magnetizable section **27** on its top edge. As the push-out rod progresses downwardly the insert pushes against the freshly formed tile to guide it onto the pallet in a known manner. After the tile has been fully ejected the push-out rod moves upwardly and carries the insert to its original position within the mold. At this point the magnet **26** is deenergized and magnet **25** is energized to thereby again fix the insert in a proper position for forming the next tile of a contour as described. At this point the turntable is again turned through 180° and the cycle is repeated.

A suitable control circuit is shown in FIG. 4. The circuit contains a double acting snap action switch **28** which is normally biased to close on contact **29** and thereby energize the oil of the electro-magnet **25**. The switch can be actuated in response to the movement of push-out rod **14** by any convenient connection (schematically shown by broken line **30**) so that the switch snaps to close on contact **31** when the push-out rod moves downwardly to a position adjacent to the insert **20** to thereby energize the coil of electro-magnet **26** and simultaneously deenergizing the coil of electro-magnet **25**. The switch remains in this position until the end of the reciprocal movement of the push-out rod and it snaps from contact **31** to contact **29** as the push-out rod leaves the mold to thereby again energize the coil of electro-magnet **25** and deenergize electro-magnet **26**.

Although the illustrated embodiment pertains to an insert which will provide a 45° end face to the formed tile, it is apparent that by providing inserts having differently shaped lower edges various concrete pipe sections may be produced.

Although but one embodiment of the present invention has been illustrated and described, it will be apparent to those skilled in the art that various changes and modifications may be made therein without departing from the spirit of the invention or from the scope of the appended claims.

I claim:

1. Apparatus for molding concrete pipes of the type having an axially irregularly contoured end, comprising:

a generally vertically inclined cylindrical mold adapted to receive a pipe forming tool and wet concrete to mold a pipe on the inside surface of said mold;

an annular insert positioned concentrically inside said mold and having an outside diameter which permits the insert to be slidably engaged with the inside surface of said mold, having a wall thickness substantially equal to the pipe to be formed, and having a bottom edge which is contoured to complement the axially irregularly contoured end of the pipe to be formed;

means for releasably holding said insert at the top section of said mold to thereby permit the concrete pipe which is formed within said mold to only extend to said bottom edge; and

means for moving said insert, after the pipe has been formed, within said mold from said top section towards the bottom of said mold and back to said top section to thereby cause said insert to push the formed pipe out of said mold and to return said insert to a proper position for forming another pipe.

2. Apparatus according to claim **1** wherein said moving means is comprised of a push-out rod which is operable to enter said mold from a position above said mold, to engage said insert, and to move it towards said mold bottom and back to said top mold section; releasable securing means for securing said insert to said push-out rod during said movement, and control means operable to release said holding means as said push-out rod engages said insert and to actuate said securing means to secure said insert to said push-out rod during said movement and to again release said securing means and actuate said holding means as said insert is returned to said top mold section.

3. Apparatus according to claim **2** including movable support means for said mold and means for repeatedly moving said mold between a position in which it is in alignment with a pipe forming tool and a position in which it is in alignment with said push-out rod and vice versa.

4. Apparatus according to claim **2** wnerein said holding means is comprised of electro-magnetic means.

5. Apparatus according to claim **2** wherein said securing means is comprised of electro-magnetic means.

6. Apparatus according to claim **2** wherein said insert is made of non-magnetizable material and wherein said holding means is comprised of an electrical coil provided at the sidewall of said mold, which coil cooperates with a magnetizable portion provided in said insert to hold said insert in said top upon energization of said coil.

7. Apparatus according to claim **6** wherein said securing means is comprised of an electrical coil located in push-out rod which coil cooperates with a second magnetizable portion provided in said insert to secure said insert to said push-out rod during energization of said push-out rod coil, and wherein said control means is comprised of switch means which is actuated to normally energize said mold coil and to deenergize said mold coil and energize said push-out rod coil upon entrance of said push-out rod into said mold and to deenergize said push-out rod coil and energize said mold coil as said push-out rod is withdrawn from said mold.

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