March 1, 1966 D. E. YATES 3,237,268

CASTING DEVICE FOR PRESSURE CASTING CONCRETE AND THE LIKE

Filed July 17, 1964

FIG. 2

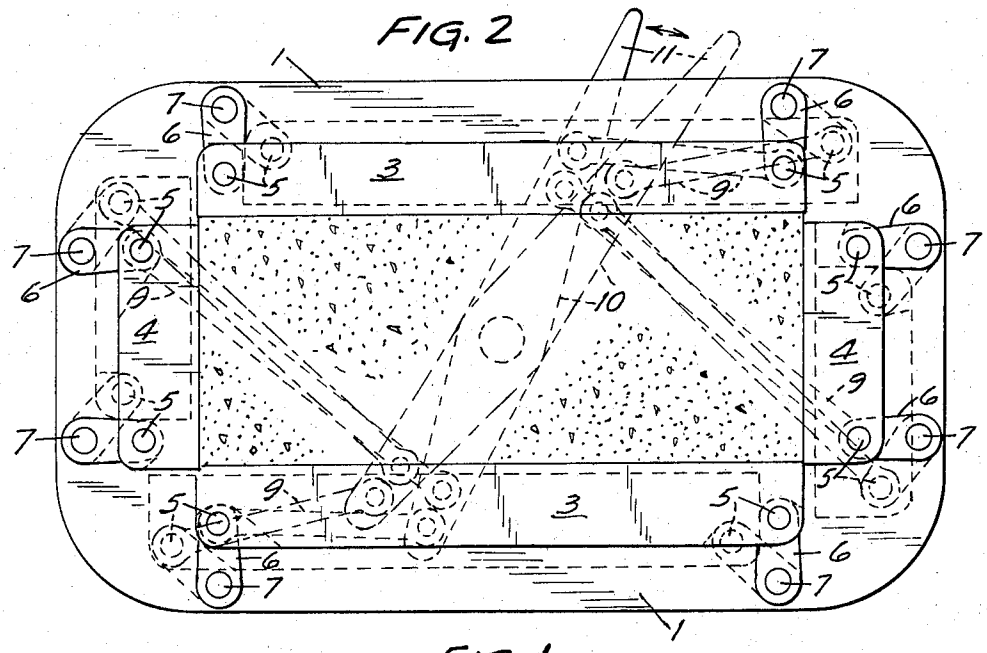


FIG. 1

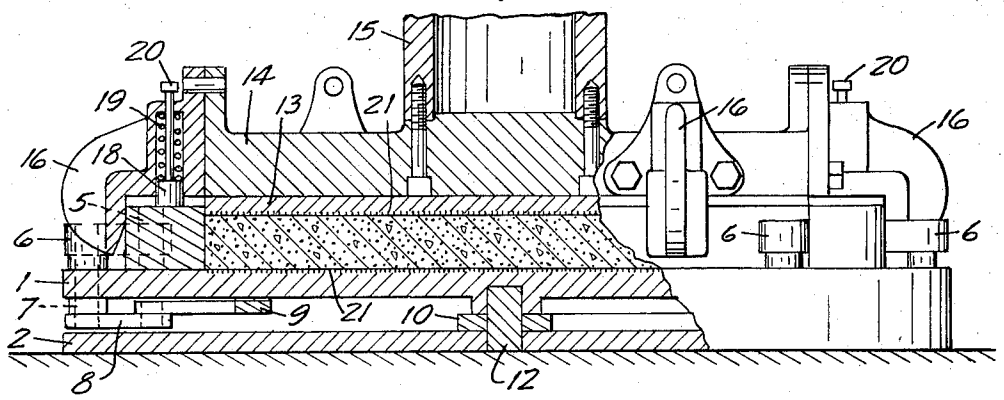
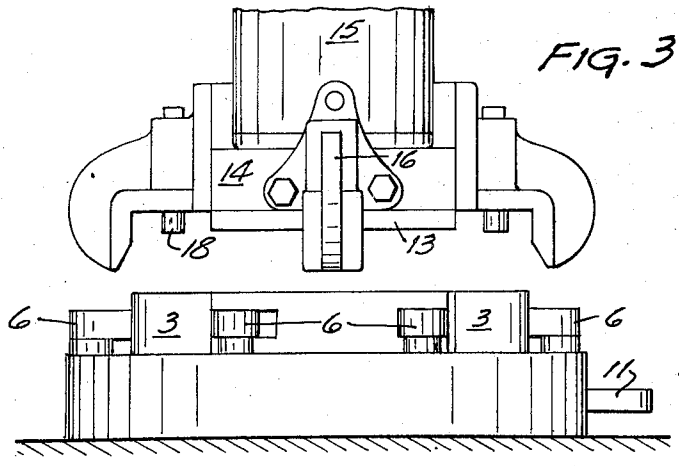


FIG. 3



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CASTING DEVICE FOR PRESSURE CASTING CONCRETE AND THE LIKE

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This invention relates to a casting device for the pressure casting of concrete, plastic and similar masses particularly concrete building blocks, patio tile, silo staves and the like.

Although a variety of devices have been designed for pressure casting concrete shapes, a relatively simple, positive acting mold permitting mass production without sacrificing unit quality has been desired. When freshly mixed concrete is subjected to high compression with provision for removal of water, it quickly hardens into a plastic mass of sufficient solidity to permit rapid removal from the mold. However, deformation of the plastic mass can occur unless the piece is carefully removed, particularly if the piece has sharp edges.

Accordingly, it is an object of this invention to provide a simple and efficient pressure casting device providing mass production capability without edge deformation of the molded block.

Still another object of this invention is to provide a pressure casting device having means for simultaneously opening the sides and ends of the device with uniform, controlled movement, initially a shearing movement, to permit immediate removal of the piece without edge deformation.

A further object is to provide a pressure casting device in which the mold is precisely and rigidly locked by the downward movement of the press ram.

Still other objects and advantages will be apparent from the following description.

In the drawings similar reference numerals indicate like parts in the several figures.

FIGURE 1 is a side view, partly in section, of the casting device with the mold in its locked position.

FIGURE 2 is a top plan view of the casting device with the press ram removed to reveal operating details of the mold in both the closed and open position.

FIGURE 3 is an end view of the casting device with the press ram in an elevated position.

Referring to the figures, the mold bottom plate **1** is supported on a base **2**. Mold side members **3** and mold end members **4** are movably mounted on said bottom plate by means of link pivot pins **5**, link arms **6**, and wrist pins **7** to permit arcuate movement of said members without change of orientation about the wrist pin axis. Link arms **6** freely rotate about link pivot pins **5** and are extended into the side and end members through suitable slots formed in said members, the slots being sized to permit lateral movement of the link arms. At least one wrist pin associated with each mold side and each mold end member is journalled in said bottom plate and is affixed at its upper extension to the corresponding link arm and at its lower extension to a control arm **8**, coupling the link arm and the control arm for simultaneous movement as a single unit. A connecting rod **9** joins each control arm to an actuating lever **10** pivotally mounted between the mold bottom plate and the base. Through the described linkages rotation of the actuating lever about its axis produces simultaneous arcuate movement of all mold side members and mold end members at a rate determined by the motion of the actuating lever. The actuating lever may be extended outside of the mold through a suitable slot in the base and serve as an actuating handle **11** for operation by manual or other means, e.g. hydraulic cylinder. The actuating lever may also be made to operate

from the underside of the base by affixing the actuating lever to a rotatable shaft **12** journalled in the base and extending therethrough for external control. Other variations for effecting rotational movement of the actuating lever about its axis can, of course, be made to adapt the device to the type of control desired.

The mold top plate **13** is mounted onto the pressure plate **14** to which the pressure ram **15** is bolted. On each side of the pressure plate is affixed at least one, preferably two, mold clamps **16**, the mold clamps extending outwardly and downwardly of said mold top plate, the lowermost portion being preferably beveled outwardly at its inner face **17**. Each mold clamp preferably carries in its body a vertical hold down plunger **18** which is downwardly biased by spring **19**. A stop member **20** on the upper extremity of the hold down plunger limits its downward travel. Both the face of the mold top plate and face of the mold bottom plate preferably are formed with thin, closely spaced drain grooves **21** therein opening into lateral drain channels (not shown) to assist the removal of water from the mold. Various spacers may be inserted between the base and the mold bottom plate to assist in distributing the pressure more uniformly, provided such spacers are not located so as to interfere with the movement of the connecting rods, control arms, and actuating lever.

In the use of the casting device of this invention counterclockwise movement of the actuating handle **11** (as viewed in FIGURE 2) either manually or automatically in a predetermined time cycle, rotates the actuating lever to assemble both side members **3** and both end members **4** on the mold bottom to form an open topped chamber having the desired block configuration. A measured amount of concrete or other casting material is then placed in the chamber and the pressure ram is lowered, e.g. by hydraulic means. As the ram lowers, the beveled inner faces of the mold clamps first engage the outer surfaces of the side and end members, locking them firmly in closed, mold forming position. As the mold top plate is lowered further, the mold clamps having locked the side and end members into position, the hold down plungers contact the upper surfaces of the side and end members to position them tightly against the mold bottom during the remaining downward movement of the mold top plate. Further downward travel of the pressure ram brings the mold top plate into contact with the casting material as it moves snugly into the chamber formed by the side and end members, forcing water out of the chamber through the drain grooves and channels. Thus, the downward movement of the pressure ram automatically and sequentially (1) locks the side and end members in position, (2) seals the side and end members to the mold bottom plate and (3) pressurally applies the mold top plate to the casting material to compact the material with removal of water, entrapped air, etc.

Once the maximum desired pressure has been achieved the pressure ram is returned upwardly to release the pressure and retract the hold down plungers and mold clamps. The actuating lever is then moved (in a clockwise direction as viewed in FIGURE 2) to the open position, simultaneously removing the side and end members from the molded piece by arcuate movement without change of orientation, each member moving initially in shear to break the adhesion between the molded piece and the mold forming surfaces of the members and to prevent damage to the surfaces and corners of the molded piece. After the molded piece is removed the actuating lever is returned to its closed position to reassemble the side and end members for another cycle. As will be appreciated, the entire operation can be fully automated by programming the movements of the pressure ram and the control rod-

actuating lever in a suitable time cycle and providing means for charging the mold chamber and removing the molded piece.

Various modifications and alterations of the above described device will be apparent to those skilled in the art without departing from the invention.

I claim:

1. A pressure casting device which comprises (1) a mold bottom plate, (2) movable side and end members disposed thereon and pivotally attached thereto by linkage means permitting arcuate movement of each of said members between an assembled mold-forming position and a disassembled mold-releasing position without change of member orientation, (3) actuating means connected to each of said linkage means to effect simultaneously said arcuate movement of all side and end members in a controlled manner, (4) a mold top plate of a configuration fitted snugly within said side and end members in assembled mold-forming position, and (5) mold clamping means in fixed relation to said mold top plate and being movable therewith, said mold clamping means extending outwardly and downwardly therefrom, the lowermost portions thereof being below said mold top plate, to engage and lock said side and end members together in assembled mold-forming position.

2. The pressure casting device of claim 1 in which the lowermost portions of said mold clamps which engage said side and end members are beveled outwardly to urge said side and end members gradually and simultaneously into assembled mold-forming position.

3. A pressure casting device which comprises (1) a mold bottom plate, (2) movable side and end members disposed thereon and pivotally attached thereto by linkage means permitting arcuate movement of each of said members between an assembled mold-forming position and a disassembled mold-releasing position without change of member orientation, (3) a single actuating means connected to each of said linkage means to effect simultaneously said arcuate movement of all side and end members, (4) a mold top plate of a configuration fitting snugly within said side and end members in assembled mold-forming position, (5) a support plate for said mold top plate, (6) mold clamps in fixed relation to said support plate and extending outwardly and downwardly therefrom, the lowermost portions thereof being below said mold top plate, to engage and lock said side and end members together in assembled mold-forming position, and (7) pressural means for changing the relative separation of said mold top plate and said mold bottom plate.

4. A pressure casting device which comprises (1) a mold bottom plate, (2) movable side and end members disposed thereon and pivotally attached thereto by linkage means permitting arcuate movement of each of said members between an assembled mold-forming position and a disassembled mold-releasing position without change of member orientation, (3) a single actuating lever pivotally disposed under said mold bottom plate and connected to each of said linkage means to effect simultaneously said arcuate movement of all side and end members, (4) a mold top plate of a configuration fitting snugly within said side and end members in assembled mold-forming position, (5) a support plate for said mold top plate, (6) mold clamps associated with said support plate and extending downwardly and outwardly therefrom, the lowermost portions thereof being below said mold top plate, to engage and lock said side and end members together in asssembled mold-forming position, and (7) drainage means in said mold bottom plate and said mold top plate to permit removal of fluids and gases from said mold.

5. A pressure casting device which comprises (1) a mold bottom plate, (2) movable side and end members disposed thereon and pivotally attached thereto by linkage means permitting arcuate movement of each of said members between an assembled mold-forming position and a disassembled mold-releasing position without change of member orientation, (3) actuating means connected to each of said linkage means to effect simultaneously said arcuate movement of all side and end members, (4) a mold top plate of a configuration fitting snugly within said side and end members in assembled mold-forming position, (5) mold clamps associated with and extending outwardly and downwardly of said mold top plate, the lowermost portions thereof being below said mold top plate, to engage and lock said side and end members together in assembled mold-forming position, and (6) means associated with said mold clamps to hold said side and end members against said mold bottom plate when locked in assembled mold-forming position.

6. The pressure casting device of claim 5 in which said means associated with said mold clamps to hold said side and end members against said mold bottom plate when locked in assembled mold-forming position comprises downwardly biased plungers mounted in said mold clamps.

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