Sept. 8, 1936. L. POLAK 2,054,001

CEMENT BRICK MAKING MACHINE

Original Filed April 14, 1931 3 Sheets-Sheet 1

Fig. 1.

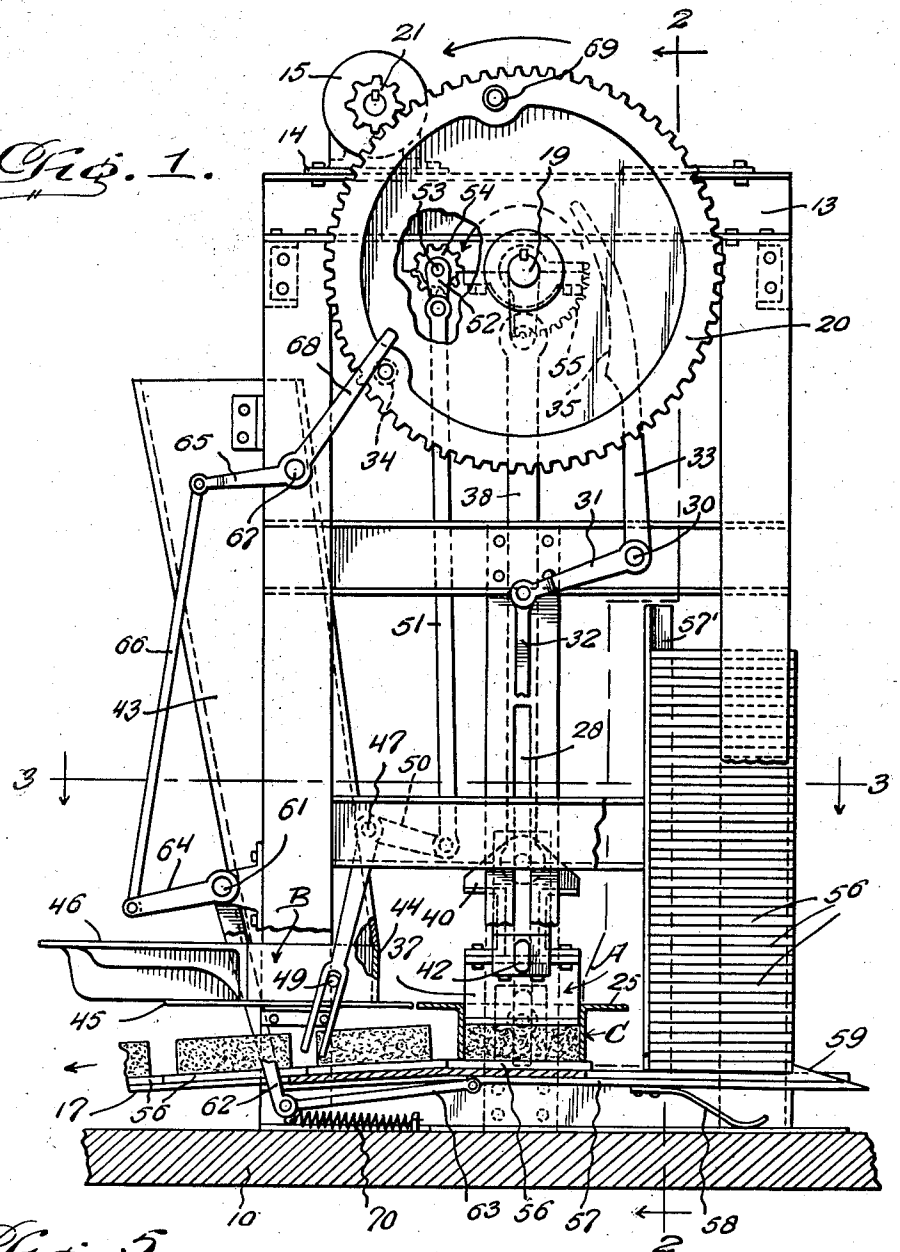
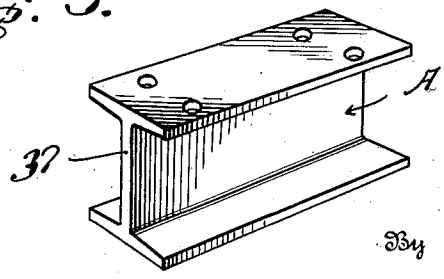


Fig. 5.



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Fig. 2.

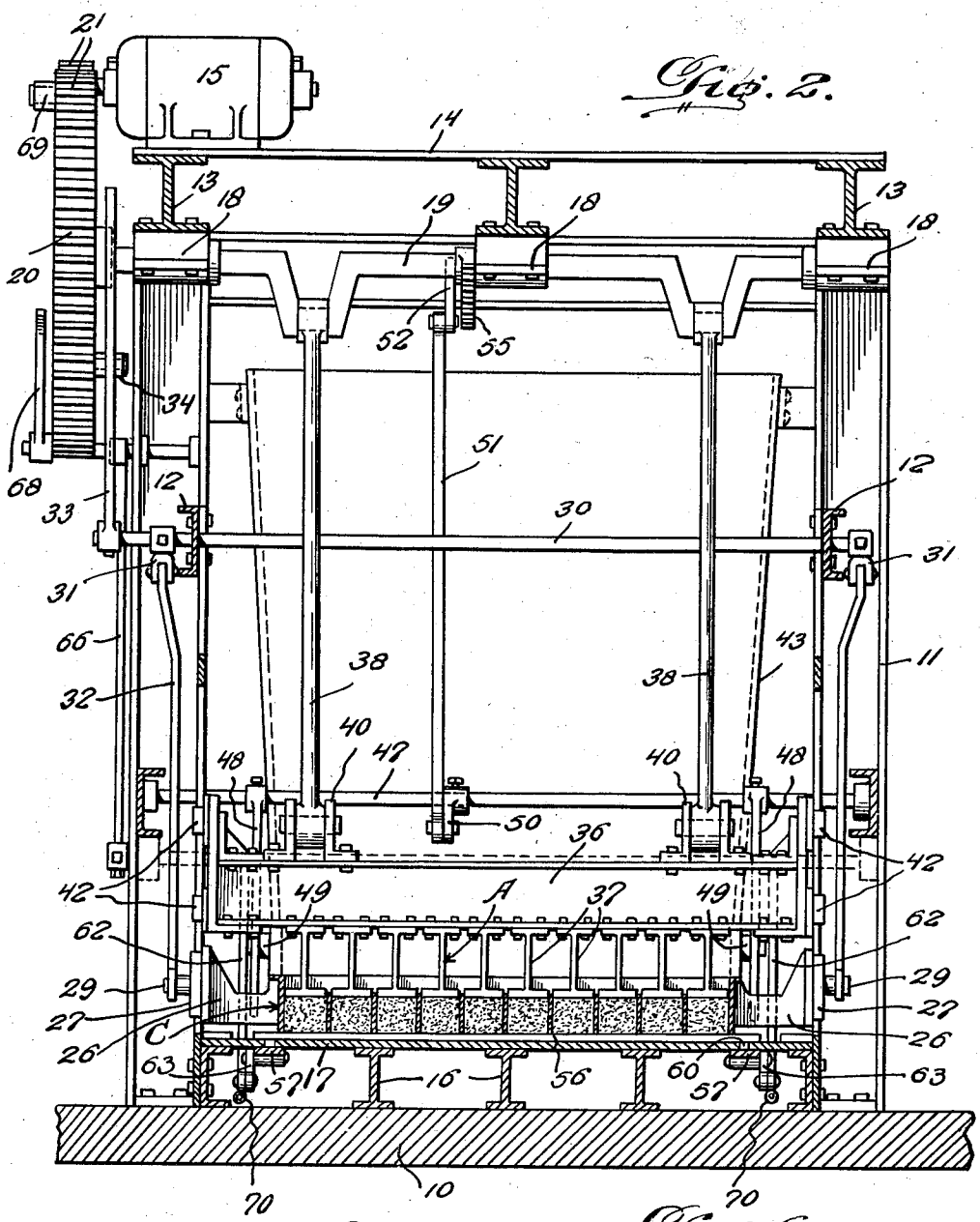
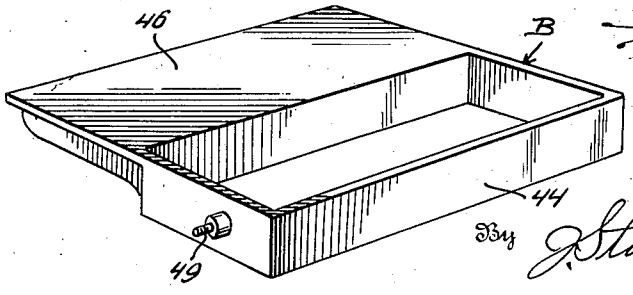


Fig. 6.



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CEMENT BRICK MAKING MACHINE

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Fig. 3.

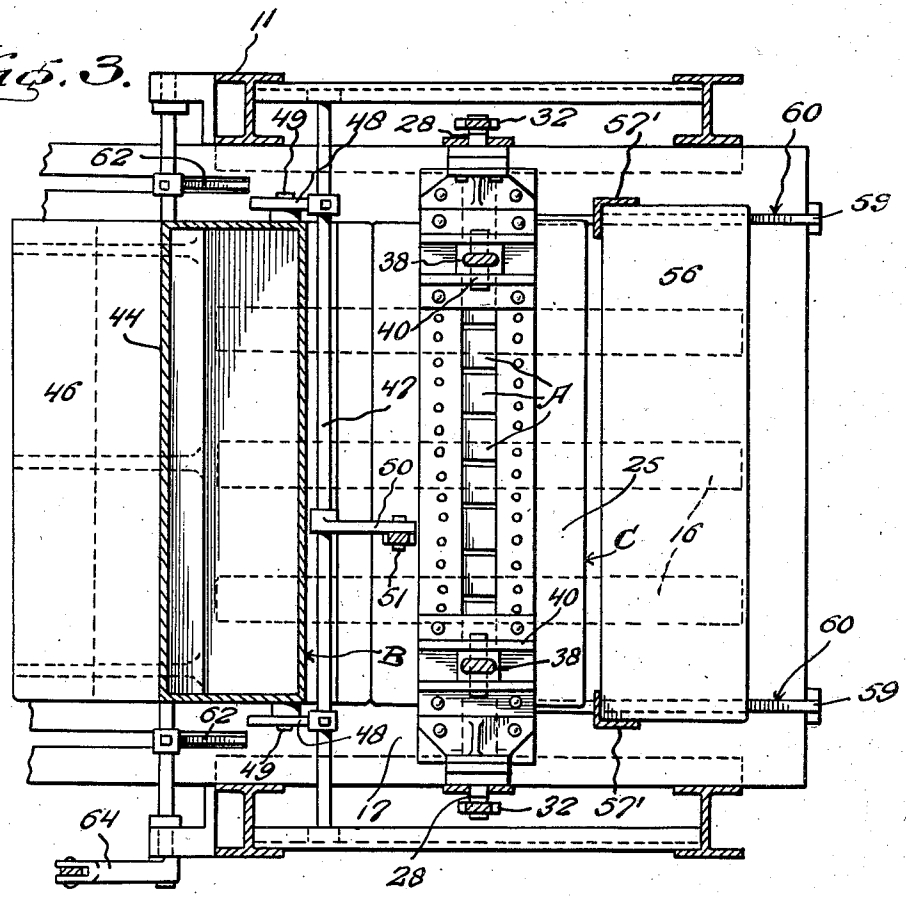
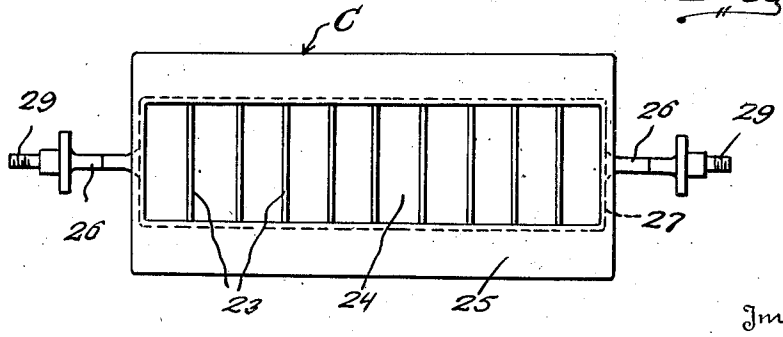


Fig. 4.



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UNITED STATES PATENT OFFICE

2,054,001

CEMENT BRICK MAKING MACHINE

Lewis Polak, Bethlehem, Pa., assignor of one-half to Hilary Fudczko, Bethlehem, Pa.

Refiled for abandoned application Serial No. 530,076, April 14, 1931. This application December 18, 1934, Serial No. 758,105

4 Claims. (Cl. 25—56)

The present invention contemplates the provision of a cement brick making machine, wherein a plurality of bricks can be quickly and cheaply manufactured with each operation of the machine. The present application is a substitute for my abandoned application Serial No. 530,076, filed April 14, 1931, and allowed June 16, 1933.

In accordance with the present invention, the machine embodies a mold divided into a plurality of compartments in which the bricks are formed, together with means for intermittently raising and lowering the mold, so that the formed bricks can be removed from the machine with the mold in elevated position.

One of the chief characteristics of the present invention resides in the provision of a novel construction of means for delivering the concrete or other plastic material to the mold, with the movement of the delivery means being so synchronized with relation to the movements of the mold, that the latter is supplied with the plastic material as it assumes its lowermost position at the completion of each cycle of operation.

Another important object of the invention resides in the provision of a plurality of false bottoms for the mold, which bottoms are normally arranged in column-like formation, and adapted to be singly shifted to a position directly beneath the mold for use, and subsequently shifted from the machine with the formed bricks thereon, after the mold has been elevated to permit of the removal of the bricks from the machine in this manner.

In carrying out the invention I comprehend the provision of a novel construction of means for singly delivering these false bottoms to the mold, and subsequently removing the bottoms with the formed bricks thereon from the machine.

A further object of the invention resides in the provision of a machine of the above mentioned character, including a motor-operated shaft, from which the various mechanisms controlling the movement of the mold, the movement of the delivery means and the shifting of the false bottoms are operated, and so timed with relation to each other, that the machine is capable of economically producing a large number of bricks in a comparatively short periods of time.

Other objects and advantages of the invention will appear when the following detailed description is read in connection with the accompanying drawings, the invention residing in the construction, combination and arrangement of parts as claimed.

In the drawings forming part of this application like numerals of reference indicate similar parts in the several views and wherein:

Figure 1 is a side elevation of the machine partly in section.

Figure 2 is a sectional view on line 2—2 of Figure 1.

Figure 3 is a sectional view on line 3—3 of Figure 1.

Figure 4 is a top plan view of the mold.

Figure 5 is a perspective view of one of the tampers.

Figure 6 is a perspective view of the frame utilized to deliver the concrete or plastic material to the mold.

Referring to the drawings in detail, 10 indicates a base upon which is mounted the frame of the machine, and this frame is made up of a plurality of vertically and horizontally disposed beams indicated at 11 and 12 respectively and suitably connected together. Arranged at the top of the frame is a plurality of I-beams 13 upon which reposes a platform 14, the latter constituting a support for the motor 15. Also mounted upon the base 10 is a plurality of I-beams 16 which support what I term the bottom of the machine indicated at 17, the latter being arranged above and in spaced parallel relation to the base 10. Journaled in suitable bearings 18 at the top of the machine is a crank shaft 19, the latter being provided with a large gear 20 which is rotated by a pinion at 21 carried by the shaft of the motor 15.

Located directly above the bottom 17 is a mold indicated generally at 22 and preferably of the construction illustrated in Figure 4. This mold can of course vary in size without departing from the inventive idea, and is provided with a plurality of spaced partitions 23, dividing the mold into a plurality of separate compartments 24, while the mold is also formed with opposed longitudinally extending reinforcing flanges at 25. This mold is mounted for vertical movement toward and away from the bottom 17, for a purpose to be hereinafter described, and in order to guide the mold in its movement, the mold is provided with end extensions 26, each carrying at its outer end an elongated lug 27 which moves in a longitudinal slot 28 formed in the adjacent vertical members 11 of the supporting frame. Also projecting from each lug 27 is a threaded pin 29, by means of which the mold is connected with the means for raising and lowering the mold with relation to the bottom 17.

For this purpose I employ a rock shaft 30 journaled in the horizontal members 12 of the

supporting frame, and projecting from this shaft are spaced arms 31, which are terminally connected with the adjacent extremity of rods 32, the opposite extremity of which are connected with the pins 29 carried by the mold. Rising from one end of the shaft 30 and arranged adjacent the gear 20 is a lever 33, which is actuated incident to the rotation of the gear 20 to rock the shaft 30, and thus elevates the mold once during each cycle of operation of the machine. For this purpose, the gear 20 is provided with a pin 34 arranged to engage the lever 33 during the rotation of the gear, and thereby rock the lever 33 to impart motion to the shaft 30 and thereby elevate the mold. It will be noted upon inspection of Figure 1 that the lever 33 is of considerable length, and formed with a curved or cam-like surface 35, normally arranged in a path of movement of the pin 34, and when the pin 34 is brought into engagement with the lever 33, the latter is shifted to the right to elevate the mold in the manner as just described, the mold remaining in an elevated position as long as the pin 34 remains in engagement with the lever. However just as soon as the pin 34 passes off the end of the lever 33, the mold gravitates to its normal or lowermost position. It is of course understood, that the compartments 24 of the mold are filled with cement or other plastic material, when the mold is in its lowermost position, and the material is then pressed or tamped into proper shape to form the bricks, after which the mold is elevated to allow the formed bricks to be removed from the machine in a manner to be hereinafter described.

For the purpose of pressing or tamping the plastic material contained in the compartments 24 of the mold, I employ a cross head indicated generally at 36, and which is preferably of angle iron construction, and depending from this cross head 36 is a plurality of I-beams 37, clearly illustrated in Figure 5, and constituting the tampers for the plastic material. Obviously, there is one of these tampers for each compartment 24 of the mold as clearly illustrated in Figure 2. The cross head 36 is also mounted for movement toward and away from the mold, and is connected with the crank shaft 19 by the connecting rods 38, the latter being pivoted in suitable bearings 40 carried by the cross head 36 as illustrated. The end members 41 of the cross head are relatively wide, and carry a plurality of guide lugs 42, which operate in the longitudinally disposed slots 28 of the adjacent vertical member 11 of the supporting frame. In this manner the cross head is guided in its vertical movement. The construction of the machine as thus far described is such, that the compartments of the mold receive plastic material when in its lowered position, after which the cross head is lowered to allow the tampers 37 to press this material within the compartments. The cross head is lowered during the rotation of the gear 20, and after the material has been suitably pressed into the desired shape, the cross head is elevated incident to the continuous rotation of the gear 20. The crosshead is initially elevated with relation to the mold, and after traveling a predetermined distance, the mold is then elevated an appreciable distance above the bottom 17, to allow the formed bricks to be removed from the machine in a manner to be hereinafter described.

As hereinabove stated, one of the chief characteristics of the present invention resides in the provision of a novel construction of means for delivering the plastic material to the molds, and having this delivering means actuated from the crank shaft, and synchronized with relation to the movements of both the mold and the cross head. The concrete or other plastic material is of course contained in a suitable hopper 43, open at its lower end, and arranged to slide beneath the hopper 43 and across the top of the mold, when the latter is in its lowermost position, is a substantially open frame 44, which is substantially of the same size area as the mold. As illustrated in Figure 1, this frame 44 is mounted on a suitable base or support 45 directly beneath the lower end of the hopper 43, to receive a portion of the contents of the latter, and the frame is intermittently shifted from its normal position beneath the hopper 43 to a position above the mold to fill the compartment 24 thereof with the concrete or other plastic material, and is subsequently returned to its normal position beneath the hopper 43. It will be noted upon inspection of Figure 6, that the frame 44 is characterized by a relatively wide shelf or ledge 46, which constitutes a cut-off for the hopper 43, when the frame is in a position to fill the mold. In other words when the frame is moved from its support 45 to a position above the mold, the shaft or ledge 46 is moved to a position directly beneath the hopper and thereby serves to close the lower end of the hopper as will be readily understood.

For controlling the movements of the delivery frame 44, I employ a shaft 47 journaled in the adjacent horizontal members 11 of the supporting frame, and projecting downwardly from this shaft at spaced points, are bifurcated arms 48. The bifurcated extremities of these arms receive the pins 49 which project from the ends of the delivery frame 44. Projecting laterally from the shaft 47, and at an appropriate point on the same, is an arm 50, which is connected with the lower end of the operating rod 51, which is employed to rock the shaft 47 and thereby impart reciprocatory movement to the delivery frame 44. The upper end of this rod 51 is connected with a crank arm 52 which is carried by a stub shaft 53, which shaft is provided with a small gear 54. The small gear 54 is adapted to cooperate with a segmental gear 55 carried by the crank shaft 19, so that once during each cycle of operation of the machine, the shaft 47 is rocked to bring the delivery frame into a position above the mold, to fill the compartments 24 thereof, and then return the frame to its normal position beneath the hopper 43. The segmental gear 55 is located upon the crank shaft at a point where it will not be brought into engagement with the gear 54, until after the mold has been returned to its lowermost position, and with the cross head and the tampers still in their elevated positions, thus providing ample space for the delivery frame to move across the top of the mold without interference on the part of the cross head and tampers.

Upon reference to Figure 1, it will be noted that the cross head and tampers are in their lowermost positions pressing the material contained within the mold. During the continued rotation of the gear 20, the connecting rods 38 will elevate the cross head and tampers an appreciable distance above the mold. From the position of the parts illustrated in Figure 1, the pin 34 will strike the lever 33 approximately upon one-fourth of a revolution of the gear, thereby actuating the lever 33 to lift or elevate the mold above the bottom 17 of the machine. Manifestly, the mold is not only elevated but remains in its elevated position,

as long as the pin 34 remains in contact with the lever 33, and the pin 34 does not leave the lever 33 until the crosshead and tampers have reached their highest position. At that particular time, the pin 34 leaves the levers 33, whereupon the mold gravitates to its normal lowermost position, and immediately subsequent to the mold assuming this lowermost position, the segmental gear 55 begins to mesh with the small gear 54, carried by the stub shaft 53. Consequently, the shaft 53 is rotated to impart rocking movement to the shaft 47, and in a direction to shift the delivery frame 44 from its normal position illustrated in Figure 1, to a position above the mold, and thereby deliver its contents to the compartment 24 of the mold. During the continued rotation of the shaft 53, the delivery frame will be subsequently returned to its normal position upon its platform support 45 directly beneath the hopper 43. This operation takes place while the cross head and tampers are being lowered into the direction of the mold, but the movements of these parts are so synchronized, that the delivery frame is in an entirely out-of-the-way position as the tampers approach and enter the compartments 24 of the mold to press the concrete or other plastic material to the desired shape.

For each operation of the machine, I provide the mold with a pallet, and after the mold has been elevated, these pallets are singly shifted from the machine with the formed bricks reposing thereon. These pallets are indicated at 56 and are normally stacked in column formation at one side of the machine between a pair of spaced suitable angle iron uprights 57', arranged to permit these pallets to be stacked from the back of the machine rather than from the top thereof. During the operation of the machine, these pallets are singly shifted from the stack or column thereof onto the bottom 17 of the machine directly beneath the mold, and after the bricks have been formed in the latter, and the mold elevated, the particular pallet with the bricks formed thereon is shifted from the machine, and the next lowermost pallet is shifted from the bottom of the column into a position for use.

For shifting the pallets in the manner above described, I employ a slide 57 which is arranged directly beneath the column of pallets, and yieldably supported with relation thereto through the instrumentality of a leaf spring 58, the latter being carried by the slide 57 and terminally bearing against the base 10 of the machine. Two of such slides are employed and arranged beneath the bottom 16 of the machine as clearly illustrated in Figure 2, and each slide is formed with an extension 59 of such dimensions as to engage the lowermost pallet 56 of the column of pallets, and shift said pallets into a position for use beneath the mold, when the slides 57 are moved in one direction. The bottom 17 of the machine is formed with slots 60 to permit of passage of the extensions 59 of the slides therethrough.

For controlling the movement of the slides 57 I employ a rock shaft 61 from which depends arms 62, each of which is connected with the adjacent slides by means of a link 63. Also projecting from the rock shaft 61 is an arm 64 connected with one end of a bell crank lever 65 by means of a rod 66. This bell crank lever 65 is fulcrumed as at 67, and has its main branch 68 lying adjacent the gear 20 and in the path of movement of a pin 69 carried by the gear. Consequently during the rotation of the gear 20, the pin 69 strikes the bell crank lever 68, rocking it upon its pivot 67, and imparting a rocking motion to the shaft 61, which by reason of its connection with the slides 57 moves the latter in one direction, and in a direction to singly deliver the lowermost pallet from the column of pallets, to a position beneath the mold for use. Each arm 62 which is connected with the adjacent slide 57 has connected therewith one end of a spring 70, the other end of which is connected to the base 10 of the machine, so that these springs are placed under tension when the slides 57 are shifted to their active positions, and after the pin 69 leaves the bell crank lever, the springs 70 function to return the slides and their associated parts to normal position. It will be observed upon inspection of Figure 1, that as each lowermost pallet of the column of pallets is shifted into a position for use, it contacts with the previously used pallet, and serves to shift the latter mentioned pallet with the formed bricks thereon forwardly of the mold. Manifestly by reason of this arrangement, as the lowermost pallet of the column of pallets is shifted into a position for use, it contacts a series of previously used pallets and shifts these pallets from the machine, one by one so that they can be suitably handled and carried to their proper destination.

While it is believed that from the foregoing description the nature and advantages of the invention will be readily apparent, I desire to have it understood that I do not limit myself to what is herein illustrated and described, and that such changes may be resorted to when desired as fall within the scope of what is claimed.

What I claim as new is:

1. In a cement brick making machine, a vertical frame having a power-operated crank shaft journaled at the top thereof, a vertically movable mold guided in the sides of the frame near the bottom of the later, a vertically movable cross head guided in the sides of the frame above the mold and having depending members adapted to enter and press the material in the mold when the cross head is lowered, connecting rods operatively connecting the crank shaft with the cross head for continuously vertically reciprocating the latter, a drive gear on one end of the crank shaft provided with a lateral pin, a horizontal rock shaft journaled in the frame beneath the crank shaft and above the mold, an upstanding arm secured on the rock shaft and having its free end portion arranged in the path of movement of said pin, and crank and link connections between the rock shaft and the mold whereby the latter is intermittently elevated to discharge the bricks molded and pressed within the latter pursuant to each upward movement of the cross head.

2. In a cement brick making machine, automatic brick molding and pressing mechanism including a vertically movable mold movable upwardly to discharge the bricks therefrom, said mechanism including a horizontal driven shaft journaled above the mold, a gear on said shaft provided with a lateral pin, horizontally movable pallet feeding slides arranged beneath the mold, yieldable means to normally move said slides in one direction into engagement with a pallet to be moved in position beneath the mold, a lever arranged in the path of movement of and adapted to be actuated by said pin, and crank and link connections between said lever and said slides whereby the latter are intermittently actuated against the action of said yieldable means to feed a pallet beneath the mold each time the latter is

elevated subsequent to each brick forming operation.

3. In a cement brick making machine, automatic brick molding and pressing mechanism including a vertically movable mold movable upwardly to discharge the bricks therefrom, said mechanism including a horizontal driven shaft journaled above the mold, a gear on said shaft provided with a lateral pin, horizontally movable pallet feeding slides arranged beneath the mold, yieldable means to normally move said slides in one direction into engagement with a pallet to be moved in position beneath the mold, a lever arranged in the path of movement of and adapted to be actuated by said pin, crank and link connections between said lever and said slides whereby the latter are intermittently actuated against the action of said yieldable means to feed a pallet beneath the mold each time the latter is elevated subsequent to each brick forming operation, a magazine adapted to have pallets stacked therein, and yieldable means to elevate said slides to normally engage the lowermost pallet of the stack each time the slides are retracted by said yieldable means.

4. In a cement brick making machine, a vertical frame having a power-operated crank shaft journaled at the top thereof, a vertically movable mold guided in the sides of the frame near the bottom of the latter, a vertically movable cross head guided in the sides of the frame above the mold and having depending members adapted to enter and press the material in the mold when the cross head is lowered, connecting rods operatively connecting the crank shaft with the cross head for continuously vertically reciprocating the latter, a drive gear on one end of the crank shaft provided with a lateral pin, a horizontal rock shaft journaled in the frame beneath the crank shaft and above the mold, an upstanding arm secured on the rock shaft and having its free end portion arranged in the path of movement of said pin, crank and link connections between the rock shaft and the mold whereby the latter is intermittently elevated to discharge the bricks molded and pressed within the latter pursuant to each upward movement of the cross head, a cement feeding hopper, a mold loading and hopper closing element horizontally slidable in a plane between the bottom of the hopper and the top of the mold when the latter is in lowered position, and means to automatically move said element to mold-loading position pursuant to each lowering movement of the mold and while the cross head is elevated, said last-named means comprising fork levers at each side of said element, said element having lateral pins engaged in the forks of said levers, and means operatively connecting said fork levers with said crank shaft.

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