

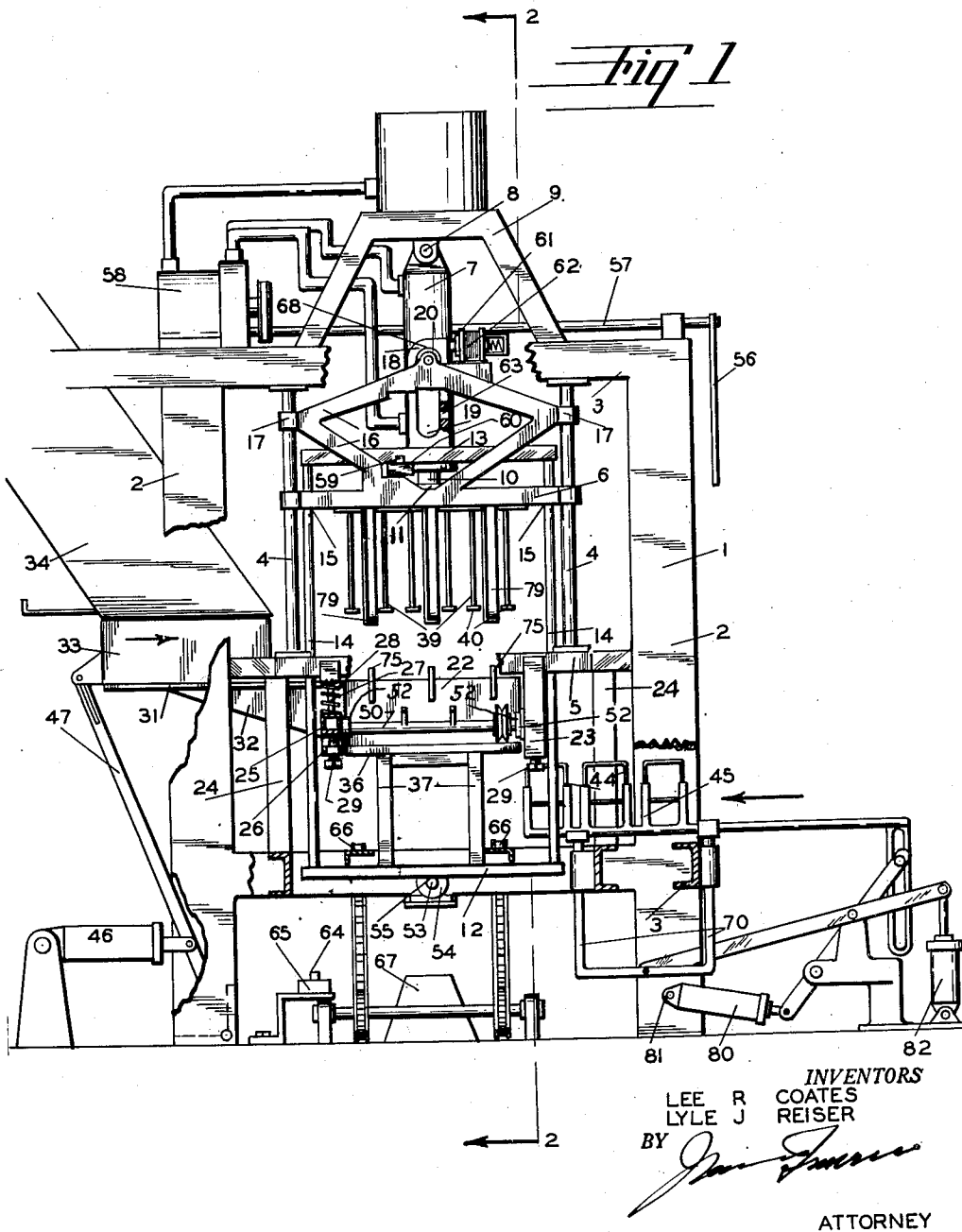
Dec. 27, 1949

L. R. COATES ET AL
BLOCK MAKING MACHINE

2,492,415

Filed Dec. 2, 1948

5 Sheets-Sheet 1



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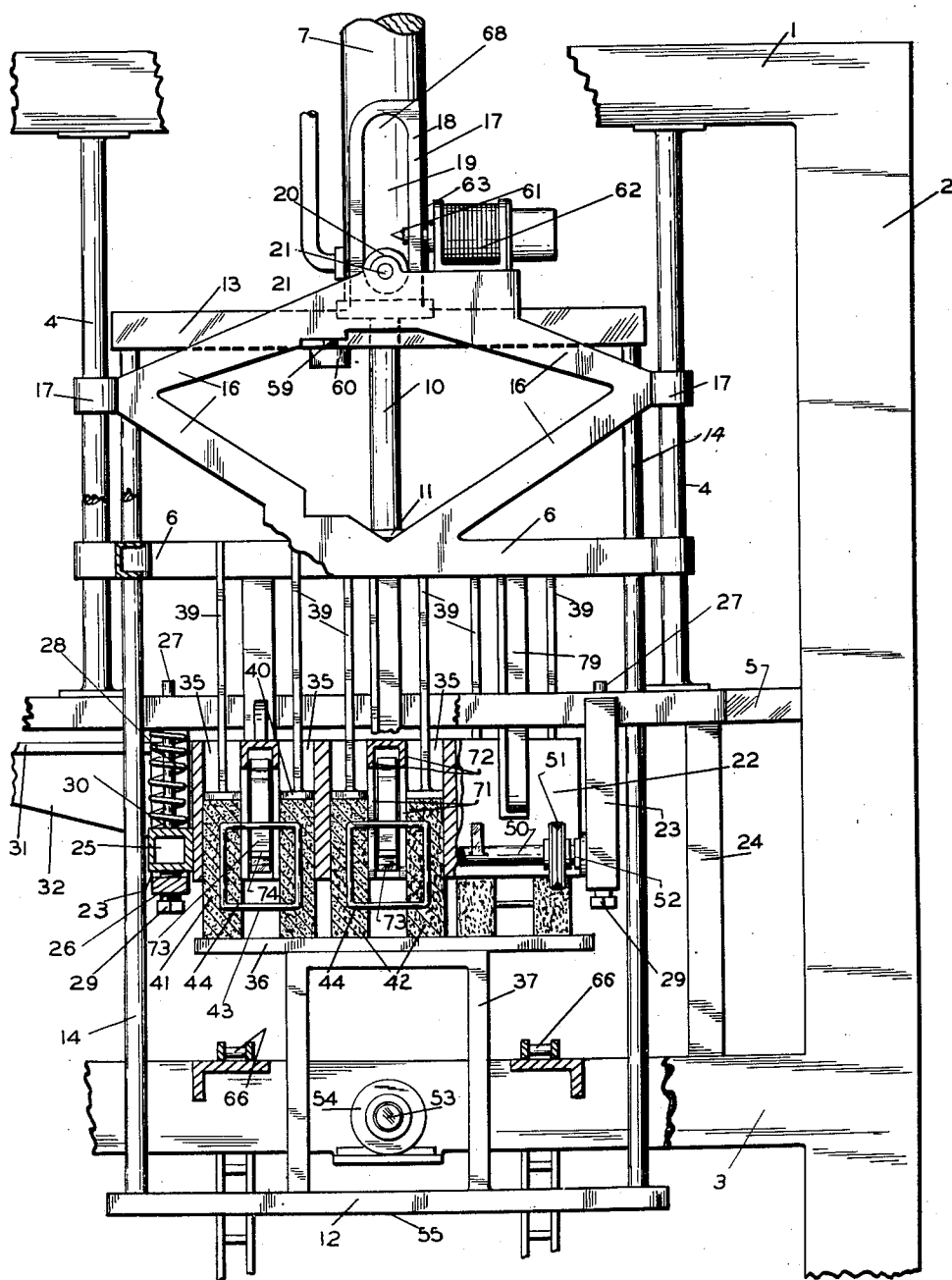


Fig 3

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Fig 4

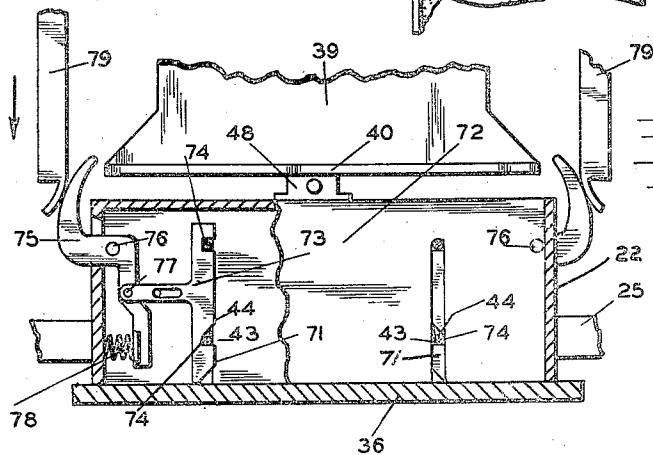
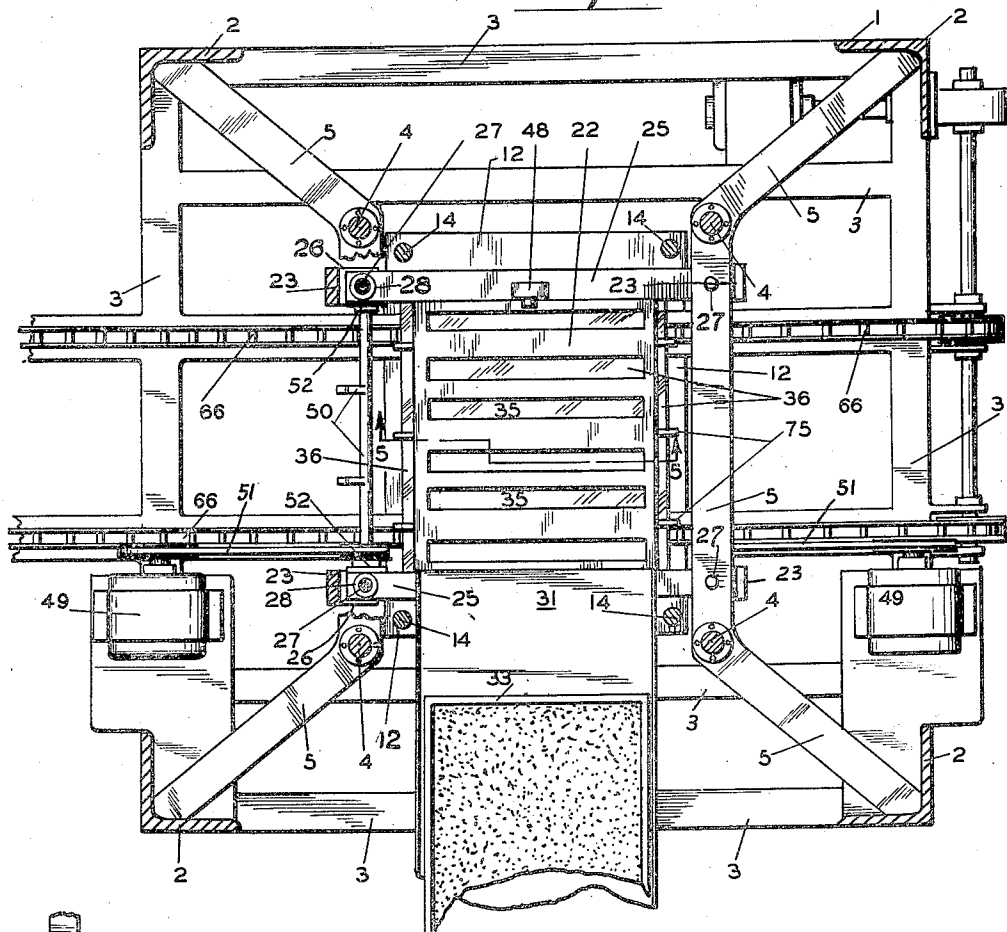


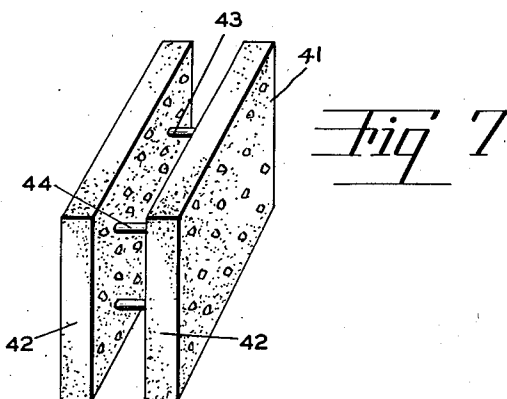
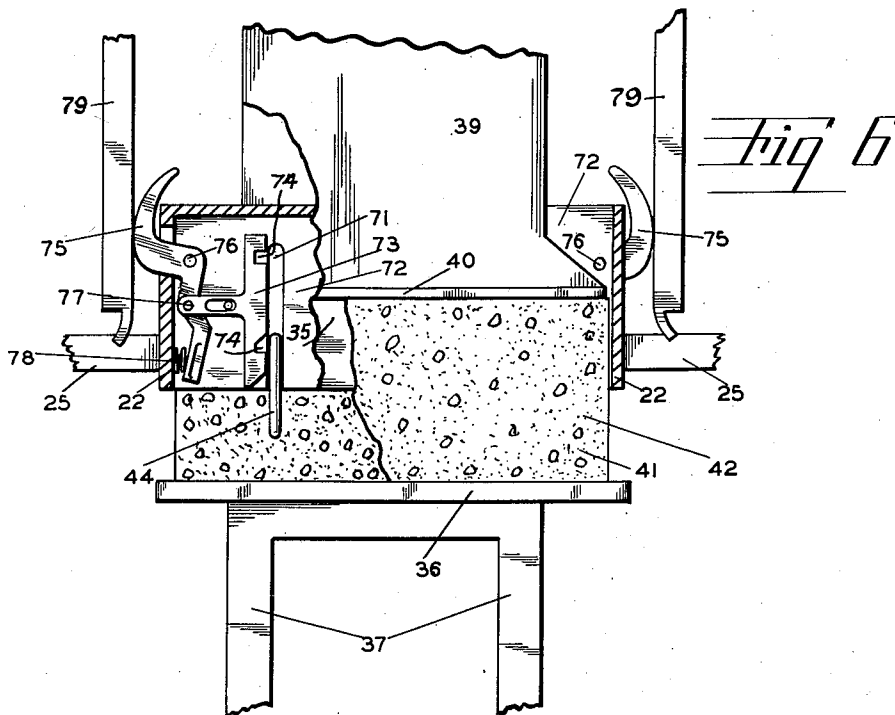
Fig 5



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UNITED STATES PATENT OFFICE

2,492,415

BLOCKMAKING MACHINE

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Application December 2, 1948, Serial No. 63,054

6 Claims. (Cl. 25—41)

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This invention relates to block making machines and is particularly adapted for the making of concrete, pumice and the like type of block.

The primary object of our new and improved block making machine is to make a block consisting of two solid body members spaced apart by spacer bars. By making a block of this nature a double wall construction can be made from the blocks having an almost complete air space between the walls, the spacing members taking up a minimum of space and reducing the heat, cold and moisture conductivity from one wall to another.

A further object of the invention is to construct a block of this type so that insulating materials may be easily blown in between the outside and inside wall.

Another object of the invention is the reduction of moisture conductivity between the walls due to the fact that if metal or solid type spacers are used they will not conduct moisture there through as is the case in a block consisting of spacing partitions of the same material, as block.

A still further object of our invention is to provide a machine for the making of the above described type of block that will manufacture the blocks in a continuous operation, the said machine having means therein for holding the spacing elements.

Another object of the invention is providing a form for forming the blocks that will receive and hold the spacing members while the blocks are being cast and also means being provided in the mold for releasing the said spacing members when the cast block is being removed from the form.

A further object of the invention is to provide a continuous conveyor for delivering the blocks from the location of the form to their destination beyond the machine.

And another object of the invention is to provide a positive means of discharging the block from the form so that the shape of the block may be accurately maintained while removing the same from the said forms.

These and other incidental objects will be apparent in the drawings, specification and claims.

Referring to the drawings:

Figure 1 is an elevation view of our new and improved block making machines, parts broken away for convenience of illustration.

Figure 2 is a sectional view taken on line 2—2 of Figure 1, parts broken away for convenience of illustration.

Figure 3 is an enlarged sectional detail view

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taken on line 3—3 of Figure 2, illustrating the block having been formed and being discharged from the form, parts of the machine broken away for convenience of illustration.

Figure 4 is a plan sectional detail view taken on line 4—4 of Figure 2, parts broken away for convenience of illustration.

Figure 5 is a detail enlarged sectional view taken through the form on line 5—5 of Figure 4. This view has the discharging plunger added thereto which is not shown in Figure 4.

Figure 6 is the same as Figure 5 illustrating how the block is being discharged from the form.

Figure 7 is a special end view of a finished block having been formed by our new and improved block making machine.

Referring more specifically to the drawings:

Our new and improved block making machine consists of a main frame 1 comprised of vertical upright frame members 2 secured together by the cross frames 3. Vertically disposed guide rods 4 are fixedly mounted to the frame members 5, which in turn form part of the main frame assembly 1. The object and purpose of these vertical guide rods is to provide a means for guiding the cross head or frame 6 on the vertical axis of the machine.

The cross head 6 is operated by the hydraulic cylinder 7, which in turn is supported at 8 to the frame work 9, best illustrated in Figures 1 and 2. The piston rod 10 of the cylinder 7 is fixedly secured to the cross head 6 at 11, the cylinder raising and lowering the said cross head in the manner to be later described.

A platform 12 is supported by a second cross head 13 by way of the hanger rods 14, which in turn are guided through the cross head or frame 6 at 15. Referring to Figures 1, 2 and 3, oppositely disposed frame members 16 forming part of the cross head 6 further guide the said cross head relative to the guide rods 4 by the bearings 17. Extending upwardly from the cross head 13 and forming part thereof and disposed oppositely to one another are brackets 18. Running longitudinally of these brackets are guide ways 19, which are adapted to receive the rollers 20, the rollers 20 being rotatably mounted to the stub shafts 21 forming part of the framework 16 of the cross head 6. The framework 16 of the cross head 6 raises and lowers the cross head 13, together with the cross head of the platform 12. The operation of which will be more fully described later.

A box-like form 22 for molding the block, is mounted to the hangers 23, which in turn are

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supported by the frame members 5, best illustrated in Figures 1, 2, 3 and 4. Referring particularly to Figures 2, 3 and 4, the form 22 has side frames 25 secured thereto, oppositely disposed from each other and resting upon the foot members 26 of the hangers 23. The form is positioned between the hangers 23 by way of the guide rods 27, which are fixedly secured to the side frames 25 at 30 and extend up through the frame members 5. Springs 28 encircle the guide rods 27 and bear down against the side frames 25 of the form, as best illustrated in Figures 2 and 3. Adjustable stops or supports 29 are threaded through the feet 26 of the hangers 23 for supporting the frames 25 and adjusting the height of the form 22.

Extending from the side of the form 22 and flush with the top of the side walls of the form is a platform 31, which is braced by the gusset plates 32 from the side of the form. The object of this platform is to support the hopper 33 which receives its supply of block making material from the chute 34 when it is in the position shown in Figure 1. The operation of this hopper will be later described.

The form 22 is divided into compartments or forms 35 into which the block making material is poured from the hopper 33. A movable pallet 36 is adapted to close the bottoms of the compartments 35 when the material is poured by the hopper 33, and is supported by the frame work 37 mounted upon the platform 12, which in turn is supported by the hanger rods 14 from the upper cross head member 13. This construction will be more fully described in the operation of the machine to follow.

Extending downwardly and forming part of the cross head 6 are plungers 39 comprised of sheet material having feet 40, best illustrated in Figures 3 and 6. The feet 40 work up and down within the compartments 35 of the form 22 in the operation of the machine, and are adapted to maintain the cast block members 41 in their molded shape while being discharged from the form, the edges of the feet 40 having a sliding fit completely around the inner walls of the compartments, insuring a cleansing of the compartment when the block is being discharged therefrom.

Referring to Figure 7 our new and improved block consists of two solid block members 42 spaced apart by spacing rods 43. These spacing rods consist of rectangular rings 44, as best illustrated in Figure 3 being cast within the material 41 when the same is poured into the forms. These rings 44 are inserted into the form 22 from underneath by a special lifting rack 45 after the previous block has been discharged from the form.

We will now describe the operation of our block making machine. Block making material is delivered from the chute 34 into the hopper 33. When the hopper is full the same is pushed over the platform 31 by the action of the operating cylinder 46 through the lever 47. When the hopper is directly over the form 22 it will contact the electric switch 48 (referring to Figure 4) closing an electric circuit through the motors 49. The motors 49 drive the vibrator shafts 50 by way of the belts 51 at a high rate of speed.

The shafts 50 are journaled within bearings 52 secured to the frame members 25 of the form, as illustrated in Figures 3 and 4. The vibration created by these vibrator shafts settle the material

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in the compartments of the form 22. Referring to Figures 1 and 2 it will be noted that the pallet 36 is contacting the bottom of the form, the same is being held in this upper position by the solenoid latches 53 of the solenoids 54 engaging the under surface 55 of the platform 12, which holds the frame work 37 and the pallet 36 in raised position underneath the form 22.

When the material has been vibrated in the form, the hopper 33 is moved by the cylinder 46 in the opposite direction of the arrow to the position shown in Figure 1. The operator of the machine then operates the lever 56 which rotates the control shaft 57 which controls a hydraulic valve within the hydraulic pumping unit 58, causing the piston rod 10 to lower the cross head assembly 6 from the position illustrated in Figure 1, lowering the plungers 39 within the compartments 35 pushing downwardly against the material 41. Just as the feet 40 engage the top surface of the material within the form, the rollers 20 carried by the cross head frame assembly 6 will engage the lower end of the guide ways 19 of the brackets 18, which form part of the cross head assembly 13.

When this happens the frame work 16 of the cross head engages the plunger 59 of the electric switch 60 (Figure 3). This will close the electric circuit through the solenoids 54 (Figure 2) withdrawing the latches 53 from underneath the platform 12. At the same instant this happens, the core pin 61, forming part of the solenoid 62, will engage the holes 63 located in the brackets 18 (Figures 1 and 3). This will prevent the upper cross head 13 and the platform 12 from dropping down when the latches 53 of the solenoid 54 are released, therefore as the piston rod 10 lowers the plungers 39 down through the form, the movable pallet 36 will be permitted to be lowered simultaneously therewith (refer to Figures 5 and 6).

Just before the pallet 36 has been lowered to its full travel permitted by the piston rod 10, the platform 12 will engage the plunger 64 of the switch 65 energizing the solenoid 62, disengaging the core pin 61 from the hole 63 within the brackets 18. At this time the piston 10 will have travelled down its full distance together with the cross head assembly 6, but by releasing the locking pin 61 it will permit the cross head 13 to lower a slight distance further depositing the pallet 36 on the conveyor chains 66, at which time the platform 12 will engage the base or stop 67 stopping the downward movement of the said platform. By the slight extra movement of the platform 12 after the plungers 39 have been stopped in their downward travel, due to the full travel of the piston rod 10 and the cross head assembly 6, a clearance exists between the top of the finished block and the foot members 40 of the plungers 39, permitting the block to be carried away transversely of the form 22 and the machine by the conveyor chain 66.

We have just described the complete forming of a block and the discharging of the same from the forms. We will now describe the method of inserting the spacer rings 44 into the forms. A special rack assembly 45 supports the rings as best illustrated in Figure 1. The control lever 56 is operated so as to raise the cross head assembly 6 to the position shown in Figure 5, raising the plungers 39 to just clear the top of the form.

At this point the roller 20 carried by the cross

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head assembly 6 will be just engaging the upper end 58 of the guide ways 19 allowing the platform 12 to remain on the base 67. This provides an open clearance between the bottom of the form 22 and the top of the pallet supporting frame work 37, permitting the rack assembly 46 to be moved in the direction of the arrow, Figure 1, by the operating cylinder 80 which is pivoted to the frame 1 at 81. When the rack reaches a point directly under the form, the operating cylinder 82 will raise the rack assembly 45 by raising the inverted U-shaped frame assembly 70, together with the rack 45 up underneath the form 22 forcing the tie rings 44 up into the slots 71 of the partitions 72 within the form (Figures 1, 5 and 6).

When the rings are in place as illustrated in Figure 5, a locking bar or latch 73 engages the spacer bars 43 of the spacer rings 44 by way of the notches 74. The locking bar 73 is maintained against these spacer bars 43 by the action of the trigger lever 75, which is pivotally mounted within the form at 76 and to the locking bars 73 at 77, a spring 78 forcing the bar 73 against the spacers 43. After the spacer rings 44 have been shoved in place by the rack 45, the rack is lowered by the operating cylinder 82 and withdrawn sidewise in the opposite direction of the arrow by the operating cylinder 80.

The locking bars 73 and the trigger levers 75 operate between the partitions 72 of the mold, best illustrated in Figures 3, 5 and 6. These double walls form the cores of the double blocks being molded. The walls 72 encasing the above mentioned parts for supporting the spacer rings 44 while the block is being molded. The width of the locking bars 73 is sufficient to cover the slots 71, preventing the entry of concrete between the walls 72 of the cores.

We do not wish to be limited to any particular type of loading rack, as other methods may be employed to place the rings within the forms, but we have merely illustrated in generalities a method of placing the rings within the form. After the rack 45 has inserted the rings, as above described, within the form and completely withdrawn to the position illustrated in Figure 1, the cross head assembly 6 will continue to travel upwardly, the roller 20 engaging the upper end 68 of the brackets 18 will then raise the bottom cross head 12 to the position shown in Figures 1 and 2 after a pallet 36 has been placed upon the frame 37. When the piston 10 has reached the top of its stroke the lower cross head 12 will have been raised sufficiently so that the solenoid latches 53 will have engaged its under surface 55 holding the cross head 13 and the lower platform 12 in raised position, maintaining the pallet 36 under the form ready to fill the form with block material as above described.

When the form 22 has been filled with block making material and the plungers 39 have started downwardly and slightly before their feet 40 contact the block material within the form, the vertical cams 79, which are fixedly secured to the cross head 8, engage the trigger levers 75, best illustrated in Figure 5, pivoting the said lever about the pivot point 76 withdrawing the locking bars 73 from engagement with the spacer rings 44, as illustrated in Figure 8, permitting the downward movement of the block 42, the pallet and the framework 37 from the form 22 in the discharging of the block from the said form.

Although certain specific embodiments of the invention have been shown and described, it is

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obvious that many modifications thereof are possible. The invention, therefore is not to be restricted except in so far as is necessitated by the prior art and by the spirit of the appended claims.

What we claim is:

1. A block molding machine comprising a main frame, a mold open at its top and bottom and supported by said main frame in fixed relation, a sub-frame slidably mounted on said main frame for vertical movement above said mold, pushers carried by said sub-frame for expelling blocks from said mold, a pallet supporting frame slidably mounted relative to said main frame for vertical movement beneath said mold to removably position a pallet against the bottom of said mold, means for releasably securing said pallet frame in its upper position with a pallet against the bottom of said mold, means for lowering and raising said sub-frame, means operative upon selective lowering of said sub-frame for locking it with said pallet frame to be moved together with said pushers spaced the height of a molded block above a pallet carried by the pallet frame, means simultaneously operative by said sub-frame for releasing said pallet frame securing means to permit movement of said pallet frame with said sub-frame, means operative by said pallet frame as it is lowered to free a block from said mold to release said sub-frame locking means and permit the raising of said sub-frame relative to said pallet frame while a pallet and molded block are removed therefrom and a fresh pallet placed thereon, and means operative by the raising of said sub-frame for subsequently raising said pallet frame to its upper position.

2. A block molding machine comprising a main frame, a mold open at its top and bottom and supported by said main frame in fixed relation, a sub-frame slidably mounted on said main frame for vertical movement above said mold, pushers carried by said sub-frame for expelling blocks from said mold, a pallet supporting frame slidably suspended from said sub-frame for vertical movement beneath said mold to removably position a pallet against the bottom of said mold, means for releasably securing said pallet frame in its upper position with a pallet against the bottom of said mold, means for lowering and raising said sub-frame, means operative upon selective lowering of said sub-frame for locking it with said pallet frame to be moved together with said pushers spaced the height of a molded block above a pallet carried by the pallet frame, means simultaneously operative by said sub-frame for releasing said pallet frame securing means to permit movement of said pallet frame with said sub-frame, and means operative by said pallet frame when it is lowered to free a block from said mold to release said sub-frame locking means and permit the temporary raising of said sub-frame relative to said pallet frame while a pallet and molded block are removed therefrom and a fresh pallet placed thereon, and prior to the raising of said pallet frame to its upper position by said sub-frame.

3. A block molding machine comprising a main frame, a mold open at its top and bottom and supported by said main frame in fixed relation, conveyor means supported by said main frame below said mold, a sub-frame slidably mounted on said main frame for vertical movement above said mold, pushers carried by said sub-frame for expelling blocks from said mold, a pallet supporting frame slidably suspended from said sub-frame

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for vertical movement beneath said mold to removably position a pallet against the bottom of said mold and to deposit the pallet on said conveyor means, means for releasably securing said pallet frame in its upper position with a pallet against the bottom of said mold, means for lowering and raising said sub-frame, means operative upon selective lowering of said sub-frame for locking it with said pallet frame to be moved together with said pushers spaced the height of a molded block above a pallet carried by the pallet frame, means simultaneously operative by said sub-frame for releasing said pallet frame securing means to permit movement of said pallet frame with said sub-frame, and means operative by said pallet frame as it is lowered to free a block from said mold and deposit it on said conveyor to release said sub-frame locking means and permit the temporary raising of said sub-frame relative to said pallet frame while a pallet and molded block are removed therefrom by said conveyor and a fresh pallet placed thereon, and prior to the raising of said pallet frame by said sub-frame.

4. A block molding machine comprising a main frame, a mold open at its top and bottom and supported by said main frame in fixed relation, a sub-frame slidably mounted on said main frame for vertical movement above said mold, pushers carried by said sub-frame for expelling blocks from said mold, a pallet supporting frame slidably suspended from said sub-frame for vertical movement beneath said mold to removably position a pallet against the bottom of said mold, means for releasably securing said pallet frame in its upper position with a pallet against the bottom of said mold, means for lowering and raising said sub-frame, means operative upon selective lowering of said sub-frame for locking it with said pallet frame to be moved together with said pushers spaced the height of a molded block above a pallet carried by the pallet frame, means simultaneously operative by said sub-frame for releasing said pallet frame securing means to permit movement of said pallet frame with said sub-frame, means operative by said pallet frame as it is lowered to free a block from said mold to release said sub-frame locking means and permit the temporary raising of said sub-frame relative to said pallet frame while a pallet and molded block are removed therefrom and a fresh pallet placed thereon and prior to the raising of said pallet frame by said sub-frame, a reinforcing element support movably mounted on said main frame below said mold for feeding an element to said mold up through the bottom thereof while the pallet frame is lowered, means carried by said mold for releasably securing said element in said mold while said mold is filled with block forming material, and means carried by said sub-frame for releasing said mold supported securing means as said sub-frame is lowered to expel a block from said mold.

5. A block molding machine comprising a main frame, a mold open at its top and bottom and supported by said main frame in fixed relation, a sub-frame slidably mounted on said main frame for vertical movement above said mold, pushers carried by said sub-frame for expelling blocks from said mold, a pallet supporting frame slidably suspended from said sub-frame for vertical movement beneath said mold to removably position a pallet against the bottom of said mold, a magnetically operated latch mounted on said main frame for releasably securing said pallet

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frame in its upper position with a pallet against the bottom of said mold, a hydraulically operated piston supported by said main frame for lowering and raising said sub-frame, a magnetically operated latch carried by said sub-frame operative upon selective lowering of said sub-frame for locking it with said pallet frame to be moved together with said pushers spaced the height of a molded block above a pallet carried by the pallet frame, a switch controlling said pallet frame latch and carried by said pallet frame, simultaneously operative by said sub-frame for releasing said pallet frame latch to permit movement of said pallet frame with said sub-frame, and a switch controlling said sub-frame latch and mounted on said main frame and operative by said pallet frame as it is lowered to free a block from said mold to release said sub-frame latch and permit the temporary raising of said sub-frame relative to said pallet frame while a pallet and molded block are removed therefrom and a fresh pallet placed thereon and prior to the raising of said pallet frame by said sub-frame.

6. A block molding machine comprising a main frame, a mold open at its top and bottom and supported by said main frame in fixed relation, endless conveyor means supported by said main frame beneath said mold, a sub-frame slidably mounted on said main frame for vertical movement above said mold, pushers carried by said sub-frame for expelling blocks from said mold, a pallet supporting frame slidably suspended from said sub-frame for vertical movement beneath said mold to removably position a pallet against the bottom of said mold, a magnetically operated latch mounted on said main frame for releasably securing said pallet frame in its upper position with a pallet against the bottom of said mold, a hydraulically operated piston supported by said main frame for lowering and raising said sub-frame, a manually controlled valve for operating said piston, a magnetically operated latch carried by said sub-frame and operative upon selective lowering of said sub-frame for locking it with said pallet frame to be moved together with said pushers spaced the height of a molded block above a pallet carried by the pallet frame, a switch controlling said pallet frame latch and carried by said pallet frame and simultaneously operative by said sub-frame for releasing said pallet frame latch to permit movement of said pallet frame with said sub-frame, a switch controlling said sub-frame latch mounted on said main frame and operative by said pallet frame as it is lowered to free a block from said mold and deposit it on said conveyor means to release said sub-frame latch and permit the temporary raising of said sub-frame relative to said pallet frame while a pallet and molded block are removed therefrom by said conveyor and a fresh pallet placed thereon and prior to the raising of said pallet frame by said sub-frame, a block reinforcing element support removably mounted on said main frame below said mold for feeding an element to said mold up through the bottom thereof while the pallet frame is lowered, means carried by said mold for releasably securing said element in said mold while said mold is filled with block forming material, and means carried by said sub-frame for releasing said mold supported securing means as said sub-frame is lowered to expel a block from said mold.

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No references cited.