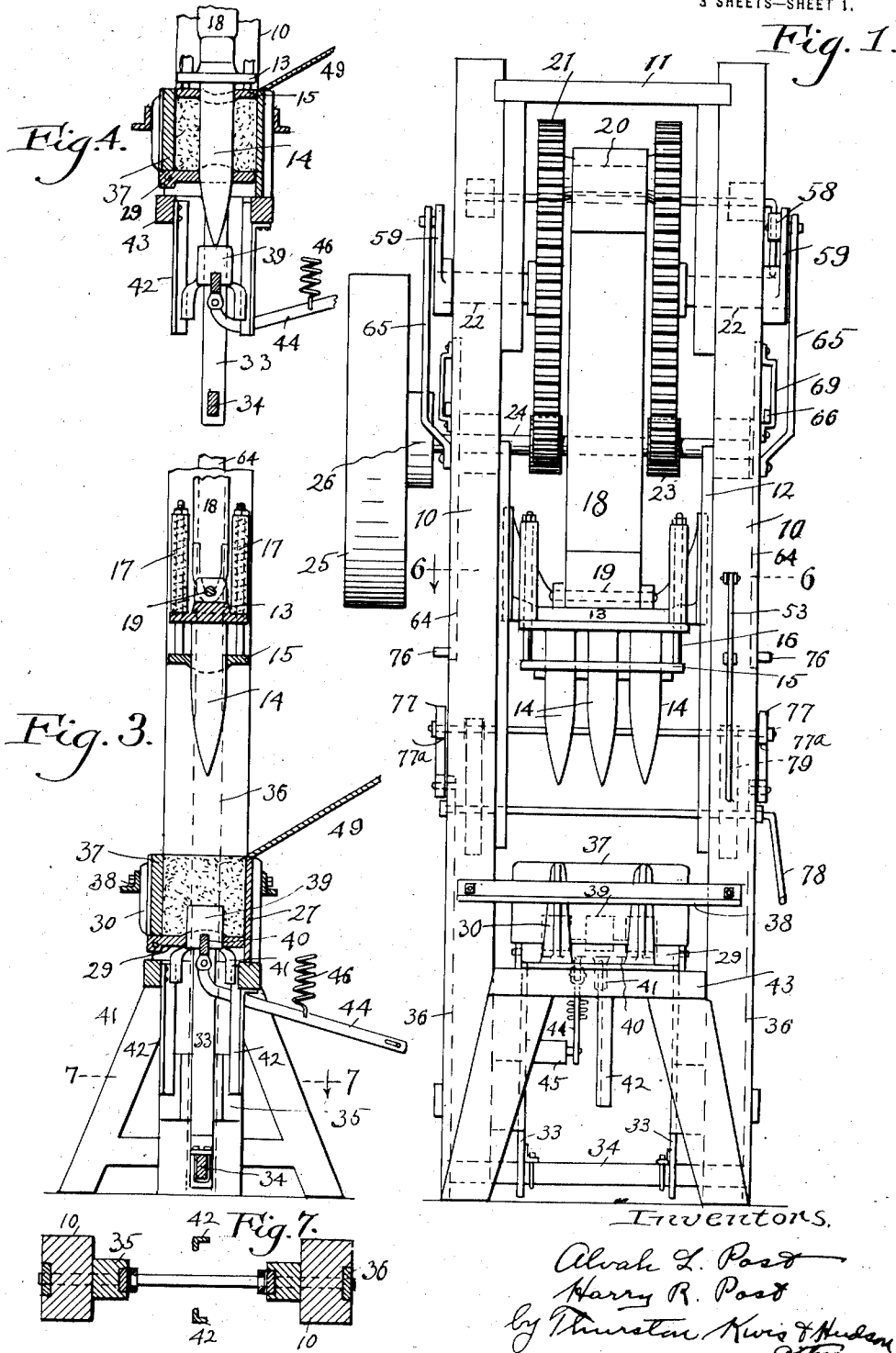


A. L. AND H. R. POST.
 CONCRETE BLOCK MOLDING MACHINE.
 APPLICATION FILED MAY 17, 1920.

1,396,779.

Patented Nov. 15, 1921.

3 SHEETS—SHEET 1.

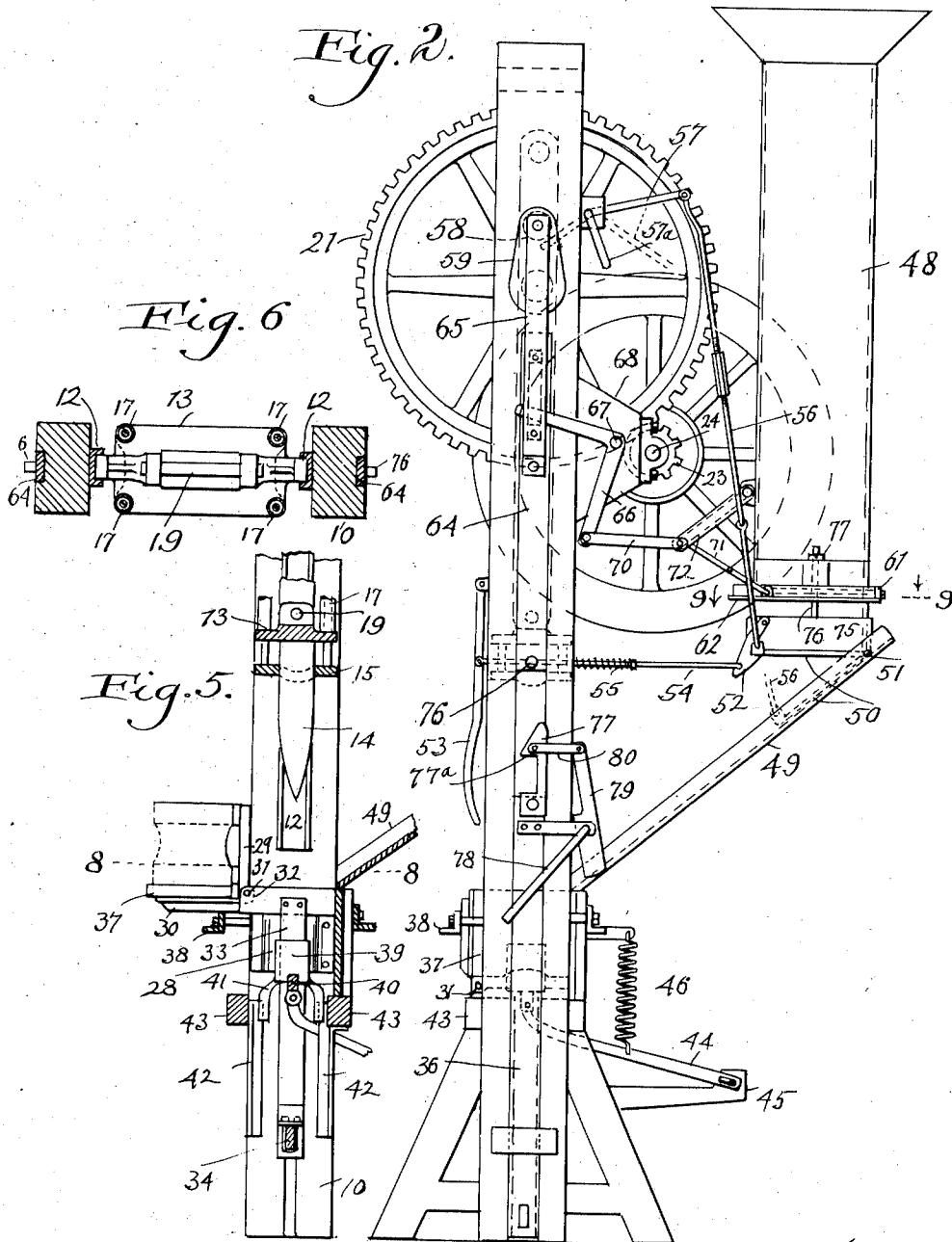


Inventors.
 Alvah L. Post
 Harry R. Post
 by Thurston K. Hudson
 atty.

A. L. AND H. R. POST.
 CONCRETE BLOCK MOLDING MACHINE.
 APPLICATION FILED MAY 17, 1920.

1,396,779.

Patented Nov. 15, 1921.
 3 SHEETS—SHEET 2.



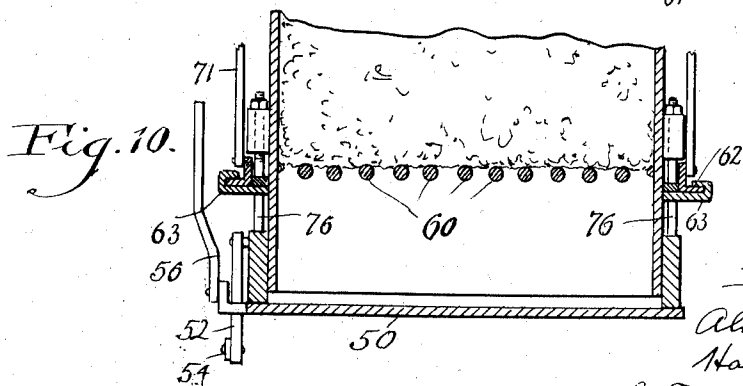
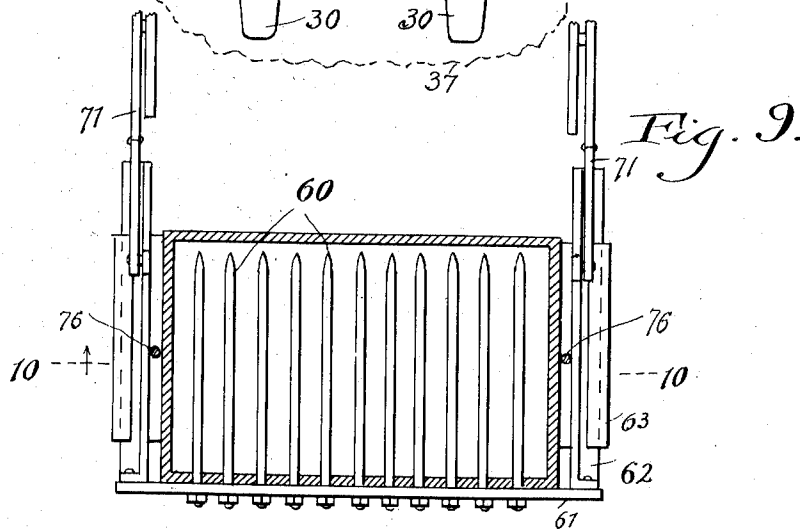
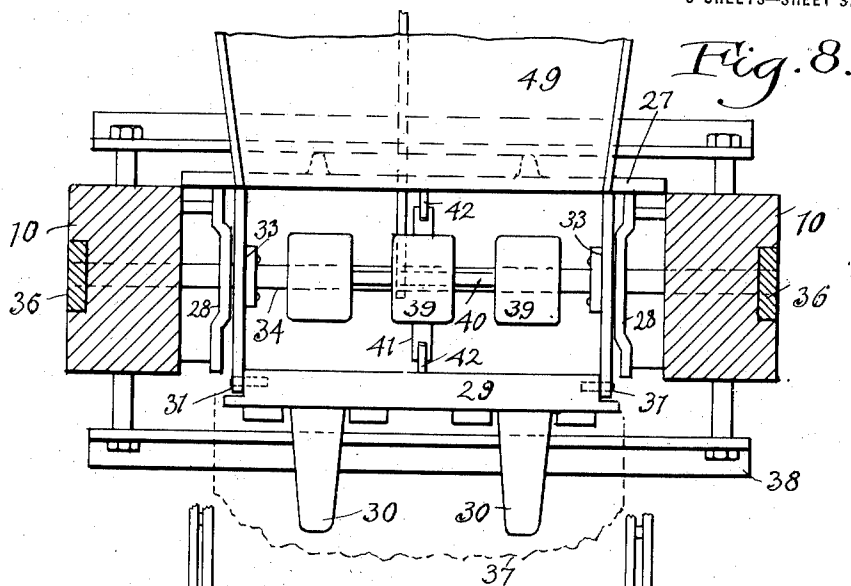
Inventors.
 Alphonse L. Post
 Harry R. Post
 by Thurston Knis & Hudson
 Attys.

A. L. AND H. R. POST.
 CONCRETE BLOCK MOLDING MACHINE.
 APPLICATION FILED MAY 17, 1920.

1,396,779.

Patented Nov. 15, 1921.

3 SHEETS—SHEET 3.



Inventors.
 Alvah L. Post
 Harry R. Post
 By Thurston Kwis & Hudson
 Attys.

UNITED STATES PATENT OFFICE.

ALVAH L. POST AND HARRY R. POST, OF KENT, OHIO.

CONCRETE-BLOCK-MOLDING MACHINE.

1,396,779.

Specification of Letters Patent.

Patented Nov. 15, 1921.

Application filed May 17, 1920. Serial No. 382,042.

To all whom it may concern:

Be it known that we, ALVAH L. POST and HARRY R. POST, citizens of the United States, and residents, respectively, of Kent, in the county of Portage and State of Ohio, and Kent, in the county of Portage and State of Ohio, have invented a certain new and useful Improvement in Concrete-Block-Molding Machines, of which the following is a full, clear, and exact description.

This invention relates to a machine for molding concrete blocks, and has for its object the provision of a machine by which blocks can be molded efficiently and rapidly. In other words, it is one of the chief objects of the invention to provide a machine by which blocks of a superior quality can be produced cheaply or economically.

The invention resides in numerous details of the machine including the arrangement of cores, part or a set of which normally project through the bottom of the mold box or flask, and a second set being carried by a plunger which is lowered to compress the material and serving to force the lower cores downward through the bottom of the flask during the stroke which brings about the actual molding or compressing action, the construction being such that pressure is applied to the material both internally and externally to compress or solidify it.

Additionally the invention relates to mechanism by which material is delivered from a suitable hopper to the mold box, and in the mechanism by which certain parts associated with the hopper including a door at the bottom thereof, and a cut-off gate above the door are operated. Still further the invention resides in mechanism by which the molded block is automatically elevated on the upward stroke of the plunger so that the block can be tilted forward on a removable pallet which forms a part of the mold box during the molding operation and can then be removed on the pallet.

The invention may be briefly summarized as consisting in certain novel details of construction and combinations and arrangements of parts which will be described in the specification and set forth in the appended claims.

In the accompanying sheets of drawings wherein we have shown an embodiment of the invention which operates with high ef-

ficiency. Figure 1 is a front view of the machine; Fig. 2 is a side view; Fig. 3 is a vertical sectional view of all but the top of the machine showing the flask filled with material, the parts being in the positions that they occupy just prior to the stroke of the upper plunger; Fig. 4 is a similar view of a portion of the machine at the completion of the downward stroke of the plunger; Fig. 5 is a similar view with the plunger in retracted position and the molded block and parts of the flask including the pallet elevated and swung forwardly on a horizontal pivot to a position such that the block can be removed on the pallet; Fig. 6 is a sectional view substantially along the line 6—6 of Fig. 1 looking in the direction indicated by the arrows; Fig. 7 is a sectional view substantially along the line 7—7 of Fig. 1; Fig. 8 is an enlarged horizontal sectional view substantially along the line 8—8 of Fig. 5 with the flask in the position shown in Fig. 5 and with the block and pallet removed; Fig. 9 is an enlarged sectional view substantially along the line 9—9 of Fig. 2; and Fig. 10 is a sectional view substantially along the line 10—10 of Fig. 9.

The machine constituting the subject matter of the present invention includes a stationary frame having two rather heavy upright parallel columns 10, 10, which are connected together by an upper cross-piece 11, and which constitute supports and form guides for the major part of the operating mechanism.

Movable vertically in guides 12 on the inner faces of the side members 10, 10 of the frame is a cross-head or plunger 13, from which project a series of vertically movable cores 14, in this case three in number, and tapered at their lower ends as shown. It is these cores which on the downward stroke of the plunger enter the material in the flask and actually mold the openings with which concrete blocks are usually provided and apply pressure internally of the material to compress the latter. Likewise these cores force downward certain cores which normally project through the bottom of the mold box. Beneath the cross-head and surrounding the cores 14 is a combined presser plate and stripper plate 15, which on the downward stroke of the plunger enters the top of the flask and compresses the material therein externally. This plate 15 is movable

relative to the cross-head, being connected thereto by four sliding bolts 16 which extend up through the corners of the cross-head into tubes 17 carried thereby, and containing springs which yieldingly resist the movement of the plate 15 toward the cross-head during the actual molding operation, and cause the separation of the plate and cross-head when the latter begins its upward stroke so as to serve as a stripper plate as the cores 14 are being withdrawn from the molded block.

The cross-head and parts carried by it are moved vertically by a connecting rod 18, pivotally connected to a cross-member 19 of the cross-head (see Fig. 6) and at its upper end being connected to a crank pin 20 extending between a pair of large gears 21 which are supported on shafts 22 journaled in the side frame members 10, which gears are driven in unison by a pair of pinions 23 on a driving shaft 24. This shaft may be driven in any desired manner, as for example, by means of a belt pulley 25 which may rotate continuously and is adapted to be clutched and unclutched to the shaft 24. In practice I employ a clutch, indicated but not shown in detail at 26, which clutch will be operated by a conveniently located lever, and is adapted when thrown in, to cause one complete revolution of the plunger and then to be automatically thrown out. Clutches of this character are well known in this and allied arts, and a detailed description of their construction is therefore not necessary.

The blocks are molded in a flask which is beneath the plunger and is supported in a stationary position between the side frame members 10 during the molding operation. This flask includes a stationary back member 27, a pair of stationary end members 28, a movable bottom member 29, which together with a pair of front arms 30 are pivoted at 31 to a pair of vertically movable cross-members 32, which are carried by a pair of vertical slides 33 connected together by a lower cross-member 34 which slides are guided for vertical movement in guides 35 (see Fig. 7) which are attached to the inner faces of the side frame members 10. The ends of the lower cross-member 34 extend through slots in the side frame members 10 and are connected to a pair of lower outer slides 36 which are guided in the outer portions of the side frame members 10. The function of these slides 36 will be explained shortly.

Above it was stated that the flask includes a stationary back 27, two stationary ends 28, 28, and a movable bottom 29 which is pivotally mounted and carries a pair of arms 30 at right angles thereto. The flask proper into which the material to form a block is dumped, is completed by what is generally termed a pallet 37, which is a removable

board adapted to be placed just inside the arms 30, and forms the front side of the box, as clearly illustrated in Fig. 3.

As will subsequently appear, on the upper stroke of the plunger following the block molding operation, the molded block, and certain parts of the flask including the bottom 29, arms 30 and pallet 37 are elevated with reference to the stationary part of the flask, and are then rotated or swung forwardly until the arms 30 rest on a stationary support 38 here shown in the form of a front cross angle so that the block can be lifted with the pallet and removed from the machine, after which a new pallet will be placed on the arms 30 and swung to upright position by swinging inward the pivoted parts of the flask, and then lowered into proper relationship with the stationary parts of the mold box.

The bottom 29 has openings coinciding in number and position with the upper cores 14 carried by the plunger, and when the flask is in normal position ready to receive the material there project through these openings lower cores 39 which are connected to a cross-piece 40 supported and guided for vertical movement by a pair of arms 41 movable vertically in a pair of angle shaped guides 42 which extend vertically downward at the lower central part of the machine from a pair of lower cross-members 43 which are fixed to and extend between the side frame members 10. To this cross-piece 40 is attached a lever 44 which extends rearwardly and at its rear end is connected to a support 45 and to this lever is attached a tension spring 46, the action of which is to normally hold the cores 39 in their upper position shown in Fig. 3, and which permits the cores to be depressed or moved downwardly through the bottom of the mold box when they are engaged by the downwardly-moving upper cores 14.

In accordance with the present invention, measured or predetermined quantities of material are delivered to the flask by mechanism which is wholly automatic except to the extent that the delivery of a charge of material necessary to fill the flask is timed by the operator by throwing a hand lever or equivalent device. In accordance with this part of my invention I provide a hopper 48, at a suitable elevation at the rear side of the machine, and into this hopper is deposited by a conveyer or otherwise, material containing the right ingredients properly mixed in condition to be molded into the blocks. The material is delivered from the lower end of this hopper to the flask by an inclined chute 49 which is supported in fixed position with reference to the lower end of the hopper and rear top edge of the flask as illustrated in Fig. 2.

Normally the lower end of the hopper is

closed by a hinged door 50, the rear edge of which is pivoted to the lower rear edge of the hopper on an axis 51. The door is normally held closed by a pivoted latch 52, and it is released so that a charge of material may fall from the bottom of the hopper and be delivered by the chute 49 into the flask by a manually movable device 53, in this case in the form of a hand lever supported on one of the side frame members 10 at the front of the machine, and connected by a link 54 to the lower part of the latch. When the operator pulls the lever 53 forwardly the latch is withdrawn from the door so that it may drop downward against the bottom of the inclined chute, and when the lever is released both it and the latch are restored to normal position by a spring 55.

The door 50 is closed automatically after a charge of material is delivered from the hopper to the chute 49, and to accomplish this the front of the door is connected by a link 56 to the rearwardly extending arm of a bell-crank 57 mounted in a block on the rear face of one of the side frame members 10 near the top of the machine. When the door is open a downwardly projecting arm 57^a of this bell-crank is swung from the full line position of Fig. 2 to the dotted line position which is adjacent a roller 58 (see particularly Fig. 1) carried by one of two cranks 59 which are provided just outside of along the side frame members 10 on the ends of the shafts 22 carrying the plunger operating gears 21. The relation of the roller 58 on this crank and the bell-crank arm 57^a is such that at the beginning of the down stroke of the plunger the roller swings the bell-crank in such a manner that the link 56 and door 50 are pulled upward until the door reaches closed position and is temporarily secured in that position by the latch 52.

In order that predetermined or measured amounts of material may be delivered through the bottom of the hopper 40^a I provide a short distance above the door a transversely moving cut-off or gate consisting in this case of a plurality of fingers 60, which pass through the rear wall of the hopper in a horizontal direction, and at their outer ends which are on the rear side of the hopper being connected to a cross-bar 61, to the ends of which are connected a pair of forwardly extending arms or slides 62 which are adapted to slide back and forth in guides 63 secured on opposite sides of the hopper.

The gate 60 is moved rearwardly so as to allow the material above it to drop down onto the closed door 50 of the hopper, and is then moved forwardly so as to form a barrier or support for the material above it and permit only the material beneath it to pass from the hopper down the chute into the flask when the door is open, and this is done automatically by the following mechanism:

On the outer faces of the side frame members 10 I provide a pair of slides 64 which are above the slides 36 already referred to, and these slides are moved up and down in their guide-ways by the two cranks 59 and by connecting rods 65 which connect the outer free ends of the cranks with the slides. The up and down vertical movement of these slides (or rather certain portions of the movement) is transmitted to the gate 60 through mechanism including a pair of bell-cranks 66 pivoted at 67 to blocks 68 on the rear faces of the side frame members 10, these bell-cranks having forwardly projecting arms which extend into loops or straps 69 carried by the slides 64. Downwardly projecting arms of these bell-cranks (see Fig. 2) are connected by links 70 and 71 to opposite sides of the arms 62 which actuate the gate 60, these links being supported from the front part of the hopper by suitable swinging hangers 72.

The operation of the machine so far described, is as follows: Assuming that the operator has restored the movable parts of the flask to normal or receiving position with the pallet along the front side thereof, as shown in Fig. 3, the operator will pull outward on the lever 53 so as to allow the bottom door 50 of the hopper to drop and permit the material previously between the gate and the door to slide down the chute into the flask. When the material slides into the flask the flask will be filled substantially as shown in Fig. 3, and the lower cores 39 will now extend upward into the material as shown in this figure. Then the operator pulls the lever, not shown, which starts the plunger operating mechanism in motion: whereupon the plunger is lowered and then elevated, and then the plunger operating mechanism is stopped with the plunger in its elevated position as illustrated in Figs. 1 and 2. As the plunger comes down, the upper cores enter the material and force the lower cores 39 through the bottom of the flask. The upper cores thus mold the openings in the block being molded and substantially uniform compression is obtained which would not be the case if the openings in the block were formed solely by the upper plungers without the assistance of the lower plungers which by projecting up through the bottom of the box displace part of the material where the openings are to be formed. Likewise it will be understood that pressure to solidify the material into block form is obtained not only internally by the downward movement of the cores but externally by the presser and stripper plate 15 which is of such a size that it will just enter the top of the flask and on the retraction of the plunger it prevents the upwardly moving cores 14 from pulling the sand upward.

At the beginning of the downward stroke

of the plunger the door 50 is first closed by the action of the roller 58 on the bell-crank arm 57^a of the bell-crank 57, and by the links 56 connecting the bell-crank to the door and then after a predetermined downward movement of the slides 64, during which time the door 50 has been closed the bell-cranks 56 and links 70 and 71 cause the rearwardly movement of the gate 60.

10 This allows the material in the hopper to drop down onto the closed door, and on the up stroke of the plunger the gate is pulled forwardly so as to divide the material which is to form the next charge from that which is now above the gate. It might be mentioned at this point that the amount or volume of the charge which is supplied to the flask can be varied if desired by reason of the fact that the lower part of the hopper, *i. e.*, that part carrying the door can be moved up or down on the lower part of the body portion of the hopper, the lower part thus movable being designated 75 in Fig. 2. This lower part of the hopper is connected onto the main portion by bolts 76 these bolts being provided at their upper ends with adjusting nuts 77.

On the downward and upward strokes of the plunger, not only is a block molded in the mold box, the door closed, and the gate operated as already described, but during the upward stroke of the plunger the block and parts of the flask including the bottom 29 and front pallet 37 are elevated so that the block and pivoted parts 29 and 30 and pallet 37 may be swung outward to the position shown in Fig. 5 as already described.

This automatic lifting of the molded block and parts of the mold box including the pallet is accomplished by the following mechanism: On the lower ends of the slide 64 laterally projecting pins 76 are provided and on the upper ends of the lower slides 36 pivoted catches 77 are provided directly beneath these pins, the catches being normally in the position shown in Fig. 2, so that on the downward stroke of the plunger the pins 76 will pass beneath the shoulders 77^a of the catches, and on the up stroke will engage these shoulders and elevate the slides 36 as well as the molded block and the movable parts of the flask. Therefore when the plunger operating mechanism comes to a stop with the plunger elevated, the molded block is elevated and the operator swings it outward to the position shown in Fig. 5 with the pallet 37 now underneath the molded block. It is then removed with the pallet, another pallet is placed on the arms 30, the movable parts of the flask then swung inward and are lowered so that the entire flask will be in position to receive the next charge, and this is done by a trip device connected to the catches 57, which device is operated by a hand lever 78 at one side of

the machine and provided with arms 79 connected by links 80 to the upper ends of the catches 77. The operator has simply to pull up on the hand lever to cause the catches to be swung clear of the pins 76, whereupon the parts drop to normal position, and when the lever is released the latches swing forward to their normal position.

Then the operation is repeated, the operator releasing the door, causing the next charge to be delivered to the flask and the plunger operating mechanism started to mold the next block.

It was previously stated that the upper cores force the lower cores 39 downward through the bottom of the mold box during the down stroke of the plunger and cores, and it will be understood that as the upper cores recede on the up stroke of the plungers, the lower cores 39 are brought up to normal position through the action of the spring 46. However, these lower cores do not engage the molded block on the receding of the upper cores because the block is lifted before such engagement can take place, so that the upward movement of the lower cores cannot injure the lower part of the molded block.

With this mechanism, largely automatic in character and controlled by the three levers 53, 78, and a lever not shown which controls the plunger operating clutch, blocks can be molded very rapidly and efficiently. Hence we are enabled to produce very good blocks at low cost.

Though we have illustrated simply the preferred construction, it is obvious that the machine may be modified in details, and we therefore do not wish to be confined to the details shown, but aim in our claims to cover all modifications which do not involve a departure from the spirit and scope of our invention as defined in the appended claims.

Having described our invention, we claim:

1. In a block molding machine, a frame, a flask adapted to receive material to be molded into block form, means for compressing material in the flask comprising a plunger, a plurality of tapered cores which are actuated by the plunger and on the compressing stroke thereof enter one side of the flask and pass through the material and through the opposite side of the flask so as to form openings in the block being molded and to compress the material internally thereof, and a stripper plate which during the compression stroke of the plunger enters one side of the flask and compresses the material externally.

2. In a block molding machine, a vertically disposed frame, a flask adapted to receive material to be molded into block form, and open at the top, means for compressing the material in the flask by pres-

sure exerted internally and externally, comprising a plunger movable along the frame and carrying a plurality of tapered cores, and a yieldable stripper plate, said tapered
 5 cores during the compression stroke of the plunger being forced through the material and through the bottom of the flask, thereby forming openings in the material and exerting pressure thereon internally, and
 10 the stripper plate during the compression stroke of the plunger entering the top of the flask and serving to exert downward pressure on the material externally thereof.

3. In a block molding machine, a flask adapted to receive material to be molded
 15 into block form, a plunger for compressing the material in the flask and provided with a core adapted to enter the material to mold an opening in the block, and a core normally
 20 projecting into the flask in line with the core of the plunger and movably supported so that it may recede from the flask during the compressing stroke of the plunger.

4. In a block molding machine, a frame, a flask adapted to receive material to be
 25 molded into block form, a plunger supported by the frame and movable toward and from the flask, said plunger being provided with a plurality of cores adapted to
 30 enter the material to mold openings therein, and a plurality of cores normally extending into the flask in line with the cores of the plunger, and movably supported so that they may be forced from the flask during
 35 the compressing stroke of the plunger.

5. In a block molding machine, a frame, a flask adapted to receive material to be
 40 molded into block form, a plunger supported by the frame and adapted to compress the material in the flask, said plunger carrying a plurality of cores adapted to enter the material to form openings in the block, and a set of cores normally projecting
 45 through the bottom of the flask and yieldingly supported so that they may recede from the flask when engaged by the plungers carried by the core.

6. In a block molding machine, a frame, a flask positioned at one part of the frame
 50 during the molding operation, a plunger movable lengthwise of the frame and having means which during the stroke of the plunger in one direction enters the flask to compress the material therein, and mechanism
 55 operating in predetermined relation with the plunger for shifting the molded block and a part of the flask lengthwise of the frame on the return stroke of the plunger following the compressing stroke,
 60 and means for operating the plunger and said shifting mechanism.

7. In a block molding machine, a frame, a flask positioned in the lower part of the
 65 frame during the molding operation, a plunger movable lengthwise of the frame

and having means which during the downward stroke of the plunger enters the flask to compress the material therein, and mechanism operating in predetermined relation
 70 with the plunger for lifting the molded block and a part of the flask on the upward stroke of the plunger following the downward compression stroke, and means for operating the plunger and said shifting
 75 mechanism.

8. In a block molding machine, a frame, a flask adapted to receive material to be
 80 molded into block form, cores normally projecting upwardly through the bottom of the flask, a plunger movable lengthwise of the frame for compressing the material in the flask and provided with opening forming
 85 cores, the first-named cores being movably mounted and adapted to be forced through the bottom of the flask during the compressing stroke of the plunger, and
 mechanism for lifting the molded block and a part of the flask on the return stroke of the plunger.

9. In a block molding machine, a frame, a flask adapted to receive material to be
 90 molded in block form, a compressor for compressing material in the flask, a receptacle adapted to receive material to be supplied to the flask, means for delivering material from
 95 the receptacle to the flask, said receptacle composed of two parts, one adjustable relative to the other, and means for permitting predetermined or measured amounts of material to pass from the receptacle to said delivery
 100 means and comprising a door at the lower part of the receptacle, and a cut-off device movable transversely of the receptacle above the door, said door and cut-off device being
 105 carried one by one of said parts of the receptacle and the other by the other of said parts whereby on the adjustment of said parts of the receptacle varying amounts of material will be supplied to the flask.

10. In a block molding machine, a frame, a flask adapted to receive material to be
 110 molded into block form, a compressor for compressing material in the flask, a receptacle adapted to receive material to be supplied to the flask, means for delivering material from the receptacle to the flask, said receptacle comprising a body portion and an
 115 adjustable bottom portion, the body portion having a cut off device and the adjustable bottom portion having a door whereby when the door and cut-off device are operated in
 120 sequence measured amounts of material are delivered to the flask.

11. In a block molding machine, a frame, a flask adapted to receive material to be
 125 molded into block form, a compressor for compressing material in the flask, a receptacle adapted to receive material to be supplied to the flask, means for delivering material from the receptacle to the flask, said
 130

- receptacle comprising a body portion and an adjustable bottom portion, the body portion having a cut-off device and the adjustable bottom portion having a door whereby
 5 when the door and cut-off device are operated in sequence measured amounts of material are delivered to the flask, and means for automatically actuating the door and cut-off device in predetermined relation with
 10 the movement of the compressor.
12. In a block molding machine, a frame, a flask adapted to receive material to be molded into block form, a compressor for compressing material in the flask, a receptacle adapted to receive material to be supplied to the flask, means for delivering material from the receptacle to the flask, said
 15 receptacle having at the bottom a hinged swinging door and above the door having a cut-off device, and means for automatically actuating the door and cut-off device in predetermined relation with the movement of
 20 the compressor.
13. In a block molding machine, a vertical frame, a flask near the bottom thereof for receiving material to be molded, a plunger movable vertically of the frame for compressing material in the flask, mechanism for operating the plunger, means by which a
 25 predetermined amount of material may be delivered from the receptacle to the flask comprising a door at the lower part of the receptacle, a cut-off device above the door, a slide movable lengthwise of the frame and
 30 operatively connected to the plunger operating mechanism, and mechanism for transmitting movement from said slide to the cut-off device.
14. In a block molding machine, a frame,
 40 a flask normally positioned at one part of the frame and adapted to receive material to be molded into block form, means comprising a plunger movable lengthwise of the frame for compressing material in the flask, a hopper adapted to receive material to be supplied to the flask, devices at the lower part of the hopper for causing predetermined or measured amounts of material to be supplied from the hopper to the flask, mechanism for shifting the
 50 molded block and a portion of the flask along the frame during a portion of the return stroke of the plunger following the compression stroke, means for operating the plunger, and mechanism operating in timed
 55 relation with the plunger for automatically shifting said devices and for operating the block and flask shifting mechanism during the cycle of movement of the plunger.
15. In a block molding machine, a vertical
 60 frame, a flask near the bottom of the frame, adapted to receive material to be molded into block form, a plunger movable lengthwise of the frame downwardly and then upwardly so as to compress the material in
 65 the flask, mechanism for operating the plunger, a hopper adapted to contain material to be supplied to the flask, a door at the bottom of the hopper, a cut-off device above the door movable transversely of the hopper to permit a predetermined amount of material to
 70 be delivered from the hopper when the door is opened, a slide movable lengthwise of the frame for elevating the molded block and a portion of the flask, and mechanisms operated by the plunger operating mechanism
 75 for shifting the door, for moving the cut-off device and for lifting said slide during each cycle of movement of the plunger.
- In testimony whereof, we hereunto affix
 80 our signatures.

ALVAH L. POST.
 HARRY R. POST.