Nov. 25, 1924. 1,517,128

W. ROBERTSON

CONCRETE BLOCK MAKING MACHINE

Filed June 20, 1922 3 Sheets-Sheet 1

Fig. 1.

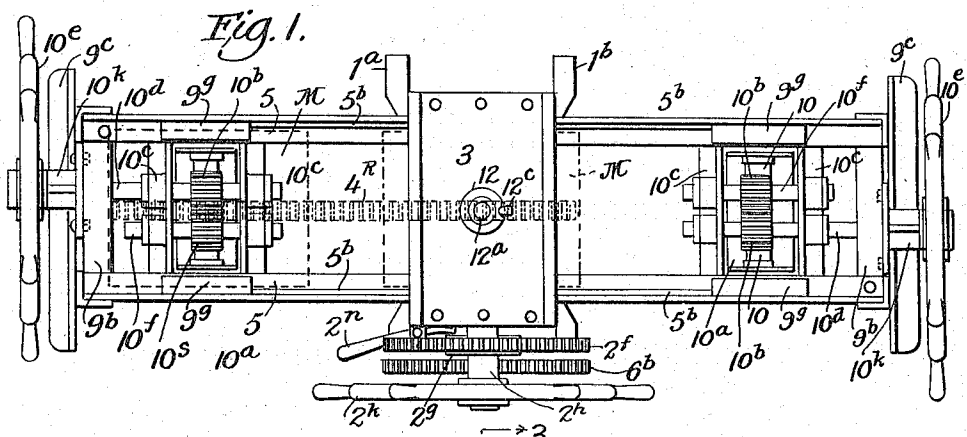


Fig. 2.

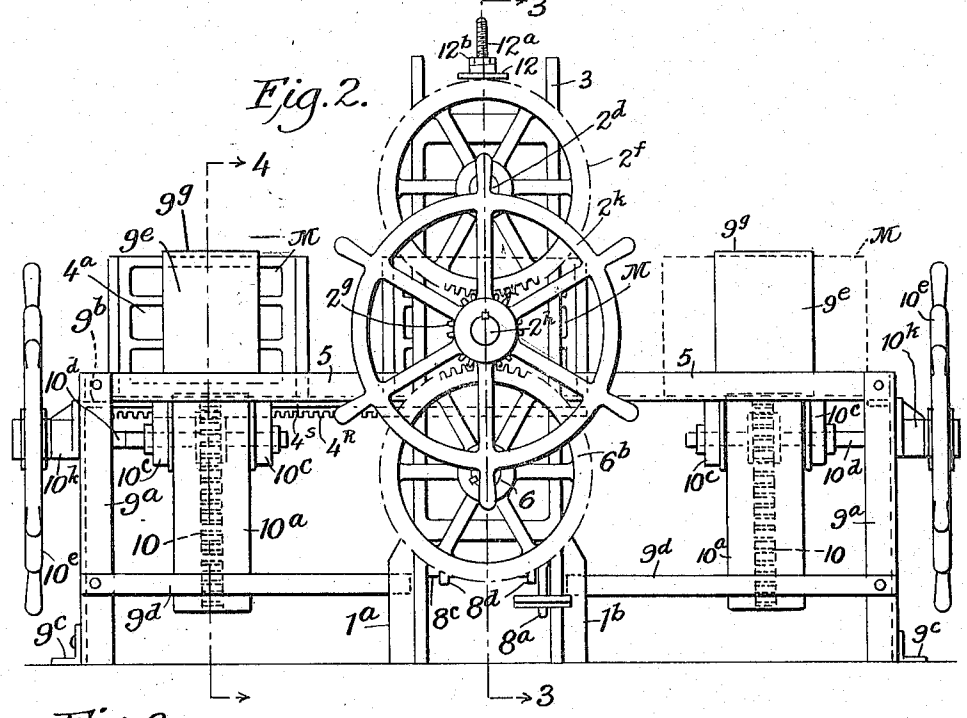


Fig. 8.

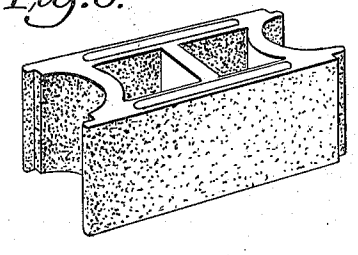
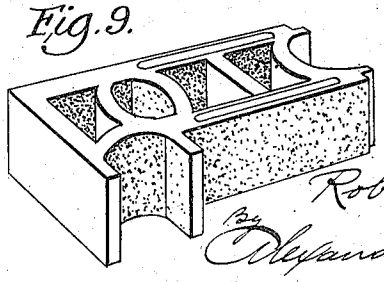


Fig. 9.



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Nov. 25, 1924. 1,517,128

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Filed June 20, 1922 3 Sheets-Sheet 2

Fig. 3.

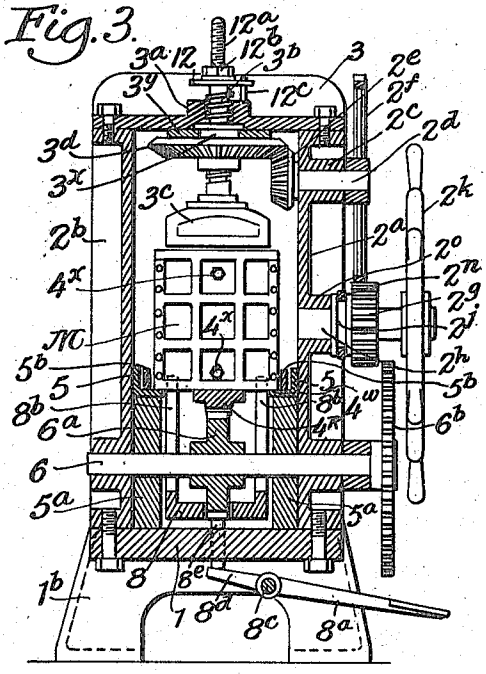


Fig. 4.

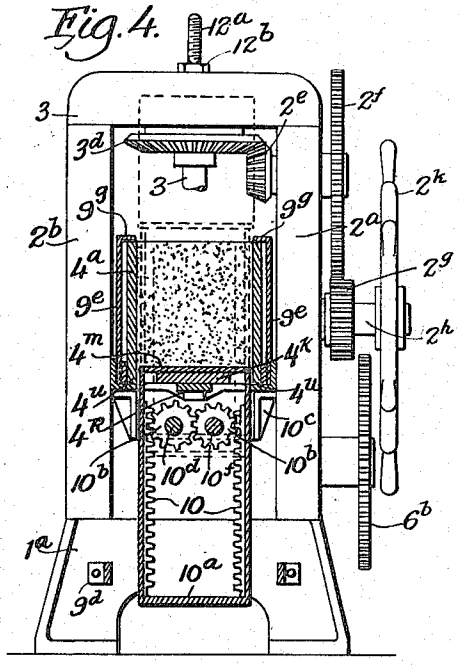


Fig. 5.

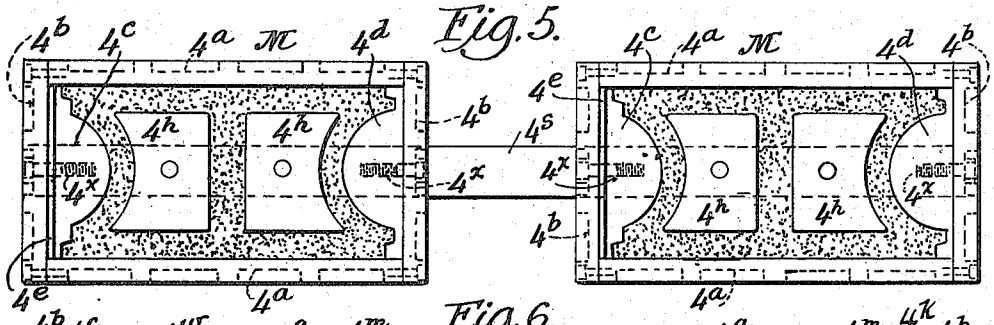


Fig. 6.

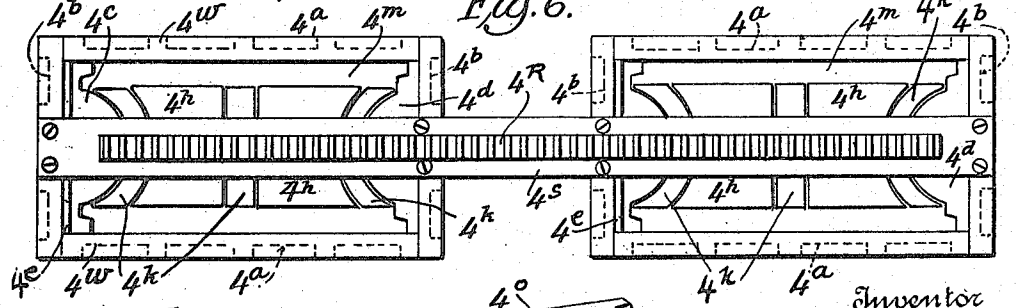
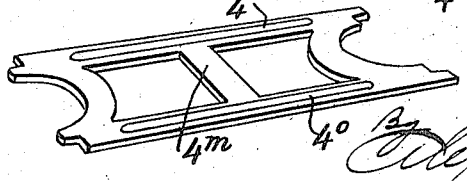


Fig. 7.



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Nov. 25, 1924. 1,517,128

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CONCRETE BLOCK MAKING MACHINE

Filed June 20, 1922 3 Sheets-Sheet 3

Fig. 10.

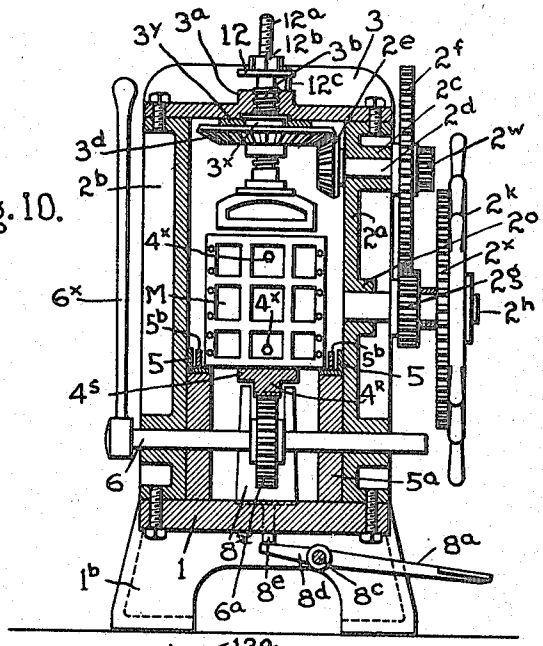
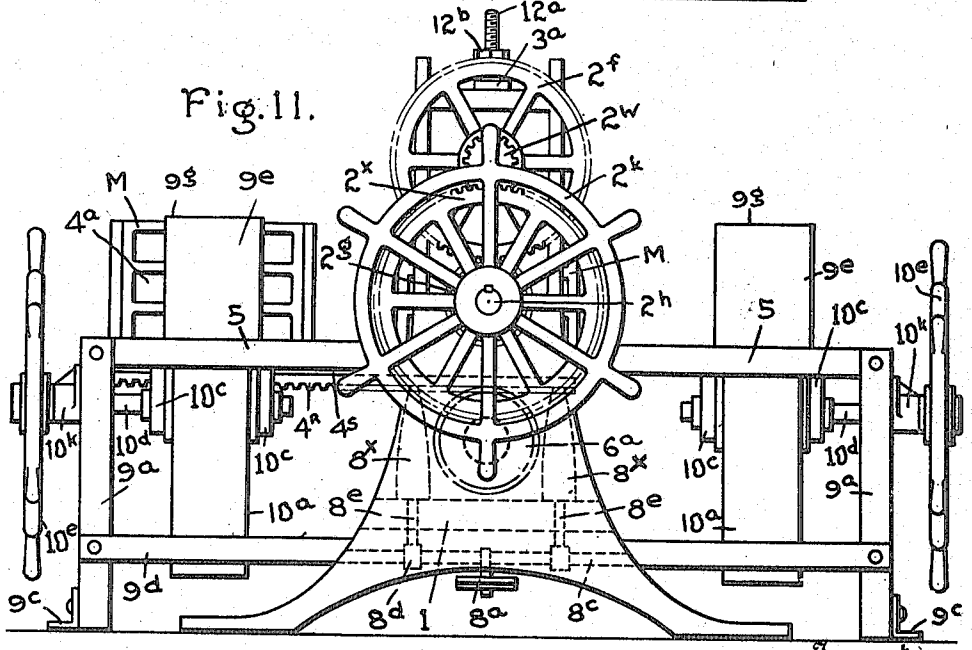


Fig. 11.



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Attorneys.

Patented Nov. 25, 1924. 1,517,128

UNITED STATES PATENT OFFICE.

WILLIAM ROBERTSON, OF LOS ANGELES, CALIFORNIA, ASSIGNOR OF ONE-THIRD TO HENRY C. SHIPPEE, OF LOS ANGELES, CALIFORNIA, AND ONE-THIRD TO JOSEPH H. COLLINS, OF SILVER LAKE, CALIFORNIA.

CONCRETE-BLOCK-MAKING MACHINE.

Application filed June 20, 1922. Serial No. 569,582.

To all whom it may concern:

Be it known that I, WILLIAM ROBERTSON, a subject of the King of Great Britain, residing at Los Angeles, in the county of Los Angeles and State of California, have invented certain new and useful Improvements in Concrete-Block-Making Machines; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form part of this specification.

This invention relates to machines for making concrete blocks suitable for use in building, and the object of the invention is to provide a novel and efficient machine which may be operated either by hand or power, and by which, block-molds when filled, can be quickly moved to pressing position, shaken, filled, pressed, and then moved from pressing position into position for ejecting the concrete block from the mold.

A further object is to provide novel means by which the wet concrete may be shaken in the mold just prior to compressing same, to insure that there will be no air pits or holes in the finished block.

Another object is to provide novel means for ejecting the block of concrete from the mold after the pressing operation.

Concrete blocks made with this machine will be uniform in density and size, free from air pits or holes, and may be rapidly turned out at a minimum of cost.

I will explain the invention with reference to the accompanying drawings which illustrate embodiments of the invention, and which will enable others skilled in the art to readily adapt and use the same, and set forth in the claims the essentials of the invention and novel combinations of parts, and novel features of construction for which protection is desired.

In said drawings:

Fig. 1 is a plan view of the press showing the two block ejectors.

Fig. 2 is a side elevation of the press shown in Fig. 1.

Fig. 3 is a section on the line 3—3 Fig. 2.

Fig. 4 is a section on the line 4—4 Fig. 2.

Fig. 5 is a plan view of the mold, showing end forms, cores, and rack in place.

Fig. 6 is a bottom view of Fig. 5.

Fig. 7 is a plan view of the mold pallet.

Fig. 8 is a perspective view of the ordinary block cast in my novel press.

Fig. 9 is a perspective view of the special corner block used in connection with the block shown in Fig. 8.

Fig. 10 is a modification of Fig. 3.

Fig. 11 is a view similar to Fig. 2, showing a modification thereof.

The frame of the machine comprises a base plate 1, legs 1^a and 1^b, side frames 2^a and 2^b, and a top plate 3, all of said members being preferably heavy castings securely bolted together, but may be cast in one piece.

As shown the base plate 1 is preferably square in shape, and to opposite end faces therefore are bolted the legs 1^a and 1^b, said legs being flanged outwardly in the usual manner at the lower edges to provide a substantial bearing surface and also to receive the holding-down bolts of the frame.

The side frames 2^a and 2^b are preferably bolted through the top of the base plate, between the legs 1^a and 1^b, said side frames being provided with a substantial flange around the outer edge of the frames for the purpose of receiving said bolts, and also to give additional strength thereto.

The top plate 3 is bolted to the top edges of the side frames 2^a and 2^b. In the centre of the top plate 3 is provided a screw housing 3^a which is tapped and adapted to engage the threads of a travel pressure screw 3^b, said screw extending vertically through the top 3, and having at its lower end a pressure pallet 3^c mounted thereon by a swivel joint in any other suitable manner. The lower portion of this pressure screw 3^b is provided with a key or other suitable means to permit the bevel gear 3^d to slide axially of the screw 3^b, but prevent the gear from rotating thereon; as shown in the drawings this bevel gear 3^d is disposed between the top of the pallet 3^c and the under side of the top plate 3, and is preferably supported under the top 3 for engagement with the bevel pinion 2^e, in the following manner. Bevel gear 3^d is provided with an

exteriorly flanged collar 3^x on its upper side, which collar fits in a corresponding recess in the under side of top 3, and engaging said flanged collar 3^x is a split plate 3^y extending around said collar and bolted to the under side of the top 3. This holds the gear 3^a in the vertical position, but allows the screw 3^c to travel up and down as the gear 3^d is rotated.

Mounted in suitable bearings 2^c on the side frame 2^a, just below the bevel gear 3^d is a shaft 2^d, which is provided with a bevel pinion 2^e on its inner end for engagement with the bevel gear 3^d. On the outer end of shaft 2^d is keyed a large gear 2^f meshing with a small gear 2^g, slidably mounted on a stud shaft 2^h attached to the side frame 2^a directly below the shaft 2^d. The hub of gear 2^g is provided with an exteriorly flanged collar 2^j at the inner side thereof, for engagement with the forked end of a gear shifting lever 2^n shown in Fig. 1, of the usual type, consisting of a lever 2^n pivoted to the side frame 2^a, and having a forked end adapted to engage the collar 2^j of gear 2^g whereby the gear 2^g may be either thrown into engagement with the gear 2^f to operate the compressing device, or may be thrown into engagement with the gear 6^b to slide the mold M under the ejecting device, hereinafter described.

At the outer side of gear 2^g is a collar to which is secured a hand wheel 2^k of any desired form for rotating the shaft 2^g. If desired, this hand wheel may be removed and a pulley (not shown) attached in its place, if it is desired to operate the device by power. As shown, when the hand wheel 2^k is turned in one direction, the small gear 2^g engaging the gear 2^f drives said gear, which in turn drives the small bevel pinion 2^e, which in turn, drives the bevel gear 3^d, thereby raising or lowering the pressure screw 3^b, carrying with it the pressure pallet 3^c. By the proper selection of gear ratios, a single man by exerting a moderate amount of pressure on the hand wheel 2^k may transmit a pressure up to about 20 tons on the concrete mold M.

In order to control the amount of compression applied to the blocks I provide a simple and efficient automatic gauge, comprising a flanged collar 12 adapted to be screwed onto a narrow threaded shank portion 12^a at the top of presser screw 3^b. This collar 12 may be set to a desired height, on the threaded shank portion 12^a, and then locked in position by means of lock nuts 12^b screwed down hard against the collar 12 in the well known manner. The screw 3^b may then be depressed until collar 12 comes in contact with a lug 12^c provided at the top of the screw housing 3^a under the collar 12 at which time screw 3^b will be prevented from further downward movement by the binding action of collar 12 rubbing against the lug 12^c. In this way successive blocks may be compressed to a uniform size and density, provided the adjustment of the gauge is not disturbed.

The molds M for the concrete blocks each consists of two side pieces 4^a and two end pieces 4^b, said pieces being preferably iron castings suitably reinforced on their outer faces in the usual manner with ribs, the inner faces thereof being smooth. The side and end pieces are preferably bolted together as shown in the drawings to form a rectangular mold, open at the top and bottom.

Within the mold M are attached by means of set screws, the male and female end forms 4^c and 4^d for the block, which forms are of any desired form and construction and may be secured to the ends 4^b of the mold M by means of set screws 4^x as indicated in the drawings. These end forms 4^c and 4^d are preferably made adjustable longitudinally within the mold M by means of said set screws 4^x to produce a longer or shorter concrete block, as desired. When the forms 4^c and 4^d are so moved inward, the space between the back of each form and the end 4^b of the mold, may be filled with iron filling plates 4^e provided therefor, said filling plates 4^e being dropped into position behind the male or female forms and held in place by tightening the set screws above mentioned. In making plain end blocks the male and female forms are left out.

Between the forms 4^c and 4^d are placed the cores 4^h of the mold, said cores being adapted to form the hollow portions in the concrete block. These cores are preferably iron castings, and are held in place in the mold M by means of small spacing plates 4^k placed in the bottom of the mold M, said cores resting on the rack bar 4^s.

The bottom of the mold consists of a metal pallet 4^m as shown in Fig. 7 which fits around the cores 4^h, and between the sides 4^a of the mold, and also between the male and female end forms 4^c and 4^d. Obviously pallets of various lengths must necessarily be supplied for various lengths of blocks. On the upper surface of the pallet near the outer edges thereof and extending nearly the full length of the pallet are ribs 4^o, said ribs being adapted to form grooves in the bottom of the block for engagement with corresponding tongues formed on the top of a similar block placed below, thereby forming a tongue and groove joint.

With a press having an ejector at either side of the press frame, I preferably connect the two molds M together as shown in Figs. 5 and 6, by a metal bar 4^s attached to the bottom of both molds, said molds being spaced apart between centres a distance equal to the distance between the centre of the pallet 3^c

and the centre of either of the ejectors. By this arrangement when one mold is under the press the other will be in position for engagement with an ejector device, the molds being thus attached and moving together.

Along the whole length of the under side of this bar 4^s is provided a rack 4^r adapted to engage a gear 6^a journaled in the presser frame for reciprocating the molds.

At the under side of each member 4^a of the mold, is provided a thin metal plate 4^w attached thereto in any desired manner, said plate serving as a rubbing plate for the mold, and being replaceable at any time, as it becomes worn, thereby insuring that the blocks will all be of uniform size.

The mold M is supported in the frame on two angle irons 5 securely riveted to the side frames 2^a and 2^b at either side thereof, and extending either side thereof, a distance equal to about one and one half times the length of the mold M. Where the angle irons 5 pass under the presser pallet 3^c the skids are further supported by blocks 5^a placed under the same, and securely fastened to the sides or base of the frame, to take the strain off the skids 5, when the mold M, placed thereon, is undergoing compression. Suitable guide strips 5^b may be placed in the bosom of the angle bars 5 to properly guide the molds M and to prevent binding.

The mold M is reciprocated on the skids 5 for loading, compressing and ejecting in the following manner: Extending through the side frames 2^a and 2^b of the press below the angle irons 5, and on the axis of the press, is a horizontally disposed shaft 6, housed in suitable bearings in the side frames, said shaft being disposed transversely to the skids 5, and on said shaft 6 between the side frames 2^a and 2^b at the centre thereof, is keyed thereto a gear 6^a of suitable diameter adapted to engage the rack 4^r on the under side of the molds M and reciprocate the mold back and forth as desired.

Shaft 6 is rotated by means of a gear 6^b keyed to said shaft outside the side frame 2^a, said gear 6^b being of sufficient diameter to engage the small gear 2^g slidably mounted on the handwheel or lever stud shaft 2^h when said gear 2^g is thrown into mesh with the gear 6^b by the gear shift lever 2^n, above mentioned.

In order that the wet concrete may be shaken in the molds M just prior to compressing and in order to eliminate air pockets from the finished block, and also to produce blocks of uniform density, a bumper device is provided. As shown in Fig. 3 the bumper 8 is shown as operated by a foot lever 8^a, but may, if desired, be operated by any other suitable means, such as compressed air or the like. Bumper 8 is placed as indicated in the drawings, directly under the presser pallet 3^c and mold M and below the mold M when the latter is in position for compression, and is cut or formed on the top thereof to fit around the gear 6^a and rack 4^r so that the projections 8^b when the bumper 8 is elevated come in direct contact with the pallet 4^m and the bottom of the mold M. Bumper lever 8^a is preferably attached to a shaft 8^c journaled in bearings in the base legs 1^a and 1^b, and likewise attached to the shaft 8^c are two projecting lugs 8^d, opposite the foot lever 8^a, the inner ends of the lugs 8^d engaging pin 8^e attached to the under side of the bumper 8, said bumper 8 normally resting on the base 1 between the side frames 2^a and 2^b. When the lever 8^a is depressed by the foot, bumper 8 is raised and the projections 8^b engaging the pallet 4^m and mold M slightly carrying with it the wet concrete when the lever 8^a is allowed to spring back, the pallet 4^m and mold M thereby drops and the wet concrete thereon is shaken up.

After compression the molds M are transferred to the ejecting device by sliding the mold, (by means of the rack 4^r engaging the pinion 6^a driven from the handwheel 2^k) out from under the presser pallet 3^c on the skids 5, until the mold comes under an ejector device at either side of the presser frame.

The skids 5, are supported at their outer ends by means of legs 9^a, said legs 9^a being tied together at the top thereof by a strap 9^b, and at the bottom of the legs by an angle-iron clip 9^c. The legs 9^a may be further tied to the base of the press by means of iron straps 9^d, below the level of the skids 5, to make the ejector table sufficiently strong and rigid.

Attached to the vertical legs of the angle irons 5, at about the centre of the ejector tables, are two plates 9^e which are flanged on their upper ends as at 9^g and are adapted to engage the top of the sides 4^a of the mold M as shown in Figs. 1, 2 and 4 and hold the same down when the mold is slid into position for ejection of the concrete block.

The ejector devices shown at opposite sides of the presser frame (Figs. 1, 2 and 4) each comprises a U-shaped ejector blade 10^a running in suitable guides fastened to the angle irons 5 and on the inner face of each leg of the ejector blade 10^a is provided a vertically disposed rack 10, said rack being securely fastened to the inside centre of a leg of the blade 10^a, and meshing with intermeshing pinions 10^b which serve to raise or lower the ejector blade 10^a, as desired. By providing the above mentioned guides for the ejector blade, in raising the concrete block from the mold the pressure is evenly applied on the bottom thereof, and vibration is eliminated, thereby preventing cracking of the wet block, or other damage thereto during the ejecting operation. The legs of the U-shaped blade 10^a are so spaced apart that the legs will, when raised, as shown in Fig.

4, enter the bottom of the mold M and engage the mold pallet 4^m between the cores 4^h and sides 4^a of the mold, and push the pallet out through the top of the mold M, raising the concrete block seated thereon, as shown in dotted lines in Fig. 4. Pinions 10^b are housed in suitable bearing box 10^c bolted to the under side of the angle irons 5. One pinion 10^b is mounted on a shaft 10^d, parallel with the angle irons 5, the inner end thereof being housed in the bearing box 10^c, and the outer end housed in a bearing 10^k bolted to the upper tie leg 9^b of the ejector table. Shaft 10^d extends slightly beyond the bearing 10^k and on the outer end thereof is keyed a handwheel 10^e for operating the pinions 10^b. Meshing with the pinion 10^b on the shaft 10^d is a second pinion 10^b of the same size as the former, and located on a shaft 10^f housed in bearings in the bearing box 10^c. Thus when the handwheel 10^e is rotated the intermeshing pinions 10^b are rotated, and the racks 10 meshing therewith, are raised or lowered carrying with them the U-shaped ejector blade 10^a.

In the device shown in Figs. 1 and 2 as the compressed block is being moved outward, in the mold, from under the pressure pallet 3^c to position for ejection, the other mold is automatically moved inwardly by the same power to position under pressure pallet 3^c, the two molds being attached together again after the block therein has been ejected and the mold refilled, and as the first mentioned mold is moved inwards and into position for pressing, the second mold is moved outward for ejection, thereby making a continuous process.

In order to increase the speed of reciprocating the moulds M to and from the presser pallet 3^c, and to facilitate the operation thereof, the modification shown in Fig. 10 may be used. Gear 6^b may be removed from the shaft 6 and a lever 6^x may be attached to the opposite end of shaft 6 in a normally vertical position, and in any desired manner. By swinging the lever 6^x approximately 90° in either direction shaft 6 will be rotated carrying with it gear 6^a, meshing with the rack 4^r on the under side of the moulds M, and the moulds will thereby be reciprocated accordingly.

As also shown in Fig. 10, in order to expedite the raising or lowering of the pallet 3^c, just prior to or after compression, a gear change ratio may be provided, which is particularly adapted for use with a hand operated machine. This gear change consists of a small gear 2^w (see Fig. 10) mounted on the shaft 2^d, outside the large gear 2^f. Also a gear 2^x, adapted to mesh with gear 2^w, may be mounted on a collar on the shaft 2^h, said gear 2^x being mounted on the outer end of said collar, as shown in Fig. 10. On the inner end of the collar is mounted the gear 2^g adapted to mesh with the gear 2^f on shaft 2^d. The collar is preferably splined on the shaft 2^h, and may be engaged with a suitable gear shifting device (not shown) to throw into mesh, either the gears 2^g, 2^f or the gears 2^w, 2^x, said pairs of gears having approximately reciprocal gear ratios. By this arrangement, during compressing the gear shift will be thrown to bring the gears 2^f and 2^g into mesh, the ratio of said gears being such that a high angular velocity of the handwheel 2^k produces a small angular velocity of the shaft 2^d. But after compression, it being desirable to raise the pallet quickly, the gear shift is operated to throw the gears 2^f, 2^g out of mesh, and the gears 2^w, 2^x into mesh, and the ratio of the gears 2^w, 2^x being approximately the reciprocal of the gears 2^f, 2^g, a correspondingly small angular velocity of the handwheel 2^k produces a high angular velocity of the shaft 2^d, thereby raising or lowering the pallet quickly.

It may be desirable to use a bumper arranged as indicated in Figs. 10 and 11 comprising a small bumper block 8^x may be placed one on either side of the gear 6^a instead of using the single block 8 as shown in Fig. 3, cut to receive the gear 6^a. In this case the same arrangement of shafts and levers may be used to raise and lower the blocks 8, but as shown in Fig. 10, the blocks 8^x may be adapted to engage the outer edges of the rack bar 4^s straddling the rack 4^r, this would result in the saving of considerable weight and material in the blocks 8, but giving the same results.

If desired, the frame of the machine may be cast in a single piece as indicated in Fig. 11. The frame thus cast will still have sufficient strength to withstand the compression strain, and the arrangement of parts will be substantially the same as that shown in Fig. 2, with, or without modifications above referred to.

In construction work as the joints between the blocks of one layer should not be directly in alignment with the joints between blocks of adjacent layers, it is evident that all blocks should not be of the same length. We have provided means for making blocks of different lengths, made in the same mold by inserting filling plates behind the end forms. These end forms may be of any desired design but should be always of male and female character so that the joint will not be smooth faced but irregular to give firmness thereto. The finished block as shown in Fig. 8 is also tongued and grooved at top or bottom which not only adds to strength of building by eliminating all side movement but also acts to prevent water seeping through the walls between horizontal joints.

The finished corner blocks as shown in Fig. 9 are of special design, this block re-

quiring a separate mold for forming to take care of the L at one end thereof. My machine however accommodates either mold by simply removing the one and replacing the other, requiring but a moment to make the change.

One of the outstanding features of my concrete block making machine is its adaptability to a "multiple unit" system. Any number of units as shown in Figs. 1 and 2 may be placed side by side and operated through a convenient system of belts and pulleys, and by a suitable source of power, in place of using hand power; also the bumper device for shaking the concrete in the molds may, if desired, be operated by compressed air or the like.

In large operations of this kind, an endless conveyor could be used for carrying the finished blocks, while still wet on the pallet 4^m, to the storing point, said blocks being automatically placed on the endless conveyor.

What I claim is:

1. In a concrete block making machine, the combination of a frame; a mold support therein; a mold adapted to be placed thereon; a presser head; a rack on said mold for moving same into compression position beneath the head or into position for discharge of the block; a screw for operating the presser head, a gear for operating said screw; a stud mounted on said frame; a driving collar slidably and rotatably mounted on said stud; a gear on said collar; intermediate shafting and gearing between the gear on the collar and the screw operating gear; a shaft mounted in the frame; a gear on said shaft meshing with said rack; a second gear on said shaft adapted to be meshed with the gear on said collar; and means for shifting the collar to cause its gear to operate the presser head, or to actuate the mold, substantially as described.

2. In combination with a concrete block making machine as set forth in claim 1, means below the presser head extending upwardly within the mold for jarring the concrete in the mold prior to compression, substantially as described.

3. In combination with a concrete block making machine as set forth in claim 1; said mold having an open bottom; a removable pallet adapted to form the bottom of the mold; means for jarring the concrete in the mold prior to compression, comprising a vertically movable block engaging the bottom side of the pallet; and means for reciprocating the block, substantially as described.

4. In combination with a concrete block making machine as set forth in claim 1. said mold having an open bottom; a pallet corresponding in shape to the contour of the base of the block removably placed in the mold; ejecting means disposed below the discharge position of the mold comprising rack bars adapted to enter within the bottom of the mold and engage the pallet and lift same with the block thereon from the mold; means for simultaneously operating the rack bars; and means for holding down the mold while the block is being ejected therefrom.

5. In a concrete block machine the combination of a frame; horizontal bars in the frame for supporting a mold and extending beyond the frame; a mold slidable on said bars; a presser head above the bars; a rack for moving the mold on said bars into position beneath the presser head or into discharge position; a block ejecting means below the bars at the discharge position of the mold; a screw for operating the presser head; a gear for operating said screw; a stud mounted on the side of said frame; a driving collar slidably mounted on said stud; a gear on said collar; intermediate shafting and gearing between said gear on the collar and said screw operating gear; a shaft mounted in the frame, a gear on said shaft meshing with said rack, a second gear on said shaft adapted to be engaged by the gear on said collar; means for shifting the collar to cause its gear to operate the presser head or actuate the mold; and means for limiting the compressive movement of the head, substantially as described.

6. In combination with a concrete block machine as set forth in claim 5, said mold having an open bottom; a removable pallet adapted to form the bottom of the mold; and means for vertically reciprocating the pallet for jarring the concrete with n the mold prior to compression, substantially as described.

7. In combination with a concrete block machine as set forth in claim 5, said mold having an open bottom; a pallet in the mold correspond ng in contour with the base of the block; and said ejecting means comprising a U-shaped member having a rack on each leg thereof, said legs being adapted to enter within the bottom of the mold and engage the pallet and lift same with the block thereon from the mold; and means for simultaneously operating the racks, substantially as described.

8. In a concrete block machine, the combination of a mold having an open bottom; a removable pallet in the bottom of said mold; means for compressing the material in the mold; means for moving the mold to and from the compressing means; and means for jarring the material within the mold when in compress on position prior to the compression, said means comprising a vertically movable member adapted to engage the under side of the pallet in the mold.

9. In a concrete block machine, the combi-

nation of a frame; a mold support therein, a mold on said support having an open bottom; a removable pallet in the bottom of said mold; means in the frame for compressing the material in the mold; means for moving the mold from or under the compressing means; and means for jarring the material in the mold when in compression position and prior to compression; said means for jarring the material in the mold comprising vertically movable blocks adapted to engage the under side of the pallet in the mold; and pedal means for vertically reciprocating said blocks.

10. In a concrete block machine, the combination of a frame; mold supporting rails thereon; a mold slidable on said rails; a presser head; means for operating said presser head; means for moving the mold on the rails into position beneath the presser head or into ejecting position; a pallet adapted to be placed in the mold before the pressing operation; means at the ejecting position for lifting the block from the mold; said ejecting means comprising a U-shaped member vertically movable and disposed below the mold supporting rails, a rack on each leg of said member, pinions meshing together and with said racks respectively, means for simultaneously operating said pinions to cause the legs of said member to rise and enter within the bottom of the mold, and lift same with the block thereon from the mold; and members adapted to engage the mold and hold same down while the block is being ejected from the mold, substantially as described.

11. A mold for concrete blocks, comprising a hollow frame; a bar disposed longitudinally on the bottom of the frame; end forms detachably secured in the frame; core members in the frame resting on the bar between the end forms; means for spacing said cores; and a removable pallet in the bottom of the mold adapted to be lifted with the compressed block thereon from the mold.

12. A mold for concrete blocks, comprising a hollow frame, a bar disposed longitudinally on the bottom of the frame; end forms detachably secured in the frame; core members in the frame resting on the bar between the end forms; means for spacing said cores; a removable pallet in the bottom of the mold comprising a sheet metal plate conforming in shape to the contour of the mold, and having openings therein adapted to accommodate the core members, and longitudinal ribs adjacent the sides thereof adapted to form grooves in the bottom of the molded block; said pallet being adapted to be lifted with the compressed block thereon from the mold.

13. A mold for concrete blocks comprising a hollow frame; a longitudinally disposed bar across the bottom of the frame; end forms detachably secured in the frame; core members in the frame resting on the bar between the end forming members; removable filler plates between the end forms and the ends of the mold; spacing plates interposed between the cores and between the end forms and the cores, and a removable pallet resting on the spacing plates in the bottom of the mold, adapted to be lifted with the compressed block thereon from the mold.

14. In combination with a concrete mold as set forth in claim 13, said removable pallet comprising a sheet metal plate conforming in shape to the contour of the mold, and having openings therein adapted to fit around the core members, and ribs on said pallet extending longitudinally thereof adjacent the sides thereof and adapted to form grooves in the bottom of the molded block.

In testimony that I claim the foregoing as my own, I affix my signature.

WILLIAM ROBERTSON.