No. 789,129. PATENTED MAY 2, 1905.

E. W. RIDER.

BRICK MACHINE.

APPLICATION FILED DEC. 11, 1902. RENEWED OCT. 7, 1904.

2 SHEETS—SHEET 1.

Fig. 1.

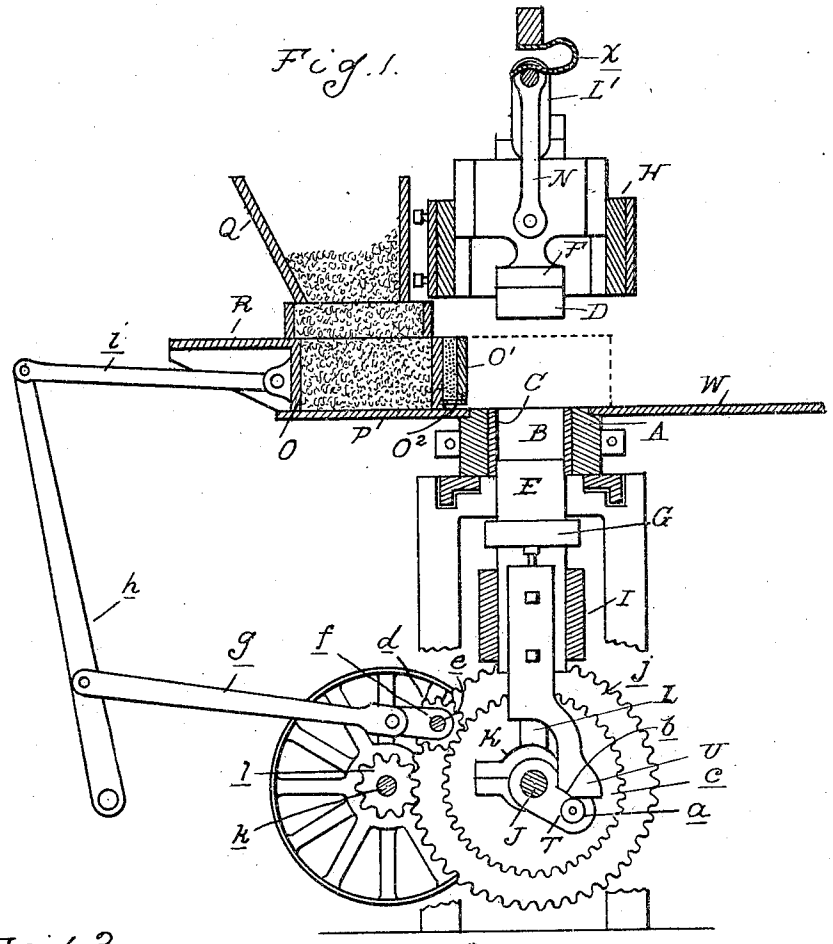


Fig. 2.

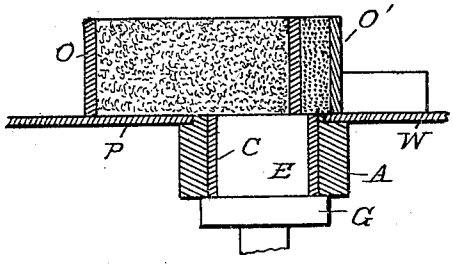
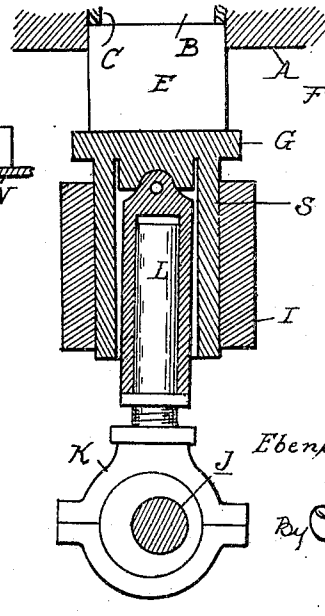
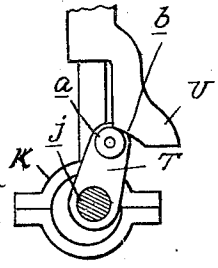


Fig. 3.





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2 SHEETS—SHEET 2.

Fig. 3.

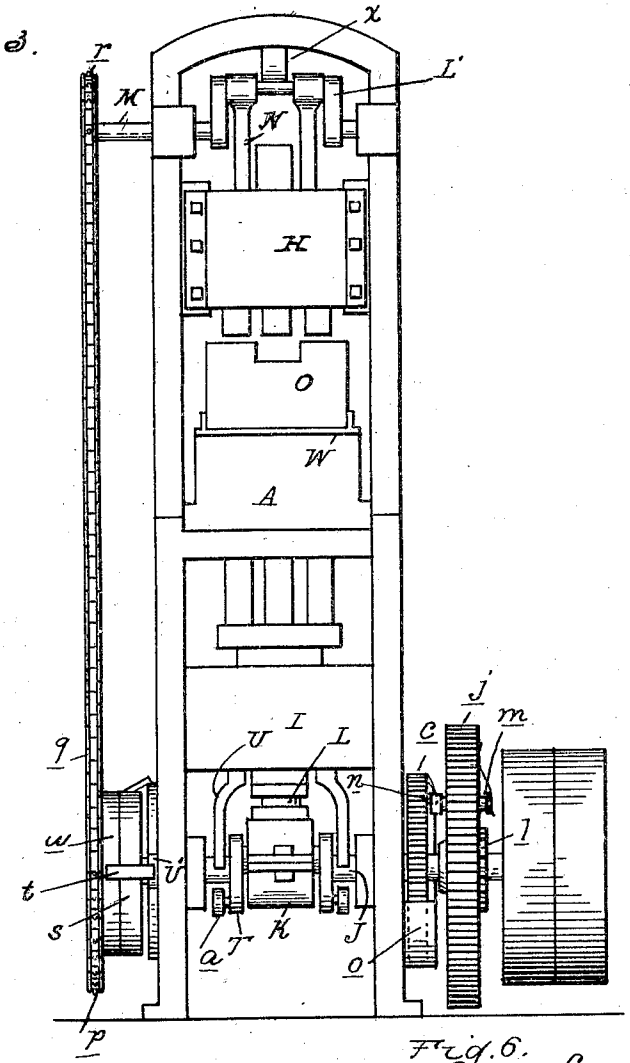


Fig. 5.

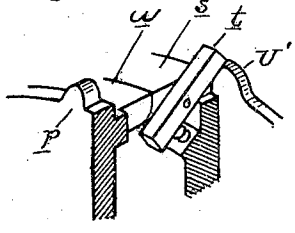
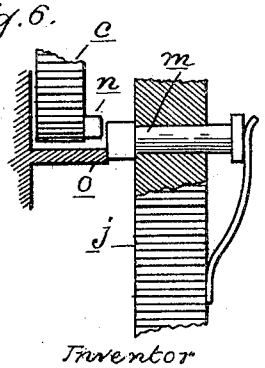


Fig. 6.



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No. 789,129. Patented May 2, 1905.

UNITED STATES PATENT OFFICE.

EBENEZER W. RIDER, OF DETROIT, MICHIGAN.

BRICK-MACHINE.

SPECIFICATION forming part of Letters Patent No. 789,129, dated May 2, 1905.

Application filed December 11, 1902. Renewed October 7, 1904. Serial No. 227,604.

To all whom it may concern:

Be it known that I, EBENEZER W. RIDER, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Brick-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates to machines for the manufacture of bricks or building-blocks, being more specially designed for use in forming bricks from a mixture of sand and cement. Where the above-mentioned material is used, it is necessary that the brick or block be subjected to considerable pressure when in the mold in order that the material may be thoroughly compacted. It is further necessary that the molded bricks or blocks be carefully handled in withdrawing them from the molds, so as not to destroy their shape.

The invention consists in the peculiar construction of a machine, a recessed bed, and oppositely-moving compressing-plungers, whereby the material forming the bricks or blocks may be first introduced into a recess in the bed, then pressed, and subsequently pushed out from the mold.

The invention further consists in the means employed for removing the formed bricks and for refilling the recess with a fresh charge of material; further, in the construction whereby bricks or blocks may be formed having a facing of different material from that forming the body.

Still further, the invention consists in the peculiar construction, arrangement, and combination of parts, as hereinafter described and claimed.

In the drawings, Figure 1 is a vertical longitudinal section through the machine. Fig. 2 is an enlarged vertical central section through a portion of the machine shown in Fig. 1. Fig. 3 is a front elevation of the machine. Figs. 4 and 5 are perspective views of details designated by letters of reference. Fig. 6 is a detail view.

The machine comprises a bed A, mounted upon suitable supporting-standards and recessed at B to form the molds for the bricks or blocks. These recesses are preferably lined with removable plates C, formed of hardened metal, as illustrated in Fig. 1.

D and E are two plungers respectively arranged above and below the bed and adapted to fit within the recesses B. In the construction shown there are two separate recesses or molds in the bed and a corresponding number of plungers D and E secured to common heads F and G. These heads are vertically slidingly secured in bearings H and I upon the frame of the machine. The cross-head G is adapted to be reciprocated by a connection with a shaft J, extending transversely of the frame of the machine and arranged beneath said cross-head. Upon this shaft is an eccentric or cam K, which engages with a rod L, having a pivotal bearing on the under side of the cross-head. The movement imparted to the cross-head by this connection is only sufficient to exert the final compression which takes place when the plungers D have been previously lowered in the recesses in the bed for effecting the initial compression. This lowering movement of the plungers D is effected through the medium of a crank L′ upon a shaft M, journaled in the upper part of the frame and connected by one or more rods N with the cross-head. The throw of the crank is sufficient so that when turned to its lower dead-center the plungers D will have been moved downward into the recesses B and partially compress the material therein. On the other hand, when the crank is turned to its upper dead-center the plungers D will be completely withdrawn from the recesses B and raised sufficiently above the bed to permit of the extraction of the bricks or blocks from the mold. Sufficient clearance is also provided for the movement of the carrier-box which contains the mixed material from which the bricks are formed. This reciprocating carrier O is in the form of a bottomless box, which is supported upon a rearwardly-extending portion P of the bed and is arranged beneath a hopper Q, into which the mixed material is

first placed. In the reciprocation of the carrier O it is moved forward sufficiently to register with the recesses in the bed and to permit the material which it contains to drop into said recesses and fill the same. During this forward movement the material in the hopper is prevented from dropping out by reason of a cut-off plate R, extending rearwardly from the carrier O.

With the construction as thus far described it will be understood that by imparting suitable timed movements to the carrier O and plungers D and E the plastic material may first be filled into the recesses B in the bed and subsequently compressed therein, first by the downward movement of the plunger D and finally by the upward movement of the plunger E. During this upward movement of the lower plunger the upper plunger will form a rigid abutment by reason of the fact that the crank L′ is upon its dead center. After the completion of these operations it is necessary to extract the compressed bricks and to remove them prior to the refilling of the molds and the repetition of the operation of compression. The extraction of the bricks is accomplished by an upward movement of the plunger E above the position which it assumes in pressing the bricks. For causing this movement the rod L is provided with a telescoping or sliding extensible connection with the cross-head G. This is formed by a cup or cylinder S, surrounding the rod L and pivotally engaging the cross-head, said cylinder also forming a dash-pot for a purpose to be hereinafter described. Adjacent to and preferably on opposite sides of the eccentric K are cranks or cams T, also secured upon the shaft J and adapted at one point in the rotation thereof to engage with downwardly-projecting bearings U on the cross-head G. In the further movement of the shaft these cranks T will raise the cross-head until the upper face of the plungers E reaches the plane of the top of the bed. At this point in the movement the cranks T, which are preferably provided with antifriction-rolls *a*, engaging with the downwardly-projecting bearing U, will pass into engagement with a portion *b* of said bearing which is segmental and arranged concentric with the axis of the shaft. The effect of this construction is to cause the plungers E to remain stationary for a short interval and in a position where their upper faces form complementary portions of the top of the bed. During this interval the carrier O is reciprocated, with the result that the compressed bricks which have been raised by the plunger G will be slid on top of said plungers and on the bed until they clear the recesses B. It is then necessary that the plungers E be quickly withdrawn or lowered to permit the material in the carrier to fill the recesses before the return movement of said carrier. This is accomplished by permitting the rollers *a* to abruptly disengage from the segmental bearing *b*, so as to withdraw the support from the cross-head G and to permit the latter to fall by gravity. To prevent the jar which would be occasioned by the striking of the cross-head upon the rod L, the cup or cylinder S is arranged to form a dash-pot, as above stated, in which the air is compressed during the downward movement of the cross-head. Thus the force of the fall will be cushioned, while the escape of air from the cup S will permit the plungers to assume their original position. The cylinder S being pivoted, as above described, it is always free to arrange its axis in coincidence with the axis of the rod L, and thus prevent any binding between said cylinder and rod.

The plungers D and E and the carrier O have a properly-timed movement imparted thereto, preferably through mechanism of the following construction: Upon the shaft J is loosely sleeved the gear-wheel *c*, which meshes with a pinion *d* upon the shaft *e*. This shaft is provided with a crank *f*, to which is connected a link *g*, having its opposite end connected to a vertically-arranged lever *h*. This lever is fulcrumed at its lower end and has its upper end connected by a link *i* with the carrier O. Adjacent to the gear-wheel *c* is arranged upon the shaft J a rotary head *j*, which, as shown, also constitutes a gear-wheel through which motion is imparted to the shaft J from a drive-shaft *k*, having a pinion *l* thereon. The head *j* carries a sliding bolt *m*, which is adapted to engage with one of a series of detents *n* upon the gear-wheel *c*. The bolt *m* is, however, held from engagement with the detent *n* through the greater portion of the rotation of the head *j* by means of a flange *o*, surrounding the gear-wheel *c*. The arrangement of this flange is such that in the rotation of the shaft J and head *j* thereof the gear *c* will be permitted to remain stationary during three-fourths of a revolution, and then by reason of the engagement of the bolt *m* with one of the detents *n* said gear-wheel will be caused to revolve with the shaft for the remaining quarter of its revolution. At this point the bolt *m* will engage with the cam at the end of the flange *o*, which will again disengage the bolt from the detent and permit the gear-wheel *c* to remain stationary. Upon the opposite end of the shaft J is loosely sleeved a sprocket-wheel *p*. This wheel is connected by a chain *q* with a sprocket *r* upon the shaft M. Adjacent to the sprocket-wheel *p* is a rotary head *s*, which carries one or more pivotal dogs or latches *t*. These dogs are adapted to engage with corresponding notches in the flange *w* on the sprocket *p*, but are periodically disengaged from said flange. The disengagement is effected by a stationary cam U′, which engages with one

end of the dog, causing the tilting of the same. The effect of the construction just described is to cause the sprocket-wheel *p* to revolve or remain stationary upon alternate quarters of the revolution of the head *s*. This, by reason of the fact that the sprocket *p* is twice the diameter of the sprocket *r*, will impart half-revolution to the shaft M for each alternate revolution of the shaft J.

The parts being constructed as shown, the operation of the complete machine is as follows: The cement or sand or other material to be compressed is placed in the hopper Q, from which it will drop into the carrier O until the latter is filled. In the movement of the mechanism the rotation of the shaft J will for one-quarter of a revolution thereof be imparted to the gear-wheel *c* through the medium of the sliding bolt *m* and one of the detents *n*. This movement will cause one complete revolution of the pinion *d*, shaft *e*, and crank *f*. The latter through the connecting-link *g*, lever *h*, and link *i* will impart a reciprocating movement to the carrier O, which will move the latter first into a position where it registers with the recesses B in the bed and then will return it to its original position. During a portion of the interval in which the carrier is above the recesses in the bed the material in said carrier will drop into said recesses, and in the return movement of the carrier the surplus material will be scraped off, leaving the recesses filled to the level of the bed. Motion will next be imparted to the plungers D through the medium of the rotary head *s*, dog *t*, sprocket *p*, chain *q*, sprocket *r*, shaft M, crank L′, rods N, and cross-head F, the operation of these parts having been previously described. By the movement of the cranks L′ the plungers D will be forced downward into the recesses B and for a sufficient distance downward therein to effect the initial compression. The final compression is then effected in the manner previously described by the eccentric K and rod L. As this movement is of small amplitude and is effected directly from the shaft J, a very powerful compression may be given. The next movement is to raise both the plungers D and E; but in order that this may be done without too much frictional resistance the pressure on the material within the mold is first slightly relieved. This is accomplished by so timing the eccentric K and the cranks T that the plungers E after making the compression will be slightly withdrawn before they are again raised and lifted to the level of the top of the bed. This relief in the pressure upon the material in the mold will reduce the frictional resistance of the sides of the mold, so that the plungers E may be more readily lifted by the cranks T. At the same time that the plungers E are thus lifted motion will again be imparted to the sprocket *p* by the reëngagement of the latches *t* with the notches in the flange *w*. The crank L′ will be turned from its lower dead-center to its upper dead-center, in which latter position it is temporarily held by engagement with the spring-clip *x*. This completes one cycle of movement, and in the succeeding cycle the forward movement of the carrier O will push the bricks raised by the plungers off onto the forward extension W of the bed. In this movement no injury is done to the bricks for the reason that the top of the plungers E form complementary portions of the upper surface of the bed, so that the bricks may be easily slid thereupon.

It is sometimes desirable to obtain bricks or blocks which are provided with a facing of different material from that formed in the body of the block. Where this is desirable, brick of this character may be manufactured by the use of the following attachment to my machine. At the forward end of the carrier O is arranged a second compartment O′, which contains the facing material. This compartment is provided with a bottom plate O^2, which will prevent the material from dropping into the mold during the forward movement of the carrier. It is not, however, absolutely necessary to provide this bottom plate, for the reason that the plungers E are held in the plane of the surface of the bed during all of the forward movement of the carrier. In the rearward movement of the carrier and after the mold has been filled with material from the main compartment of the carrier O a thin layer of the material in the compartment O′ will be deposited on top of the other material in the mold. Where the removable bottom plates O^2 are used, this must first be withdrawn by suitable mechanism. (Not shown.) With the construction thus described each reciprocation of the carrier O will first fill the mold with the body material and then deposit a layer of the facing material thereon, after which both will be compressed in a single operation of the plungers.

What I claim as my invention is—

1. In a machine for molding blocks, the combination with an upper plunger, of a lower plunger having a cup-shaped extension at its lower end for forming a dash-pot, a downwardly-extended bearing associated with the lower plunger, a rod slidably mounted within said cup-shaped extension, a rotary shaft, an eccentric thereon arranged to engage the rod to reciprocate the plunger, and a crank on the shaft having a roller arranged to engage a segmental portion on said downwardly-extended bearing.

2. In a machine for molding blocks, the combination with a bed having a mold-recess therein, of a rotary shaft, a pair of plungers adapted to compress the plastic material in said recess, means associated with the shaft for raising the upper plunger, means for rais-

ing the lower plunger, the upper face of the lower plunger being elevated to the plane of the top of the bed, said last-mentioned means including a rod operatively associated with the shaft and slidably mounted within a pivoted hollow cylindrical extension on the lower plunger, a receptacle for the plastic material supported upon said bed, and means for moving said receptacle into registration with said recess in the bed to first push away the compressed block, and to subsequently refill the mold-recess.

3. In a machine for molding blocks, the combination with a bed having a mold-recess therein of a pair of plungers adapted to compress the plastic material in said recess, means for raising said plungers to extract the compressed brick, including a crank for the upper plunger, and resilient means for temporarily maintaining said crank in its upper dead-center, means for maintaining the lower plunger with its upper face in the plane of the top of the bed, a receptacle for the plastic material adapted to be reciprocated into and out of registration with the mold-recess in said bed, the forward movement of said receptacle being accomplished while said lower plunger is maintained in its upper position, whereby the formed block may be pushed off on to the imperforate portion of the bed.

4. In a machine for molding blocks, the combination with a bed having a mold-recess therein of a pair of plungers adapted to compress the plastic material in said recess, means for raising said plungers to extract the compressed brick, including a crank for the upper plunger, and resilient means for temporarily maintaining said crank in its upper dead-center, means for maintaining the lower plunger with its upper face in the plane of the top of said bed and a receptacle for the plastic material adapted to be reciprocated into and out of registration with the recess in the bed, the forward movement of said receptacle being accomplished during intervals in which said lower plunger is in its upper position, and means for quickly lowering said lower plunger when said receptacle is still in registration to refill the mold-recess.

5. In a machine for molding blocks, the combination with a bed having a mold-recess therein of a pair of plungers adapted to compress the plastic material in said recess, means for raising said plungers to extract the compressed brick, a receptacle for the plastic material adapted to be moved into registration with said mold-recess while said upper plunger is in its raised position, means for temporarily maintaining said lower plunger with its upper face in the plane of the top of the bed to permit the pushing off therefrom the molded block and for then dropping said plunger to introduce a new charge of the plastic material into the mold-recess, and means for cushioning the fall of said plunger, including a rod slidably mounted within a pivoted hollow extension on the lower plunger.

6. In a machine for molding blocks, the combination with a bed having a mold-recess therein of a pair of plungers adapted to fit within said recess, means for filling said recess while said upper plunger is raised out of engagement therewith, means for then lowering said upper plunger to partially compress the material in said recess, and then rigidly holding said plunger from upward movements, means for then raising said lower plunger to accomplish the final compression, means for then slightly lowering the lower plunger and then raising both plungers to extract the compressed block.

7. In a machine for molding blocks, the combination with a bed having a mold-recess therein of a pair of plungers for compressing the plastic material in said recess, means for moving the upper plunger from a position where it is withdrawn from said recess to a position in engagement therewith and for maintaining said plunger temporarily in each of said positions, means for filling the recess while said plunger is in its upper position, means for slightly raising said lower plunger while said upper plunger is in its lowered position to effect the final compression, means for slightly lowering the lower plunger after the final compression, including a piston associated with said lower plunger and independent means for raising said lower plunger during the withdrawal of said upper plunger, and for then quickly dropping the lower plunger.

8. In a machine for forming blocks, the combination with a bed having a mold-recess therein, a reciprocating plunger for compressing the plastic material in said recess, a carrier for the plastic material adapted to be registered with said recess and fill the same during the period in which the plunger is withdrawn, a receptacle on the carrier having a discharge means normally closed during the forward movement of the carrier and operating subsequently and before the return of said plunger for depositing a layer of facing material at the top of said recess whereby both materials are simultaneously compressed.

9. In a machine for forming blocks, the combination with a bed and a mold-recess therein of a pair of plungers for compressing the plastic material in said recess, a carrier for the plastic material adapted to be registered with the recess during the period in which the upper plunger is withdrawn, the said carrier being provided with two compartments respectively for the body and facing material of the block, means for normally closing the facing-material compartment, means for holding the lower plunger in a position where its upper face is flush with the bed, while said carrier is being moved into

registration with said recess, means for then quickly withdrawing said lower plunger to fill said recess with the body material, said carrier being adapted upon its return movement to deposit a layer of facing material above the body material in said recess whereby both materials are simultaneously compressed upon the operation of the plunger.

10. In a machine for molding blocks, the combination with a rotary shaft, of an upper plunger, a lower plunger having a hollow extension at its lower end, a hollow rod pivoted within said extension, means associated with the shaft for imparting a reciprocatory movement to said rod.

11. In a machine for molding blocks, the combination with a rotary shaft, of an upper plunger operated by said shaft, a lower plunger having a pivoted cup-shaped extension at its lower end for forming a dash-pot, a rod operatively associated with said shaft and slidably mounted within said extension, and means on the rod arranged to engage said extension, and means on said shaft for imparting a reciprocatory movement to said rod for operating the plunger.

12. In a machine for molding blocks, the combination with an upper plunger, of a lower plunger, a rotary shaft having operating means associated with said plunger, a cross-head on the lower plunger having a pivoted cup-shaped extension at its lower end for forming a dash-pot, a rod slidably mounted within said extension and arranged to engage the lower surface of the cross-head, and means on said shaft for imparting a reciprocatory movement to said rod for operating the plunger.

13. In a machine for molding blocks, the combination with an upper plunger, of a lower plunger having a pivoted extension at its lower end, a rod having a telescopic connection with said extension, and arranged to engage the lower surface of the plunger, a rotary shaft having operating connections with said plungers, means on the shaft for imparting a reciprocatory movement to said rod to operate the lower plunger, and means for engaging the extension of the plunger to operate the same while the rod is at rest.

14. In a machine for molding blocks, the combination with an upper plunger, of a lower plunger having a hollow extension at its lower end for forming a dash-pot, a rod fitting within the extension and arranged to contact with the lower surface of the extension, means for imparting a reciprocatory movement to said rod to operate the plunger, and means for engaging the hollow extension after said reciprocatory movement of the rod to operate the same independent of the rod.

15. In a machine for molding blocks, the combination with an upper plunger, of a lower plunger, a cross-head on the lower plunger having a cup-shaped extension at its lower end for forming a dash-pot, downwardly-extending bearings on the cross-head, a rod slidably mounted within said extension and arranged to engage the cross-head, a rotary shaft, an eccentric thereon arranged to engage the rod to reciprocate the plunger, and cranks on the shaft engaging the downwardly-extending bearings on the cross-head to operate the same independent of the operation of the rods.

16. In a machine for molding blocks, the combination with an upper plunger, of a lower plunger, a cross-head on the lower plunger having a cup-shaped extension at its lower end for forming a dash-pot, downwardly-extended bearings on the cross-head, a rod slidably mounted within said extension and arranged to engage the cross-head, a rotary shaft, an eccentric thereon arranged to engage the rod to reciprocate the plunger and cranks on the shaft having rollers at their free ends engaging the downwardly-extended bearings on the cross-head to operate the same independent of the operation of the rod.

In testimony whereof I affix my signature in presence of two witnesses.

EBENEZER W. RIDER.

Witnesses:

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A. G. ROBERTSON.