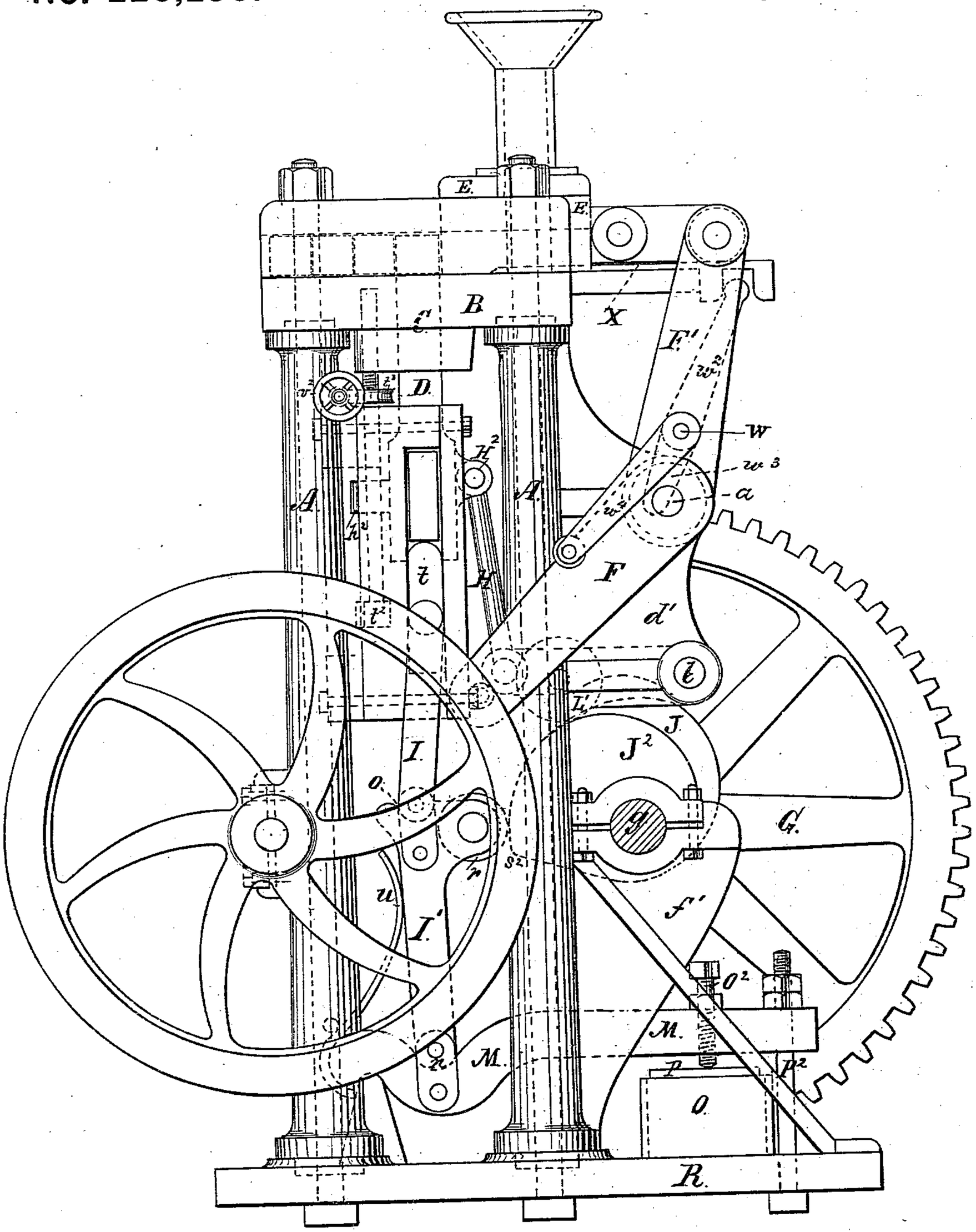
3 Sheets—Sheet 1.

A. WALKER.

Machine for Molding and Compressing Artificial Blocks or Bricks.

No. 226,256. *Fig. 1.* Patented April 6, 1880.



Witnesses:
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L. P. Robinson

Inventor:
Alfred Walker

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Machine for Molding and Compressing Artificial Blocks or Bricks.

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Fig. 3

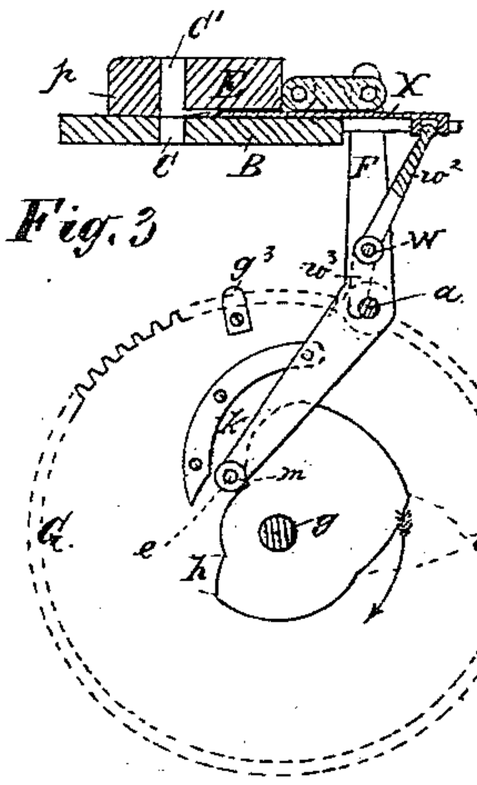

Fig. 2.

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3 Sheets—Sheet 3.

A. WALKER.

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Fig. 4.

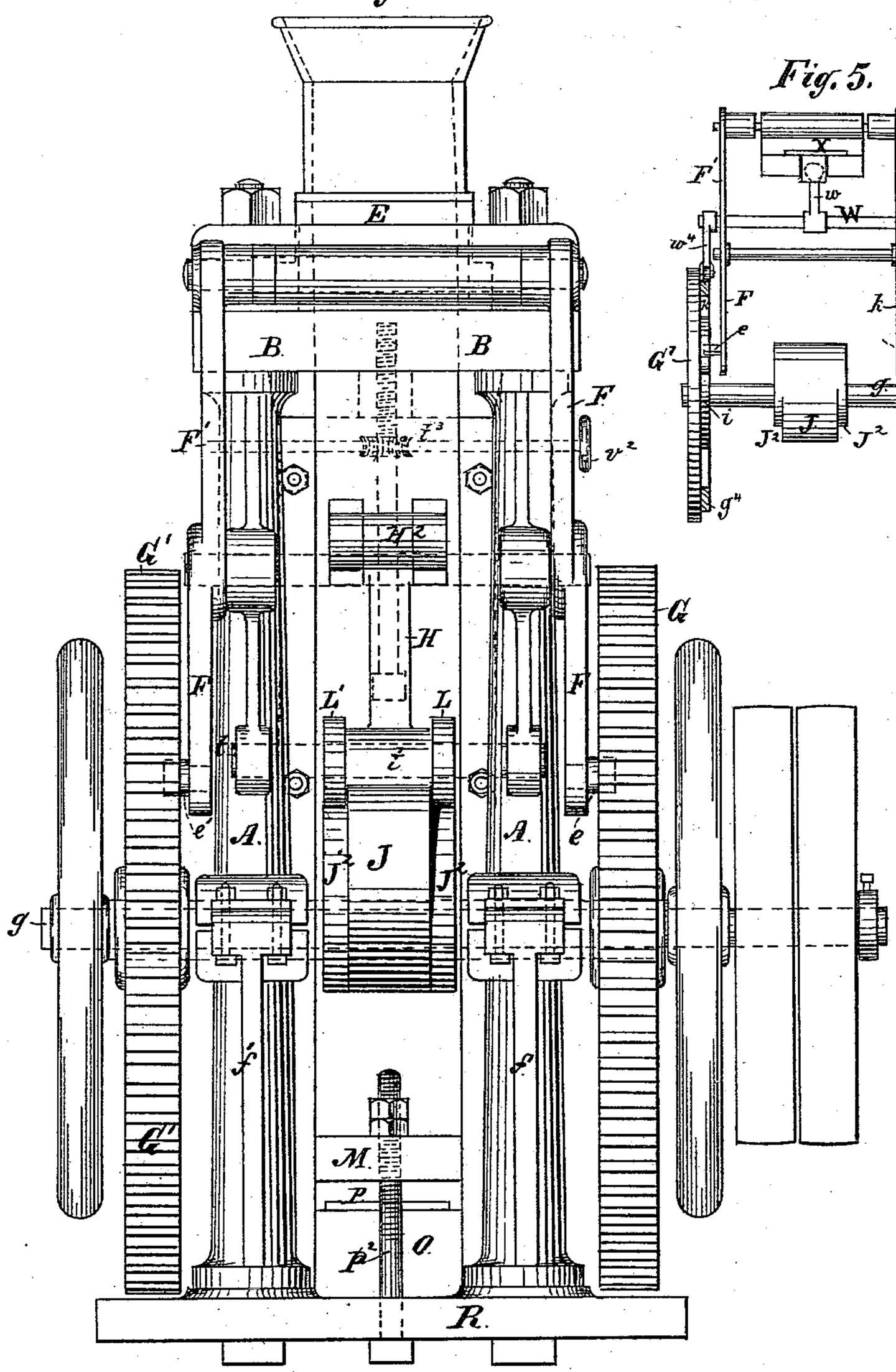

Fig. 5.

Witnesses:

Henry Eichling.

L. R. Robinson

Inventor:

Alfred Walker

UNITED STATES PATENT OFFICE.

ALFRED WALKER, OF SING SING, ASSIGNOR TO JAMES P. ROBINSON, TRUSTEE, OF NEW YORK, N. Y.

MACHINE FOR MOLDING AND COMPRESSING ARTIFICIAL BLOCKS OR BRICKS.

SPECIFICATION forming part of Letters Patent No. 226,256, dated April 6, 1880.

Application filed January 14, 1880.

To all whom it may concern:

Be it known that I, ALFRED WALKER, of Sing Sing, county of Westchester, and State of New York, have invented certain new and useful Improvements in Machines for Molding and Compressing Artificial Blocks or Bricks for pavements or building purposes from granular material, such as concrete, a mixture of sand or broken stone and asphaltum, &c.; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the annexed drawings, in which—

Figure 1, Sheet I, represents a side view of a machine embodying my improvements. Fig. 2, Sheet II, is a vertical central section of the same. Fig. 3, Sheet II, is a detail view, partly in section. Fig. 4, Sheet III, is a rear view of the machine. Fig. 5 is a detail view of the same.

Similar letters of reference in the several figures indicate the same parts.

This invention has for its object to improve the construction of machines for molding and compressing artificial blocks or bricks for paving purposes or for use in the construction of buildings; and it consists in certain novel details of construction and combinations of parts, which I will now proceed to particularly describe.

Referring to the drawings, A A are pillars, supporting a plate, B, which is provided with an opening, C, the length and width of the latter being of the exact size of the block or brick to be manufactured, and admitting the passage of the plunger D. A head-block, E, is placed on top of plate B, and is so arranged as to slide horizontally between two projecting pieces, *b b'*, of plate B. Said head-block E is also provided with an opening, C', of the same dimensions as opening C.

By an oscillating movement of double-armed levers F the head-block E may be shifted in such a manner as to occupy three different positions successively. In the first position its opening C' forms a continuation of opening C in plate B, to allow of the filling of opening C with the concrete or other material employed. In the second position its end (designated *p* in the drawings) covers the opening C, in order to interrupt communication between C and C', and to allow the material in opening C to be compressed by the plunger D; and in the third position its end *p* is entirely moved off of opening C, so as to permit the compressed block or brick to ascend to the upper level of plate B and to be removed by the head-block E as the latter slides to its first position—that is to say, into the position where its opening C' registers with opening C. In order to produce these three successive movements, the head-block E is fastened to one end of the doubled-armed lever F. The lever F is made fast, by means of the shaft *a* and the brackets *d d*, to a pair of pillars, A A. The other end of the lever F (see Figs. 3 and 5) is provided with pins *e e'*, carrying friction-rollers *m*. Two brackets, *f f*, also fastened to A A, support the shaft *g*, which has gear-wheels on its extremities.

Fastened to the inner side of the wheel G is a cam provided with three cam-surfaces, *h i k*, arranged in such a manner as to produce excentric motion whenever the wheels G G' are rotated. The friction-rollers *m m'*, coming in contact with these cam-surfaces *h i k* and yielding to their different eccentric positions, will cause the sliding movements of head-block E in the following manner:

As shown in Figs. 2 and 3, the roller *e* encounters the outside of cam-surface *h*. As soon as wheel G is rotated in the direction as indicated by the arrow the roller *m* will follow the course of the cam-surface. The cam-surface *h* being eccentric toward the left, the upper arm of lever F will be thrown in the opposite direction, and carry with it the head-block E, by which motion the second position above described is attained. In further rotating the wheel G the roller *m* will meet the cam-surface *i*, which, being still more eccentric, will carry the head-block E farther toward the right, leaving the opening C in plate B free from the end *p* of head-block E and placing the head-block E in the third position. On meeting the third cam-surface, *k*, the roller *m* will follow the under side of the same, and thereby nearing the center will be carried toward the right, and consequently the head-block E will be shifted toward the left and attain the first position, leaving openings C and C' communicating with each other, as indicated in Fig. 3, Sheet II.

The wheel G′ is provided with a cam-groove similar to the cam-surfaces above described, and in this groove works the roller *m* on the pin *e′*, carried by the other lever F.

The time occupied in traversing the distance between the different cam-surfaces and while the block E is not in motion is utilized in such manner that the distance between *k* and *h* will allow for the filling of opening C with concrete, &c., the distance between *h* and *i* will allow for compressing this material by the plunger D, and the distance between *i* and *k* will allow for the compressed block or brick to be raised to the level of plate B by the further movement of the plunger D.

The operation of compressing the material for the construction of bricks, paving-blocks, &c., is performed by means of the plunger D within the opening C, operated upon by compound levers I and I′, which latter follow the movements of a cam, J.

Fastened to the center of the shaft *g*, which carries wheels G G′, is the cam J. The compound lever I I′ has a movable joint, *o*, (see Fig. 1, Sheet I,) and having its fulcrum at *n*. Near its joint *o* it carries a friction-roller, *r*, which, following the course of the cam J, produces a vertical movement of the knob *q*, fastened to one end of the lever I.

The lower end of plunger D being so formed as to correspond in shape with the knob *q*, the plunger will be slowly pushed upward whenever the friction-roller *r* follows that course of the cam J which is indicated by *s s′ s²*, Fig. 2. This upward movement of plunger D, acting on the material, is sufficient to give to the latter the necessary density and shape required. When the most eccentric portion, *s²*, of the cam J in its revolution reaches the roller *r*, the compound lever I I′ is straightened to a vertical position, and then continued slightly beyond a vertical position, so as to relieve the pressure on head-block E, as shown in Fig. 1. As soon as said portion *s²* has passed said roller the compound lever I I′ is returned to its former bent position (see Fig. 2) by means of a spring, *u*, the lower end of which is rigid and the free end is curved, so as to bear against the lever I′, as shown.

In the lower part of the brackets *d d′* is a shaft, *l*, which carries one end of a lever, K, and forms the fulcrum thereof. The other end of the lever K is connected by a rod, H, with the lower portion of the plunger D by means of a bolt and lugs, H². Between the two ends of the lever K, and near the end to which the rod H is connected, are two friction-rollers, L L′, which straddle the cam J and engage with two cam-surfaces, J², arranged on each side of the cam J.

Before the cam J releases the compound lever I I′, as just above described, the rollers L L′ are engaged by the cams J², by which means the lever K is raised, and through the connecting-rod H elevates the plunger D until its upper surface is level with the upper surface of the plate B. When the most eccentric portion, *s²*, of the cam J² has passed the rollers L L′, the lever K, rod H, and plunger D drop of their own weight or some mechanical device and leave the opening C free for the reception of another charge of the plastic material.

In order to render the compressing action of the compound lever I I′ slightly yielding in case more material shall have been admitted into opening C than is necessary for the making of one brick or block, or in case the material is in such a state as to cause more resistance than usual in compressing it, and in order to overcome this increased resistance, the fulcrum *n* of lever I′ is connected to and rests on a lever, M, near the fulcrum thereof, which fulcrum is at one end of said lever. The other end of said lever M rests upon a nest of springs, O, provided with a follower, P. The tension of the springs may be regulated by a set-screw, O², passing through the lever M and bearing upon the follower P, and the upward play of the lever M may be regulated by a screw-bolt, P², passing through the base-plate R and the lever M, and carrying a nut on the upper side of said lever.

The upper end of the lever I is provided with two pins or studs extending from it in opposite directions, and working in guide-slots *t* in the frame-work of the machine. The plunger D is also provided with similar projections working in said slots for the purpose of guiding it in its vertical motion.

For regulating the quantity of material admitted into the opening C and the density of the mass after being compressed, I employ devices arranged and operating as follows: On the plunger D on the side opposite the rod H is a lug, *h²*, through which passes a rod or bolt, T, having a head, *t²*, on its lower end and a screw-thread on its upper portion, which screw-thread engages with a female thread in a tap-hole in the under side of the plate B. The rod or bolt T has feathered to it a worm-wheel, *t³*, which is engaged by a worm, *v*, on a shaft, V, having its bearings in the frame of the machine, and provided with a head or knob, *v²*, for turning it.

When the plunger D descends its lowest point is determined by the lug *h²* resting on the head *t²*. By turning the worm-shaft V, and thus, through the worm *v* and worm-wheel *t³*, imparting a rotary motion to rod or bolt T, said rod or bolt is screwed into or out of the tap-hole in the plate B, and consequently the point occupied by the head *t²* is made higher or lower, so as to either diminish or increase the depth of the space between the top of the plunger and the top surface of the plate B—or, in other words, the depth of the opening C—when the plunger is down.

As the top of the plunger in its upward movement or stroke is always the same, the bricks or blocks will always be of the same size; but their density will vary according to

the quantity of material, as a greater quantity will be more closely compressed than a lesser quantity.

When the plunger D is at its lowest point, the opening C in the plate B, the opening C′ in the head-block E, and the tube or mouth of the hopper which supplies the material are all in line with each other, and the material therein forms a continuous column. In such case it is desirable to separate the material in the opening C from the material above it before the head-block begins to move back to allow the material to be compressed into a brick or block, because it is desirable that the bricks or blocks should be not only of the same dimensions, but also of exactly the same density in all cases, and this result can only be accomplished by having the mold filled accurately each time, which has been found impossible heretofore. In my invention this result is positively insured by means of cut-off devices constructed and operating as follows:

In the two levers F F′, just above their fulcra, a rock-shaft, W, has its bearings. This rock-shaft carries an arm, w^2, projecting upward, and two arms, w^3 w^4, projecting downward, said arms being rigidly attached to said rock-shaft. The upper arm, w^2, carries at its upper end a ball, which engages with a socket, x, in the rear end of a knife, X, which is arranged to slide between the upper surface of the plate B and the lower surface of the block E. The lower arms, w^3 w^4, are provided with friction-rollers, and are attached near the ends of the shaft W, while the upper arm, w^2, is about midway between them. The arm w^3 is engaged by a projection, g^3, on the wheel G, and the arm w^4 engages with a projection, g^4, on the wheel G′.

When the plunger D is at its lowest point and the opening C has received the material for a brick or block, as the wheel G revolves the projection g^3 strikes the lower end of the arm w^3, and through the rock-shaft W′ and arm w^2 forces the knife X forward, so as to cut off the material on a level with the top surface of the plate B. The knife is held in its position by the engagement of the projection g^4 on the wheel G′ until the head-block E moves back so as to cover the opening C, and is then drawn farther back, so as to clear the opening C′, in which position it remains until ready for another forward movement. After the material has been compressed the head-block E moves still farther back until the end p is clear of the opening C, whereupon the plunger D rises and elevates the compressed brick to the level of the plate B. The head-block E then moves forward and pushes the brick or block to the position illustrated in Fig. 2.

In machines heretofore constructed the material in the mold has been separated from that above it simply by the horizontal movement of the head-block, by which movement the material is scraped from the top of the mold in such a manner as to leave its top surface rough and uneven and by no means uniform in all cases. Such process simply tears or pulls one portion of the plastic mass away from the other portion. In some cases stones, pebbles, and other solid particles are pressed into the lower portion of the mass, and in other cases they are torn away from said portion, so that also the bricks or blocks may all be of the same length, breadth, and thickness, yet they will not be of the same density.

In my invention the knife X divides the mass into two portions before the head-block begins to move at all. It works with a cutting movement instead of a scraping or tearing movement, making the divided surface smooth and even, and when the cut is completed the lower surface of the knife is exactly in line with the lower surface of the portion p of the head-block E, so that when said head-block and said knife move backward simultaneously, as above described, a continuous smooth surface is presented to the top of the material in the mold or opening C.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a machine for molding and compressing artificial paving blocks or bricks, the combination, with a mold-plate, a movable head-block, and a compacting-plunger, of the compound lever or toggle I I′ and cam J, for moving forward the plunger to compress and compact the material into a block or brick, and the lever K, connecting-rod H, and the said cam J, for further moving the plunger to eject the completed block or brick from the mold, substantially as described.

2. In a machine for molding and compressing artificial paving blocks or bricks, the combination, with the plunger D and compound lever or toggle I I′, of the rotating cam J, so shaped as to force the said lever or toggle past its center after completing the block or brick, and thus take off the pressure from the head-block E and allow the latter to be readily moved aside without binding in its guides, substantially as described.

3. The combination, with the compound lever or toggle I I′ and cam J, of the spring u, for throwing back the said lever or toggle to its original bent position after or while the completed block or brick is being ejected, substantially as described.

4. The combination, with the plunger D, cam J, and compound lever or toggle I I′, of the adjustable spring-seated lever M, forming the bearing or support of the lower member of the compound lever or toggle, substantially as described, for the purpose specified.

5. The combination, with the sliding plunger D, of the adjustable rod T, having the head t^2, for limiting the backward movement of said plunger, and consequently determin-

ing the capacity of the mold and the amount of pressure to which the block or brick is to be subjected, substantially as described.

6. In a machine for molding and compressing artificial paving blocks or bricks, the combination, with a head-block, through which the material is fed to the opening in the mold-plate and against which the material is compressed and compacted, of an independent cut-off blade for severing the column of material flush with the top of the mold-plate before the head-block moves to cover the opening in the mold-plate, substantially as described, for the purpose specified.

7. The cut-off blade X, adapted to slide within a recess in the under side of the head-block E, with its lower surface flush with the lower surface of the head-block, so that when said cut-off blade and said block move back simultaneously a continuous smooth surface will be presented to the top of the material in the mold below, substantially as described, for the purpose specified.

8. The combination, with the cut-off blade X, of the rock-shaft W, provided with arms w^2 w^3 w^4, the wheel G, having the projection g^3, and the wheel G′, having a similar projection, g^4, and a rim or bearing for the arm w^4, substantially as described, for the purpose specified.

A. WALKER.

In presence of—
ERNEST ABSHAGEN,
THOMAS E. BURNS.