

J. Caswell, Brick Machine.

2 Sheets, Sheet 1.

N^o 32,047.

Patented Apr. 16, 1861.

Fig. 1.

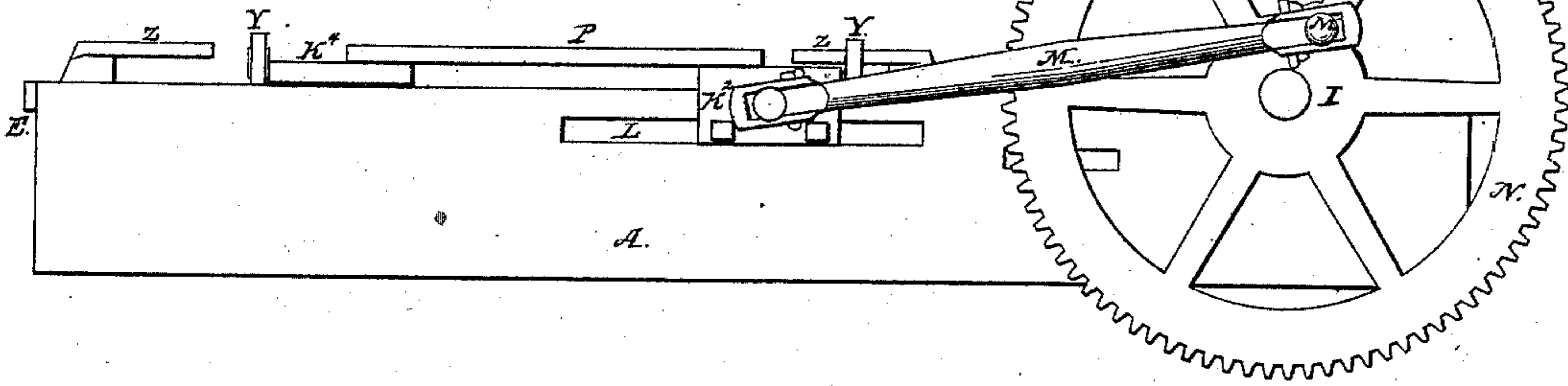


Fig. 2.

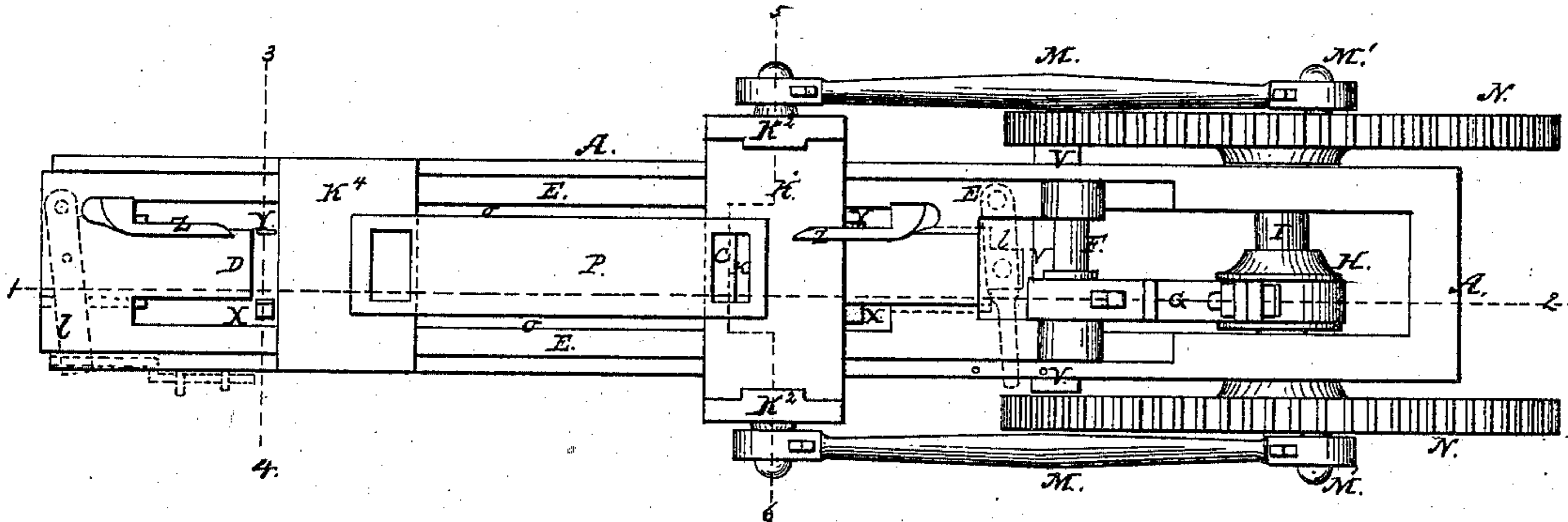
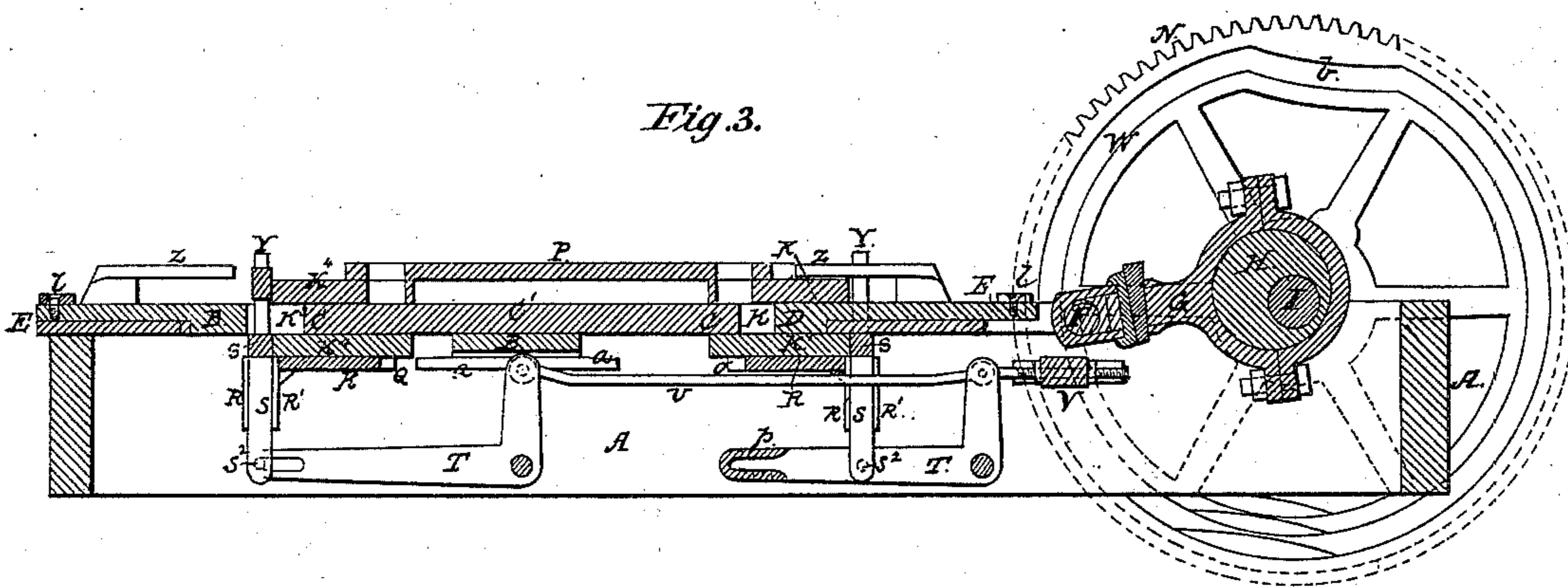


Fig. 3.



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Inventor:

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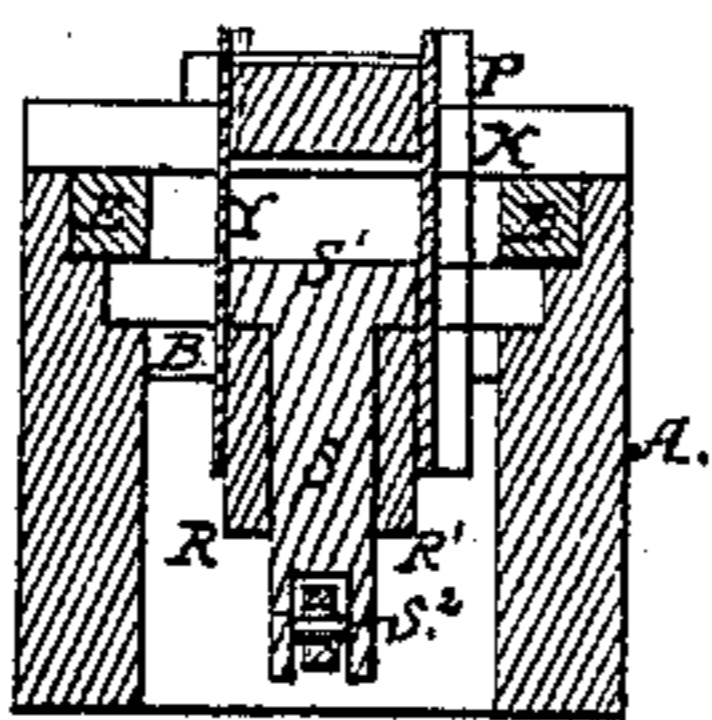
J. Caswell,
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Fig. 4.



Figs.

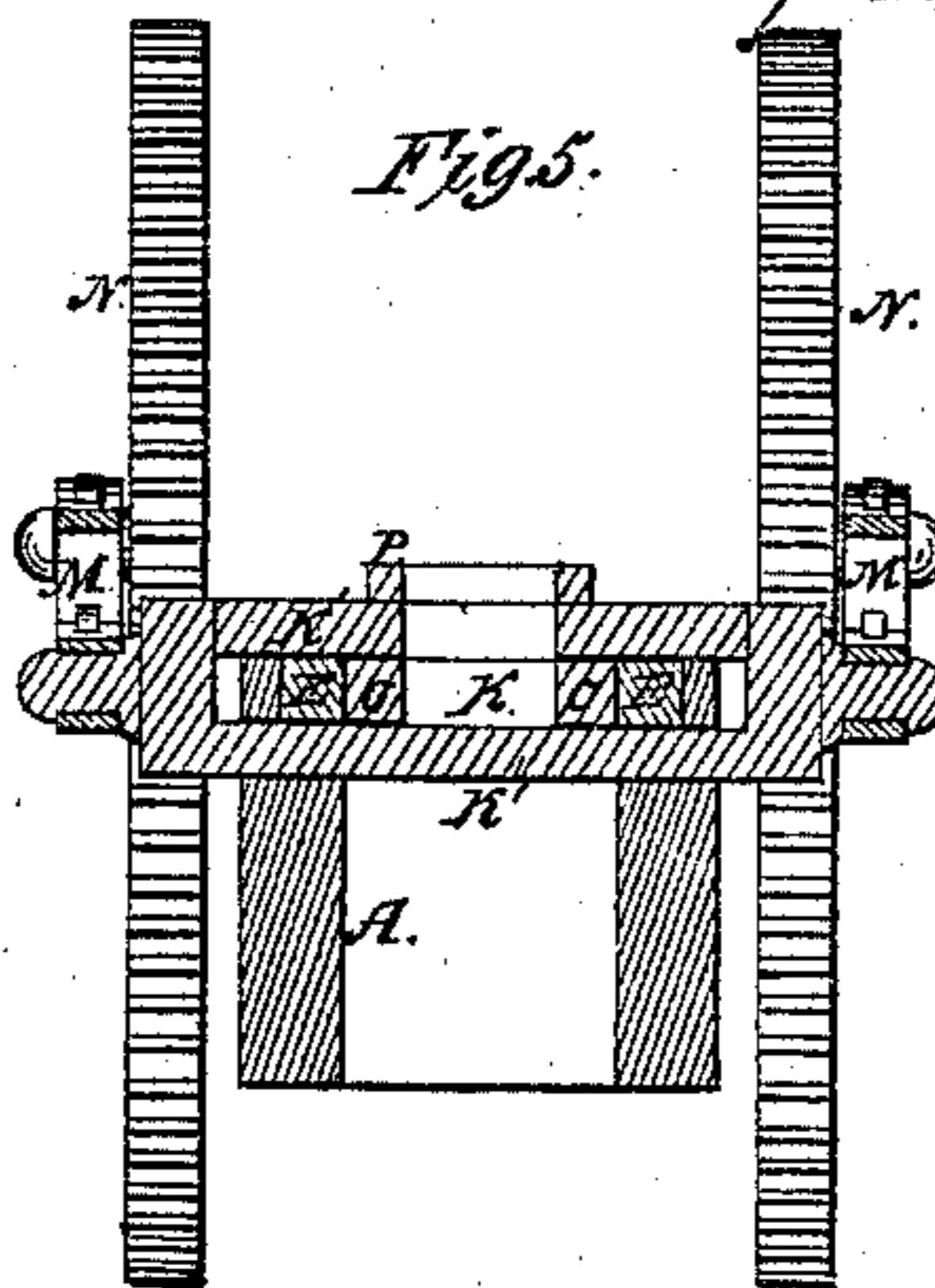


Fig. 6.

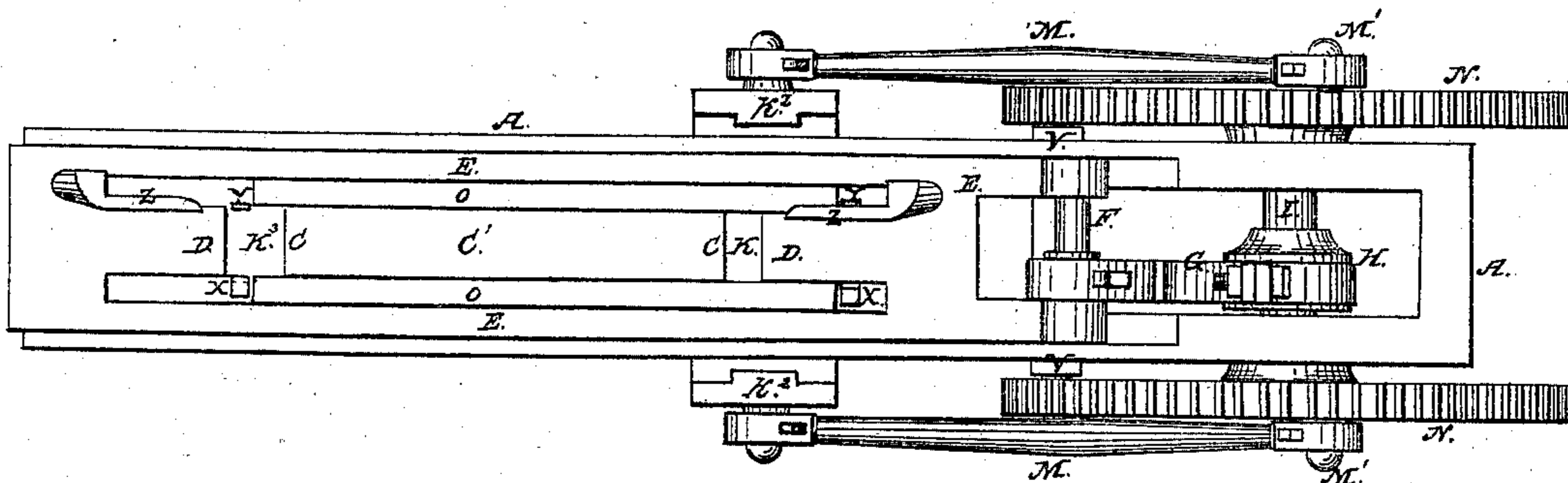
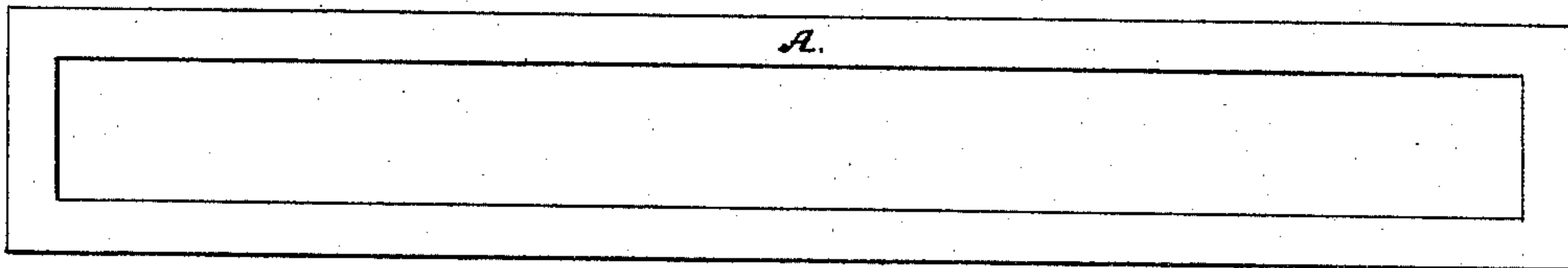


Fig. 7.



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UNITED STATES PATENT OFFICE.

JOHN CASWELL, OF SYRACUSE, NEW YORK.

BRICK-MACHINE.

Specification of Letters Patent No. 32,047, dated April 16, 1861.

To all whom it may concern:

Be it known that I, JOHN CASWELL, of Syracuse, in the county of Onondaga and State of New York, have invented new and useful Improvements in Brick-Machines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making part of this specification.

Figure 1, is a side elevation of the improved brick machine. Fig. 2, is a top or bird's eye view of the same. Fig. 3, is a vertical longitudinal section of the same at the line 1, 2, of Fig. 2. Fig. 4, is a vertical transverse section of the same at the line 3, 4, of Fig. 2. Fig. 5, is another, transverse section at the line 5, 6, of Fig. 2. Fig. 6, is a top view of the machine with the upper connected plates of the molds removed. Fig. 7, is a horizontal section of the frame of the machine.

Similar letters in the several figures refer to corresponding parts.

These improvements relate to that class of brick machines designed for making bricks of dry clay through the agency of an extraordinary pressure exerted thereon, and consist in constructing the frame of the machine as hereinafter described for the purpose of giving it the necessary strength and firmness to resist the heavy strain and pressure to which it is constantly subjected, and providing it with the necessary bearings to give precision to the movements of the pistons and molds; forming, arranging and securing the molds within the frame in such a manner, and causing them to move in such relation to the movements of the extension plate pistons, while pressing the clay as to entirely expel the air therefrom, and providing a peculiar combination of parts for lifting the bricks from the molds and placing them between the automatic grasp of upright springs and standards which convey them over the pistons and gently lay them on the upper surface of the same.

To enable others skilled in the art to make and use my invention I will proceed to describe its construction and operation.

The frame A, is made of a rectangular form, and is cast in one massive piece for the purpose of giving the greatest possible strength, within the narrow limits of its

sides, where the powerful longitudinal pressure necessary to form the bricks is exerted, and thus prevent it from springing laterally or in the slightest degree yielding to the pressure, and giving precision to the movements of the pistons and molds by affording bearings for them to slide on their entire length. Casting these bearings on, or rather with the frame, enables them to be planed perfectly parallel and true.

To the horizontal cross piece B, of the frame, which forms a strong brace to its central portion, are secured the stationary pistons C. These pistons consist simply, of a smoothly planed oblong plate C', exactly corresponding in cross section with the size and form of the flat surface of the brick, and firmly secured at its central portion of the cross piece B by suitable bolts.

The movable pistons D are secured at the ends of a strong iron frame or plate E, whose sides rest and slide on the upper bearings of the frame A, and between the sides of the same, and whose upper surface as well as the upper surfaces of the stationary and movable pistons C, D, are on the same horizontal plane with the top of the frame A. This frame, or plate E, is made in the form of a yoke at one end, across which is secured a horizontal shaft F, to which is attached by a strap joint, the end of a connecting rod G, strapped at its opposite end to an eccentric H, secured to a horizontal transverse shaft I turning in suitable boxes near the end of the frame A, and having large cog wheels secured to its ends outside the frame. This eccentric H is secured on the shaft I immediately next the side of the frame A, so as to bring the strain as near the box or bearing as possible, and thereby prevent the shaft I springing at the center, under the heavy strain exerted upon it during the compression of the clay into bricks. The extent of throw of the eccentric H exactly corresponds with the distance the clay is compressed in the molds, and the distance apart of the faces of the pistons C, D, when respectively nearest each other to form the bricks, and farthest apart to receive the clay, will depend upon the character or quality of clay used, and may be regulated by inserting the movable pistons D, in dovetail guides in the ends of their frame E, and providing them with set screws, or other device, for moving their

faces nearer to or farther from the faces of the stationary pistons C, as is done in other brick machines.

The movable mold K, nearest the eccentric shaft, is formed of two horizontal parallel transverse plates K' arranged one above the other, the lower one extending through horizontal slots L, in the sides of the frame A, with its upper surface flush with the lower surfaces of the pistons, and the upper one extending a like distance, with its lower surface flush with the upper surface of the pistons, and the two being connected together by upright end pieces K², from the outer surfaces of which project wrist pins, to which the ends of connecting rods M, attached at their opposite ends to similar wrist or crank pins projecting from the faces of the cog wheels N, in such a manner as to cause the said mold K, to have a reciprocating movement commensurate with the throw of the wrist or crank pin on the cog wheels N, at every revolution of the same. The other mold K³ is also formed of parallel transverse plates K⁴, situated the same distance apart and in the same relation to the upper and lower surfaces of the mold as the plates K', but instead of extending beyond the sides of the mold, as in the former case, the ends of the lower plate extend over and rest and slide upon the lower projecting bearing formed on the inside of the sides of the frame A, while the ends of the upper one extend even with the outer surfaces of the sides of the frame.

The sides of the molds K, K³, are formed of two horizontal parallel longitudinal rails O, whose ends are secured between the upper and lower transverse plates of the two molds. These rails O, exactly fill the space between the inner surfaces of the movable mold frame E, and the sides of the stationary mold plate, C' and serve to connect the respective upper and lower transverse plates of the two molds together. The upper transverse mold plates K', K⁴, are also connected together on top by a longitudinal plate P, in whose ends, which rest and are secured on the said transverse plates, are formed openings, corresponding with similar openings in the plates K' K⁴ immediately above the molds with which they communicate, in such a manner as to allow the passage of the clay through them into the same, at the proper stages of their movements.

To the under surfaces of the lower transverse mold plates and next the sides of the frame A, are secured parallel longitudinal ribs or plates Q, beveled on their edges next each other, so as to form dovetails for the insertion of corresponding horizontal dovetail plates R, secured at one of their ends to grooved vertical guide plates R', between which are inserted and slide the shanks or slides S, of the lifting platens S', the

said horizontal plates R, and guide plates S, connected to them, forming in fact a right angled frame for the support of the platens when at rest, and their guidance during their up and down movements.

The lower ends of the shanks or slides S, are made in the form of yokes or forks, with horizontal bolts S² extending across them, which bolts, when the platens are lowered and at rest, are situated on the same horizontal plane as the transverse fulcrum shafts of right angled levers T, suspended in suitable boxes in the sides of the frame A. The upper ends of the upright portions of these levers T are connected together by a horizontal rod U so as to cause them to move together, and to a transverse bar V, passing through a slot in the sides of the frame A, and having anti-friction rollers on its ends, which enter grooves W in the inner faces of the cog wheels N. These grooves, are made circular nearly the entire distance around the cog wheels, the deviation from this regular course, which is less than one sixth of the circumference, extending in the form of segments of a circle, the reverse of the circle of the wheels, in such a manner as to give the necessary rocking movement to the right angled levers T, at the proper times to raise and lower the lifting platens S.

The end of the lower portion of the right angled lever T, farthest from the cog wheels N, has a horizontal slot formed in it, which, when the friction rollers on the end of the crossbar V are in the concentric circular portion of the grooves W, and the lower portion of said lever is horizontal, is on the same horizontal plane as the bolt S² across the yoke or forked end of the shank or slide S of the lifting platform or platen next the mold, which moves immediately above it, so as to receive the same at a certain portion of its reciprocating movement, and the corresponding lower end of the right angled lever, has a projection P on its side, in which a groove is formed, whose mouth or open end is the reverse of the corresponding part of the groove in the end of the other lever, so as to admit of the end of a stud or bolt S², projecting from the lower end of the shank or slide of the lifting platen next the cog wheels N, entering the same, at the necessary time to lift the platen above it.

To one of the sides of the sliding frames R' of the platens S' are secured vertical standards X, whose inner surfaces are even with the ends of the platens, and on the opposite sides of said frames R', and even with the opposite ends of the platens, are secured upright springs Y, whose upper ends curve slightly inward toward the standards X in such a manner as to gradually lessen the space between the springs and standards, toward the upper ends of the same, and thus

enable the bricks to be held between the two when raised by the platens, until the upper end of the springs are pressed outward by the cam bars Z, and made to release their hold, of the bricks when they are brought fairly over the ends of the movable pistons D. These cam bars Z are formed on studs or blocks, secured to the top of the movable piston frame E, and extend longitudinally toward each other a short distance above the top of the said frame, and are rounded or made tapering at their ends so as to give the desired outward movement to the tops of the springs Y, when brought against the same.

The operation of this improved machine is as follows: The clay, properly pulverized, is introduced to the molds K, K³, through suitable spouts or trunks, whose lower ends are even or flush with the upper surface of the longitudinal plate P, secured to the upper transverse mold plates K', K⁴, in such relation to the openings in the same, which alternately communicate with the molds, as to enable the necessary supply of clay to the molds, when their respective movable pistons D are farthest from the stationary ones C. Supposing that a regular rotary motion is given the main shaft I, by means of pinions meshing in gear with the cog wheels N, the movable pistons D, will have the necessary reciprocating movement at each revolution of the said cog wheels, through the agency of the eccentric H on their shaft, and pitman G, of the same strapped to the movable piston frame E, to alternately compress the clay within the two molds into the reduced size of bricks, between the faces of the said movable pistons and the faces of the stationary ones.

The power necessary to produce this result will be exerted by the eccentric H, directly on a line with the movements of the said movable piston D, and as the sides of the frame E of these pistons have a bearing on the sides of the strong substantial frame A, their entire length, and these sides are situated but a short distance from the line on which the said pistons move, the whole strain on the frame A and other parts will be longitudinal, and the tendency of the said frame, movable pistons, piston frame, and in fact all other parts which participate in the pressure, to spring laterally, will be counteracted. These characteristics also attend the movable molds, whose reciprocating movement is much greater than the throw of the pistons.

The arrangement of the wrists, to which the ends of the pitman rods M of the molds are attached, in relation to the eccentric H, is such, as to cause them to move with the pistons D, but at an increased speed, at certain stages of their movements, so as to expel the air from the clay in the said molds

during the compression of the same. In order to illustrate the manner in which the molds operate to produce this result, we will suppose the piston D, nearest the eccentric H, to be opened or extended from its stationary piston C, the full extent it is capable of moving, the piston D at the opposite end of the movable piston frame E, will have pressed the clay between it and its stationary piston C, into the reduced bulk necessary to form a brick, and the opening in the upper transverse mold plate K', communicating with the clay feeding spout or trunk, and mold K, nearest the eccentric, will be directly over the space between the open or extended piston and its stationary one, so as to allow the said mold to be entirely filled with clay. During the closing or pressing movement of this piston, the movement of its mold K, with it and past the clay at an increased speed, will cause the inner surfaces of the mold to draw upon and, flatten the particles of air forced toward and against the same, through the clay, during the gradual pressure of the same, and will thus, through the natural tendency of the flattened particles of air to adhere to, and move with the smooth mold surfaces sliding past the surfaces of the clay, cause the said air to be discharged therefrom. This movement of the surfaces of the mold past the clay, will, in addition to rolling, as it were, the air from the surfaces, smooth the same, and in the event of it being laid at unequal densities in the mold, or of portions of it being lumped together, the sliding surfaces will roll, and intermix the whole mass in the mold to one common density. During this pressing movement of one piston, to form a brick, the opposite one is being opened or removed from its stationary piston, next which a brick was formed on the previous throw of the eccentric. At the commencement of this movement of the pistons, the molds are on the eve of terminating their reverse movement, and just before doing so, the end of the sliding frame R farthest from the eccentric strikes the end of the stationary bar a, and it is held in a state of rest while the mold K³, moves a very short distance over it to clear the brick before terminating its stroke and sufficiently long to enable the lifting platen next it to ascend and raise the brick above it, and leave it suspended between the spring Y and standard X. This raising of the lifting platen farthest from the eccentric is effected by the right angled lever T, next it into whose end slot the bolt S², at the lower end of the shank or slide S, of the said lifting platen is caused to enter during its movement with the mold K³, both right angled levers T, being moved on their shafts to produce this result at the termination of every reciprocating throw of the molds, by means

of the irregular portions *b*, of the cam groove *W*, in the cog wheels *N*, operating on the friction wheels on the end of the transverse bar *V*. After this lifting platen has
 5 raised the brick and descended to its original position, the brick is carried between the spring *Y* and standard *X* by which it is held, with the beforementioned return movement of the molds over the end of the
 10 piston *C*, which formed it, on which it is laid by the upper end of the spring *Y* coming in contact with, and sliding past or over the curved surface of the cam bar *Z* which draws the spring from the brick and there-
 15 by release it.

The spring *Y*, is held out of range of the ends of the bricks previously laid and slid over the surface of the piston *C*, by the side of the said cam bar *Z* against which it
 20 slides, until it again returns past the curved end of the bar. Just before the termination of the stroke of the molds, the uprights or standards *X*, strike the end of the movable piston frame *E* and slide the lifting platen
 25 frame and its attachments back to its original position. In this manner a brick is formed between one of the movable pistons *D*, and its stationary one *C*, while a previously formed brick is being discharged
 30 from the molds of the corresponding pistons, at the opposite end; the peculiar relation of the eccentric *H*, pitman rod wrists *M*², and irregular portion *b* of the cam grooves *W*, in the cog wheels *N*, causing the
 35 pistons *D*, to act alternately, and the right angled levers *T*, through their end slots in which the bolts *S*² of the lifting platen shanks or slides *S*, alternately enter, to raise the bricks from the molds above said lifting
 40 platens.

Instead of having only one set of pistons and a single mold at either end, two or more may be employed, in which event two pitman rods *M*, and eccentrics *H*, will be neces-
 45 sary, arranged immediately next the boxes in which the main shaft journal turn, so as to bring the strain upon said shaft as near the sides of the frame *A*, as possible.

When the movable pistons, *D*, are inserted
 50 in dovetails in the frame *E*, as represented by red lines in Figs. 2 and 3, the distance between their faces and the faces of the stationary pistons *C*, and consequently the quantity of clay admitted to the molds, may be
 55 regulated by levers *l*, secured to them by

screws, near their centers, and to the frame *E*, by screws at their ends, and operated at the proper stages, by pins or studs projecting from the frame *A*.

Having thus fully described the construction and operation of this improved brick machine, what I claim therein as new and desire to secure by Letters Patent is:

1. Making the frame of the machine in one rectangular piece consisting of the sides
 65 and ends *A*, and the cross tie *B*, within it, to which the stationary pistons *C*, are secured, and provided with the bearings at its sides, upon which the movable piston frame *E*, and molds bear their entire length during
 70 the whole extent of their reciprocating movements, substantially as before described.

2. Expelling the air from the clay during the operation of pressing the same, and after
 75 the mold is closed by means of the movable molds *K*, *K*³, constructed, arranged, and operating as herein set forth.

3. The combination and arrangement of the right angled slotted levers *T*, connected
 80 together at top, sliding lifting platens, *S*', having pins or studs *S*² at their lower ends, which enter the slots of the said levers *T*, at the proper intervals of time, and horizontal
 85 sliding cross bar *V*, having anti-friction rollers on its ends, which enter the grooves *W*, in the cog wheels on the main shaft, for lifting or discharging the bricks from the molds, and pressing them between the upright springs *Y*, and standards, *X*, substan-
 90 tially as described.

4. Suspending the frames in which the sliding platens *S*', are secured, in horizontal guides *Q*, below the molds, for enabling their
 95 movements to be arrested by the ends of the stop bar *a* coming in contact with them, during the upward and downward movements of the lifting platens, as before described.

5. The employment of the upright springs *Y*, and standards *X*, on the sides of the slid-
 100 ing platen frame, for holding the bricks suspended on a plane sufficiently far above the pistons to clear them, and the cam bars *Z* for releasing the hold of the springs, and causing the bricks to drop on the upper sur-
 105 face of the pistons, as herein fully set forth.

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