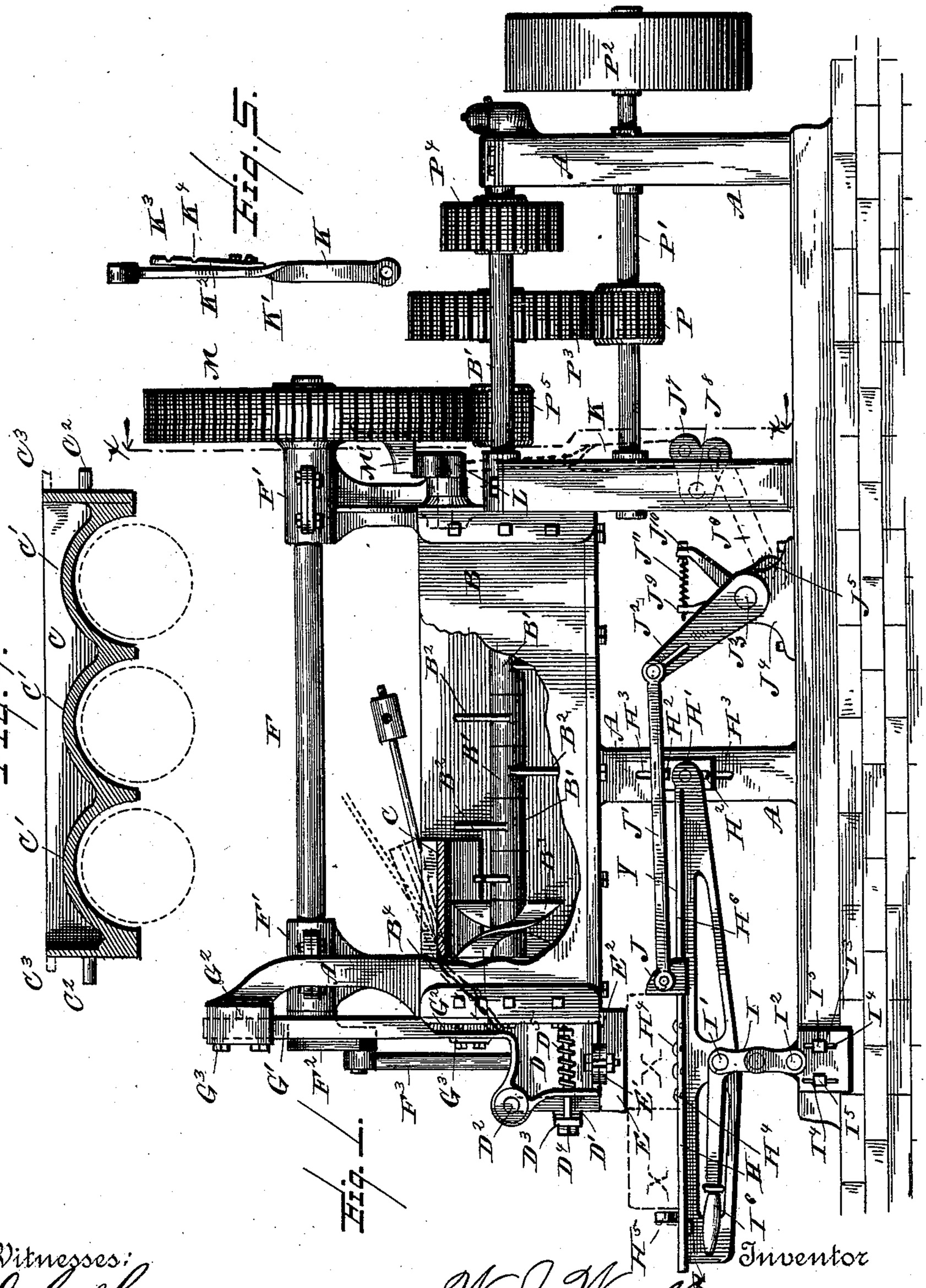
(No Model.) 2 Sheets—Sheet 1.

W. J. WOOLLEY.

BRICK MACHINE.

No. 361,038. Patented Apr. 12, 1887.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 1.

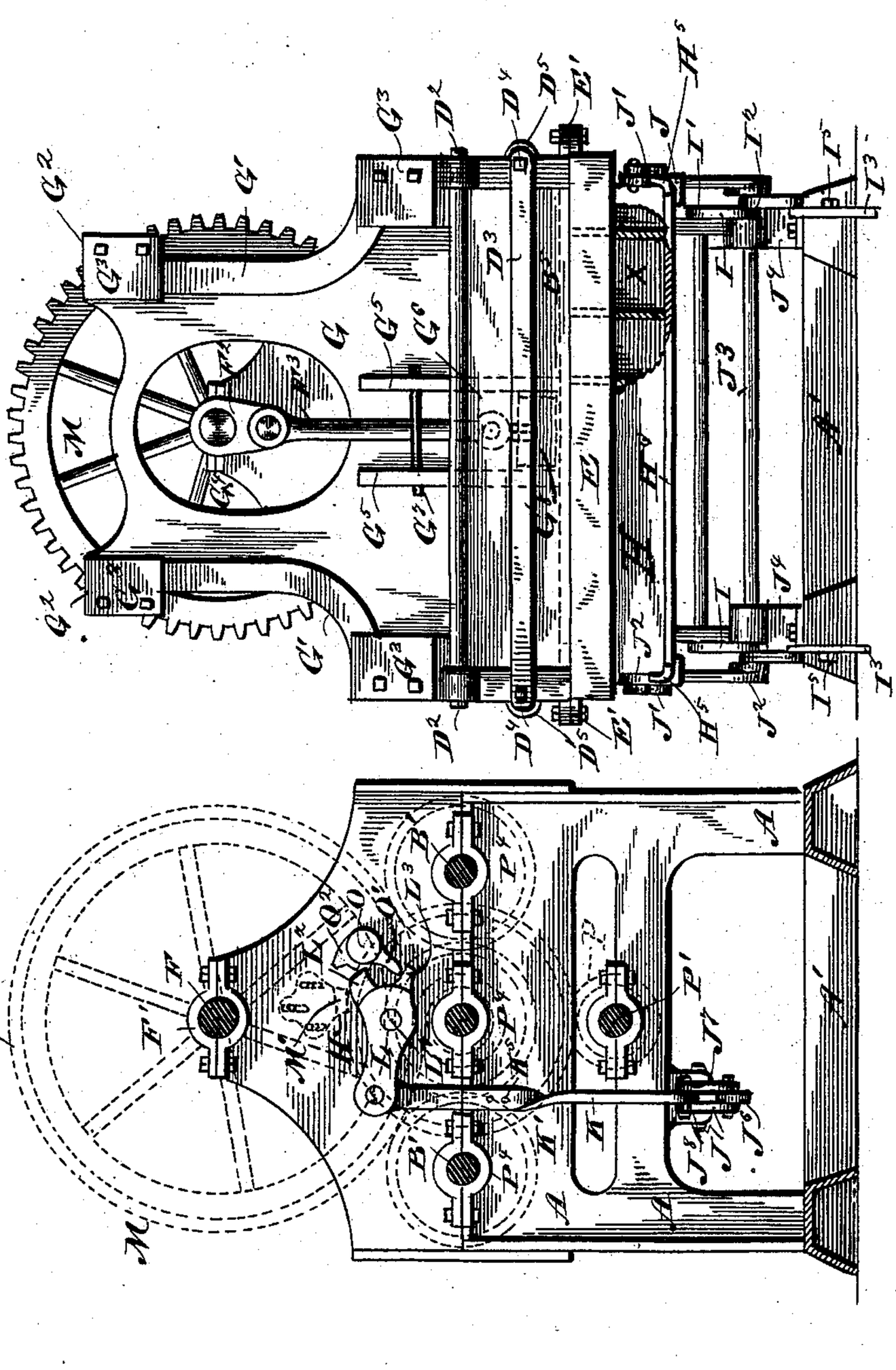

Fig. 2.

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UNITED STATES PATENT OFFICE.

WILLIAM J. WOOLLEY, OF ANDERSON, INDIANA.

BRICK-MACHINE.

SPECIFICATION forming part of Letters Patent No. 361,038, dated April 12, 1887.

Application filed January 15, 1887. Serial No. 224,467. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM J. WOOLLEY, a citizen of the United States, residing at Anderson, in the county of Madison, State of Indiana, 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.

This invention has relation to brick-machines of that class in which clay is forced through dies into the brick-mold by reciprocating mechanism; and among the objects of the invention are to provide a relief-plate for the clay-box, near its delivery end, relief devices for the plunger-box, automatic mechanism for placing and removing the molds, and mechanism for lowering the mold-table at will.

Other objects and advantages of the invention will appear in the following description, and the novel features thereof will be particularly pointed out in the claims.

Referring to the drawings, Figure 1 is a side elevation, with portions in section, of the machine constructed in accordance with my invention. Figs. 2 and 3 are a rear and a front elevation, respectively, of the machine. Fig. 4 is a sectional detail of the clay-box relief-plate. Fig. 5 is a detail, hereinafter described.

Like letters of reference indicate like parts in all the figures of the drawings.

A represents any suitable frame-work constructed and adapted to receive, support, and permit the desired movements of the several parts of the machine.

B represents the clay-box, in which are arranged a series of three shafts, B′, each provided with a series of knives, B^2, and each terminating with a feed-screw, B^3, so that by the rotation of the shafts the clay within the box is worked or tempered. The clay-box is open at its top, except at its front end, where there is provided a relief-plate, C, which consists of a casting (see Fig. 4) comprising three arches, C′, conforming in curvature to the peripheries of the several feed-screws B^3, so that these parts may revolve near the under inner surfaces of the arches, so long as the plate is in a horizontal position.

At its front end the plate is provided with pivots C^2, which are mounted on bearings formed in the side walls of the clay-box, and, if desired, lugs may project from the sides of the plate, as indicated by dotted lines C^3, Fig. 4, located at or near the front or free end of the plate, so that said lugs shall rest upon the upper edges of the opposite walls of the clay-box, in order to limit the downward movement of said free end and retain the plate in a horizontal position when not otherwise affected. The front wall of the clay-box is inclined, as shown by dotted lines, B^4, Fig. 1, and is provided with a discharge-opening, B^5, Fig. 3, through which the clay passes into the plunger-box D.

The front wall, D′, of the plunger-box is pivoted at its front upper corners, D^2, and extending from side to side across and in front of the cover D′ is a relief-bar, D^3, secured to the plunger-box by means of bolts D^4—one at each end—encircled by coiled springs D^5, which have a tendency to draw the bar D^3 and front D′ firmly against the ends of the plunger-box, and yet so as to permit of an outward movement of the front D′ when more than a normal pressure of the clay against its inner surface occurs.

E represents the die-plate, which is secured to the bottom of the plunger-box by means of bolts E′, passing through lugs E^2, formed on the die and on the plunger-box end.

F represents the plunger-shaft, which is supported at each end in bearings F′, formed in the frame-work, and at its front end is provided with a crank, F^2, to which is connected the plunger-rod F^3.

G represents the plunger, and G′ its side edges, which are made true and parallel, to run in gibs or ways G^2, formed in the frame-work of the machine, and provided with clamping-plates G^3, bolted to the face of the gibs to retain the plunger in the ways. The plunger is apertured in oval form, as at G^4, for the passage therethrough of the shaft and crank, and is provided on its face with supplementary gibs G^5, for the guidance and reciprocation of the cross-head G^6, (see dotted lines, Fig. 3,) to which the connecting-rod F^3 is pivotally attached. A pin or bolt, G^7, extends from gib to gib above the cross-head, to limit its upward movement, and a removable block or

spacer, G^8, is arranged between the gibs and below the cross-head, for the purpose of communicating the downward movement of the cross-head to the plunger. By inserting blocks G^8 of varied thicknesses a variable throw is given to the plunger in a manner well known in this class of machines.

H represents the mold-table of the machine, and it is pivoted at its rear end in a bearing, H′, which is secured by bolts H^2, passing through slots H^3 in a portion of the frame-work, whereby the rear end may be vertically adjusted. Otherwise the table is supported centrally at each side by toggle-levers I, one link of which is pivoted, as at I′, to the table, and the other, as at I^2, to a casting or bracket, I^3, having slots I^4, through which bolts I^5 pass into a portion of the frame-work.

The toggle-levers are duplicated at the opposite side of the machine from that shown in Fig. 1, and the pivots I′ I^2 are made to extend across the machine, so that by depressing the free end of a lever, I^6, which is rigidly connected to the upper link, I, of the toggle, the table may be lowered at the will of the operator. Friction-rollers H^4 are provided to facilitate the movement of the brick-molds along the table. A stop, H^5, is formed on or adjustably attached to the table to facilitate the loosening of the bricks within the molds, by oscillating the latter across the table between the opposite stops, H^5, therein, as is usual.

J represents a mold-placer or push-bar, which extends from side to side of the table, and which is constructed to embrace the edges H^6 thereof, which are at its rear fitted as guides or ways for the push-bar J. This bar is given a reciprocating movement on the table for a distance substantially equal to the width of the brick-molds employed in the machine, by mechanism constructed and properly timed in its operation, as follows:

Connecting-rods J′, one at each side of the machine, are pivoted to the push-bar J and to the rock-arms J^2, one at each side of the machine, these arms being mounted on a rock-shaft, J^3, having bearings in steps J^4, secured to the frame-work. Each of the rock-arms J^2 is extended beyond the rock-shaft to form short arms J^5, which are connected by links J^6 with a bell-crank plate, J^7, pivoted, as at J^8, to a portion of the frame-work.

The standard J^9 extends upwardly from the step J^4, and a bracket, J^{10}, is formed on each of the rock-arms J^2, and between the two is arranged a cushioning device or spring, J^{11}. From the bell-crank plate J^7 there extends a connecting-rod, K, which, in this instance, is a simple bar of iron provided with eyes at each end and quarter turned, as at K′, to bring the upper eye at a right angle to the plane of the lower eye of the rod. To the upper part of the rod K is secured a spring, K^2, having therein notches K^3 K^4. This spring is arranged between the rod and the frame of the machine, which frame is provided with a knife-edge, K^5, adapted to take into the notches in the spring. The upper end of the bar is pivotally connected to the longer arm of a pivoted lever, L, mounted on a fixed stud, L′, projecting from the frame of the machine. The lever L is extended beyond its stud or pivot to form one or more short arms, L^2 L^3.

M is a gear, rigidly mounted upon a shaft, for operating the plunger. To one of the spokes, or it may be to a web, M′, extending from one spoke to another of the gear, is adjustably secured a tappet, M, in such a position that once during each revolution of the gear said tappet comes into contact with the arm L^2 of the lever L, whereby the bar K, connected to the lever, is lifted to operate the other parts with which it is connected, as hereinafter described. Upon a fixed stud, O, projecting from the frame-work is mounted a returning-lever, O′, an arm, O^2, of which projects into the path of the tappet M, the arm O′ projecting below the arm L^3, or into a recess formed by the two arms L^2 L^3 of the lever L.

The remaining members of the system of gearing employed in this machine comprise a pinion, P, on the power-shaft P′, which is provided with a suitable belt-pulley, P^2, and a gear, P^3, mounted on the central shaft, B′, of the series of tempering-shafts arranged in the clay-box. Each of said shafts B′ is provided with a gear, P^4, (see Fig. 2,) meshing with each other. On the central shaft, B′, of the series is mounted a pinion, P^5, which meshes with the gear on the plunger-shaft.

The operation of my improved brick-machine is as follows: Clay being supplied in the clay-box and having been properly tempered by the operation of the shafts therein, the plunger is thrown into operation in the usual manner, so that as the plunger rises the clay is forced by the feed-screws through the throat or opening B^5 into the plunger-box, when the plunger descends, cutting off the further entrance of clay into the plunger-box and forcing that already therein down into and through the die E and into the brick-mold beneath the die. Now, for the purpose of bringing out some of the advantages of my improvements, I will temporarily discontinue the operation of the machine at this point. The throat of the box is now closed, and as the tempering-shafts of the feed-screws therein are still rotating there is a tendency in the clay to crawl up out of the box near its front end, so that my relief-plate C prevents the displacement of the clay from the box by swinging on its pivots to the position indicated by dotted lines, Fig. 1. The conformation of the relief-plate is such that when in a horizontal position the space between it and each of the shafts is confined, so that a backward movement of the clay toward the rear of the box is in a measure, if not entirely, prevented, and it also facilitates the retention of the already tempered clay at the front end of the box, as well as to prevent its discharge over the top edges of the box.

Again, should the quantity of clay which has been delivered into the plunger-box be excessive or unequally tempered, so that the pressure at one end of the plunger-box and against its front wall is abnormally greater than that at other portions thereof, then said front is acted upon by the rigid bar so to to yieldingly present a uniform resistance to outward movement of the front, and thus in a measure nullify the unequal pressure within the box and against its front wall. Again, should a stone or other foreign substance tend to prevent the removal of a brick-mold from beneath the die, the operator has simply to depress the front end of the handle I^6, and thus lower the table and permit the mold and the obstruction to be readily removed toward the front of the table. Again, by rendering the table adjustable both beneath and at the end thereof it may be adapted for the passage and filling of molds of varied depths, the parallelism of the upper surface of the table with the lower surface of the die being preserved. I will now resume the operation of the machine temporarily suspended.

A brick-mold had been filled. It now remains to remove the same from beneath the die and present another mold for filling. In the operation of the machine heretofore described the push-bar J has been withdrawn to the rear and to about the point Y, and the brick-mold has been placed by the attendant upon the table in front of the push-bar. With a revolution of the plunger-shaft the tappet N now comes in contact with the arm L^2 of the lever L, lifting the connecting-rod K, so that the notch K^4 of the spring K^2 becomes seated on the knife-edge K^5 in the frame and is yieldingly held from further upward movement. The upward motion of the lever K draws on the link J^6 by means of the bell-crank plate, and this throws the longer arm of the lever J^2 to the front, as shown in Fig. 1. This movement forces the brick-mold to a position directly beneath the die E, the filled mold being carried forward from beneath the die toward the stops H^5 on the table. In its forward movement the lever J carries its arm J^{10} toward the bracket J^9, thus compressing the spring or cushion between them, whereby the momentum of the arms and the push-bar is yieldingly overcome. The tappet N now moves into contact with the arm O^2 of the returning-lever, and its arm O′ abuts against the arm L^2 of the lever L, so as to lift the same and to depress its longer arm to which the bar K is provided. This causes a downward movement of the bar until the notch K^3 of the spring K^2 thereof becomes seated on the knife-edge. This movement of the bar pushes the link J^6 by means of the bell-crank plate and thus throws the rock-arm J^2 to the rear, drawing with it the push-bar J by means of the connecting-rod J′.

Although I have shown and described one system of gearing and connecting devices for operating the movable parts of my machine, I do not confine my invention in this regard to the exact devices shown and described for the purpose specified, as they may be varied in any regard and to any extent within the limits of mechanical skill without a material departure from my invention.

Having described my invention and its operation, what I claim is—

1. The combination, with the clay-box of a brick-machine and with the tempering and feeding mechanism therein, of a relieving-plate constructed to conform to the peripheries of the feeding-screws of the tempering mechanism, substantially as specified.

2. A relieving-plate for a brick-machine, having an arched or curved outline in cross-section, substantially as specified.

3. A relieving-plate for a brick-machine, having a curved or arch form in cross-section, and provided with pivots and means for retaining the same in a horizontal position, substantially as specified.

4. In a brick-machine, the combination, with the plunger which acts as a gate, and the clay-box and its feeding mechanism, of a relieving-plate having a curved form in cross section, substantially as specified.

5. In a brick-machine, the combination, with the plunger-box, the front wall of which is suspended on pivots, of a front retaining-bar, and bar-retaining bolts encircled by springs, said bolts being arranged at the end of the plunger-box and capable of longitudinal movement against the tension of the springs, substantially as specified.

6. In a brick-machine, and in combination with the table thereof, a push-bar mounted for reciprocation upon the table and connected by a rock-arm operated by suitable devices connecting the same with a tappet on the gear of the plunger-shaft, whereby at each revolution of said gear and during each reciprocation of the plunger the push-bar is operated, substantially as specified.

7. In a brick-machine, a tappet secured to the gear of the plunger-shaft, in combination with a lever pivoted to the frame-work and projecting into the path of the tappet, and with a rock-arm, push-bar, and suitable connecting devices, substantially as specified.

8. In a brick-machine, and in combination with the plunger-shaft thereof, a tappet connected with the shaft, a lever pivoted in the path of the tappet, and a return-lever, also pivoted in the path of the tappet and constructed to reverse the movement of the first lever produced by the tappet, substantially as specified.

9. In a brick-machine, a tappet mounted for motion synchronous with that of the plunger, in combination with a primary lever pivoted independently and in the path of the tappet for receiving one motion therefrom, and a secondary lever independently pivoted in the

path of the tappet in advance of the primary lever, for giving a return movement to the latter, substantially as specified.

10. In a brick-machine, the combination of the plunger-shaft, a tappet mounted thereon, pivoted levers mounted in the path of the tappet, a connecting-bar, a bell-crank plate, and a yielding stop device mounted on the bar and having contact with a fixed portion of the machine, whereby the momentum of the levers specified is cushioned, substantially as specified.

11. In a brick-machine, the combination, with a push-bar, its connecting-rods and rock-arms, of a cushioning device for cushioning the push-bar and its connections, substantially as specified.

12. In a brick-machine, the combination, with the table, of a push-bar mounted for reciprocation thereon, connecting-rods, rock-arms mounted on a shaft, connecting-links, a bell-crank plate, a connecting-bar, and a lever pivoted in the path of a tappet carried by the plunger-shaft, substantially as specified.

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

WILLIAM J. WOOLLEY.

Witnesses:

E. B. STOCKING,

WILLIAM S. DUVALL.