G. W. BOND.

BRICK MACHINE.

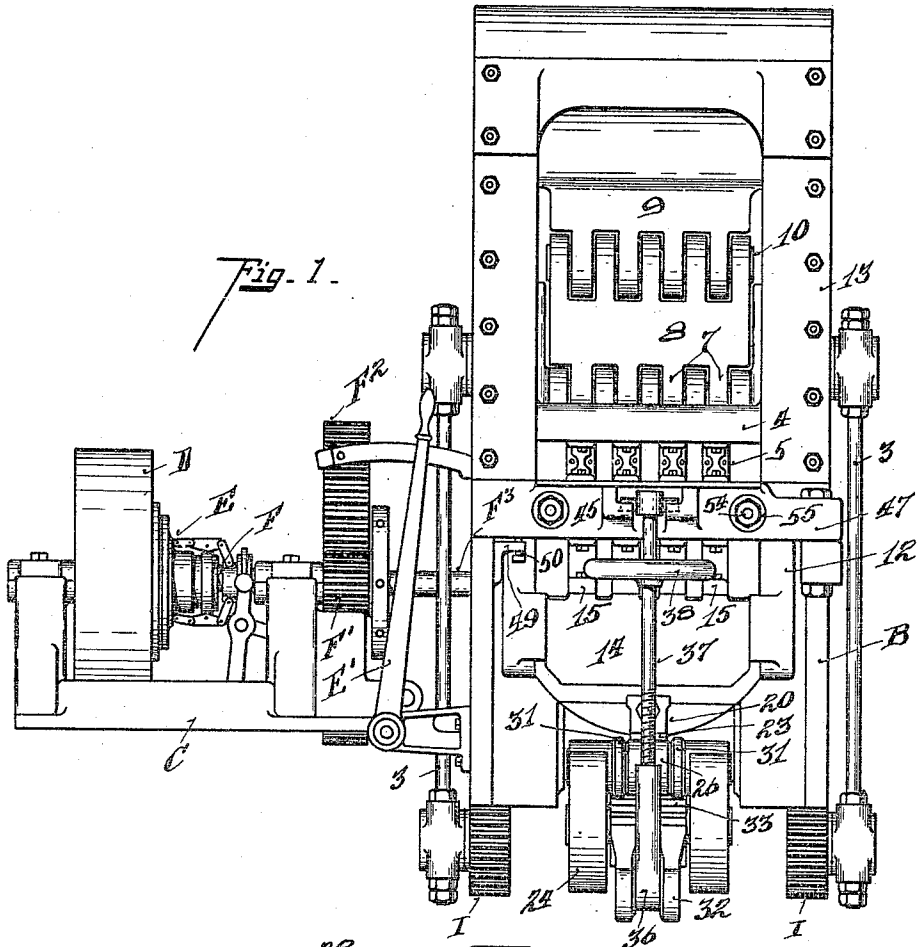
APPLICATION FILED MAR. 24, 1908.

957,543.

Patented May 10, 1910.

4 SHEETS—SHEET 1.

Fig. 1.



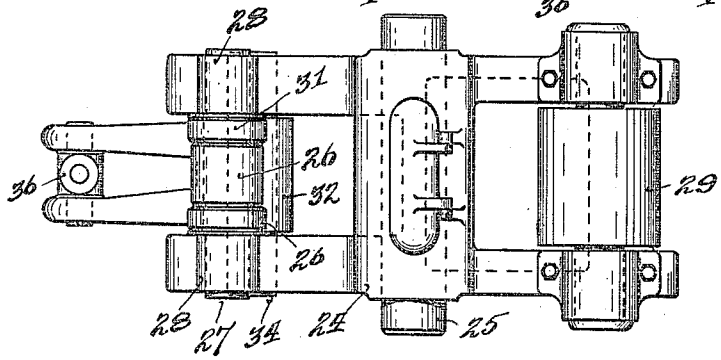


Fig. 2.

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Witnesses

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4 SHEETS—SHEET 2.

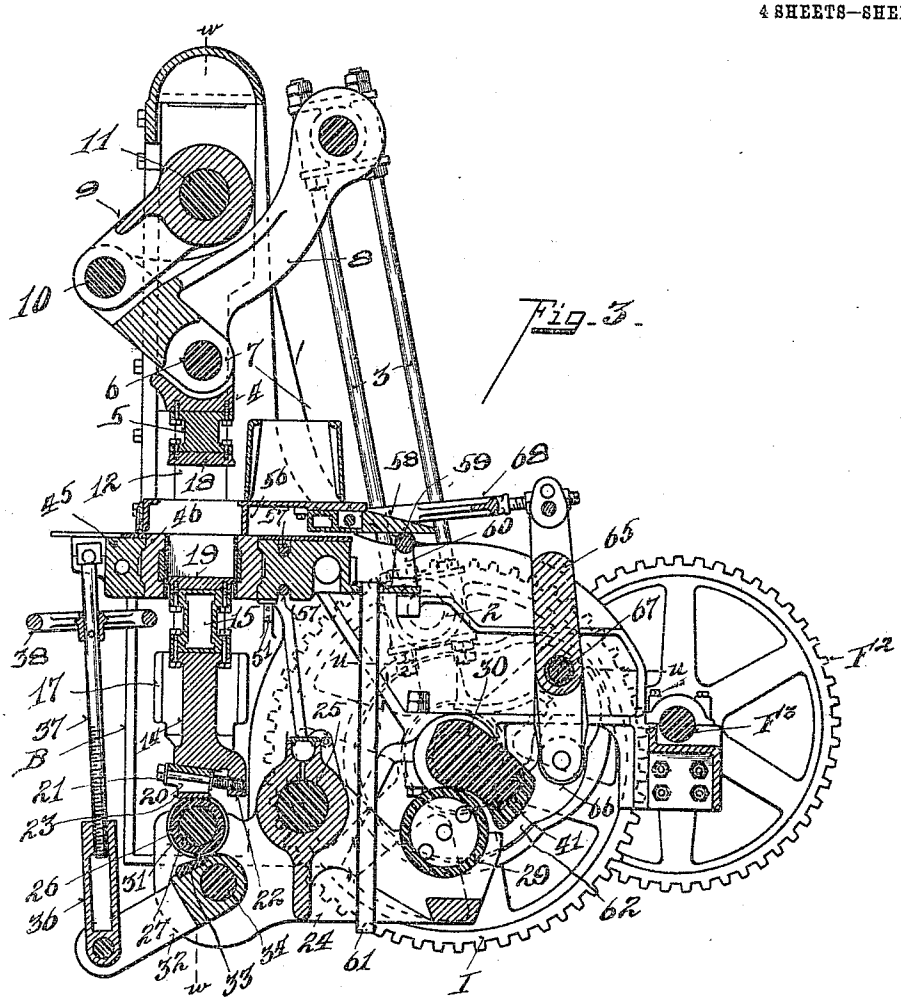

Fig. 3.

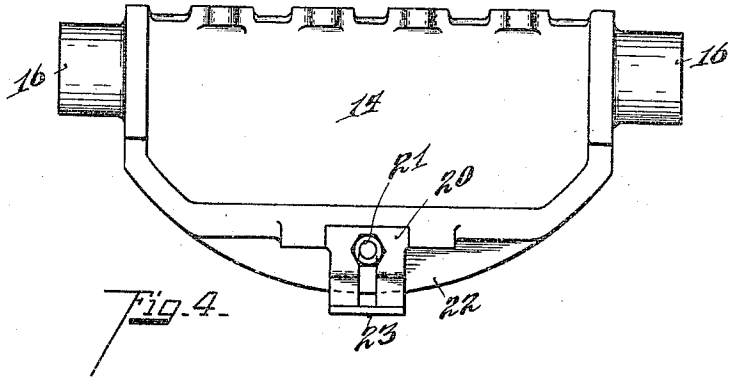

Fig. 4.

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4 SHEETS—SHEET 3.

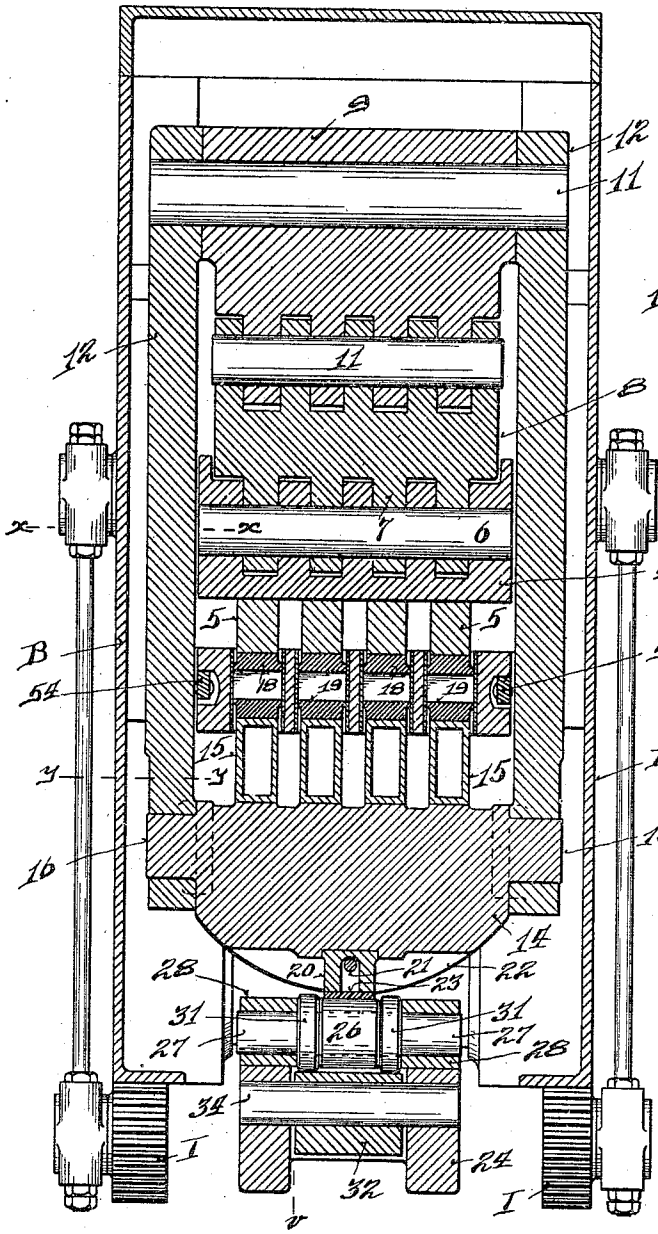

Fig. 5.

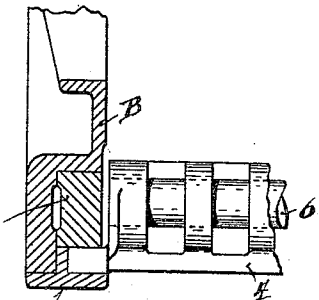

Fig. 6.

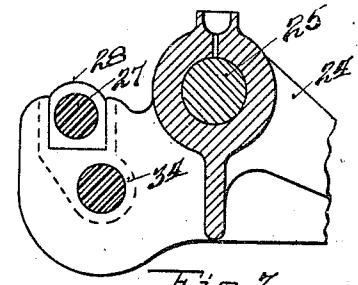

Fig. 7.

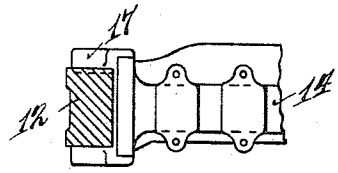

Fig. 8.

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4 SHEETS—SHEET 4.

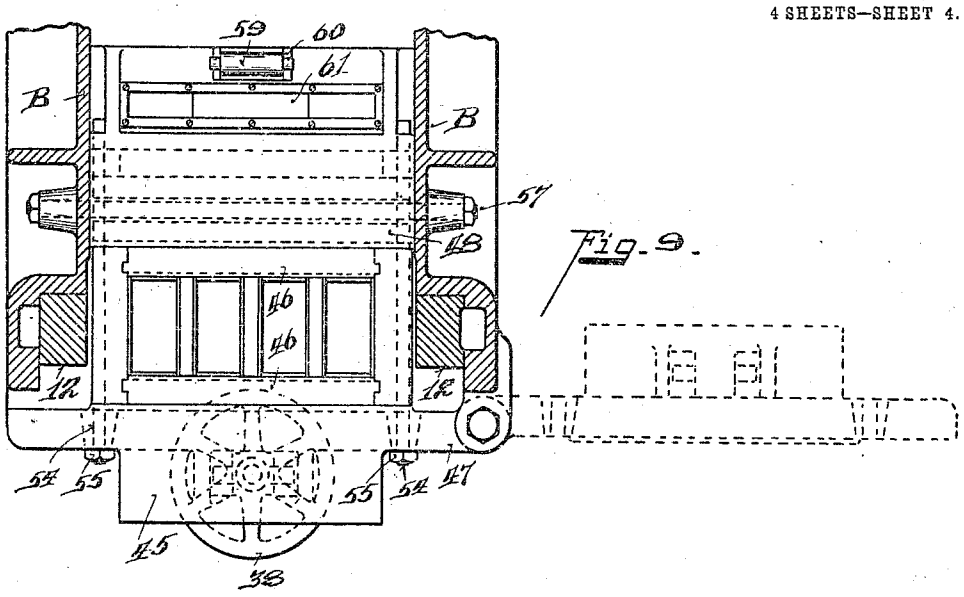

Fig. 9.

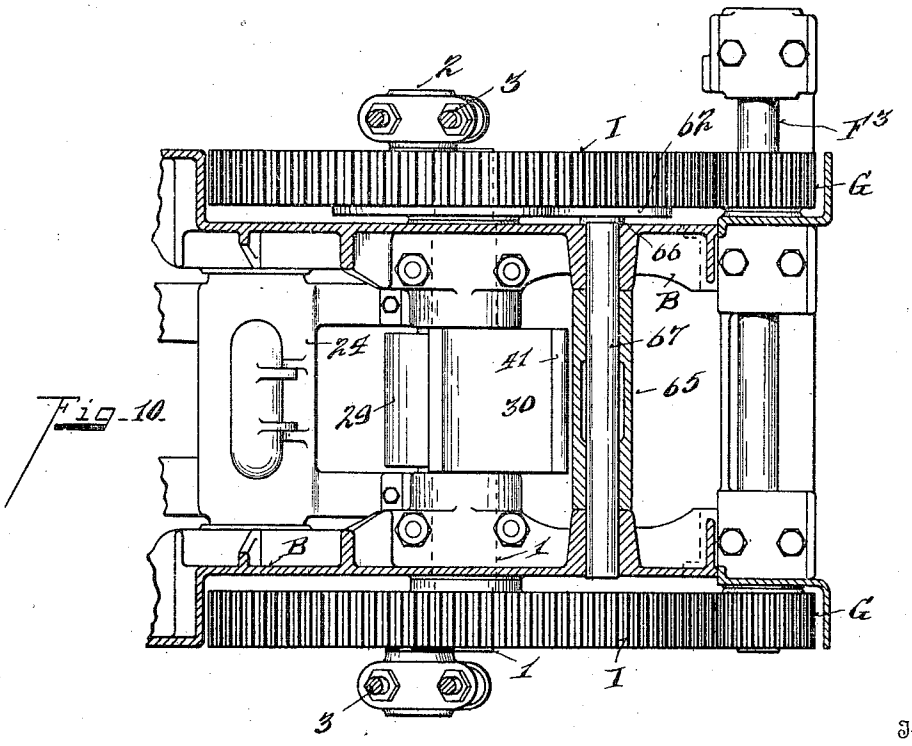

Fig. 10.

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UNITED STATES PATENT OFFICE.

GEORGE W. BOND, OF ELWOOD, INDIANA, ASSIGNOR TO THE ELWOOD IRON WORKS, OF ELWOOD, INDIANA, A CORPORATION OF INDIANA.

BRICK-MACHINE.

957,543. Specification of Letters Patent. **Patented May 10, 1910.**

Application filed March 24, 1908. Serial No. 423,055.

To all whom it may concern:

Be it known that I, GEORGE W. BOND, a citizen of the United States, residing at Elwood, in the county of Madison and State of Indiana, have invented certain new and useful Improvements in Brick-Machines, of which the following is a specification.

One of the objects of my invention is to fulcrum a bell crank lever directly upon the cross-head of the upper plunger, the cross-head being suspended upon said lever.

Another object of my invention is to employ a bell crank lever and toggle link fulcrumed upon the upper cross-head, the link of the toggle being hinged to the lever arm and to slide-bars upon which the lower cross-head is mounted and normally resting upon the lifting lever to control the throw of the lower plungers.

Another object of my invention is to support the lower plunger upon slide-bars, the cross-head of said plungers firmly supported upon a lifting lever, which controls the throw of the lower plungers.

Another object of my invention is to provide means for the initial lifting of the lower plunger and obtaining the initial compression therefrom on the underside of the brick by initial movement of the lower plungers, as the toggle pivots are moving from the dead center.

Another object of my invention is to provide means for firmly and unyieldingly supporting the lower plunger member upon the lifting lever and to impart an upward pressure before the act of ejecting the brick, and to finally eject the brick from the molds by an accelerated movement of the lifting lever.

Another object of my invention is to provide a lifting roller supported upon a single coacting arm, both arm and roller being mounted and journaled in the lifting lever.

Another object of my invention is to provide means for adjusting the lower plunger vertically upon the supporting roll, and also to provide means for adjusting vertically the position of the lifting roller upon a coacting supporting arm.

Another object of my invention is to provide a cam mechanism coacting with a cylindrical roller journaled upon the lifting roller for controlling the lifting movements of the lower plunger.

Another object of my invention is to provide means for increasing and decreasing the throw of the lifting cam.

Another object of my invention is to provide means for adjusting the lower plungers to any desired position relative to the thickness of the brick or the amount of clay to be compressed.

Another object of my invention is to provide ready means for renewing and adjusting such parts of the mechanism as are subjected to great wear, so as to obtain uniform results in the operation of the brick machine.

Another object of my invention is to provide a mold-box inclosed within the frame, and a horizontally hinged door to which the mold-box is clamped, and suitable ways in the frame upon which the mold-box and tables are supported, said ways being provided with set screws for adjusting the level of the mold-box and tables.

Another object of my invention is to provide a rear mold table supported upon brackets provided with means for adjusting said table vertically, and means for locking said table in adjusted position.

Another object of my invention is to provide a bracket carrying an anti-friction roller upon which the charger is supported and slides.

The features of my invention are more fully set forth in the description of the accompanying drawings, forming a part of this specification, in which:—

Figure 1 is a front elevation of my improved brick machine. Fig. 2 is a top plan view of the lifting lever. Fig. 3 is a central vertical section through the machine, with the parts in their normal position. Fig. 4 is a front elevation of the lower cross-head. Fig. 5 is a section on line *w*, *w*, Fig. 3, showing the parts in their initial, compressing position. Fig. 6 is a section on line *x*, *x*, Fig. 5. Fig. 7 is a section on line *v*, Fig. 5, of the lifting lever. Fig. 8 is a section on line *y*, *y*, Fig. 5. Fig. 9 is a section, through a portion of the machine, illustrating the molds and table in elevation. Fig. 10 is a section on line *u*, *u*, Fig. 3, with the supplemental driving frame omitted.

As shown in the drawings, the brick machine is of that type adapted to press clay or sand and lime into brick form, and consists of the following mechanism:—

B represents the side frame.

C represents the frame supporting the driving mechanism.

D represents the main driving pulley.

E represents a clutch for throwing the driving shaft F into and out of operation, said clutch being controlled by the lever E′.

F′ represents a gear fixed upon shaft F and meshing with a gear F^2 fixed on an intermediate shaft F^3. Said intermediate shaft F^3 is suitably journaled in a frame secured to the side frame B, (see Figs. 3 and 10).

G represents intermediate gears fixed on shaft F^3, meshing with gears I fixed on the cam shaft 1. These gears I are placed upon each side of the machine, as shown in Fig. 10, and form master gears for actuating the various levers and mechanism to produce the requisite operation of pressing brick. The gears I are provided with crank pins 2, upon which the pitman or connecting rods 3 are hinged at one end, the opposite end of the rods 3 being pivotally connected to a bell crank lever controlling the movement of the upper plungers.

4 represents the upper cross-head to which the plungers 5 are secured. The cross-head moves in ways formed between the front face plates 13 of the side frames and the slide bars (see Fig. 6).

8 represents a bell crank lever provided with ears 7 adapted to lie between ears projecting from the cross-head 4.

6 represents a pin extended through the ears of both the bell crank lever and cross-head for forming a pivotal connection between the two members.

9 represents a toggle lever pivotally connected to ears projecting from the bell crank lever 8 by means of the pin 10. Said toggle lever is pivotally connected by means of the pin 11 to the slide-bars 12. These slide-bars 12 are located in guide slots formed in the main frame, as shown in Fig. 6.

14 represents a lower cross-head mounted upon the slide-bars 12, by means of the gudgeons 16 projecting from the cross-head and entering into bores formed in the slide-bars 12.

17 represents flanges projecting from the slide-bars 12 overlapping the edges of the lower cross-head 14 for rigidly maintaining the cross-head against pivotal movement upon the slide-bars.

5 represents plungers secured and projecting from the upper cross-head, and 18 represents plunger plates secured to said upper plunger.

15 represents plungers secured to the lower cross-head 14, said plungers being likewise provided with plunger plates 19.

The construction of the plungers are such that they are reversible upon their cross-head, and in assembling no attention need be paid as to which end should be mounted upon its plunger or to receive the plunger plate. The lower cross-head 14 is provided with an inclined groove adapted to receive the foot plate 20, said foot plate carrying an adjusting screw 21, having a threaded engagement with a flange 22 projecting from the lower cross-head.

23 represents a wearing plate secured to the foot plate 20. The upward movement of the lower cross-head and its contained parts, together with a partial upward movement of the upper cross-head is obtained by the following instrumentalities:—

24 represents a lifting lever supported on axle 25, said axle being mounted in suitable bearings formed in the side frame.

26 represents a roller mounted upon the axle 27, said axle being supported in the slide-boxes 28. The slide-boxes 28 are mounted in a groove formed in the lifting lever 24. The roller 26 is in contact with the bearing plate 23 for imparting upward movement to the upper cross-head.

29 represents a roller journaled on the rear portion of the lifting lever, (see Fig. 2), adapted to contact with the surface of the cam 30 of the cam shaft 1, the weight upon the front end of the lifting lever maintaining the contact of the roller 29 with the cam 30, together with such working strains as are brought upon the forward end of the lifting lever during the brick compression action between the upper and lower plungers. Thus the rotation of the cam, owing to its peculiar shape, raises the lower cross-head and its contained parts, and the return is caused by the weight upon the forward end of the lifting lever. To adjust the lower plungers to a proper depth in the mold-box, the following instrumentalities are provided:—

31 represents rollers journaled upon the shaft or axle 27 upon each side of the roller 26, (see Figs. 2 and 5).

32 represents an arm provided with an inclined surface 33, adapted to contact with the rollers 31, said inclined surface being preferably in the form of a wearing plate secured upon the arm 32. Said arm 32 is pivotally connected upon the axle 34 supported in the lifting lever 24.

36 represents a screw threaded sleeve pivotally connected upon the forward end of the arm 32, and 37 represents a screw rod having a threaded engagement with the sleeve 36 at one end, and supported and swiveled at its opposite end in a head detachably connected to the front mold table 45; the connection is such that it can readily be detached and swung outward to gain access to the mold-box to remove the plates forming the mold and the like.

38 represents a hand wheel for turning the screw rod to adjust the inclined surface to any desired pitch necessary to obtain the proper depth in the mold-box by lower-

ing the lower plunger. Such adjustment of lower plunger is necessary, owing to varying conditions of the clay, and by this means of adjustment the normal position of the lower plungers within the mold-box may be varied at pleasure. Some clays require more compression than others, the position of the lower plungers within the mold-box determines the amount of charge fed therein.

In order to adjust the lower plungers to aline the plunger plates with the face of the mold table, the foot plate 20 is moved in or out upon the inclined surface of the lower cross-head by means of the adjusting screw 21, which raises or lowers said cross-head and its contained parts as required. The depth of mold for the different thicknesses of brick can also be increased or decreased by adjusting this foot plate and correspondingly changing the throw of the lifting lever by lengthening or shortening the cam 30. To accomplish this, I have constructed the cam with a detachable plate 41, which is secured to the main body of the cam by a dove-tailed tongue and slot formed in the respective members, so that by changing the face plate the requisite length of throw of the cam is readily obtained. I have therefore provided two different means for adjusting the normal position of the lower plungers in the mold frame, one to make the smaller adjustments to adjust the plungers in the mold frame to compensate for wear of the parts and to regulate the amount of the different charges to suit varying conditions in every-day practice experienced in using this class of machinery, the other adjustment in length of cross-head and length of cam is provided so as to obtain bricks of varying thicknesses as occasion demands.

It will be observed that the lifting lever is journaled to the main frame by an axle 25, and that the cam 30 on the cam shaft and roller 29 are always in contact, so that the contour of the cam 30 controls the position and movement of the lifting lever 24. Changing the contour of the cam, the movements of the lever can be varied, and if desired the contour of the cam can be made to give an accelerated motion to the lifting lever when the toggles of the upper plunger are moving away from the dead center, subjecting the brick in the mold to greater pressure. This accelerated motion causes the lower plunger to move faster than the upward movement to the upper plunger. In such instance the link 9 is moved vertically with the slide bars 12, causing its opposite end, connected to the bell crank lever, to flex inward or counteract the outward or raising movement of the bell crank lever. This action having a tendency to practically maintain the upper plunger in a stationary position as far as its actuating mechanism is concerned, and if moved upward is through its connection upon the brick and lower plunger.

The lifting of the upper plungers initially is slow, and by accelerating the movement of the lower plungers and slide bars, additional and continued pressure can be obtained. As the accelerating movement is accomplished by the contour of the face of the cam 30, the detachable plate 41 is provided, enabling interchangeability of plates having faces of greater or less convexity to suit different conditions.

The operation of the upper and lower plungers, and their contained parts, is as follows:—The upper plunger is lowered into the mold-table through the action of the main gears I, connecting the rods 3, actuating bell crank lever 8, moving the same downward and the toggle lever 9 to the right, forcing the upper plunger into the mold-box, in which position the toggle lever and bell crank lever are brought to a dead center. The cam 30 is relatively positioned with the connecting rods of the bell crank lever to commence a lifting action upon the lower plunger at such dead center position of the upper plunger levers. The toe portion of the cam contacts with the roller 29, depressing the rear end of the lever 24, raising the forward end thereof, which in turn raises the lower cross-head and its contained mechanism, likewise carrying with it the side plates and upper plunger and lever mechanism a slight distance, which compound movement of slide-bars and connecting rods 3 actuates the upper plungers faster than the lower plungers, enabling the same to clear the brick and pass up above the charger, as the lower plunger is moved to its alined position in the face of the mold-table. When the lower plunger is adjusted upward by the arm 32 from its normal position, shown in Fig. 3, the rollers and sliding boxes 28 occupy a raised position within their seat in the lifting lever. The upward action of the lower plungers in such position is caused as follows:—The lower plungers are raised by the contact between the rollers 23 and adjusting arm 32 until the forward end of the lifting lever has moved upward, which action in such instance is slightly faster than the raising action of the lower plungers, seating the boxes against the lifting lever when the lifting action is transferred to the central roller 26 and continues throughout the remainder of the compression or raising action of the lower plungers. This changing of lifting points from one member to the other is gradual and without jar. In normal or lowest adjusting position of the lower plungers by the arm 32, the slide boxes 28 are in direct contact with the lifting lever and the action of the lifting lever is direct with roller 26 and plungers.

The mold table is constructed as follows:—45 represents the front mold table which is gained upon its inner face to receive a corresponding boss on the mold frame 46 (see Fig. 3). The table is provided with horizontal hinge projection 47, pivotally connected to a bracket projection extending from the frame B so as to be freely swung outward. 48 represents the rear table, likewise gained and gaged to the rear side of the mold frame. The front mold table is sustained by hinges at one end, and by a bracket 49 at the other end, (see Fig. 1), through which passes an adjusting screw 50, the point of which contacts with the rear end of the table 45. The rear table is supported on like brackets 51, (see Fig. 3), provided with set screws engaging with the table, so that the tables may be adjusted vertically by means of said screws. Said tables and mold frame are provided with longitudinal cores, through which are loosely passed clamping rods 54. 55 represents nuts for drawing the parts together. The front mold table can be swung outward by releasing the nuts 55 and disengaging the screw rod 37 from its connection with the table.

The rear table, of course, supports the charger 56. In order to hold the table firmly in position against the thrusts of that charger, I have provided cross tie bolts 57 lying in gains supported in said table. 58 represents the tail extension of the charger. 59 represents an anti-friction roller supported upon brackets 60, so as to relieve the charger of friction. 61 represents a dust discharge spout for the dischargement of the surplus of the charge down into a pit in rear of the table. 65 represents arms provided at their lower ends with friction roller 66 moving in cam-way 62 on one of the master gears G. These arms fulcrum with the main frame at 67. 68 represents a pair of arms hinged to the charger and adjustably secured to the free ends of arm 65. This method of operating the charger is in common use.

Having described my invention, I claim:—

1. In a brick press employing two opposed plungers, slide-bars, a bell crank lever fulcrumed on the cross-head of the upper plungers, a toggle link hinged to one of the arms of the bell crank lever and journaling on said slide-bars, the cross-head of the opposite plungers mounted on said slide-bars, and lever mechanism for operating the said slide-bars, substantially as described.

2. In a brick press, a main frame, slide bars, a lower plunger secured to said slide-bars, an upper plunger, a bell crank lever pivotally connected to said plunger, a link pivotally connected to said slide-bars and one arm of the bell crank lever, a drive shaft, connections between said bell crank lever and drive shaft flexing said bell crank arm and link outward in an upward movement of the upper plunger, and lever mechanism for operating said lower plunger and slide-bars.

3. In a press employing a bell crank lever and toggle link, two opposed plungers upon one of which the bell crank lever is fulcrumed, slide-bars, the toggle link journaled on said slide-bars, the opposite plungers mounted upon said slide-bars, a lifting lever, a cylinder journaled in sliding boxes carried by said lifting lever, and a coacting supporting arm journaled upon said lifting lever, substantially as described.

4. In a press employing two opposing plungers, slide-bars carrying one of said plungers, a lifting lever, guide-ways in said lever, sliding boxes in said guide-ways, a cylindrical roll journaled in said boxes, a segmental arm journaled in said lifting lever and contacting with companion rollers during the initial movement of the lifting lever, substantially as described.

5. In a press employing two opposing plungers, slide-bars carrying one of said plungers, a cross-head supporting said plungers and provided at its foot with an adjusting wedge, a lifting lever, a cylinder journaled thereon and contacting with said adjusting wedge, substantially as described.

6. In a press provided with two opposed plungers, slide-bars upon which the cross-head of one set of said plungers is mounted, a lifting lever, a central roll loosely journaled therein and contacting with the foot of the cross-head, a segmental arm journaled on said lifting lever and having an incline contacting with rolls adjacent to the central roll during the initial movement of the lifting lever, and means for adjusting said arm radially, substantially as described.

7. In a press, employing opposing plungers, the cross-head of one of which is operated by lifting lever mechanism consisting of three loosely journaled rolls thereon, the central roll contacting with the foot of the cross-head, and the outer rolls contacting with an adjustable arm journaled upon the lifting lever provided with an incline for imparting the initial lifting movement of the cross-head, substantially as described.

8. In a press carrying an upper and lower opposed plunger, a cross-head of the lower plunger being mounted upon slide-bars and supported upon rolls loosely journaled in the lifting lever, an adjusting arm coacting with the supporting roll journaled upon the lifting lever and hinged at the opposite end to an adjusting device at the front of the machine, substantially as described.

9. In a brick press, mechanism for operating the lower cross-head and plunger, a lifting lever carrying operating mechanism for said cross-head composed of a roll loosely journaled in said lever, and a coacting in-

clined arm, a friction roller journaled on said lever, a driving cam in contact therewith and controlling the movement of the lifting lever, said cam being provided with a detachable face plate, substantially as described.

10. A mold table for a brick press, consisting of a front table horizontally hinged to the frame and adjustably supported upon brackets secured to the frame, a rear table forming an apron supporting the material carried by the charger, means for adjusting the table vertically and horizontally, a mold-box interposed between the said table, and means for clamping the parts in their adjusted position, substantially as described.

11. In a brick press, a main frame, a pair of slide-bars vertically movable therein, a lower plunger fixed to said slide-bars, lever mechanism for operating said plunger and slide-bars, coacting vertically movable and pivotally movable means mounted on said lever in connection with said plunger, a cam surface on said pivoted means engaging said vertically movable means, and means for adjusting said pivoted means, thereby correspondingly adjusting said cam surface relatively to said vertically movable means.

12. In a brick press, a main frame, slide-bars, a lower plunger secured to said slide-bars, an upper plunger, a bell crank lever pivotally connected to said upper plunger, a link pivotally connected to said slide-bars and one arm of the bell crank lever, a main drive shaft, a cam upon said shaft, a lifting lever pivoted upon said main frame, one end engaging said cam, the opposite end engaging said lower plunger, said cam being formed to provide an accelerated upper movement to said lower plunger during a partial upper movement of the upper plunger, substantially as described.

In testimony whereof, I have hereunto set my hand.

GEORGE W. BOND.

Witnesses:

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LEO J. O'DONNELL.