

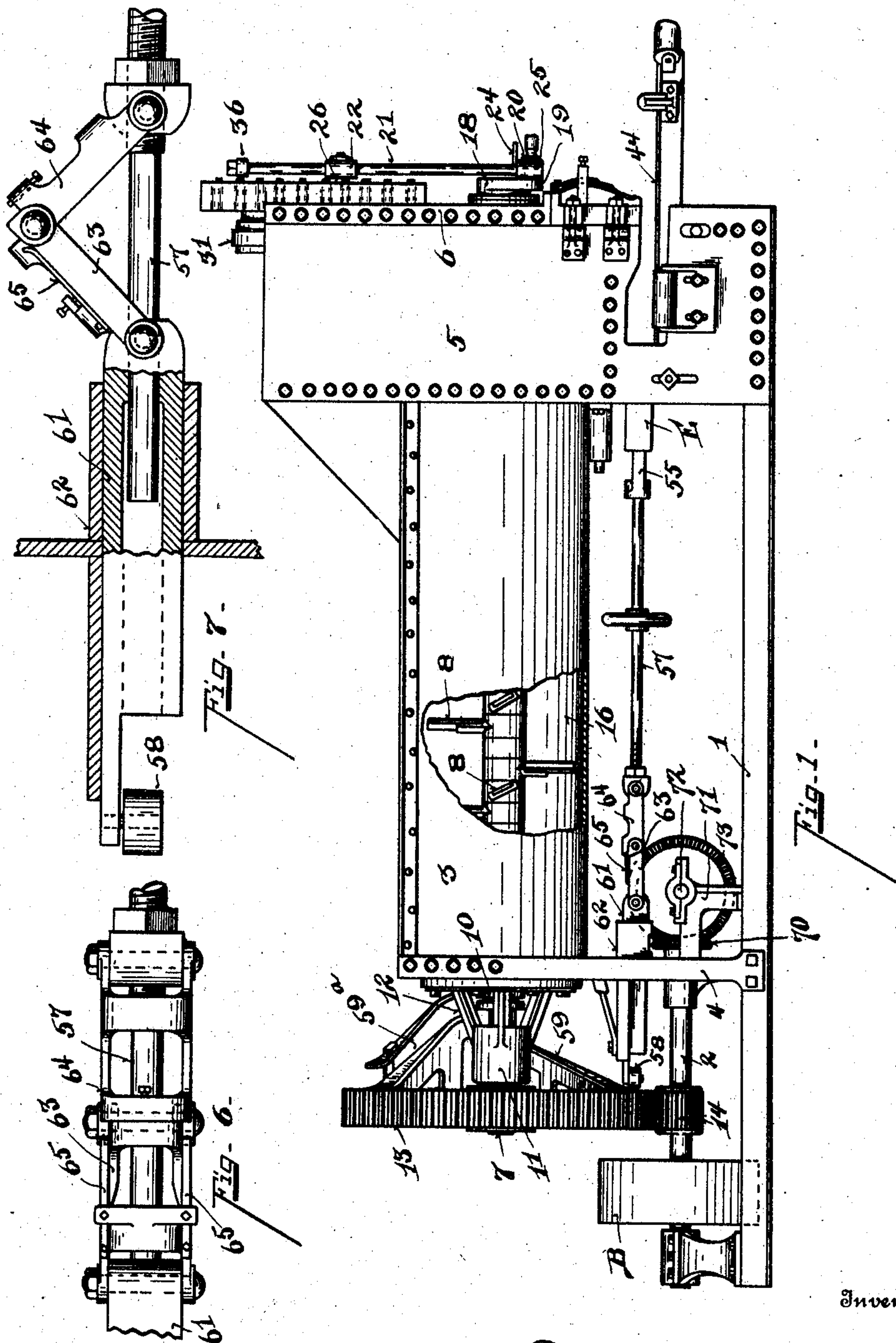
No. 787,019.

PATENTED APR. 11, 1905.

D. J. C. ARNOLD.
BRICK MACHINE.

APPLICATION FILED SEPT. 23, 1904.

3 SHEETS—SHEET 1.



Witnesses

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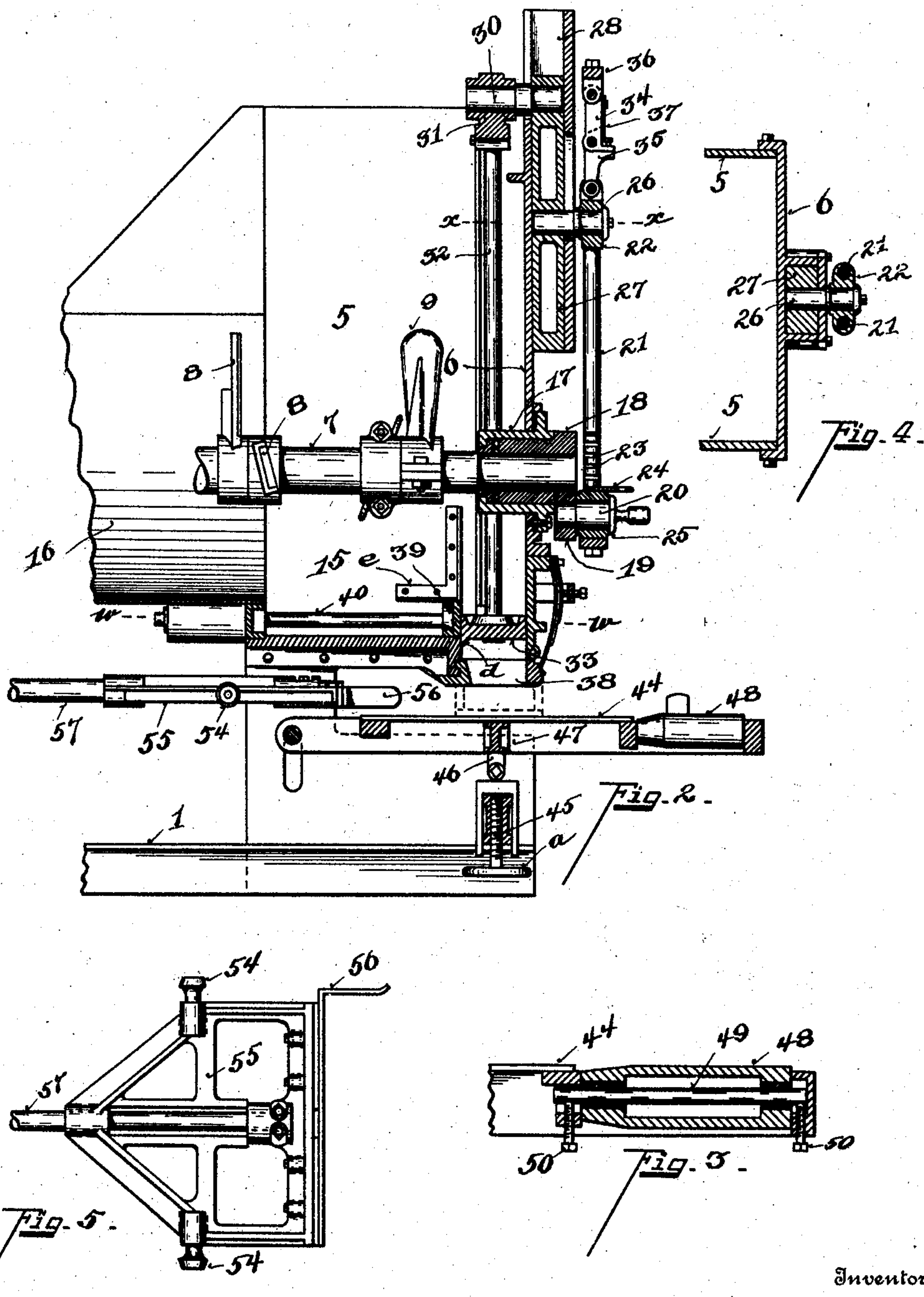
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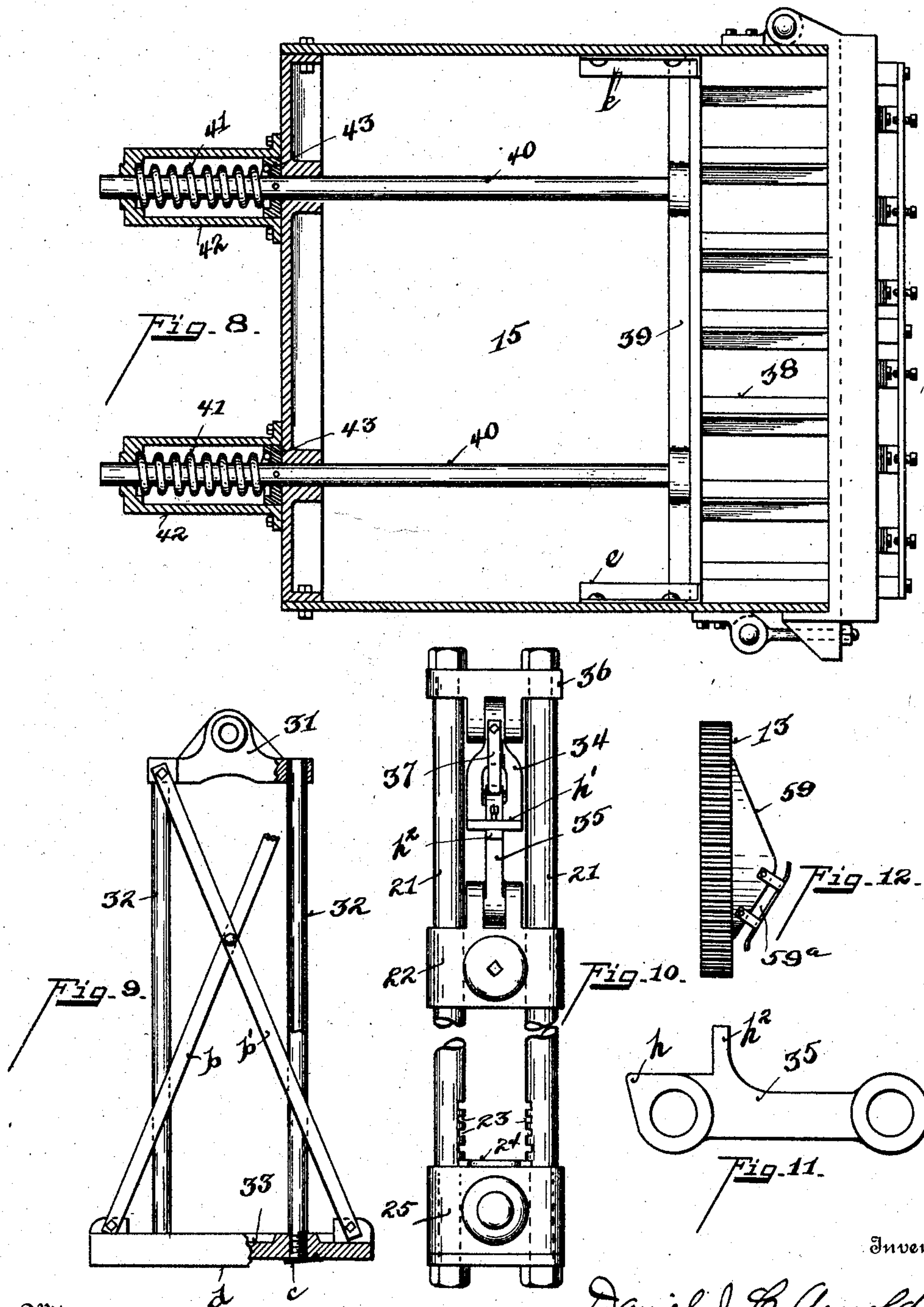
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

DANIEL J. C. ARNOLD, OF NEW LONDON, OHIO, ASSIGNOR TO THE
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BRICK-MACHINE.

SPECIFICATION forming part of Letters Patent No. 787,019, dated April 11, 1905.

Application filed September 23, 1904. Serial No. 225,560.

To all whom it may concern:

Be it known that I, DANIEL J. C. ARNOLD, a citizen of the United States, residing at New London, in the county of Huron and State of Ohio, have invented certain new and useful Improvements in Brick-Machines, of which the following is a specification.

My improvements relate to that class of brick-machines known as the "horizontal soft-mud" brick-machine.

It consists generally of a horizontal pug-mill, a chamber at the front of the delivery end, and a vertical inside press for forcing the tempered clay into the mold.

One of the objects of my invention is to provide the lower portion or face of the press-plunger with air-valves and hollow connecting-rods forming air-passages thereto, enabling the making of a perfect brick by admitting the air on top of the mass of clay and preventing the air from being drawn up through the mass of clay when the press-plunger rises.

Another object of my invention is to provide a flange at the rearward edge of the press-plunger, preventing an uneven pressure upon the clay by reason of the undue escape of clay, during the downward pressure, from under the press-plunger into the charging-chamber, decreasing the supply of clay.

Another object of my invention is to provide a yielding press-box at the bottom of the pugging or charging chamber, acting as a relief to allow the surplus clay to escape into the pugging-chamber and to yield when the mass of clay should contain stone or other foreign substances apt to injure the molds when carried down by the plunger.

Another object of my invention is to provide the mold-actuating mechanism and pit-man for operating the press-plunger with particular relief mechanism preventing undue strains upon such parts.

The object of my invention is to provide a strong and more durable machine and to improve the operation of the various parts thereof, as will be fully explained in the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a side elevation of the machine, partly in section. Fig. 2 is an enlarged sectional elevation of the charging-chamber press and the mold-table underneath. Fig. 3 is a sectional view of one of the rollers mounted at the front end of the mold-table upon which the mold is rolled in the action of relieving the brick from the molds. Fig. 4 is a section on line *xx*, Fig. 2. Fig. 5 is a top plan view of the front end of the mold-carriage. Fig. 6 is a top plan view of the toggle-release joint of the pusher-rod for the mold-carriage. Fig. 7 is a sectional view, partly in elevation, of the toggle-joint release mechanism of the pusher-rod of the carriage, showing the same in released position. Fig. 8 is a section on line *ww*, Fig. 2. Fig. 9 is a detailed sectional view of the press-plunger. Fig. 10 is a front elevation of the connecting-rod for driving the press-plunger. Fig. 11 is an enlarged detailed view of one of the toggle-joint release members. Fig. 12 is a detail view of the gear for driving the pug-mill shaft, showing the position of cam for operating the connecting-rod and mechanism of the mold-carriage.

1 represents the bed-sills on which the framework of the machine is supported.

2 represents the power-shaft journaled in brackets supported upon the sill.

3 represents a U-shaped pug-mill of ordinary construction supported at the rear end on the uprights 4 and at the front end by the side plates 5, which form the side of the charging and press chamber. This press chamber is rectangular, the sides of the chamber being supported by the sill, the front plate 6 being rigidly secured to the sides.

7 represents the pug-mill shaft extending through the pug-mill and charging-chamber from the front to the rear. This shaft is provided with a series of pug-knives 8 inside of the tempering or pug-mill chamber 16. It is also provided with propeller-blades 9 to force the clay under the plunger of the press, which will be hereinafter explained.

10 represents a stuffing-box at the rear end of the pug-mill to prevent leakage.

11 represents the rear journal of the pug-shaft, which is supported on bracket 12, rigidly connected to the rear end plate.

13 represents a main gear keyed to the pug-shaft, meshing with the gear 14 on the power-shaft 2.

B represents a main driving-pulley on shaft 2.

15 represents the charging-chamber in which work the propeller-blades and the press mechanism.

16 represents the pug-mill chamber.

The front of the pug-mill shaft 7 journals in a sleeve 17. 18 represents an enlarged hub fixed to said shaft and journaling in said sleeve. It is provided with an eccentric extension 19, to which the crank-pin 20 is fixed. 25 represents a crank-wrist journaled upon the crank-pin 20.

21 represents parallel pitman-rods embraced by the crank-wrist 25 and adapted to be vertically adjusted thereon.

23 represents a series of notches on the inner side of the pitman-rods, respectively. 24 represents a keeper secured in either pair of said notches in securing the vertical engagement of the crank-wrist to the pitman-rods, so that the length of the stroke of the pitman may be adjusted by changing the position of the keeper. The upper end of said pitman-rod passes through a cross-bar 22. Said cross-bar is mounted upon a connecting-rod 26, the inner end rigidly secured to a vertically-moving plunger 27, sliding in ways 28 on the outside of the front plate 6 of the charging-chamber. In the preferred form of construction the parallel pitman-rods 21 pass through and are slidable in the cross-bar 22, but are fixed against this sliding movement to a pair of toggle-joint arms 34 35.

36 represents a cross-bar to which the pitman-rods 21 are secured. This cross-bar is provided with ears to which the joint-arm 34 is pivoted. A cross-bar 22 is likewise provided with ears to which the toggle-joint arm 35 is pivoted. The inner ends of these toggle-arms are pivoted together and form a brace-joint and are held in alignment by the spring 37 engaging against the cam projection *n* integral with the toggle-arm 35. These arms are likewise provided with the flanges *h'* *h''*, adapted to abut each other when aligned and preventing the toggle-arms from swinging to the inside beyond the dead-center. When undue strain, however, is applied through the crank-pin, the spring 37 will yield. The toggle-links will open outwardly and the power raising the plunger 27 is tripped at that point, when the pitman-rods will freely slide through the cross-bar 22 in its upper travel and applying no power to the plunger 27. The object of this construction is to prevent breaking of the dies 38 or some other part of the mechanism should a stone or some other object be carried by the press down upon the die.

30 represents a connecting-rod affixed to the plunger 27 and projected into the top of the charging-chamber, upon which is mounted a yoke 31, to which yoke is affixed a pair of plunger-rods 32, carrying the press-platen 33, which press-platen when in its lowest position is shown in Fig. 2. These plunger-rods are preferably made of hollow form, open at each end.

b b' represent braces secured to the yoke 31 at one end and to the press-platen 33 at the other end, adding rigidity to the press-platen and its connecting mechanism.

c represents a valve fixed to the lower face of the press-platen 33.

By this construction air is admitted on the top of the mass of clay, and when the plunger or press-platen raises the air is not drawn through the clay in such upward action. By this construction it is enabled to make a more perfect brick. The press-platen is provided with a flange *d* extending downwardly along the rearward edge thereof, this construction enabling the clay to be held under the platen, preventing an uneven pressure upon the clay by reason of the undue escape of clay in the downward pressure of the platen. In order that the clay may be held up against the die until the molds have been actually filled by the press-plunger and yet allow the surplus clay to escape, I provide a rearwardly-moving side of the press-box 39. This side of the press-box is supported on the bottom of the charging-chamber and held in position by rods 40 and the guides *e*, attached to said sides. Said rods extend through the rear wall of the charging-chamber and are surrounded by retractile springs 41, seating in housing-boxes 42 and bearing against the spring-seats 43, which are pinned to the shafts and are moved with them to compress the springs which normally hold the sides of the press-box in position, but yield to undue strain, said rods operating on the same principle as plunger-rods. This method having a yielding side to a press-box moving inwardly from the platen is advantageous over other forms of yielding mechanism. The said plunger forming the side of the press-box moving inward under the strains to escape the surplus clay, as soon as the platen raises they are immediately moved backward, carrying the surplus clay back into position for filling molds, thus keeping the mold press-box in proper position for receiving the press-platen and cooperating therewith. Of course instead of springs weights may be employed to return the plunger to the side of the box and are the equivalent of springs.

The mold-table and the mechanism for operating the molds are constructed as follows: 44 represents a mold-supporting table. It is supported centrally by the step 46, which is pivotally adjusted by the screws 45, operated by handle *a*, on which the central stem 47 of the mold-table rests. The mold when pushed

out is slid upon a pair of rollers 48, which are supported upon an adjustable shaft 49, which is held in position by the set-screw 50, so as to adjust the relative heights of the supporting-rolls, which are made hollow, so as to form an oil-box fixed to run around the shaft. The molds are pushed off of the table by means of the following devices: 55 represents the mold-carriage, the front end of which engages the rear side of the mold. The pusher-head is supported upon friction-rollers 54, which project laterally and travel in grooves or ways E formed in the sides of the machine. 56 represents a guard or finger for engaging over the ends of the mold. This mold-carriage is connected to a sectional pitman-rod 57 61, which extends rearwardly and is positively operated forward and backward by the following means: 58 represents a friction-roller on the rear end of the connecting-rod or pitman and normally rests in the path of cam 59, attached to the main gear-wheel on the pug-mill shaft 7. It is necessary to reciprocate the mold-carriage forward when the press-platen is rising and immediately retracts the same, so that another mold may be placed on the mold-table before the descent of the press-platen. To accomplish this result and to operate the mold-carriage and mechanism positively, the cam 59 is placed in such relation to the crank on the pitman-shaft that the cam 59 begins to push the roller 58 forward immediately after the crank-pin commences to move vertically to raise the press-platen, and in order that the mold-carriage may be quickly withdrawn during the plunger ascent the reverse and retracting cam 59^a commences at the termination of cam 59, engaging over the roller 58 and drawing it completely backward during the travel of the gear in that part of the revolution which completes the upward movement of the crank 20, so that a positive forward and backward movement of the mold-carriage is made during the partial revolution as the crank-pin 20 is being raised upward.

In order to prevent breaking of parts in case any stone should engage in the mold and die, to prevent the free outward movement of the charge-mold and causing a breakage, a yielding mechanism is provided in the push-rod connection, as shown in Figs. 1, 6, and 7, in which the carriage-rod or sectional pitman is made of two parts jointed together as follows: 61 represents the rear and positive section of the pitman or connecting-rod, the connecting-rod proper being slidable in the hollow section 62 in the line of its axis, as shown in Fig. 7. 63 64 represent a pair of knuckle-jointed links which are held approximately in a straight line by springs 65. As shown in the drawings, link 64 is hinged to a collar on the nut of the connecting-rod and is fixed longitudinally by said nut on the shaft.

Link 63 is attached to the sectional sleeve-shaft 61, to which said link is pivoted. The springs 65 rest upon the cam-point of link 64 when they are straightened out, occupying the position shown in Fig. 1, as the three joints of links are slightly out of line. Undue strain upon the shaft 57 will cause the spring to yield, the links rising into the position shown in Fig. 7. The section 57 of the pitman-rod telescopes and moves forward in the sleeve-section 61. As soon as the links commence to rise the forward motion on the actuating-roller 58 is all taken up by the telescoping of the connecting-rod section and is not imparted to the mold. By this method the connecting-rod is straight at all times and is not subjected to torsional strain by the telescoping of the connecting-rod, one section moving within the other, always being in right line, and the motion of shortening the length of the connecting-rod is taken up on the pivots of the links themselves.

70 represents a bevel gear fixed to the shaft 2.

71 represents a journal-bracket fixed to the sills 1 and upright supports 4, two being employed, in which a shaft 72 is journaled. 73 represents a bevel gear in mesh with gear 70 and receiving power therefrom. By this construction auxiliary mechanism can be driven, such as sanding-machine used in connection with the molds, &c.

Having described my invention, I claim—

1. In a brick-machine employing a horizontal pug-mill, a vertical charging-chamber, the pug-mill shaft extending through the charging-chamber, supported in a sleeve bearing in the front plate of the machine, an enlarged hub fixed to the end of said shaft journaling in said sleeve, a crank-pin mounted in said enlarged hub, a pitman journaling on and driven by said crank, a vertically-moving plunger mounted in ways supported on the frame, a stud-shaft connected to said plunger, projecting outwardly and forming a journal for the pitman, a second shaft connected to said plunger and projecting inwardly over the charging-chamber, a rod rigidly connected to the press-platen at the lower end, and supported on said inwardly-projecting shaft, whereby the said pitman drives the said plunger and platen rod vertically in unison, substantially as described.

2. In a brick-machine employing a horizontal pug-mill and shaft, a charging-chamber and a press-platen, the mechanism for operating the press-platen, consisting of a crank mounted on the front end of the pug-mill, a vertically-moving plunger journaled in ways mounted on the frame, a stud-shaft connected to said plunger and projecting outwardly above the crank-pin, and a pitman connecting said stud and crank, a second stud-shaft mounted on said plunger and projecting inwardly over the charging-chamber, a rod rigidly con-

connected to the platen and journaled on said inwardly-projected stud-shaft, substantially as described.

3. In a brick-machine employing a vertically-moving press-platen having direct connection to the crank on the pug-mill shaft by pitman and plunger connection, said pitman being held in operative position by a toggle-joint and spring, which are tripped by undue strain to allow said pitman to move idly.

4. In a brick-machine employing a vertically-moving press-platen, a charging-chamber, a press-box located above the die, one side of which is supported upon plunger-rods held in position by a yielding support, whereby said press-box moves horizontally under the strain of the press-platen to receive surplus clay during the platen descent, and plunger-rods supported and carrying said yielding sides, and means for automatically returning the plunger-rods to normal position when the platen is retracted.

5. In a brick-press employing a pug-mill shaft, a vertical press inside of the charging-chamber, a die at the mouth of said chamber, a mold-table supporting molds under the dies of a mold push-rod operated by a connecting-rod, the rear portion of which is slidably supported in a journal, an engaging device at the rear end of said rod, reverse-acting cams mounted on the rim of the main gear on the pug-mill shaft, the parts being so disposed that the said cams reciprocate the connecting-rod forward and backward, during the part revolution of said pug-mill gear, substantially as described.

6. In a brick-machine of the class described, employing a mold-carriage and connecting-rod operated by reverse-driving cams mount-

ed on the pug-mill gear, the faces of which are revolved in a plane intersecting an engaging device mounted on the rear end of a connecting-rod, said connecting-rod being made of two sections, one slidable within the other, same being locked together by a toggle-joint and spring connection, whereby said toggle-joints will be tripped by undue strains, and one section of the connecting-rods will slide within the other without operating the molds.

7. In combination with a vertically-charging press of a brick-machine, operated by the pug-mill shaft, the mechanism for reciprocating the mold-carriage, consisting of a main driving-gear on the pug-mill shaft, reverse driving-cams mounted on the rim of said gear, a connecting-rod fixed to the mold-carriage at the front end and slidably journaled in a support at the rear end thereof, a friction-roller journaled on the rear end of said connecting-rod, with its peripheral face athwart the paths of travel of the faces of the driving-cams, the parts being so disposed that both of said cams actuate the pitman-rod and molds positively in both directions, during part revolution of said main gear, substantially as described.

8. In a brick-press of the type shown in combination with the press-platen of a hollow plunger-rod passing through the said platen, and a valve to close said hollow rod, substantially as described.

In testimony whereof I have hereunto set my hand.

DANIEL J. C. ARNOLD.

Witnesses:

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