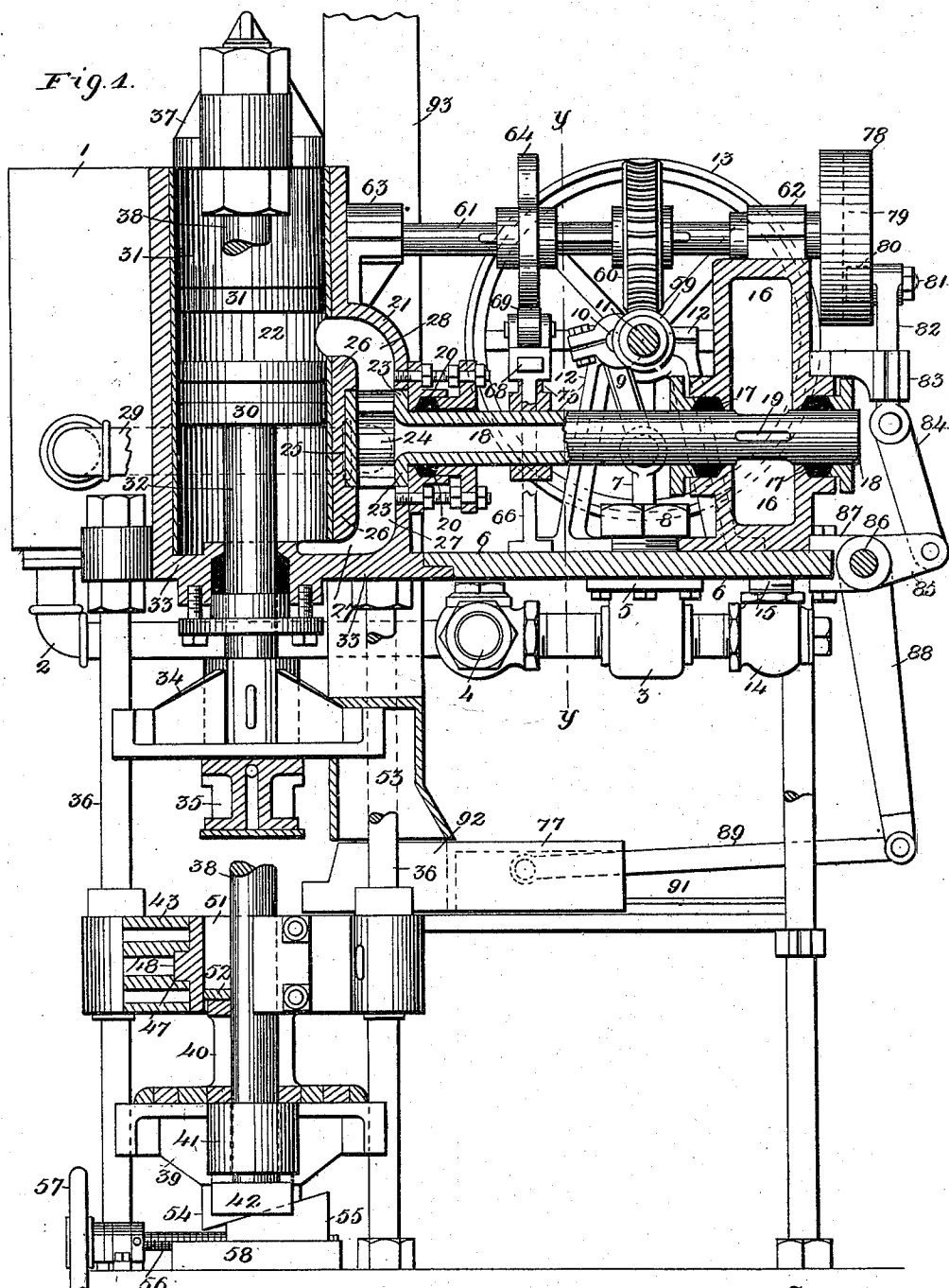


G. LANGER.
HYDRAULIC BRICK PRESS.

No. 570,314.

Patented Oct. 27, 1896.



Witnesses
W. B. Wells
Louis M. Wells

Inventor
Gotthold Langer
By *His Attorneys*
Keller & Starex

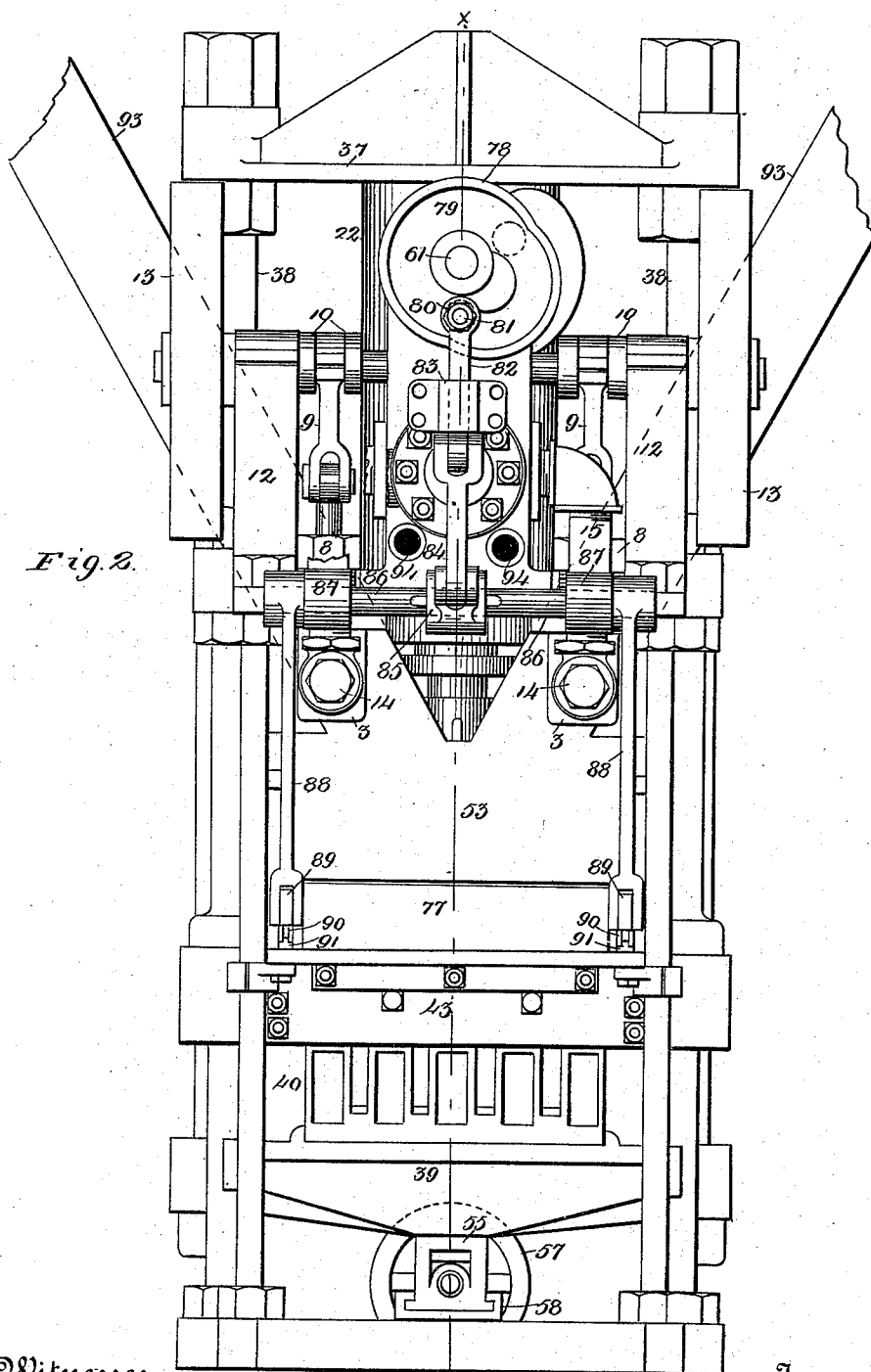
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6 Sheets—Sheet 2.

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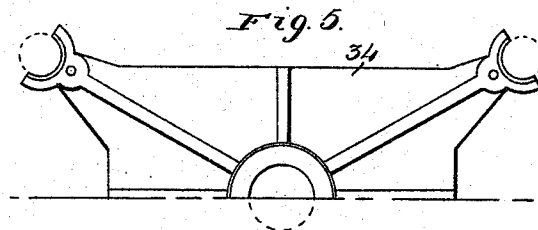
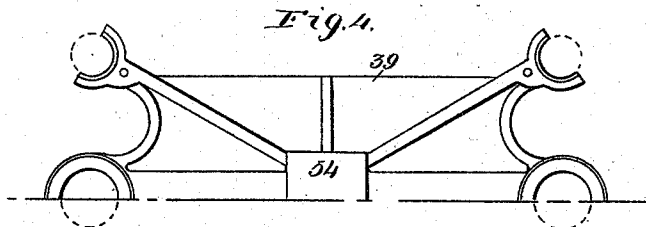
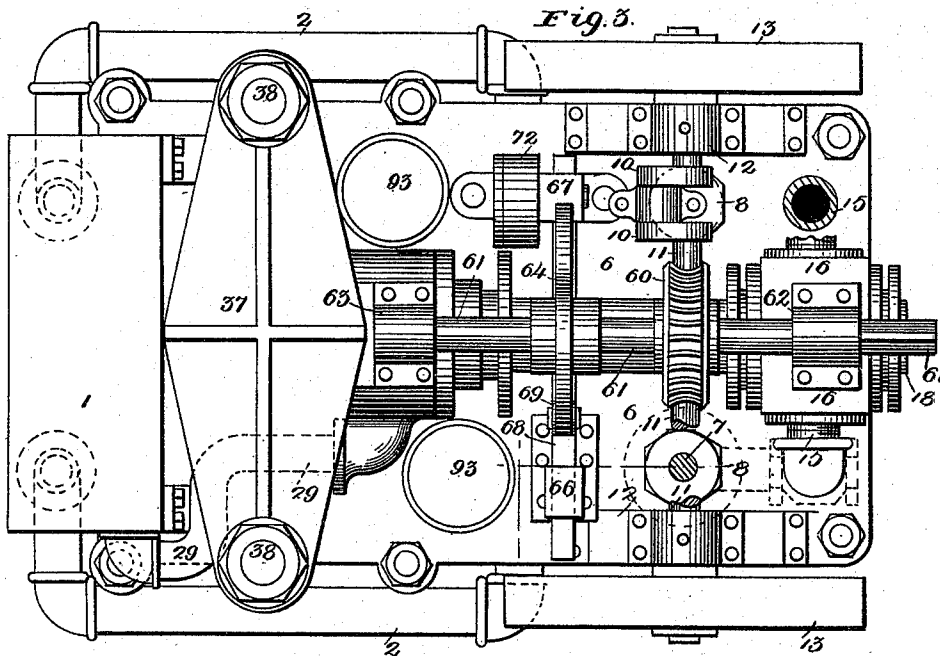
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6 Sheets—Sheet 3.

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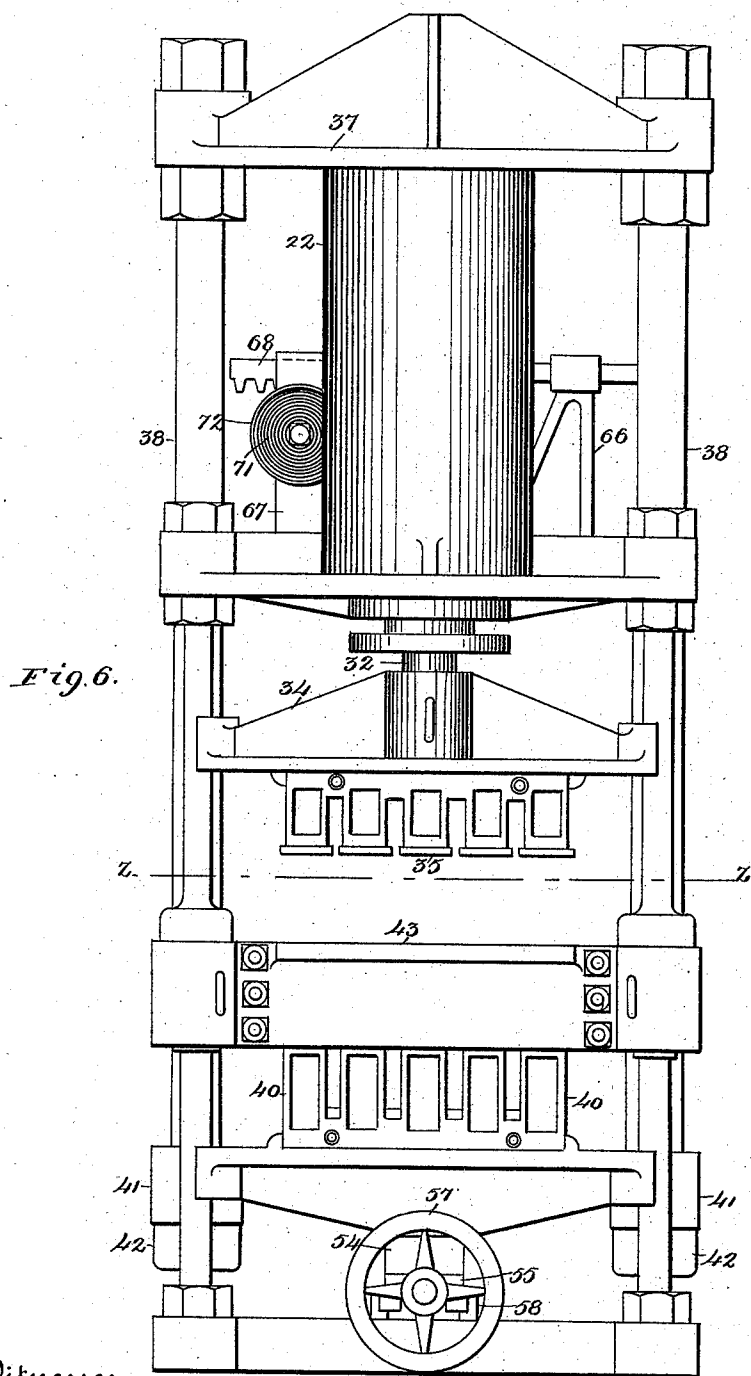
(No Model.)

6 Sheets—Sheet 4.

G. LANGER.
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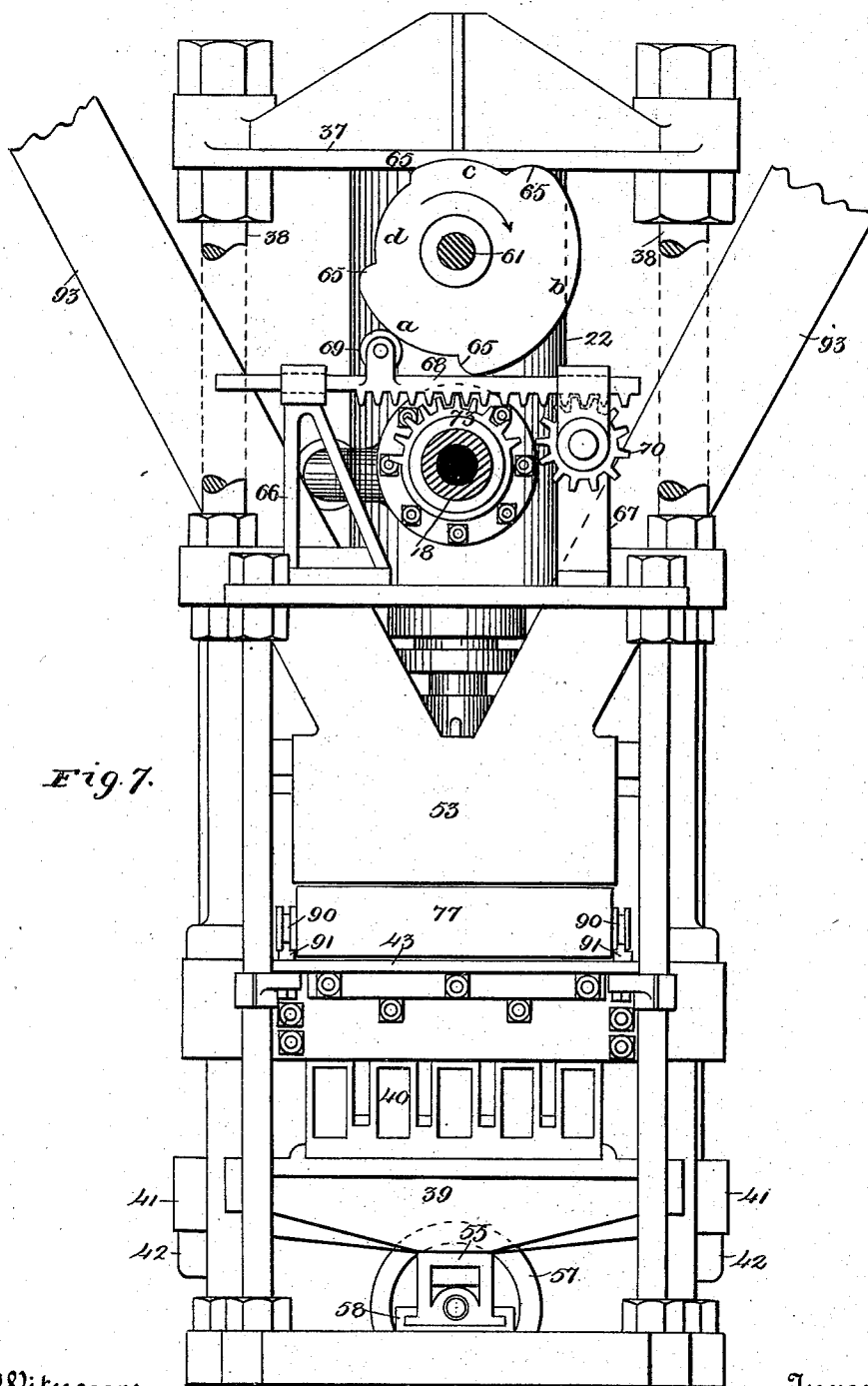
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6 Sheets—Sheet 5.

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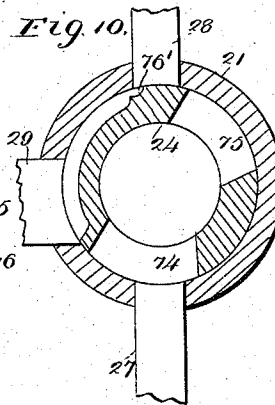
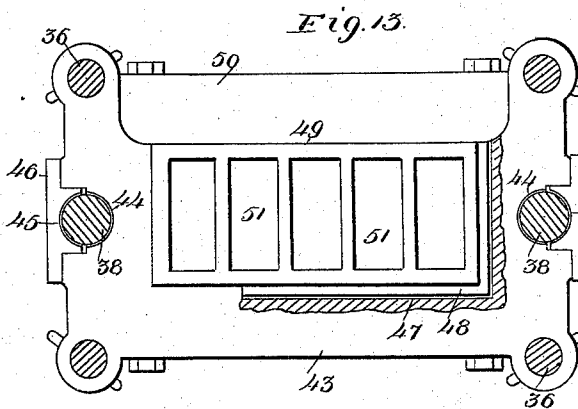
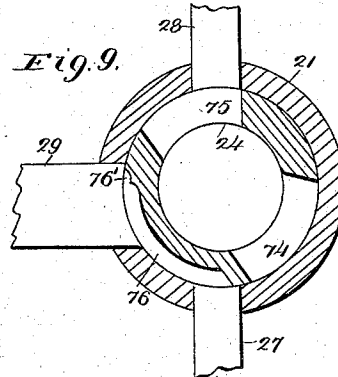
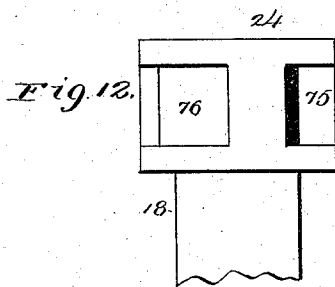
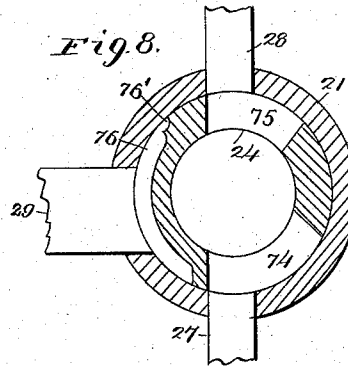
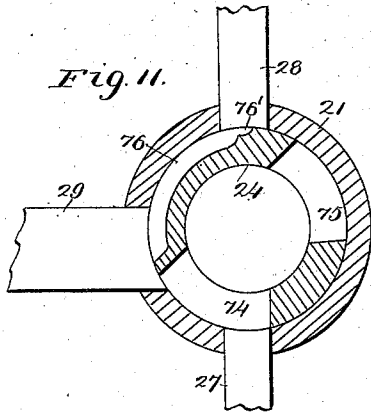
(No Model.)

6 Sheets—Sheet 6.

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UNITED STATES PATENT OFFICE.

GOTTHOLD LANGER, OF ST. LOUIS, MISSOURI, ASSIGNOR TO OTTO KULAGE,
OF SAME PLACE.

HYDRAULIC BRICK-PRESS.

SPECIFICATION forming part of Letters Patent No. 570,314, dated October 27, 1896.

Application filed December 26, 1895. Serial No. 573,270. (No model.)

To all whom it may concern:

Be it known that I, GOTTHOLD LANGER, a citizen of the United States, residing at St. Louis, State of Missouri, have invented certain new and useful Improvements in Hydraulic Brick-Presses, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention has relation to improvements in hydraulic brick-presses; and it consists in the novel arrangement and combination of parts more fully set forth in the specification and pointed out in the claims.

In the drawings, Figure 1 is a middle vertical section on the line *x x* of Fig. 2, showing some of the parts in elevation. Fig. 2 is a rear view of the machine. Fig. 3 is a top plan view. Fig. 4 is a plan view of one-half of the lower compression-head controlled by the upper piston. Fig. 5 is a plan view of one-half of the upper compression-head controlled by the lower piston. Fig. 6 is a front elevation of the machine. Fig. 7 is a section on the line *y y* of Fig. 1 as to its upper portion, the lower portion of said figure being in elevation. Figs. 8, 9, 10, and 11 are sections of the main controlling-valve, showing the four positions assumed by the same during a single operation of the operating-pistons. Fig. 12 is a side elevation of the valve in the position indicated in Fig. 11, and Fig. 13 is a section on line *z z* of Fig. 6.

The object of my invention is to construct a hydraulic press, designed especially for the manufacture of bricks, which shall combine simplicity of construction with a maximum mechanical efficiency, the latter being more or less dependent on the specific construction of the valve controlling the flow of water to the operating-pistons and on the mechanism by which the valve itself is manipulated. The efficiency in the present instance too is dependent on the permanent head or pressure stored in the air-compression chamber and on the specific relation said chamber bears to the valve above referred to.

In detail the machine may be described as follows:

Referring to the drawings, 1 represents the main water-supply tank, from either side of

the bottom of which lead the conducting-pipes 2 2, each pipe being in communication with a pump 3. A suitable check-valve of the usual construction is interposed in the path of each pipe near its juncture with the pump, the casing 4 only of such valve being here shown. Each pump 3 is securely bolted by means of a flange 5 to the under side of a bed-plate 6, which serves as a supporting-plate for the several parts to be presently described. The piston-rod 7 of each pump operates within a stuffing-box capped by a terminal bolt 8 above the bed-plate, the pumps being operated through the medium of the connecting-rods 9, driven by the crank-arms 10 at either end of the transverse shaft 11, mounted in suitable bearings 12 on top of the bed-plate, the shaft itself being driven from the pulleys 13 at each end thereof by any convenient or suitable source of power. The discharge end of each pump is provided with a suitable check-valve, of which only the casing 14 is shown, and communicates by a pipe connection 15 with the bottom of an air-compression chamber 16, located at one end of the bed-plate 6.

Passing through suitable stuffing-boxes 17, formed in the opposite lateral walls of the air-compression chamber 16, and closed at its outer end, is a hollow rotatable tube or conduit 18, having a series of peripheral slots 19, establishing communication between the chamber and the interior of the tube, said tube being disposed substantially at right angles to the shaft 11 and being supported at its opposite end in the stuffing-box 20, carried by the outer wall of a valve-casing 21, which latter forms a lateral extension or enlargement of the main piston-cylinder 22. The expanded end or flange 23 of the tube 18 forms one end of a controlling-valve 24, operating within the valve-casing 21 and forming, preferably, an integral part of said tube, the opposite end or base of the valve finding a seat within a suitable circular depression or socket 25, formed on the inner wall 26 of the valve-casing 21.

Leading from the valve-casing are two passages 27 28, establishing communication, respectively, with the base and middle of the main cylinder 22, and leading from the valve-

casing is also a discharge-pipe 29, which communicates with the main supply-tank 1. The passages 27 28 and the pipe 29 are controlled by the various ports and groove which characterize the controlling-valve 24, whose action will hereinafter be specifically described.

Reciprocating within the main cylinder 22 are two pistons, a lower piston 30 and an upper piston 31, the lower having a piston-rod 32, passing through a stuffing-box at the base of the cylinder-plate 33, (which, by the way, is lapped and connected to the bed-plate 6, whereby both form a solid and continuous bed-plate,) the lower end of the piston-rod 32 carrying a head 34, provided with a plunger 35, of usual construction. The ends of the head 34 partially embrace the stationary pillars 36 of the machine-frame, said pillars serving thus to guide the head in its reciprocation. The upper surface of the cylindrical piston 31 is secured directly to or forms an integral part of the transverse beam 37, from the outer ends of which depend the reciprocating rods 38, by which the lower head 39 and plunger 40, forming part thereof, are operated. The ends of the head 39 also partially embrace the pillars 36, thus guiding the head in its reciprocations. (See Figs. 4 and 5.) The rods 38 pass through suitable lugs 41 of the head 39 and terminate in suitable expanded ends 42, by which the head is raised as the rods 38 and piston 31 ascend or rise.

The mold-box frame 43 is secured between and keyed to the pillars 36, the reciprocating rods 38 passing loosely through the guide-ways formed by the grooves 44 of the frame and corresponding grooves 45 of the terminal guide-plates 46, secured to said frame. The frame is provided with a groove 47 for the reception of the tongue 48, forming a part of the mold-box 49, by which the mold-box can be conveniently slipped into the frame. A plate 50 reinforces the frame on the side from which the mold-box is introduced.

The mold-box can contain any number of compartments 51, each being designed, of course, to receive a plunger 35 from the top and a plunger 40 from the bottom, a suitable plate 52, secured to each plunger 40, being introduced into each compartment for the support of the clay fed thereto from the hopper 53, as subsequently explained. The thickness of the brick and the degree of compression of the same is regulated by varying the initial position of the head 39. The latter is provided with an inclined supporting-block 54, which rests on a correspondingly wedge-shaped or inclined block 55, the latter being adapted to be adjusted back and forth by the screw 56, operated by a hand-wheel 57, a suitable grooved plate 58 serving to guide the block 55 in its adjustments. It is apparent that as the block 55 is moved in one direction or the other it will vary the relative position of the head 39 and plunger 40, carried by it, and hence determine the capacity of the re-

sulting compartments 51, within which the clay is to be compressed.

It has been stated that power is imparted to the transverse shaft 11. It will now be in order to describe the means whereby the rotatable tube 18 is set in motion and how this operates the valve 24, controlling the passages 27 28 and the opening leading to the pipe 29.

Carried by the shaft 11 is a worm-pinion 59, which meshes with a worm-wheel 60, keyed to a longitudinal shaft 61, mounted in bearings 62 63 of the compression-chamber 16 and cylinder 22, respectively, the said shaft 61 having additionally keyed thereto a differential or compound cam-plate 64, revolving with the shaft in the direction indicated by the arrow in Fig. 7, the several sections of the cam-plate corresponding to different positions assumed by the valve 24 under the operation of said sections. The cam-plate has four sections *a b c d*, each formed by the arc of a circle of different radial lengths, the maximum radius identifying the section *b*, the next smaller, section *a*, the next, section *c*, and the smallest, section *d*. The several sections are connected by rounded shoulders 65, by which the parts operating the tube 18 are driven.

Mounted in suitable bearings or standards 66 67 on top of the bed-plate and adapted to reciprocate therein in a direction parallel to the plane of rotation of the cam-plate 64 is a rack-bar 68, bearing an antifriction-roller 69 along its upper surface. As the cam-plate 64 rotates in the direction indicated the shoulders 65 successively come in contact with said roller and shove the rack-bar in its bearings in one direction. From the peculiar formation of the cam-plate, however, the bar 68 will be shoved forward only by two of the shoulders 65—viz., the two between the sections *d* and *a* and *a* and *b*, and the distance it is thus shoved forward will be equal to the difference in length between the radii of sections *d* and *a* and *a* and *b*. Of course, while the roller 69 is being traversed by the arc of any section no further movement or advance for the time being of the rack-bar will take place, that is to say, the rack-bar will be stationary for the interval that the arc of any section is passing over the roller 69.

Referring to Fig. 7, we see that the arc of section *a* is passing over the roller 69. The rack-bar is stationary, therefore, until it is shoved or advanced by the shoulder between sections *a* and *b*, and the amount of advance will be the difference in length between the radii of sections *a* and *b*. The shoulders between the sections *b c* and *c d* are, however, inoperative so far as advancing the rack-bar is concerned, since, after the section *b* has passed the roller 69, the radii of the succeeding sections *c d* gradually decrease, the arc of the last-named section being formed with the shortest radius. After the bar 68 has been advanced or reciprocated in one direction by two of the shoulders 65 of the cam-

plate (that is, the shoulders between the sections *d a* and *a b*) it is returned or reciprocated to its original position by the pinion 70 cooperating with the rack-bar, said pinion being mounted in the standard 67 and being controlled by a resilient coiled spring 71, having one end secured to the shaft of the pinion and the other end to the inner wall of a casing 72, forming a part of the standard 67. (See Fig. 6.) The spring 71 is wound so that its tendency is to constantly tend to turn the pinion 70 in a direction to move the rack-bar against the impelling or advancing action of the cam-plate 64, by which action the roller 69 is always kept in close contact with the periphery of said cam-plate, thus insuring a positive return of the rack-bar to its original position as the roller 69 is passing over the releasing-shoulders 65, separating the sections *b c* and *c d*, the term "releasing" being applied here for convenience to the last-named shoulders, which do not positively advance the rack-bar, but which (on account of the gradually-decreasing length of the radii of the sections between which they are interposed) permit its return to its original position under the action of the coiled spring 71.

From the foregoing it is therefore obvious that the rack-bar 68 is reciprocated back and forth during the operation of the machine—in one direction by the impelling-shoulders of the cam-plate and in the opposite direction by the action of the coiled spring 71. As the rack-bar thus reciprocates, the teeth thereof cooperate with a toothed segmental gear-wheel 73, embracing and secured to the tube 18. The tube 18 will therefore rock back and forth in its stuffing-boxes under the reciprocating action of the rack-bar. As the tube is thus oscillated it correspondingly oscillates the valve 24, carried by the inner end thereof, placing the ports of said valve in a new relation with reference to the passages 27 28 and pipe 29 for every advance of the rack-bar, that is, with every advance of the several sections of the cam-plate 64. The valve 24, which is cylindrical, is composed of two parts 74 75, communicating with the tube 18, and a peripheral groove 76, adapted to establish communication between either of the passages 27 28 and the pipe 29. The position of the valve at any time can be interpreted from any position of the cam-plate 64, on which the operation of the valve depends. The four positions of the valve, as indicated in Figs. 8, 9, 10, and 11, correspond to the positions to which the valve and tube 18, carrying the same, have been turned under the action of the sections of the cam-plate and spring 71, respectively. It is therefore proper at this time to describe the operations of the machine under the several positions of said valve.

Starting with the position of the valve as shown in Fig. 8, in which position it corresponds to the position of the cam-plate as its section *a* is passing over the roller 69, we see that ports 74 75 are respectively in commu-

nication with the passages 27 28, leading to the cylinder 22, and that communication with the pipe 29 is cut off. Under these circumstances the water passing through the tube 18 enters the cylinder 22 on both sides of the lower piston 30 and below the piston 31. Water being thus introduced on both sides of the piston 30, and the pressure being thus equalized, the said piston 30, with its piston-rod 32, will immediately drop by its own weight under the action of gravity, carrying the head 34 and plungers 35 to the mold-box. The heavy upper piston 31 under these circumstances remains stationary, but should it for any reason rise slightly, (which it might do if the lower piston did not drop fast enough under the circumstances and thus allow an undue accumulation of pressure under the upper piston,) and draw after it the rods 38, depending from the cross-beam 37, carried by the same, I leave sufficient play between the lugs 41 and the expanded end 42, so that even should the upper piston rise slightly it would not raise the head 39 and plungers 40 with it and disturb the contents of the compartments of the mold-box. As the cam-plate 64 continues its rotation in the direction previously indicated the shoulder 65 between the sections *a* and *b* advances the rack-bar 68 a distance equal to the difference between the radii of the arcs of said sections, rocking the tube 18 and turning the valve 24 to the position indicated in Fig. 9, and establishing communication between the tube 18 and the passage 28 only, and further establishing communication between the passage 27 and waste-pipe 29 by means of the groove 76. Under these circumstances the water from the air-compression chamber 16 is forced through the passage 28 into the cylinder 22 between the two pistons only, forcing the pistons positively apart and driving the water below the lower piston through the passage 27, groove 76, and waste-pipe 29 into the supply-tank 1. As the pistons 30 and 31 are thus forced positively apart the plungers 35 and 40 will be driven into their respective compartments of the mold-box, the two sets of plungers as a result compressing the clay contained in the mold-box compartments. With the further rotation of the cam-plate 64 the section *c* will be the next to bear against the roller 69; but as the radius of the arc of said section is much less than that of section *b* just passed the impelling action of the cam-plate ceases, and the spring 71 will now retract the rack-bar 68, rocking the tube 18 and the valve 24 to the position indicated in Fig. 10, that is to say, water will be forced only under the lower piston 30 through the passage 27, communication being entirely cut off between the port 75 and passage 28, and that between the latter and the pipe 29 being also cut off, with the exception of the slight relief-opening afforded by the extension 76' of the groove 76, to be presently referred to more in detail. From the pre-

vious operation, however, the space in the cylinder 22 between the two pistons has already been filled with water, thus forming a solid connection, as it were, between the two pistons. It follows, therefore, that as water is forced under the lower piston 30 for the third position of the valve 24 said water-pressure will raise both pistons simultaneously, thus simultaneously elevating the plungers 35 40, between which the brick has been compressed and is still held, the parts being so proportioned that no further simultaneous elevation of said plungers will take place after the plungers 40 have passed through the mold-box compartments and the upper surfaces of the plates 52 have become flush with the upper surface of the mold-box, by which time of course the bricks have been fully lifted or ejected from the mold-box, although still held between the two sets of plungers by which they were compressed. As the cam-plate 64 continues its rotation, and the section, *d*, having the shortest radius is brought against the roller 69, the spring 71 has by this time retracted the rack-bar 68 to the limit of its backward stroke and the tube 18 and valve 24 have been turned to the position indicated in Fig. 11; that is to say, communication has been cut off between the port 75 of the valve and the passage 28, but communication has been established between the passages 27 28 and discharge-pipe 29 by means of the port 74 and the groove 76, respectively, whereby the water from between the two pistons runs back into the tank 1 through the groove 76, allowing the upper piston to drop to its normal position, and the water from the chamber 16 passes through the port 74, a portion passing through the passage 27 below the piston 30 and a minor portion being directed through the port 74 into the pipe 29, so as to partially reduce the pressure of the water entering below the piston 30 and prevent a raising of the latter faster than the water above it can return to the tank and allow the upper piston to drop to its normal position. The instant the upper piston 31 begins to drop and the lower one to rise a sufficient release of the bricks held between the plungers 35 40 is effected to enable the end of the charger 77 at that instant to shove them aside from between the plungers, the action of the charger being hereinafter more fully described. The valve 24 therefore has by this time been brought to its normal or fourth position and the cam-plate 64 has made a complete revolution; that is, the four sections *a b c d* thereof have all acted on the roller 69 of the rack-bar, the sections *a b* driving said bar in one direction and the radially-receding sections *c d* releasing said bar and allowing it to be reciprocated in the opposite direction through the action of the spring 71. Of course as the advancing shoulder 65 of the section *a* strikes the roller 69 in the beginning of the next succeeding revolution of the cam-plate the bar 68 will be shifted so as to

turn the valve 24 to the position indicated in Fig. 8, thus beginning the next cycle of operations.

It was stated above that the moment the bricks between the plungers are released during the fourth position of the valve (the release being in fact effected by an initial slight raising of the lower piston before the upper piston begins to drop and lower its ejecting-plungers below the upper surface of the mold-box) the charger shoves the bricks aside. It is now in order to describe the operation of the charger and how it feeds the clay to the mold-box at the same time that it shoves the bricks aside which have been formed during the previous operation.

Carried at the outer extremity of the shaft 61, to which are keyed the worm-gear 60 and cam-plate 64, is a terminal eccentric disk 78, provided with a cam-guideway 79 on its outer face, the said guideway being adapted to receive the antifriction-roller 80, carried at the inner end of a pin 81, secured to the upper end of a rod 82, adapted to reciprocate within a bearing or bracket 83, secured to the outer wall of the compression-chamber 16. Pivottally connected to the lower end of the reciprocating rod 82 is one end of a link 84, whose opposite or lower end is pivoted to the free end of the arm 85, connected rigidly to a rock-shaft 86 intermediate of its ends, said rock-shaft being mounted in suitable bearings or brackets 87 at the end of the bed-plate 6. The outer projecting ends of the rock-shaft 86 have each secured thereto a rigid arm 88, to whose lower end is pivottally secured one end of a link 89, whose opposite end is pivottally secured to the charger 77, previously referred to. The charger 77 is mounted on rollers 90, moving in a suitable track 91, and has a hollow compartment 92 for the reception of the clay dropped into it from the hopper 53. It is apparent that as the shaft 61 rotates the disk 78 will impart a reciprocating motion to the rod 82, which in turn will oscillate the rock-shaft 86, and the latter will, through the connections 88 and 89, impart a reciprocating motion to the charger 77, causing the latter at the proper moment to deposit the necessary quantity of clay into the compartments of the mold-box and at the same time to shove aside the compressed bricks released by the separation of the plungers 35 40 during the fourth position of the controlling-valve 24, as already explained. The hopper 53 is supplied with clay from the inclined chutes 93, to which it is fed from any convenient source.

As motion is imparted to the transverse shaft 11 and the pumps 3 are operated the space in the chamber 16 is filled with water to such an extent until the air confined within the chamber is under great pressure and compressed into a small volume. The expansive force of the confined air is utilized to positively force the water pumped into said chamber into and through the rotatable or oscillat-

ing tube 18 and the valve 24 carried by it, thereby making under this reserve of pressure the pistons 30 and 31 instantly responsive to each and every position or condition of the valve. The specific construction and details of the present machine make the latter compact and yet at the same time effective and capable of developing a maximum amount of mechanical efficiency. The valve, too, in the present case having a broad seating-surface and being subjected only to an oscillatory or rocking motion, there is little liability of leakage or of the parts getting out of order.

It is to be understood, of course, that the present device, or rather the hydraulic feature of it, is not necessarily restricted to brick-presses, but may be utilized for hydraulic purposes generally. Under the present construction a single valve operates two pistons confined in a single cylinder, the valve itself being controlled by the hollow tube which communicates with the compression or air chamber, in which the water is always under great pressure.

94 represents relief-ports for the chamber 16. It will be seen that the end of the tube 18 which is mounted in the outer stuffing-box of the chamber 16 is closed, the inner wall of the closed end serving to take up or resist the pressure necessarily communicated to the interior of the tube from said chamber. This same interior pressure in the tube is resisted at its opposite end by the inner surface of the base of the valve 24. The hydraulic pressures being thus equalized within the tube at either end, no excess of pressure remains to force the valve 24 against its seat, and said valve thus oscillates on its seat without friction. Were the tube 18 merely of a length to be supported by the inner stuffing-box of the chamber 16, and were the tube under those circumstances to open directly into the chamber 16, the pressure within said chamber would be communicated to the interior of the tube, but at the same time would force the valve against its seat with a force equal to that which would be communicated to the superficial area of the exposed surface of the base of the valve and the latter would operate under great friction. By the present arrangement, however, all friction incident to the hydraulic pressure disappears.

A reference to the drawings, Figs. 8 to 11, inclusive, discloses the presence of an extension 76' to the groove 76 of the valve 24. The object of said extension is to establish a sufficient leakage from the space between the two pistons 30 and 31 during the third position of the valve, Fig. 10, whereby, as the two pistons and their plungers are raised simultaneously to effect the discharge of the compressed brick from the mold-box, the upper piston with its plunger may take a slight drop to relieve the strain from the brick to which it was subjected during the compressing operation and prevent the unsupported sides of the brick from crumbling un-

der the said strain after the brick has been raised from the mold-box.

Having described my invention, what I claim is—

1. In a hydraulic press, a suitable supply-tank, an air-compression chamber, means for storing and pumping the water from said tank into said chamber, a suitable cylinder, operating-pistons located in said cylinder, a hollow tube closed at its outer end, and having peripheral openings establishing communication between the air-compression chamber and said cylinder, and a valve coöperating with said hollow tube and adapted to control the path of the water operating the pistons in said cylinder, substantially as set forth.

2. In a hydraulic press, a suitable supply-tank, an air-compression chamber, means for storing and pumping the water from said tank into said chamber, a suitable cylinder, operating-pistons located in said cylinder, an oscillating or rotatable hollow tube closed at one end and having peripheral openings establishing communication between the air-chamber and said cylinder, and a valve carried at the opposite end of the tube for properly directing the water from the air-chamber into the cylinder and operating the pistons therein, substantially as set forth.

3. In a hydraulic press, a suitable cylinder, a valve-casing having passages leading to the same, a waste-pipe leading from said casing, a hollow tube closed at one end, means for oscillating said tube, a valve at the open end thereof controlling the communication between said tube and the passages and waste-pipe, an air-compression chamber communicating with the interior of the tube and cylinder the closed end of said tube passing through the compression-chamber, and a suitable pump or pumps for delivering water to said chamber, substantially as set forth.

4. In a hydraulic press, a suitable cylinder, a hollow oscillating tube communicating therewith, an air-compression chamber also in communication with said tube, a valve controlled by said tube, a cam-plate having a series of sections formed by radii of different lengths, shoulders separating the several sections, means for imparting rotation to said cam-plate, intermediate connections between said cam-plate and tube for imparting an oscillating motion to the tube in one direction by a definite number of the shoulders, and means for oscillating the tube back in the reverse direction, substantially as set forth.

5. In a hydraulic press, a suitable cylinder, a valve-casing having passages in communication with said cylinder, a discharge-pipe leading from said casing, an air-compression cylinder, a hollow tube closed at one end and having peripheral openings establishing communication between the air-chamber and valve-casing, means for oscillating said tube, a valve carried by the tube in the casing, said valve having ports leading to the interior of the tube, and a peripheral groove

adapted to establish communication between the said passages and the waste-pipe, substantially as set forth.

6. In a hydraulic press, a suitable cylinder, an air-chamber, a hollow tube establishing communication between the two, a controlling-valve carried by said tube, a segmental gear-wheel carried by said tube, a rack-bar having teeth cooperating with said gear-wheel, bearings for said rack-bar, a roller carried by said rack-bar, a cam-plate having a series of shoulders located at variable distances from the center of rotation of said cam-plate and adapted to move the rack-bar in one direction, and a spring-controlled pinion cooperating with the rack-bar and adapted to move the latter in the opposite direction, substantially as set forth.

7. In a hydraulic press, a cam-plate having sections *a*, *b*, *c*, and *d*, shoulders separating the several sections, the shoulders between sections *d a*, and *a b*, being positively impelling in character upon the rotation of the cam-plate in one direction, and the shoulders between sections *b c*, and *c d*, being releasing in character with respect to the direction of the said rotation of the cam-plate, substantially as set forth.

8. In a hydraulic brick-press, a supply-tank, pipes leading therefrom and communicating with suitable pumps, a suitable transverse drive-shaft for said pumps, an air-chamber into which the water is forced by said

pumps from said tank, a cylinder, a hollow rotatable or oscillating tube establishing communication between the air-chamber and cylinder, a discharge-pipe leading from the tube back to the tank, a valve controlled by said tube, passages leading to the cylinder controlled by said valve, a longitudinal shaft operated from the transverse shaft, intermediate connections between said longitudinal shaft and hollow tube for oscillating the latter, pistons operating within the cylinder, plungers connected to said pistons, a mold-box for said plungers, a charger operated by the longitudinal shaft, and a clay-hopper for said charger, substantially as set forth.

9. In a hydraulic press, a suitable cylinder, pistons operating within the same, an air-chamber, a hollow oscillating tube closed at its outer end and mounted within suitable stuffing-boxes on said air-chamber and extending through said chamber, said tube having suitable peripheral openings formed along that portion thereof which is confined within the air-chamber for establishing communication between said chamber and the cylinder, and a valve adjacent to the cylinder controlled by said tube, substantially as set forth.

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

GOTTHOLD LANGER.

Witnesses:

C. F. KELLER,
EMIL STAREK.