

(No Model.)

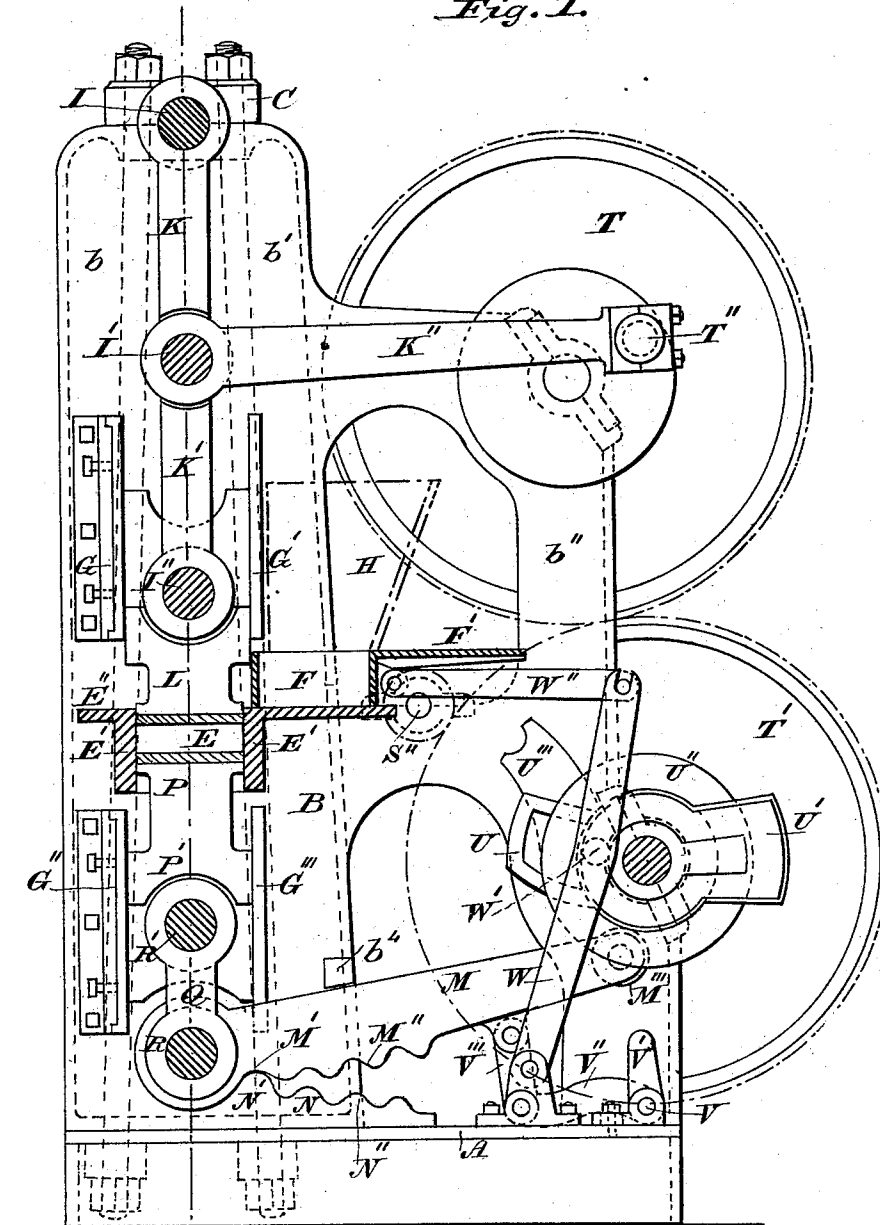
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W. ANDRUS.
BRICK MACHINE.

No. 297,218.

Patented Apr. 22, 1884.

Fig. 1.



Witnesses:

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Fig. 2.

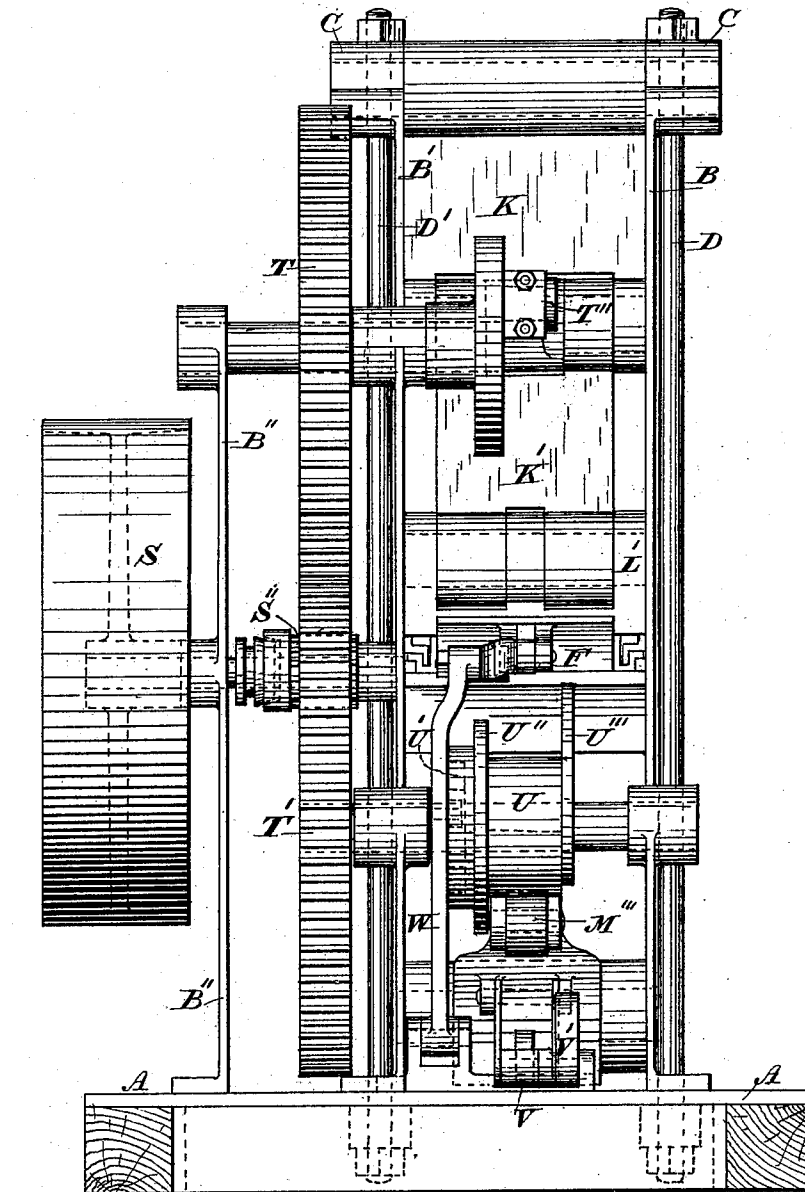


Fig. 5.



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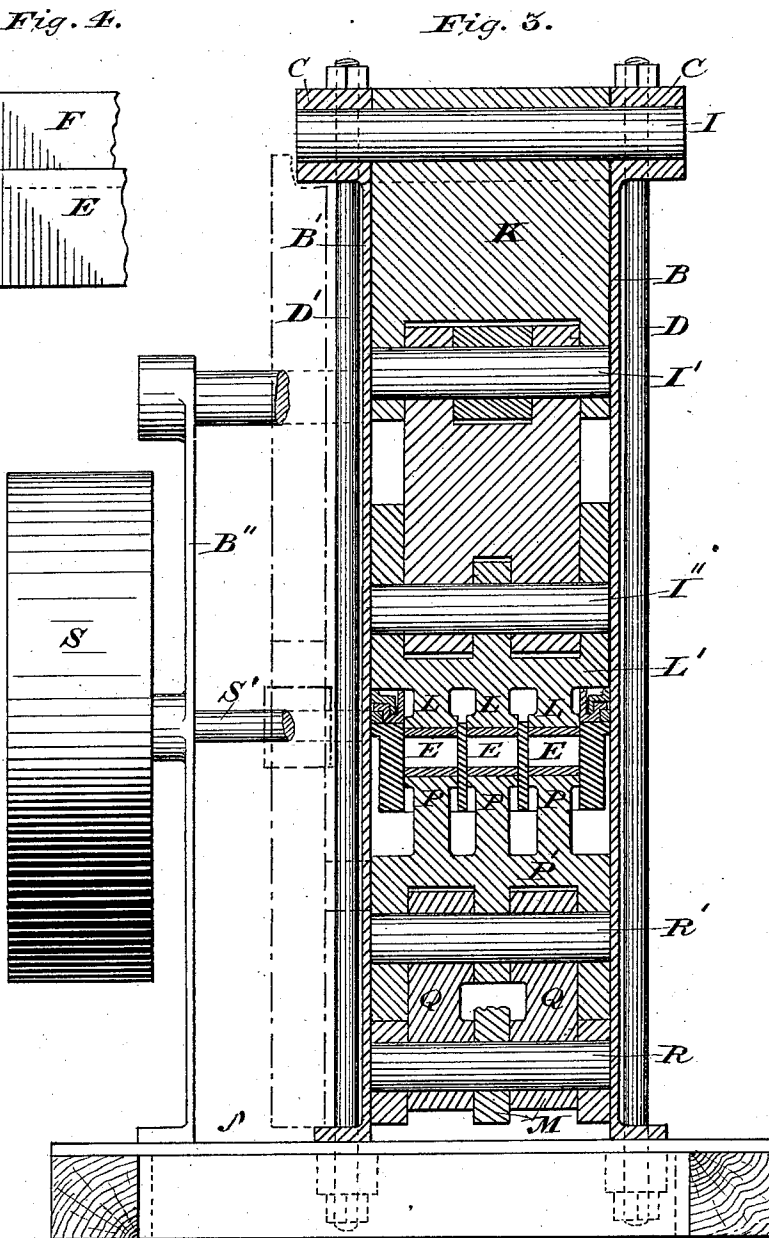
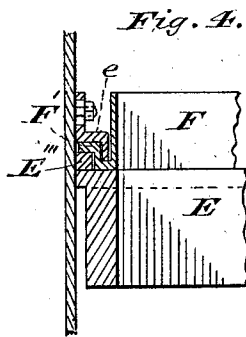
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UNITED STATES PATENT OFFICE.

WILLIAM ANDRUS, OF KEOKUK, IOWA.

BRICK-MACHINE.

SPECIFICATION forming part of Letters Patent No. 297,218, dated April 22, 1884.

Application filed March 3, 1884. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM ANDRUS, a citizen of the United States, residing at Keokuk, in the county of Lee and State of Iowa, 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 consists in an improved machine for making hard-pressed brick from pulverized clay, which I make and use substantially as set forth hereinafter, and as shown in the accompanying drawings, in which—

Figure 1 is a side elevation, partly in section. Fig. 2 is a rear elevation at right angles to Fig. 1. Fig. 3 is a section parallel to Fig. 2. Fig. 4 is a detail section of filler-box support. Fig. 5 is section of rock-shaft-holder.

The features of the invention are set forth in the general description, and among these are, first, an improved process of making brick, designed to secure more uniform density throughout the mass than usual; second, a peculiar lever arranged to give slow motion and great pressure in pressing the brick, and then a fast motion to discharge them; third, the combination of such a lever to move one set of plungers with a knuckle-joint arrangement for moving another set against them; fourth, a peculiar arrangement of cam and lever for pressing the brick and discharging them; fifth, a combination of a crank-motion and a cam-and-lever motion for operating opposite pressing-plungers; sixth, a peculiar arrangement for operating a filler and discharger; seventh, a peculiar protected slideway for filler and discharger; eighth, various other features, details, and combinations.

The machine is built with a main frame and several operative and other parts supported thereon. The main frame has a bed, A, three upright parts, B B' B'', caps C, mold-frame E', and other parts. The two parts B B' are similar, and form side frames for most of the mechanism. They each have uprights *b b'*, and are re-enforced by strong vertical rods D D', having nuts above to tighten them. These rods reach through and hold the bed A below and the caps C above. A pivot-shaft, I, is held on top between frames B B' and the caps

C, as shown. On this is pivoted a broad swinging link or part, K, which is connected to part K' by a like pivot, I', which in turn is connected to a plunger-head, L', by a like pivot, I''. The plunger-head bears three or other number of plungers, L, on its lower side, and is provided with guideways G G' on the frames B B', in which it is held firm and true, while free to move up and down to press and release the brick in the molds. A pivot-block, N, is fixed on the bed-plate A, and bears a main pivot-bearing, N', and a number of additional bearings, N'', extending in series from N' away from the working pivot end of lever M, as shown. These may be varied in form from a cog-like form to one with a plane surface.

The lever M is made as shown, and rests on block N. It is provided with a number of pivot-bearings, M' M'', corresponding with those on block N, with which they are arranged to engage. These two sets of pivot-bearings or fulcrum-points are arranged in relation to each other, so that they will be brought into contact by a rolling motion from end to end of the lever-bearings as the lever end is moved up or down. The lever M bears in one end the pivot-shaft R, by which it is connected with link Q, which is connected to the plunger-head P', by the like pivot R', so as to move that and its plungers P up and down as the lever moves. The plunger-head P' bears plungers P on its upper side, with spaces cut between them to clear the walls of the molds. It has guideways G'' G''' on frames B B', which hold it firm and true, while free to move up and down to compress and push out the brick and to open the molds again for clay.

The mold-frame E' is held firmly in place, connecting the uprights *b b'* of the two frames B B', and contains three or other number of molds, E, which extend through it vertically, with walls between them. The plungers P move up and down in the molds without leaving them, forming movable bottoms therein. They descend far enough to admit enough clay into the molds above them to form the brick, and rise far enough to first compress the brick and then push them out of the molds upward. They receive their motion from that

of lever M, moving on pivot-block N on bearing N' to compress the brick, and on the bearings N'' to push the brick out, and on both in the return to draw down the plungers again.

5 The upper plungers L descend into the molds, while the lower ones are rising, far enough to press the brick and rise out of the molds far enough to allow the brick to be removed and the mold refilled with clay.

10 The several parts are made and arranged so that the pivots I I' R', the links K K' Q, the plungers L P, and the molds E will come into one straight line between the two external holding-pivots, I R, as shown, at the time of
15 greatest pressure on the brick, so as to enable the parts to exert their maximum strength and force of compression on the brick.

A table-surface, E'', extends before and back of the molds. The brick are pushed out over
20 this in front, and the clay pushed in from behind over it.

A hopper, H, is held above the back part of table E'', and is arranged to receive pulverized clay, which is carried up by an elevator or otherwise, and to discharge it into
25 filler-box F. The filler-box F is open at the top and bottom and closed on the other sides, and is provided with an apron, F', which extends back from its top edge, so that when the
30 filler-box is pushed forward over the molds the apron will be brought under the hopper and prevent the clay falling out. The box is made of a height and size suitable to hold a
35 little more clay than the molds, so that when it is pushed out it will fill them, and when drawn back will bring back the surplus, cutting off the mass of clay in the molds level
40 and even full, so that the brick will be of uniform density. The box F is held by bearing-ways E''' and projecting hangers F', which are
45 arranged in the peculiar way shown, so that the parts e will descend over and in front of the ways, so as to shield them from the falling or striking of dust from the clay used.

45 The machine is driven by a large belt-wheel, S, on shaft S', which has bearings in frames B'' B', and bears a small pinion-wheel, S'', which engages with and drives the two large
50 wheels T T', which are of equal size, so they will turn alike. The shaft of wheel T has bearings in frames B'' B', and bears a crank, T'', from which the pitman connecting-rod K'' connects with pivot I', so as to move that back
55 and forth as the wheel is turned. This serves to move the upper plungers, L, up and down to do their desired work and to make the connecting parts act as with a knuckle-joint. The shaft of wheel T' has bearings in frame B B', and in an auxiliary support, and bears driving-cams U U'.

60 The cam U is of a peculiar shape, and engages with a rolling friction-wheel, M'', in the end of lever M, so as to move that up and down, as required, to move the plungers P in
65 the manner desired. This cam is fixed on the circular flange U'', and bears a projecting part, U''', which has a concave bearing on its

outer end, which is arranged to engage with and push down the end of arm V' on rock-shaft V. This rock-shaft is held by bearings
70 on bed A, so as to rock freely. When the arm V' is turned down in this way by part U''', the arm V'' on the same shaft is raised so as to push up the lever M by the link V''', which is pivoted to both the arm and lever.
75 This is arranged to cause the plungers P to descend gradually at the proper time and to the proper depth in the molds. When the lever M is moved down again by the cam U, the rock-shaft and arms are brought back
80 again to their first position. The rock-shaft V is made adjustable on bed A, so that it may be moved back or forth to adjust the extent of movement. When the brick has been pushed
85 up, the lever M is held at a point where the arm V'' rests on part A, and the adjustment of shaft V adjusts in this way the point at which the brick are held after being pushed out of
90 the molds for removal. The part N can be also adjusted in height to adjust the descent of plungers in the molds. A bearing, b'', is fixed so that the lever M will strike on it when
95 its driven end is rising, in case the plungers should stick in the molds and not descend properly, so as to force them to do so. The cam U' is fixed on flange U'', and bears a channel around it on one side to receive the roller
100 W', and is of a peculiar form, as shown, arranged to drive the filler-box F out at the right time and draw it back properly.

The lever W is pivoted on the bed A, and bears the roller W' on a projection from it, arranged to fit into and be moved by the cam U'. The upper end of lever W connects by rod
105 W'' to the back end of the filler-box F, so as to move it back and forth, and is slotted vertically to receive a wrist-clutch on rod W'', so that it may be disconnected at any time to stop the outlet of clay from the hopper until that
110 gets properly filled, or for other purpose, and can then be connected again for working. The driving-shaft is provided with a friction-clutch, arranged for safety from accidents and for facility in starting and stopping.

The several parts of the machine, while admitting of various modifications of form and
115 arrangement, are carefully made and arranged to work together in the manner substantially as shown and set forth, so that there will be several separate periods of time in which the
120 parts will act together, as follows: First, the molds being filled, the two sets of plungers will come together on the clay therein to compress it alike from both sides, while its central portions are held nearly stationary by friction
125 with the sides of the molds, to make the brick alike dense on both sides; second, the clay being compressed very hard, and the several joints forming the pressing-knuckle above having reached a straight line of maximum action,
130 they will continue their motion a short distance beyond such line to let wheel T turn fully, and to withdraw their plungers a short distance, while the bottom plungers continue to rise, but

not so fast, and push up the brick in the mold and relieve it from its first set to the sides thereof; third, the crank of wheel T, having passed its center, will draw back these parts again and
 5 force down the upper plungers to their first distance upon the brick, which has thus been loosened and raised, say, one-eighth inch, so as to press it that much more than at first, and render it equally dense throughout, which
 10 the set against the walls of the mold tends to resist until that is broken, and prevent the central parts being compressed as much as the sides; fourth, the parts having passed the center, both sets of plungers, with the brick
 15 between them, will be raised until the brick is free from the molds and the upper plungers, particular care being given to the form of cam U to make both sets of plungers move upward alike during this part of the action, and so
 20 the upper plungers will release the brick slowly; fifth, the brick, being lifted free from the molds, will be held up while the filler-box F will be pushed out against them to push them forward over the table, whence they may be
 25 taken off by hand for packing and setting in the kiln, and to bring a new charge of clay over the molds; sixth, the brick being removed and clay brought over the molds, the bottom plungers will be carried down to open the
 30 mold and let the clay fall to fill them; seventh, the molds being filled, the boxes F will be drawn back and cut off and carry back the surplus of clay on the molds, leaving them even level full; eighth, the plungers will come
 35 together again, and the series of operations be repeated continuously in like order. In this operation the motions given by the upper wheel are regular and continuous from the turning of its crank, while those given by the
 40 lower wheel are peculiarly governed by its special cams.

I claim—

1. In a brick-machine, one lever arranged to operate one or more brick-pressing plungers, and combined with a cam having in its
 45 circuit portions arranged to act upon such single lever and give through it to the plungers a series of actions to compress the brick, to move the brick slowly in the molds, to
 50 push the brick out of the molds, to hold the brick out of the molds for removal, and to draw the plungers back to the bottom of the molds again.

2. In a brick-machine, a lever arranged to
 55 operate one or more brick-pressing plungers, and provided with two or more fulcrums arranged for alternate action—one for use in pressing the brick and one or more for pushing the brick out of the molds—and located

nearer to the first or driving end of the lever. 60

3. In a brick-machine, the lever M, arranged to operate two or more plungers to compress the brick, and provided with fulcrums M' M'' between the driving and driven pivots, for use
 65 in alternate or serial order.

4. In a brick-machine, the combination of means to operate opposing sets of plungers to press the brick, such means consisting of a crank, pitman, and knuckle-jointed parts to
 70 operate one set of plungers, and of a cam and lever to operate the other set, the whole arranged to press the brick, and then by the same lever to push them out of the molds.

5. In a brick-machine having two wheels, T T', driven alike, for operating opposing sets
 75 of pressing-plungers, the combination of a crank and pitman and knuckle-jointed parts connecting from one wheel to one set of plungers, with a cam and lever connecting from the other wheel to the other set of plungers, 80
 the whole arranged so the cam and single lever will act both to compress the brick and then push them out of the molds.

6. The combination of the lever M, provided with two fulcrums for alternate use, and parts
 85 R Q R', with the knuckle-jointed parts arranged to operate opposing sets of plungers for compressing the brick.

7. The combination of the lever M, provided with two fulcrums for alternate use, and parts
 90 R Q R', with the knuckle-jointed parts arranged to operate opposing sets of plungers, and so that the several joints between the joints I R will come into one straight line at the point
 95 of greatest pressure on the brick.

8. The improved process of making brick which consists in filling molds with pulverized clay and compressing it by opposing plungers moving together, then releasing the brick
 100 from pressure, and while so released moving them in the molds, then re-pressing the brick with a greater pressure than at first before discharging them from the molds.

9. The rock-shaft V, with its two arms, V' V'', combined with operating part U'', and
 105 arranged to move lever M to draw down the lower plungers.

10. In a brick-machine, the combination of mold filler-box F with its covered slideways and bent supporting-hangers, arranged sub-
 110 stantially as and for the purpose set forth.

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

WILLIAM ANDRUS.

Witnesses:

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 T. C. BRECHT.