3 Sheets—Sheet 1.

Z. VANIER.

Brick-Machine.

No. 197,576. Patented Nov. 27, 1877.

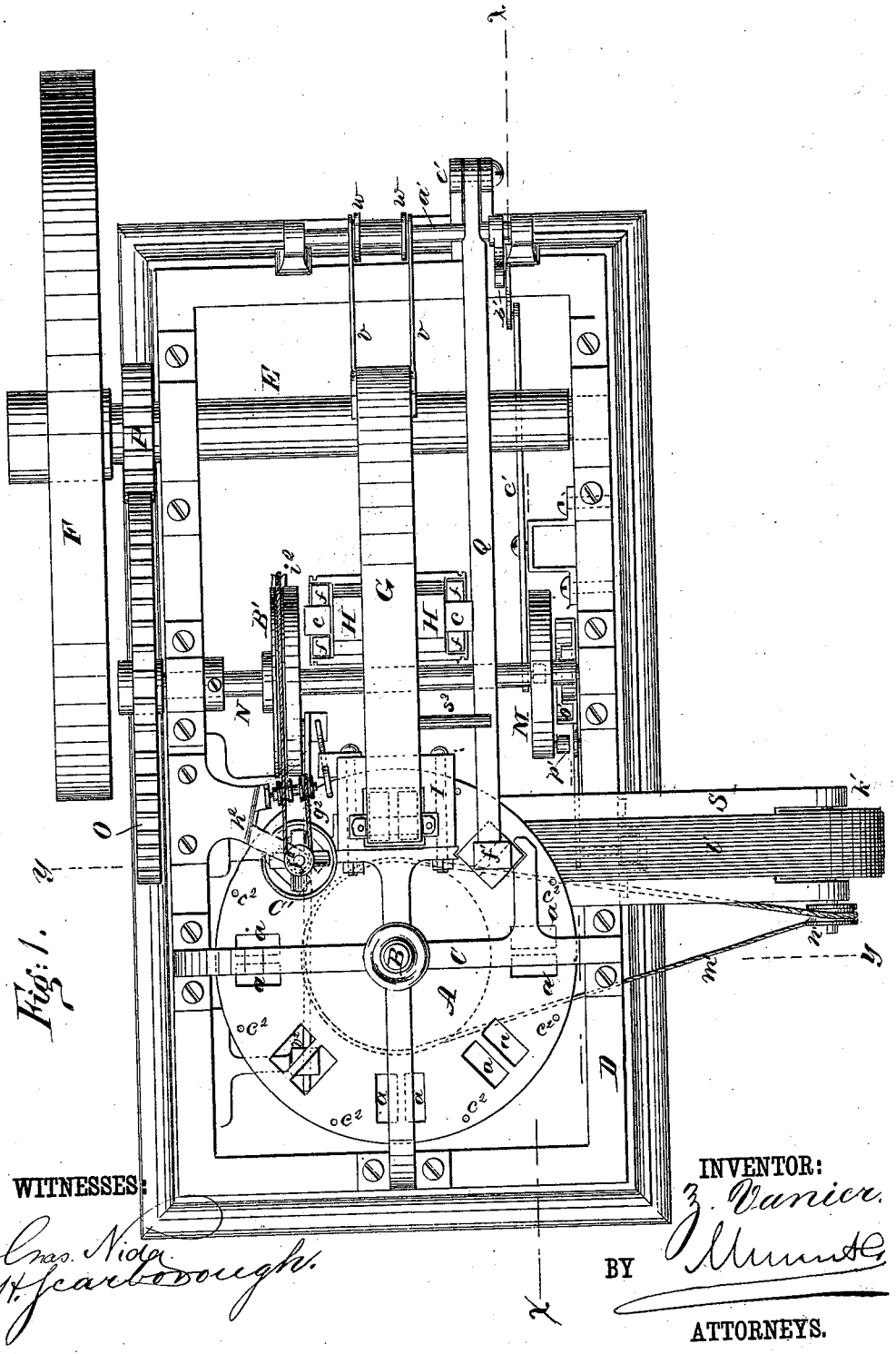

Fig. 1.

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3 Sheets—Sheet 2.

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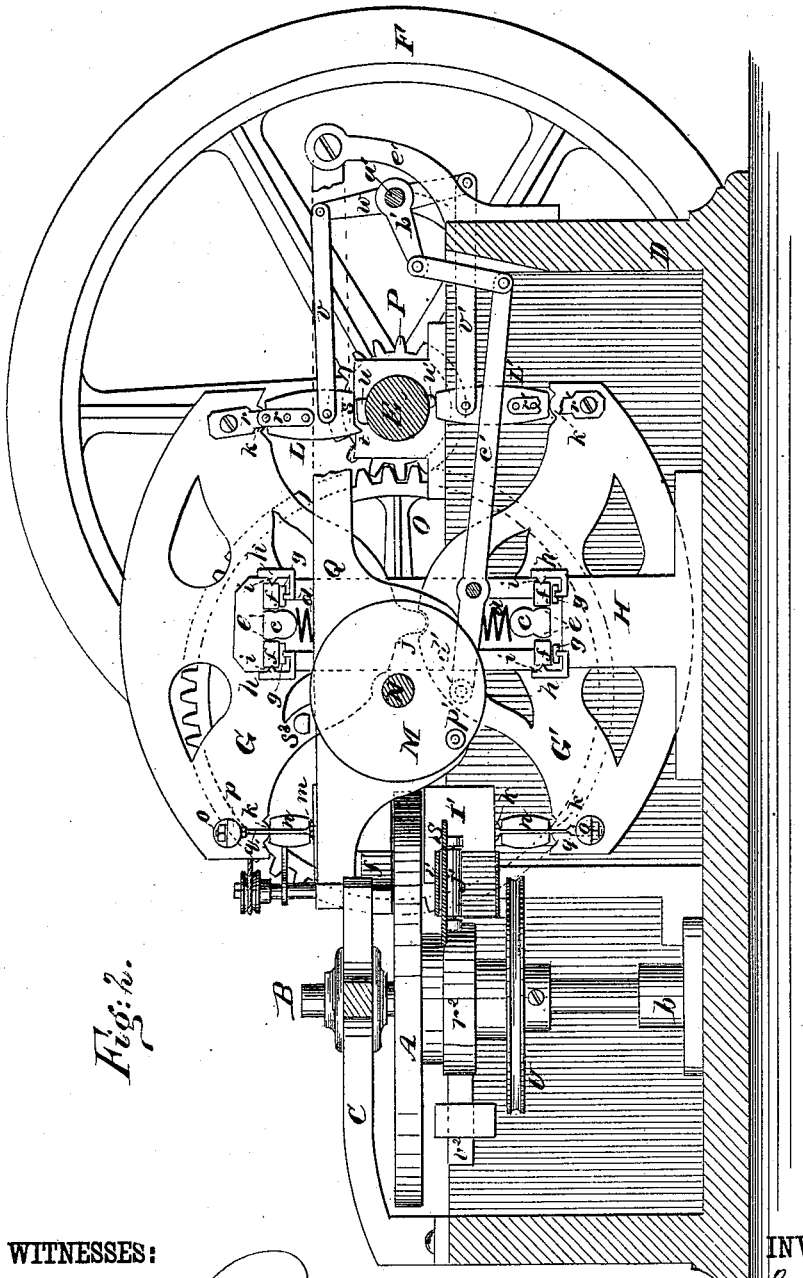

Fig. 2.

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3 Sheets—Sheet 3.

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Fig: 3.

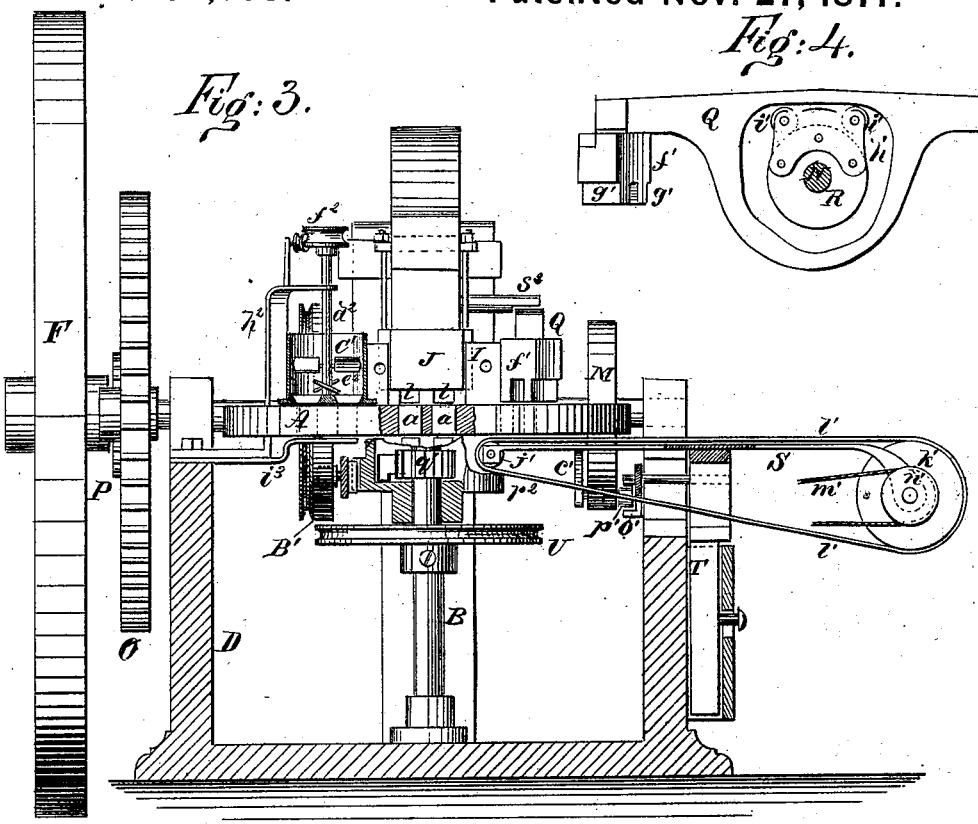


Fig: 4.

Fig: 5.

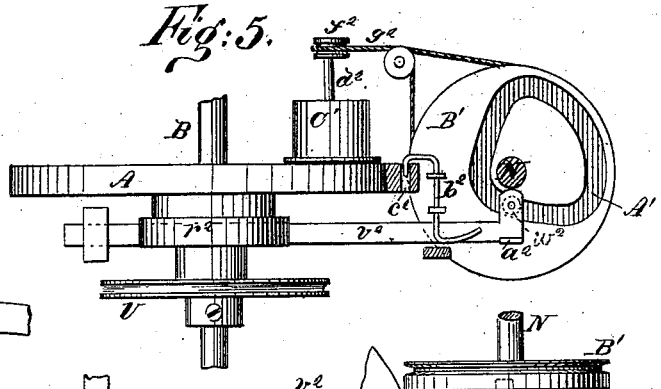


Fig: 7

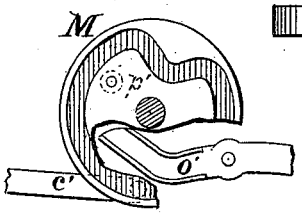
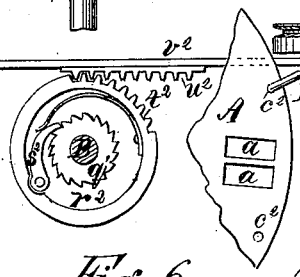


Fig: 6.



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UNITED STATES PATENT OFFICE.

ZÉPHIRIN VANIER, OF WESTBOROUGH, MASSACHUSETTS.

IMPROVEMENT IN BRICK-MACHINES.

Specification forming part of Letters Patent No. **197,576**, dated November 27, 1877; application filed September 1, 1877.

To all whom it may concern:

Be it known that I, ZÉPHIRIN VANIER, of Westborough, county of Worcester, and State of Massachusetts, have invented a new and Improved Brick-Machine, of which the following is a specification:

Referring to the drawings, Figure 1 is a plan view of my improved machine. Fig. 2 is a side elevation in section on line *x x* in Fig. 1. Fig. 3 is an end elevation in section on line *y y* in Fig. 1. Fig. 4 is a detail view of a portion of the discharging-lever and wheel for operating the same. Fig. 5 is a detail view of the revolving table that carries the brick-molds, and the filling, operating, and locking devices for the same. Fig. 6 is a detail plan view of the mechanism for giving motion to the table. Fig. 7 is a detail view of the cams for moving the table and for throwing the toggles into gear.

Similar letters of reference indicate corresponding parts.

The object of my invention is to provide a machine for rapidly manufacturing bricks from dry clay by means of heavy pressure created by mechanism hereinafter described.

Referring to the drawings, A is a table secured to the shaft B, and having formed in it several pairs of brick-molds, *a*. The shaft B is journaled at its upper end in a spider, C, that is secured to the frame D, which supports all of the parts of the machine. The lower end of the shaft is journaled in a step, *b*, in the lower part of the frame.

E is the main shaft of the machine, which is supported by pillow-blocks secured to the upper portion of the frame D, and upon one end of which there is a heavy fly-wheel, F.

G G′ are heavy working beams, placed one above and one below the shaft E and table A, and journaled in standards H, secured to the bed of the machine.

The shafts *c* of these working beams roll on a flat surface in the ends of the standard, and are forced apart by springs *d*, and they are provided with convex projections *e* that move in contact with blocks *f*, that are supported by rubber springs *g*, which rest on the L-shaped projection *h*. Upon the vertical portion of these projections there are angular or knife-edged ribs *i*, against which the outer ends of the blocks *f* rest.

The adjacent portions of the beams G G′ are semicircular, and from one of them a tooth, *j*, projects, which is received by a mortise in the other. Upon the under surface of the beam G, and upon the upper surface of the beam G′, near their ends, convex surfaces *k* are formed.

Above the table A a guide, I, is supported by the spider C, and contains a follower, J, having on its under surface two projections, *l*, that fit the molds *a* in the table. Upon the upper end of the follower there is a convex projection, *m*, between which and the projection *k* on the beam G there is a block, *n*.

There is a transverse hole, *o*, in the beam G, above the projection *k*, in which a half-round bar, *p*, is placed. Springs-rods *q* are screwed into the follower J, one at each side of the block *n*, and extend upward through the projecting ends of the bar *p*, and are provided with nuts for drawing the follower, the block, and the beam together.

Below the table A a guide, I′, is formed in a cross-bar which forms a part of the frame D. In this guide there is a follower, J′, which is similar in all respects to the follower J in the guide I, and is connected with the beam G′ in the same manner as the follower J is connected with the beam G.

To the rear end of the beam G an arm, L, which forms a part of the toggle by which the beams G G′ are operated, is connected by straps *r*, and to the rear end of the beam G′ the arm L′ is connected by straps r^1. The arm L is placed above the shaft E, and has a wide bearing-surface, *s*, and a lip, *t*, for engaging a wide-faced cam-lug, *u*, that projects from the shaft E. The bearing-surface of the lower arm L′ is narrower than that of the upper arm L, and the cam-lug u^1 on the shaft E, with which it engages, is also narrower than the cam-lug *u*. These cam-lugs are arranged diametrically opposite on the shaft, and engage the two parts of the toggle simultaneously; but the cam-lug *u*, being widest, continues to act after the lug u^1 has ceased to act. The object of this will be described in connection with the operation of the machine.

The arms L L′ of the toggle are connected by means of links v v^1 with levers w, having equal arms, and secured to a rocking shaft, a^1, which is journaled in standards secured to the rear of the frame D.

To the shaft a^1 an arm, b^1, is secured, which is connected by a link with a lever, c^1, pivoted to the side of the frame D, and carrying a roller, d^1, which is engaged by a cam, M, on the shaft N.

The shaft N is journaled in boxes attached to the upper portion of the frame D, and to it is secured a spur-wheel, O, that takes its motion from a pinion, P, on the main shaft E.

Q is a lever that is pivoted to an arm, e^1, attached to the rear end of the frame D, and is connected with a follower, f^1, moving on guides formed in the spider C, and having formed on it two projections, g^1, which fit the molds a in the table A. There is a cam-opening, h^1, in the lever Q, which surrounds a disk, R, on the shaft N, which disk carries two rollers, i^1, in its periphery that engage the cam h^1.

S is a table, supported by the vertically-sliding bar T, and having at its inner end a roller, j', and at its outer end a drum, k', for carrying the endless apron l' over the table. The apron receives an intermittent motion by a belt, m', that runs over a pulley, n', secured to the shaft of the drum k', and around a wheel, U, placed on the shaft B. The table S is carried upward to receive the bricks from the molds, and afterward gently lowered by a cam-lever, o', which is pivoted to the frame D, and connected with the sliding bar T. This cam-lever is engaged by a pin or roller, p', projecting from the back of the cam M.

Upon the shaft B, under the table A, a ratchet-wheel, q', is secured, that is surrounded by a drum, r^2, containing a spring-pawl, s^2, that engages the ratchet.

On the periphery of the drum there is a toothed segment, t^2, which is engaged by a rack, u^2, on the bar v^2, which slides in ways formed in the frame D. The bar v^2 carries a roller, w^2, that is engaged by a cam, A′, formed in the side of the wheel B′, placed on the shaft N. A lug, a^2, projects from the side of the bar v^2, for operating the locking-bolt b^2, which slides in guides attached to the follower-guide I, and engages holes c^2 in the table A. The lower end of the bolt is bent, forming a cam, which is engaged by the lug a^2 at every movement of the bar v^2.

Above the table A, at one side of the follower-guide I, there is a cylinder, C′, in which a vertical shaft, d^2, is journaled. On the bottom of this cylinder there are two openings corresponding with a pair oft he molds a in the table A, and above the bottom several screw-blades, e^2, are attached to the shaft d^2. The upper end of the shaft d^2 is provided with a pulley, f^2, which is driven by a round belt or chain, g^2, which runs in a groove in the wheel B′.

The direction of the belt is changed by two pulleys journaled in boxes supported by the standard h^2, that supports the upper end of the shaft d^2. A fork, i^2, projects from the periphery of the wheel B′, and serves to tighten the belt or chain g^2 through a portion of the revolution of the wheel B′.

The operation of my improved machine is as follows: Damp clay, such as is usually employed in making bricks, is put in a suitable hopper and supplied to the cylinder C′, whence it passes to the molds a, being agitated and wedged downward by the blades e^2, which are made to rotate, while the table A is at rest, by the belt or chain g^2, which is tightened, during the time occupied in filling the molds, by the fork i^2. A plate, i^3, under the table A prevents the clay from dropping through the molds.

While one pair of molds is being filled another, containing clay, is being pressed between the followers J J′ by the straightening of the toggle-arms L L′. The cam u, which moves the upper beam G, having a wider face than the cam u^1, which moves the lower beam G′, the upper beam G continues to move after the lower one is released, causing the follower J to move the brick downward in the mold after it is pressed, thus loosening it and rendering it easier for the discharging mechanism to force the brick out of the mold.

After the bricks are pressed they are moved forward by the rotation of the table A, and discharged from the mold by the follower f^1, the table S having previously risen to receive them. This table descends simultaneously with the follower, and when the table A makes another forward movement the endless apron l' is rotated sufficiently to carry the bricks outside of the frame-work of the machine, when they may be removed. When the lever Q is raised by the rollers i^1 in the periphery of the disk R, it strikes a pin, s^3, that projects from the beam G, and raises the forward end of the said beam. The beam G′, by virtue of its connection with the beam G, is also moved away from the molds. The pressure is secured by the straightening of the toggle-arms L L′, by the action of the cams u u^1.

In the present case the cams act at every fourth revolution of the shaft E.

This intermittent action of the cams is secured by holding the arms L L′ out of engagement with the cams while the shaft E makes three revolutions, and moving them so that they are caught by the cams at the fourth revolution by means of the connection of arms with the lever c^1, which is moved at the proper instant by the cam M.

The motion of the fly-wheel F is accelerated during the three revolutions in which no work is done, and, as it is of large diameter and great weight, its momentum is sufficient to exert the required pressure. There is no lateral strain upon the shaft E, as it simply revolves between the arms L L′, and the pressure exerted by the cams is alike above and below the shaft.

All of the bearings where any considerable strain is exerted are constructed with rolling surfaces, so that the friction of the machine is reduced to a minimum.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. The fly-wheel F, shaft E, cams u u^1, and toggle-arms L L′, in combination with mechanism for throwing the toggle-arms into engagement with the cams at intervals, as shown and described.

2. The combination of the narrow toggle-arm L′, narrow-faced cam u^1, the wide-faced cam u, toggle-arm L, having the lip t, the beams G G′, and followers J J′, for pressing the clay in the molds and loosening it therefrom, substantially as shown and described.

3. The cam M, lever c^1, arm b^1, lever w, and connecting-rods v v^1, in combination with the toggle-arms L L′ for throwing them into engagement with the cams u u^1, substantially as shown and described.

4. The combination, in a brick-machine, of the rocking beams G G′ and the vertically-reciprocating followers J J′, arranged and operating, as herein described, with the intermittingly-rotating table A, having pairs of molds a, as and for the purpose specified.

5. The combination of the cam B′, sliding bar v^2, carrying the roller w^2, and rack u^2, the drum i^2, ratchet q', spring-pawl s^2, and table A, substantially as shown and described.

6. The belt b^2, table A, and the sliding bar v^2, having the lug a^2, in combination, substantially as herein shown and described.

7. The combination of the plate i^3 with the table A, substantially as shown and described.

8. The pin s^2, projecting from the beam G, and the lever Q, in combination, substantially as and for the purpose shown and described.

9. The table S, carrying the roller j, drum k', and endless belt i^1, the wheel U, and pulley n', in combination, substantially as shown and described.

10. The wheel M, having the roller p', and cam-lever o', in combination with the table S, for giving the table an intermittent vertical motion, substantially as shown and described.

11. The convex projections k, formed on the beams G G′, for receiving the blocks n and toggle-arms L L′, substantially as shown and described.

12. The springs d, in combination with the shafts c of the beams G G′, substantially as shown and described.

13. The blocks f, L-shaped supports h, having angular bearings i, and the shaft c, having the rounded projections e, and rolling on a flat surface, as described, in combination, substantially as shown.

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Witnesses:
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