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Z. VANIER.

Pressed-Brick Machine.

No. 223,617. Patented Jan. 13, 1880.

Fig. 1.

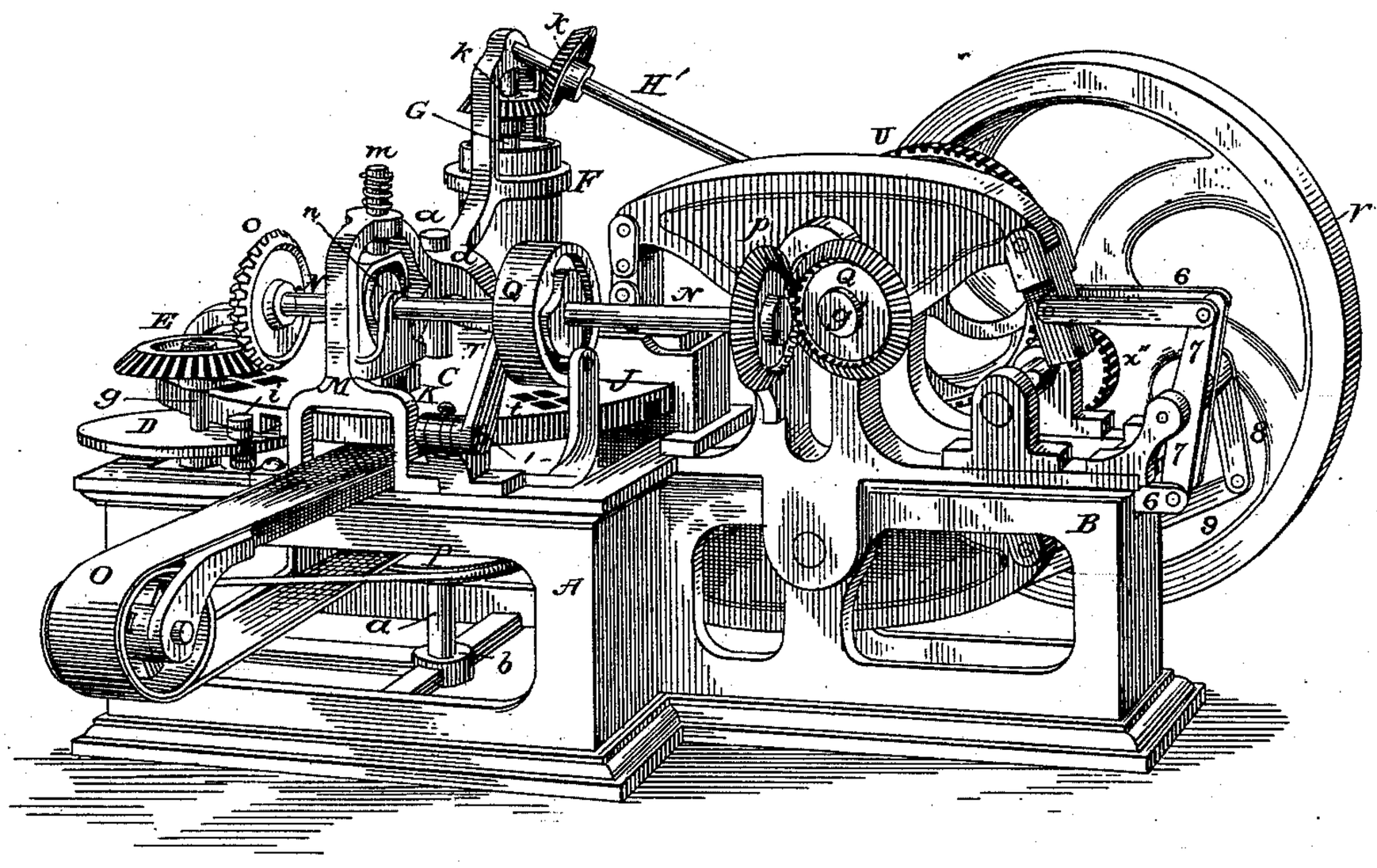

Fig. 2.

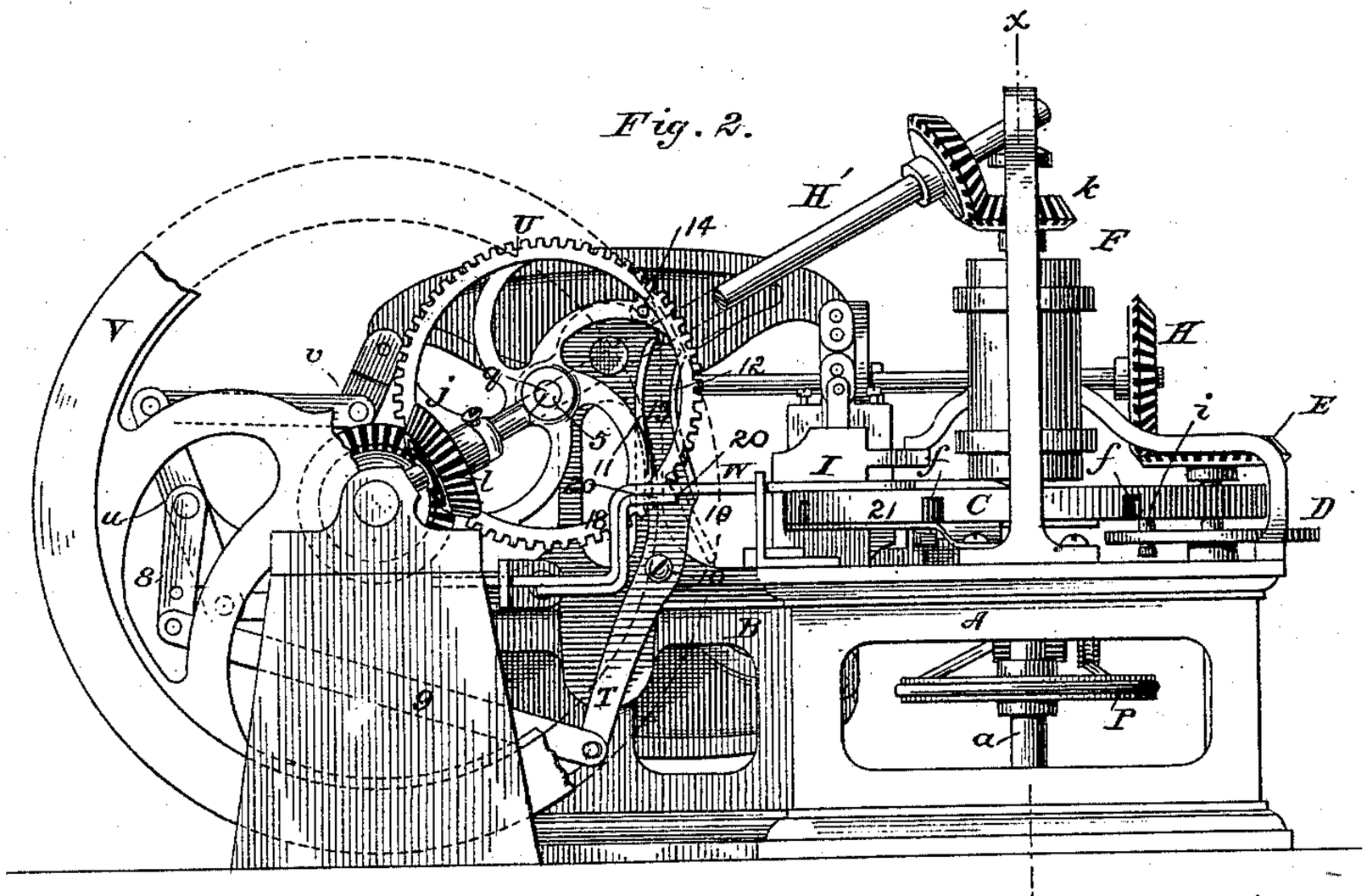

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Fig. 3.

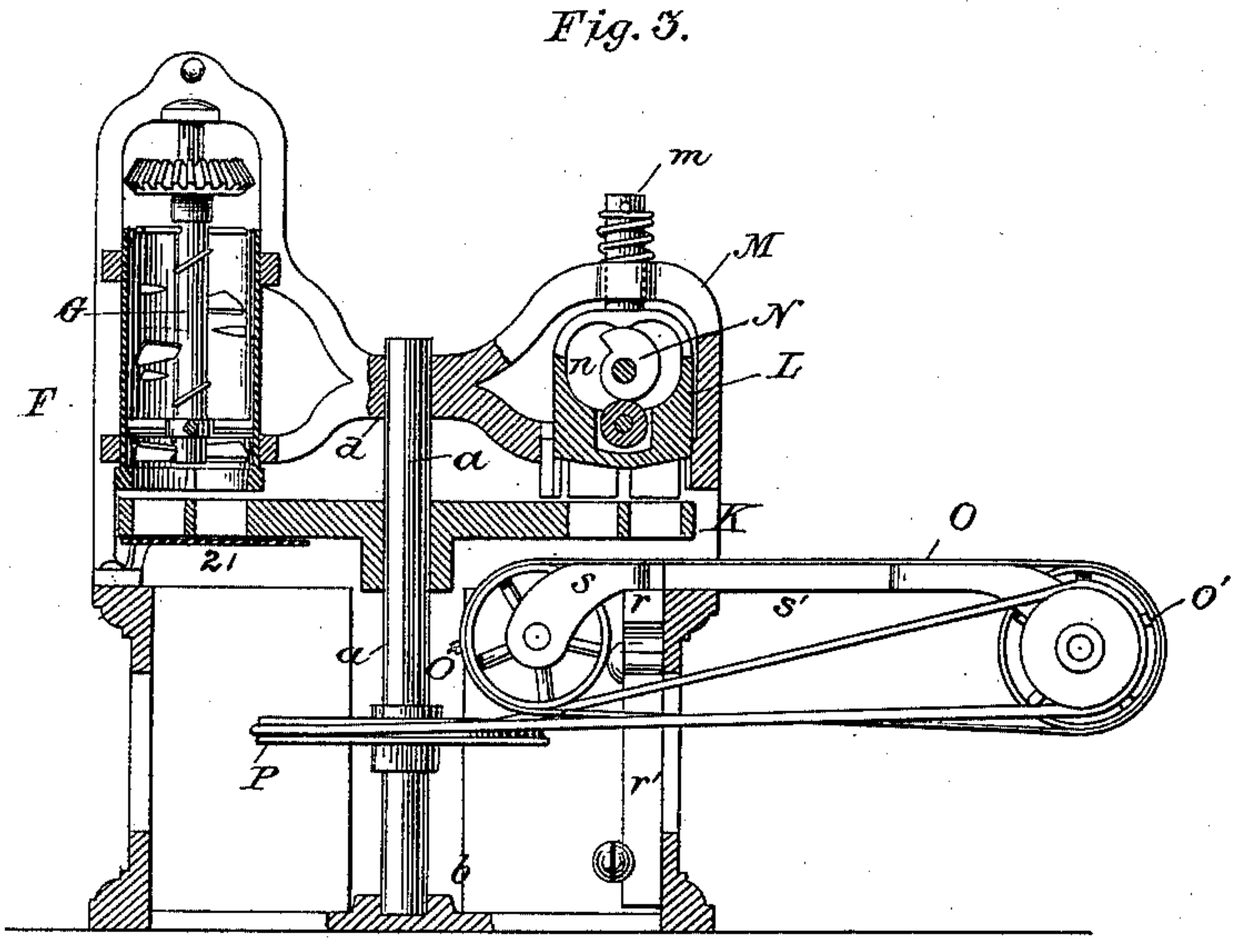

Fig. 4.

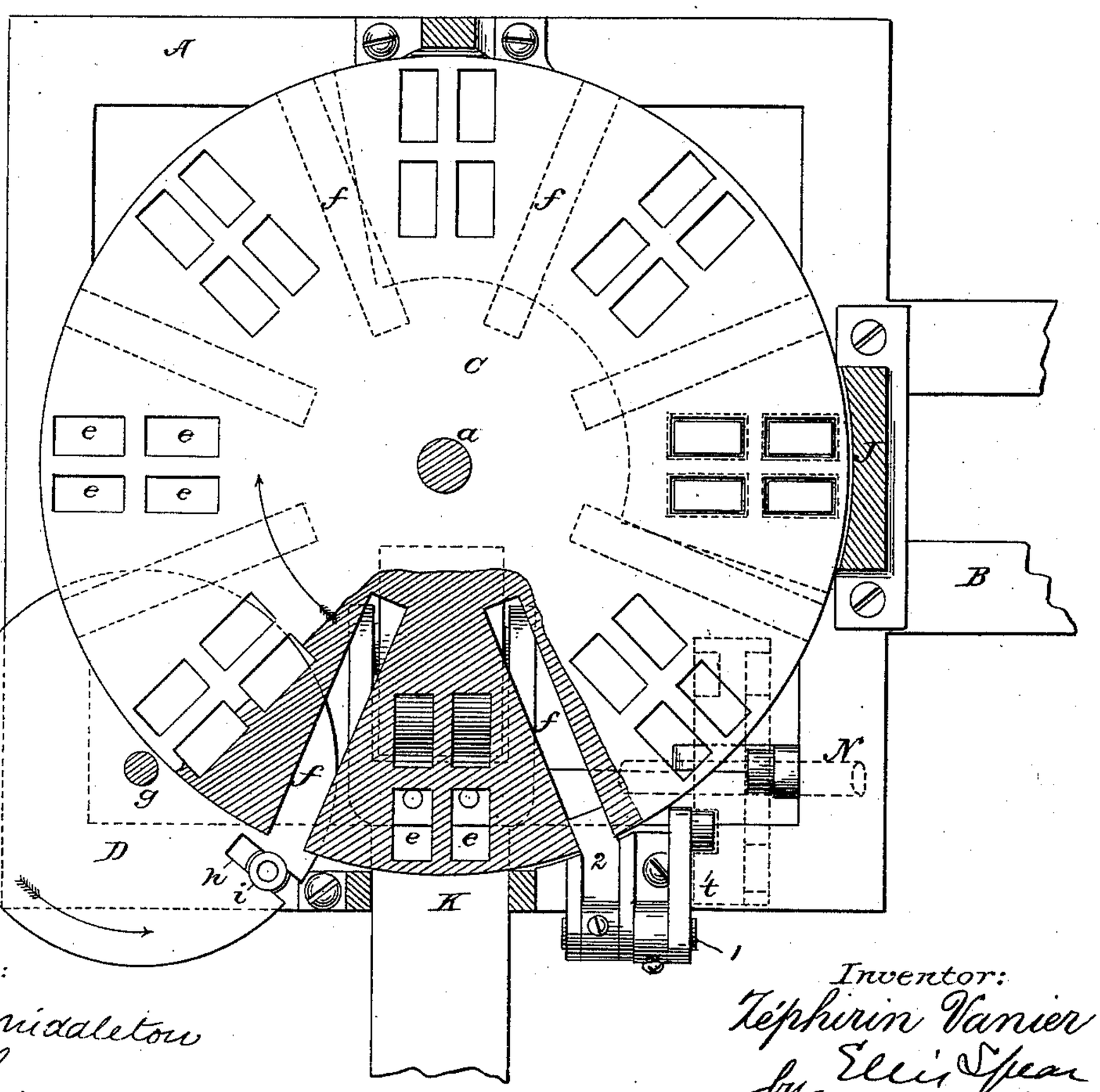

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Fig. 5.

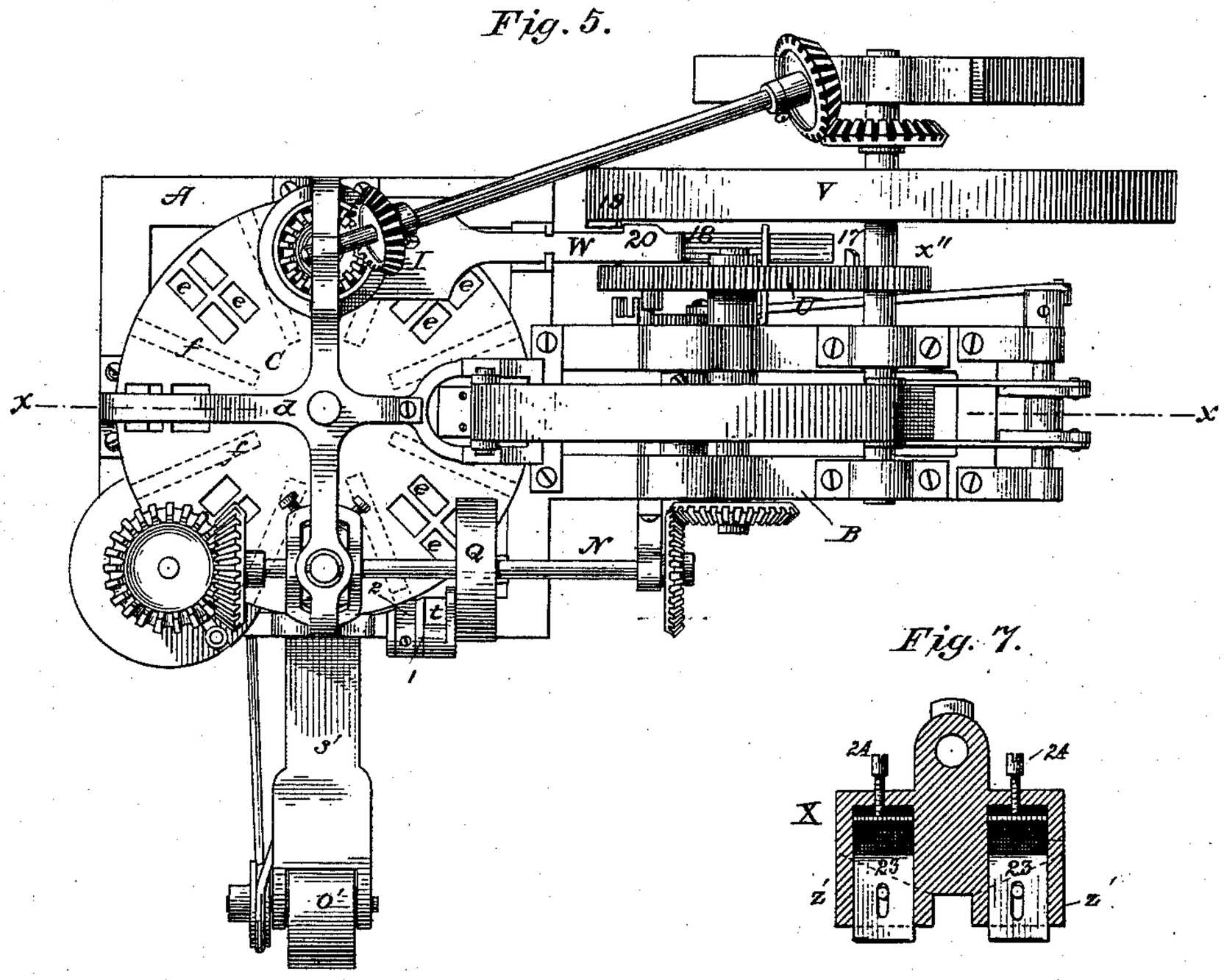
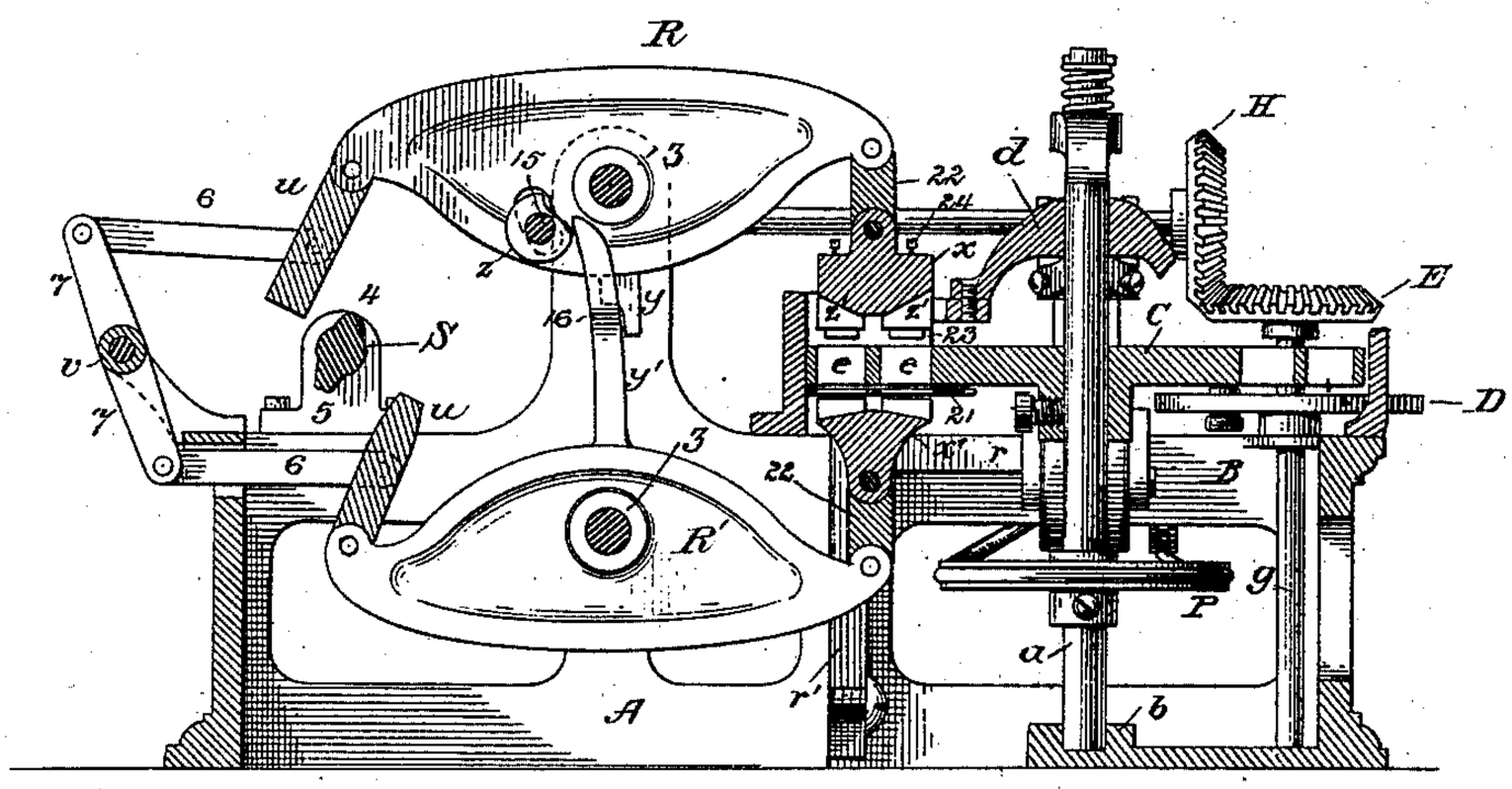


Fig. 7.

Fig. 6.



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UNITED STATES PATENT OFFICE.

ZÉPHIRIN VANIER, OF WESTBOROUGH, MASSACHUSETTS.

PRESSED-BRICK MACHINE.

SPECIFICATION forming part of Letters Patent No. 223,617, dated January 13, 1880.

Application filed November 6, 1879.

To all whom it may concern:

Be it known that I, ZÉPHIRIN VANIER, of Westborough, in the county of Worcester and State of Massachusetts, have invented a new and useful Improvement in Pressed-Brick Machines; and I do hereby declare that the following is a full, clear, and exact description of the same.

My invention relates to brick-machines of that class in which the bricks are formed by pressure in molds arranged within a horizontal revolving table, the clay being fed to the molds by a pug-mill and pressed in said molds, and then discharged and removed therefrom. It is an improvement on the machine shown in patent granted me on the 27th day of November, 1877, and numbered 197,576; and it consists of improved details of construction, whereby the machine is made more simple and effective in its operation. These details are hereinafter fully set forth, and are particularly indicated in the claims.

In the drawings hereunto attached, and forming part of this specification, Figure 1 is a perspective view of the machine. Fig. 2 is a side elevation, showing the main driving-wheel, the pug-mill, and the apparatus for driving the same, certain parts being broken away to disclose the interior mechanism. Fig. 3 is a partial section on line *x x* of Fig. 2. Fig. 4 is a plan view of the revolving table, with the surface in part removed to show the means for giving intermittent rotary motion to said table. Fig. 5 is a top view of the machine, and Fig. 6 a section on line *y y* of Fig. 5, Fig. 7 being a detailed view of the plunger.

In these drawings, A represents a substantial frame or support for the revolving table, and B a similar frame for the driving and compressing apparatus.

Centrally upon the frame A is located the table C, which is supported upon the shaft *a*, stepped in a suitable socket at *b*, and having its upper bearing in the frame-work *d*. The table is fixed to the shaft *a*, and is supported by it. Within this table, arranged at regular intervals, are the pockets *e*, (here represented as in sets of four,) each side being adapted to be filled with the clay from the pug-mill at one operation, to receive the pressure at another, and to be discharged by a third operation of the machine, whereby four bricks are made at each stroke.

The table is formed with radially-arranged grooves *f* upon its under surface, and located midway between adjacent sets of molds. For connection with these grooves, and to give proper intermittent motion to the table, a wheel, D, is journaled horizontally upon the frame B, its center being just outside the periphery of the table C.

The shaft *g* of the wheel D is prolonged, as shown in Fig. 6, and has fixed upon it a beveled gear, E, meshing into a similar beveled gear, H.

In the wheel D is set a pin, *i*, with friction-roller, adjusted in the slot so as to bring it in the revolution of the wheel directly into the outer opening of the groove *f*.

The wheel revolves in the direction of the arrow, Fig. 4, and lies close underneath the table C, so that the pin *i*, which projects up just far enough to move in the groove *f*, bears in its motion against the left-hand wall of the groove, and presses it to the left until the said table is turned a distance equal to the space between the sets of molds, measured from center to center—or, in other words, to bring any given set of molds underneath that part of the mechanism which is to operate in connection therewith. After the pin emerges from the said groove, and during that part of the revolution of the wheel D while the pin *i* is moving from the point of its exit from the groove to that point where it again enters the next succeeding groove, the table remains stationary. Thus, while the motion of the wheel D is constant and uniform, it imparts a definite intermittent motion with a smooth start and stop to the table C, adjusted, as aforesaid, to bring each set of molds into proper position for the action of the pug-mill, or the pressing-levers, or the discharging devices, and to leave them in such position until said devices perform their proper function.

Shown at F, Figs. 2 and 3, is a pug-mill of ordinary construction, (with a set of openings corresponding in size and shape to the forms of the molds,) having a shaft, G, both supported in the frame-work, the shaft being provided with inclined feeding-blades and stirrers,

On the shaft G is a beveled gear, driven by another corresponding gear on the end of the inclined shaft H′, which derives its motion through the beveled gear *j* and *k* from the main driving-shaft of the machine. The beveled gear *j* is connected with the shaft H′ through an intermediate spring, *l*, whereby the shaft G in the mill is allowed to yield in case it meets with any unusual obstruction in its work, and in order that it may operate upon the clay with a yielding pressure.

The pug-mill, as before described, discharges through the openings in its bottom into a set of molds, *e*, which are brought by the intermittent motion of the table C, moving in the direction of the arrow, Fig. 4, and by means of wheel D, directly underneath the said pug-mill, and left there long enough to be filled while the pin *i* is performing that part of its revolution outside of the table C. A space is left between the bottom of the pug-mill and the upper surface of the table C sufficient to allow the blade I to pass between said mill and table. This blade is moved at intervals by mechanism hereinafter described, being timed in its motion so as to cut off the clay from the molds as soon as they are filled. This blade remains underneath the mill until the table is turned sufficiently to carry the set of molds away from beneath the mill, when the blade is withdrawn. The molds pass on in step-by-step movement until they reach the joint J, where they receive the pressure, and then still farther to the point *k*, where the pressed bricks are discharged.

The discharging mechanism consists of a plunger. (Shown more clearly at L in Fig. 3.) It is provided with four blocks fitted in size and arrangement to the four molds of the sets. It slides in vertical guides in the frame M with a part of the general frame-work of the machine.

The plunger L has a vertical shaft, *m*, which passes through an opening in the frame M, and is provided with a spring bearing between the upper surface of the frame and a pin in the upper part of the shaft *m*, the action of the spring tending to keep the plunger raised out of the molds and free from the upper surface of the table.

A cam, *n*, on the shaft N, working against a friction-roller within the plunger, is arranged to depress the said plunger at the proper moment, when a set of molds containing the pressed bricks is brought around and arrested beneath it. This shaft N is carried in suitable bearings, and has upon one end the gear-wheel *o*, which drives the wheel D, and upon the other end a gear, *p*, by means of which it receives motion from the secondary shaft *g*.

The bricks pushed from the molds outward by the action of the cam are received upon an endless band, O, Fig. 3, which passes over drums O′ O², and is driven by means of a band from the wheel P on the shaft *a*.

The apparatus is adjusted to give the endless band motion, carrying the upper part outward.

Underneath the upper part of the endless band is a lifting-arm, *r*, Fig. 3, which moves in contact with the inner surface of the frame, and carries a section, *s*, of the frame which supports the drums of the endless belt. The outer part, *s′*, of this frame is fixed to the frame of the machine, and remains stationary; but the part *s* is adapted to be lifted by the arm *r*, so as to bring the endless band O up against the under surface of the table C. This motion is produced by means of a vertical part, *r′*, of the arm *r*, which has a pin working in a cam-groove in the disk Q upon the shaft N, Fig. 1. The vertical movement of this arm and the band which it carries is so timed that the band is lifted to receive the bricks as they are pressed out by the plunger, and is lowered with them. As this band O is driven from the shaft *a* of the table C, it will be apparent that the motion of the band is intermittent and corresponds exactly with that of the table. The band, as it rises, is arrested in its longitudinal movement at the same time that the table is arrested to allow the bricks to be pushed from the molds, and starts with the table to move the bricks outward from the machine. In this connection and upon Fig. 1 will be observed an arm, *t*, pivoted at 1, and provided with a stud, 2, locking into the radial grooves *f* of the table C, as shown more clearly in Fig. 4.

The arm *t* has a pin with friction-roller, which works in another cam-groove in the face of the wheel Q opposite that first described.

The shape of the cam last described and the adjustment of the arm *t* and the stud 2 are such that the said stud is lifted at the instant when the molds *e* are directly underneath the operating devices for filling, pressing, and emptying; and, further, the stud 2 is so located as to enter the groove *f* and hold the table C securely locked at the instant when the said operating devices are at work. It is then depressed, and the pin *i* upon the wheel D enters the preceding groove and gives the table C another partial rotation.

The mechanism for compressing the bricks is shown in Fig. 1, and more clearly in Fig. 6. It consists of a pair of walking-beams, R R′, mounted on shafts 3 3, which have their bearings in parts of the frame B. These beams receive intermittent motion simultaneously by means of pivoted bars *u u*, which are acted upon by eccentrics 4 and 5 on the main shaft S. These pivoted bars are connected by pitmen 6 6 to arms 7 7, Fig. 6, on the rock-shaft *v*. This rock-shaft is provided, as shown in Fig. 2, with an arm, 8, fixed upon the end thereof next the driving-wheel, as shown in Figs. 1 and 2. The arm 8 is connected by a bar, 9, to a lever, T, having its fulcrum on the bearing 10, fixed to the main frame of the machine. The upper end of this lever T is provided with flanges 11 12, which form a curved groove, 13. The flange 11 projects

downwardly beyond the flange 12, and receives the impact of the stud 14, which is fixed upon the inside of the wheel U. This wheel U is carried upon the shaft *q*, which extends through bearings in the standard which supports the upper walking-beam, and through a slot in the web of the walking-beam itself. It carries on the opposite end the beveled gear which drives the shaft N. The cog-wheel U receives its motion from the pinion *x*, which is fixed on the shaft of the main driving-wheel V, and has, therefore, motion in a direction opposite to that of the main wheel. In the construction shown the wheel U revolves with one-third of the speed of the wheel V. The arrangement of the parts is such that when the pin 14 leaves the channel 13 of the lever T, by reason of the forward curve of the said channel, said lever is drawn back, which throws the parts into the position shown in Fig. 2—that is to say, the pivoted bars *u u* are thrown, the upper one outward and the lower inward, so that the eccentrics on the shaft S pass without contact with said bars, and consequently without operating upon the walking-beams. When, however, the pin 14 in the revolution of the wheel U has arrived at the point where it comes in contact with the lower extension of the flange 11, it throws forward the upper end of the lever T, which, operating through its arm 9, crank 8, rock-shaft *v*, and other connections upon the bars *u u*, turns them toward the shaft S in such position that the cams can operate upon them, thereby lifting the rear end of the upper walking-beam and depressing the rear end of the lower, and causing the forward ends to approach each other and press upon the clay in the molds, which, by the adjustment of all the parts, are brought at the instant into position to receive the approaching plungers on the ends of the walking-beams. The channel 13 is in proper shape to give the required motion to hold the bars *u u* in position long enough to receive the required motion from the main shaft S. Then the upper end, as before described, causes the pin to draw back the lever and throw out the bars *u u*.

The eccentric 5 on the shaft S is formed with a slight transverse depression on its face to receive the corner of the upper bar, *u*, on which it acts.

The walking-beams R R′ are thrown apart at the forward end, after the pressure is imparted to the bricks, by means of devices shown more clearly in Fig. 6. These devices consist, first, of a lever, *y′*, fixed centrally on the beam R′, and another lever, *y*, fixed to the beam R. The upper part of *y′* is formed with an offset, as shown at 16, the lever above the offset being bent aside so as to pass the lower part of the beam R and stand near one side. It is there operated upon by the cam *z*, which is on the shaft 15 of the wheel Q. The cam is so shaped and arranged that in the motion of the said wheel, as soon as the pressure has been applied, it moves the upper end of the lever *y′* inwardly, thus depressing the forward end of the beam R′ at the same time the offset 16 on the lever *y′* moves the lever *y* in the same manner and with the same effect upon the beam R. By this mechanism the pressing-plungers on the forward end of the walking-beams are separated from the revolving table, and held apart during its motion, and then allowed to be forced together to impart the necessary pressure upon the clay within the molds.

On the wheel U is a stud, 17, which acts upon the shoulder 18 of the sliding-bar W, which carries the blade I. The effect of this stud is to drive forward the said blade at the proper time to cut off the clay from the molds, and the stud is properly located upon the wheel U for this purpose. An inclined flange, 19, is fixed upon the inside of the wheel V in proper position to act upon a shoulder, 20, on the bar W for the purpose of drawing back the blade I at the proper time.

It will be observed that the compressing-plungers act in opposite directions to press the clay within the molds upon both sides alike.

In order to hold the clay securely in place after the molds leave the pug-mill a plate, 21, is extended around underneath the line of the molds from the pug-mill to the compressing-plungers, including both. Being perforated to admit the lower plunger where the clay is being compressed, no further support of this kind is needed.

The compressing-plungers *x x′* are shown in section in Fig. 6. They are connected to the walking-beams by pitmen 22 22, and move in guides supported on the main frame. The upper plunger is shown more clearly detached in Fig. 7. It consists of a solid block, X, having four projections, *z′*, fitted in size and shape exactly to the molds *e e*, and with openings between to discharge the air from the bricks.

The projections or plungers *z′* are recessed to receive small pistons 23, proportioned in cross-sections the same as the plungers *z′*, in which they are fitted. These plungers 23 rest upon springs adjusted by set-screws 24, by means of which they are made to project beyond the face of the plungers *z′*, but may be pressed back flush with said face. These plungers or pistons serve the purpose of pushing the clay outward before it is pressed, so as to fill the edges and corners and to make the brick of more even density.

The lower plunger is formed with four small plungers, fitted like those first described, but without the spring-pistons.

The general construction of the frame is more solid and simple, as are the moving parts, and all are less liable to get out of order than the old form of machines; also, the strain and wear are reduced to a minimum. The filling, pressing, and discharging being done simultaneously, the machine can work more rapidly.

The device for starting is such that there is no jar in stopping or starting, and the locking

device holds the table securely for the operations performed when the table is at rest.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. The combination of the plunger L and the endless band O, having the described connection with the shaft of the revolving table, whereby it has intermittent motion in connection therewith, as set forth.

2. In combination with the plunger L, the endless band O, having a fixed drum, O′, and the movable drum O^2, adapted to be lifted and depressed in connection with said plunger, as set forth.

3. The combination of the lifting-frame *r r*, the cam-wheel Q, and the shaft N, as set forth.

4. The combination of the arm *t*, stud 2, and cam-wheel Q, as set forth.

5. The combination, with the pug-mill F and the revolving table C, of the blade I, operated in connection therewith, as set forth.

6. The combination, with the pug-mill, of the shaft H′ and the connecting beveled gears, with the beveled gear *j* and spring *l*, as set forth.

7. In combination with the walking-beams R R′, the levers *y y′* and the cam *z*, as set forth.

8. The combination, with the bar W, having the offset 18, of the stud 17 on the wheel U, as set forth.

9. The combination of the inclined flange 19 and the notch 20 on the bar W, as set forth.

10. The combination of the blocks X, the plungers, the piston 23, and the springs, as and for the purposes set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ZÉPHIRIN VANIER.

Witnesses:

LOUIS K. TRAVIS,

W. TROWBRIDGE FORBES.