

4 Sheets—Sheet 1.

No. 389,334.

Patented Sept. 11, 1888.

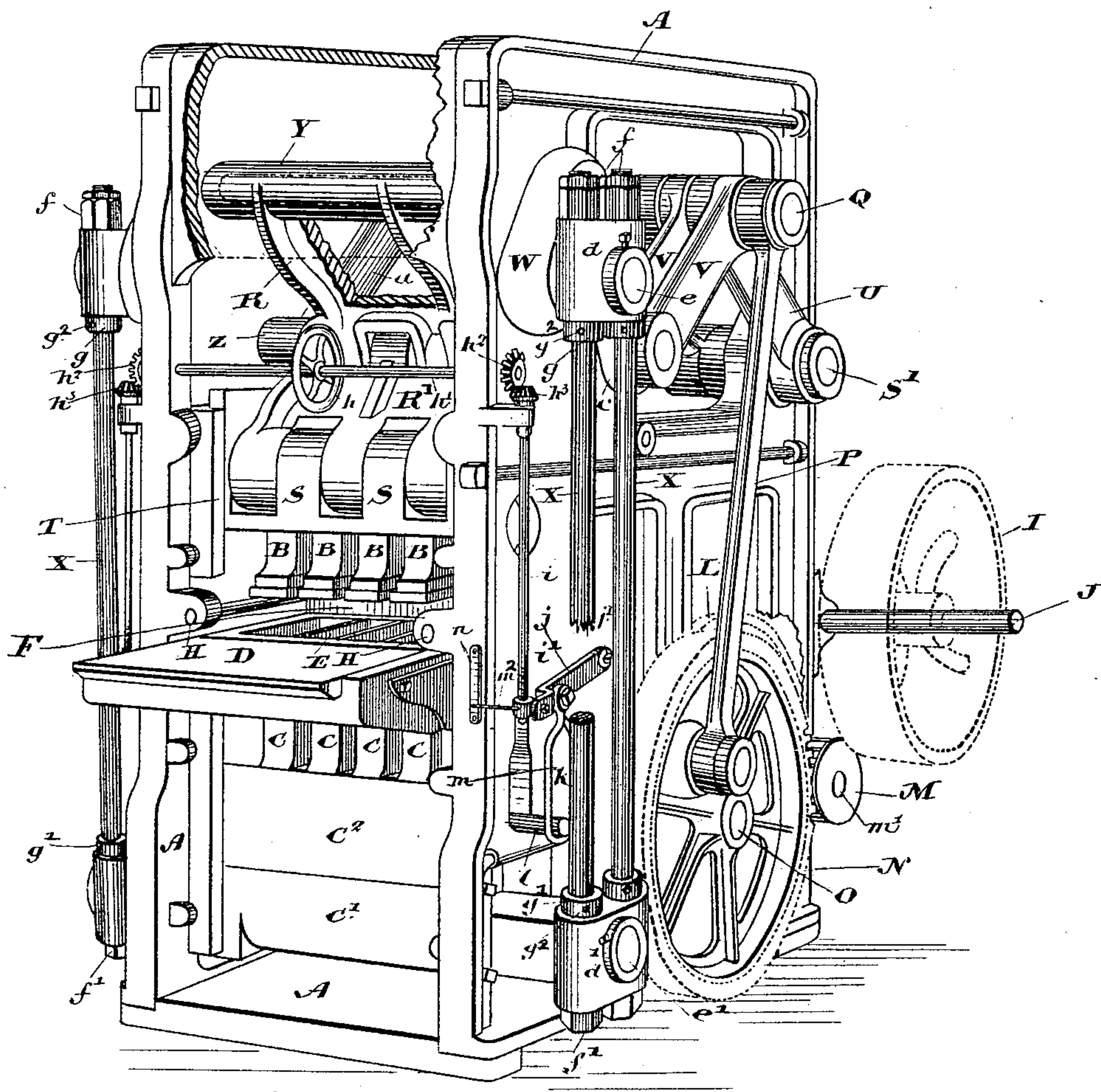


Fig. 1.

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(No Model.)

4 Sheets—Sheet 2.

W. S. & J. M. SMITH.
RECIPROCATING BRICK MACHINE.

No. 389,334.

Patented Sept. 11, 1888.

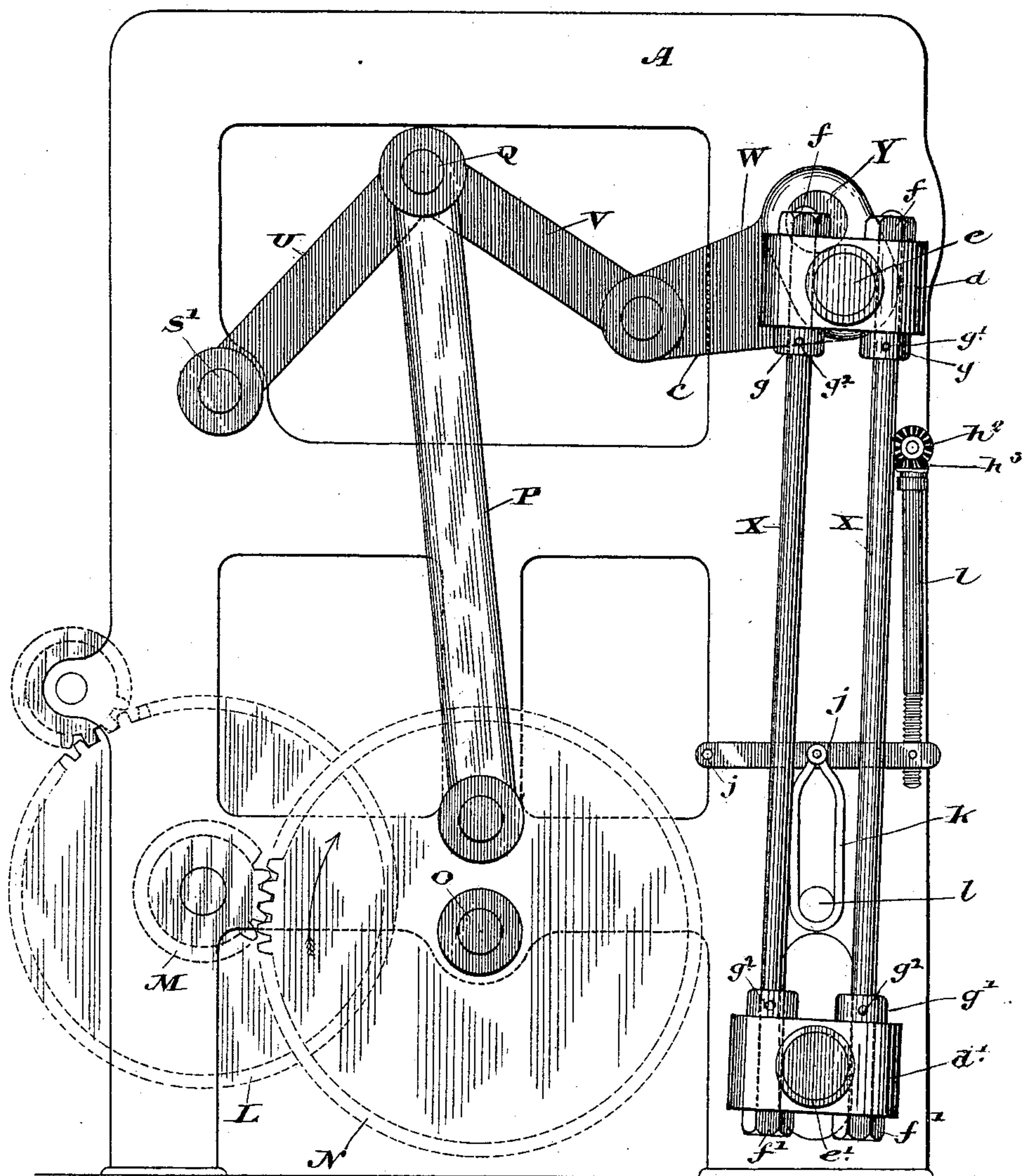


Fig. 2.

Witnesses.

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(No Model.)

4 Sheets—Sheet 4.

W. S. & J. M. SMITH.
RECIPROCATING BRICK MACHINE.

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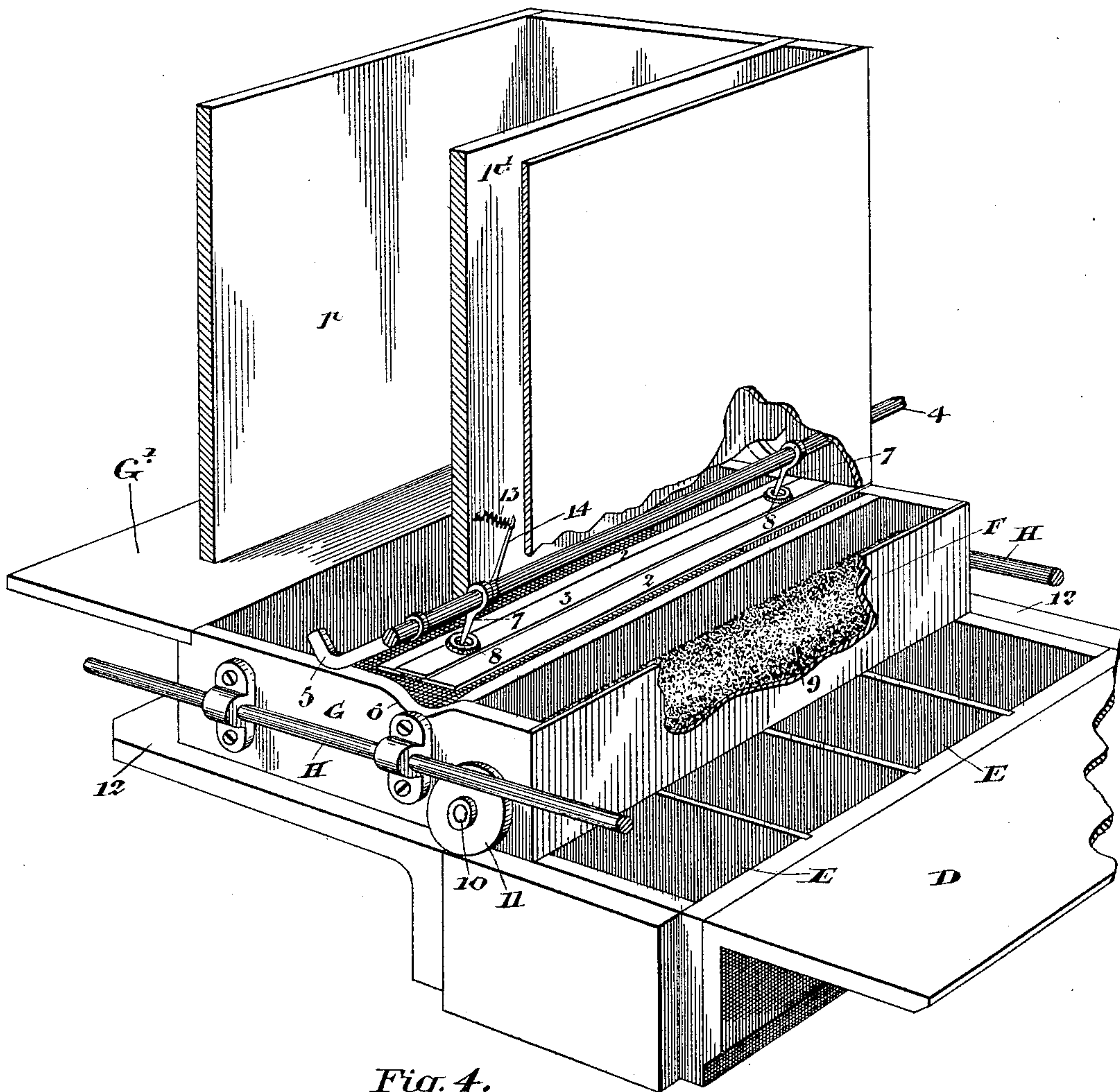


Fig. 4.

Witnesses.

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UNITED STATES PATENT OFFICE.

WILLIAM S. SMITH AND JAMES M. SMITH, OF GALT, ONTARIO, CANADA.

RECIPROCATING BRICK-MACHINE.

SPECIFICATION forming part of Letters Patent No. 389,334, dated September 11, 1888.

Application filed October 28, 1887. Serial No. 253,646. (No model.) Patented in Canada November 18, 1887, No. 28,020.

To all whom it may concern:

Be it known that we, WILLIAM STEWART SMITH and JAMES McTAVISH SMITH, both brick-machine manufacturers, and both of the town of Galt, in the county of Waterloo, in the Province of Ontario, Canada, have jointly invented certain new and useful Improvements in Pressed-Brick-Making Machines, of which the following is a specification, and for which we obtained Letters Patent in the Dominion of Canada, November 18, 1887, No. 28,020.

The object of the invention is to provide a machine for making pressed brick of any thickness or any density, as desired, and which combines great strength with compactness of parts and simplicity of construction as compared with other machines of similar character, and whereby extreme pressure can be obtained by means of a system of pivoted compound leverage, the strain on the frame caused by the downward pressure of the upper plungers being counteracted by the upward pressure of the lower plungers, so that there is no appreciable strain on the frame under any pressure, however great; and it consists, essentially, of plungers adapted to move up and down in vertical ways, so as to compress the brick, the upper plunger rising while the lower plunger is being lowered, and vice versa, both deriving motion by means of one pitman or shaft connected with the driving gear-wheel; also means provided for adjusting the distance between the plungers, so as to regulate the thickness of the brick; means for regulating the amount of clay supplied to the molds and of indicating the quantity; an automatic device for supplying sand to the top and bottom of the brick; a reciprocating feed-frame adapted to carry clay from the hopper to the molds by means of a cam-actuated system of levers, and to shove the brick after being pressed onto a table outside the frame of the machine; means provided for carrying clay to hopper, and an automatic device for raising the brick on the lower die out of the molds to the same plane as the bottom of the reciprocating frame and the discharge-table, all of which is hereinafter more particularly described.

Figure 1 is a perspective view of the machine from the front. Fig. 2 is a side elevation of the far side of the machine, as shown

in Fig. 1. Fig. 3 is a longitudinal sectional elevation. Fig. 4 is a detail showing hopper, sanding device, reciprocating feed-frame, mold-openings, and discharge-table.

In the drawings like letters of reference indicate similar parts in the different figures.

In Fig. 1, A is the main frame of the machine, with parts partially broken away to illustrate the means of operating the upper plungers. In this view the upper plungers, B, are shown elevated, while the lower plungers, C, are depressed, four bricks corresponding in number to the plungers having been pressed and removed from the discharge-table D. The mold-openings E, from which the bricks have been ejected, are also shown, as more fully explained under Fig. 3.

F is the sand-box in front of the reciprocating feed-frame G, and H one of the guide-rods on which the reciprocating feed-frame G is adapted to move. (*Vide* also Figs. 3 and 4.) The feed-box is here in position to bring forward a fresh supply of clay to the mold-openings.

I is a drum on shaft J, driven by the belting which operates, by a series of gear-wheels, K L M, (*vide* Figs. 1 and 3,) the geared driving-wheel N on the main shaft O.

P is the crank-shaft or pitman, pivoted on the driving-wheel and on the movable shaft Q, which carries a series of lever-arms, which operate the hinged pressure-frame R R', giving vertical motion to the upper plunger-frame, S, adapted to move in ways T, formed on the main frame. The arm U is pivoted to the fixed shaft S' at one end and to the movable shaft Q at the other. The arms V are similarly pivoted to the movable shaft Q and to the eccentric-cam W, which operates the pressure-rods X X, the mechanism for raising and lowering the upper and lower sets of plungers being similar on both sides of the machine.

Y is a fixed eccentric-cam shaft, on which is pivoted the hinged pressure-frame R R', hinged at Z. There are two or more lever-arms, a, pivoted at one end to the upper movable shaft, Q, and at the other to the hinged shaft Z, and another set of arms, b, pivoted to the fixed shaft S' and the upper movable shaft, Q. (*Vide* Fig. 3.) Part of the pressure-frame R has been broken away to show one of the arms a.

By reference to Fig. 3 it will be seen how an

up-and-down motion is given to the upper plungers, B. When the movable shaft Q is drawn down by the crank-shaft P, S' and Y being fixed shafts, the arms *a* and *b* and R R', the hinged pressure-frame, become spread, forming, as it were, sets of toggle-joints, and the lower portion, R', of the pressure-frame acquires a downward motion, causing the plunger-frame S to move through the ways T and the upper plungers, B, descend. When the movable shaft is raised again by the revolution of the drive-wheel, the action is of course reversed and the plunger-frame rises through the ways T.

In Figs. 1 and 2 the mode of operating the lower plungers, C, is indicated. Y is a fixed eccentric-cam shaft, on which the eccentric-cam W is pivoted, *c* being the long arm of eccentric-cam, pivoted to the movable arm V on the movable shaft Q. Another pivoted arm, U, connects the movable shaft Q and fixed shaft S'. The pressure-rods X are fitted into a cap, *d*, which is pivoted on arm or shaft *e* to the eccentric-cam in such a manner that when the arm *c* of the eccentric W is caused to descend the pressure-rods X are drawn up by the rocking motion given to the eccentric cam W, carrying with them the lower cap, *d'*, which carries the circular shaft or arm *e'*, which carries the frame C' for lower movable plungers, C. When the arm *c* of the eccentric is raised by the action of the crank-shaft P and connections, and the pressure-rods are caused to descend, carrying with them the plunger-frame C' and plungers C, it will be noticed that motion is given to the upper plungers, B, and lower plungers, C, by power communicated by the same pitman or crank-shaft P, and power is communicated in such a manner, as already indicated, that when the upper plungers, B, are descending the lower plungers, C, are rising, so as to compress the clay between them in the mold-openings, and when the upper plungers, B, are rising from the mold-openings E the lower plungers are descending, the strain on the frame caused by the downward pressure of the upper plungers being counteracted by the upper pressure of the lower plungers, thus relieving the frame of the machine from undue strain. The same system of leverage and of pressure-bars is on each side of the machine, there being also two geared driving-wheels, N, and crank-shafts P for operating the pressing mechanism.

For the purpose of adjusting the distance between the upper and lower sets of plungers, so as to regulate the thickness of the brick when pressed, the pressure-rods X, which pass through the caps *d* and *d'*, are provided with threaded nuts *f* and *f'* at their upper and lower ends, which are threaded to receive the nuts, and movable collars *g* and *g'* with set-screws *g''*.

For regulating the amount of clay supplied to the molds, the device illustrated in Figs. 1 and 2 is employed, in which *h* is a hand-wheel, which moves a shaft, *h'*, journaled in the frame,

and carrying at each end the mitered gear-pinion, *h²*, which meshes with the mitered gear-pinion *h³* on end of shaft *i*. The other end of shaft *i* is threaded, working through a collar formed on one end of the pivoted bar *j*, which is pivoted to main frame at *j'*. To the pivoted bar *j* is pivotally attached the link *k*, in which rests the handles *l* of the movable plunger-frame C². These handles work through slots *m* in the main frame and raise the lower movable frame, C², which carries the lower movable plungers, C, which enter the mold-openings, and on which the clay falls from the reciprocating feed-frame. The ends of the pivoted bars *j*, carrying the supporting-links *k*, may thus be raised or lowered, raising and holding the movable frame C² up from the plunger-frame C' or lowering it down so as to rest upon the plunger-frame C', as may be desired.

On the collar *i'*, through which the threaded end of shaft *i* works, is fixed an indicator, *m²*, which points out the raising or lowering of the lower plungers, C, on the graduated scale *n*.

In Fig. 3, which is a sectional elevation lengthwise through the machine, *o* is a carrier or endless belt for carrying clay to the hopper on rollers *o'* *o²*, the roller *o'* being driven by power communicated from shaft *m'* or otherwise, as desired. In front of the clay-hopper *p* is a compartment for sand, *p'*, which supplies sand to said box F, as hereinafter described.

For the purpose of carrying the clay from the hopper to the mold-openings D at the proper time when the upper plungers, B, are raised and the lower plungers, C, are lowered, there is a cam, *q*, centrally fixed on the main shaft O, with cam-groove *q'* and roller *q²*, which is adapted to travel through the groove *q'*, which is so shaped, as indicated, to give proper reciprocating intermittent motion to the reciprocating feed-frame G.

r is a pivoted lever-arm, pivoted at *r'*, on which the cam-groove roller *q²* is fixed. A link, *r²*, is pivoted at one end to the lever-arm *r*, and at the other end to the bell-crank lever *s*, which works on the shaft *m'*. The long arm of this bell-crank lever has pivotally attached to its end the rod or pitman *t*, which is pivotally attached to the reciprocating feed-frame G. The system of leverage, actuated by the cam *q*, causes the bell-crank lever *s* to rock to and fro at the proper time, and so move the feed-frame G forward at the time when the plungers are moved away from each other and carry the clay to the mold-openings E. As the reciprocating feed-frame is moved forward, the bottom board, G', Fig. 3, attached thereto, is also moved forward, and closes the bottom of the clay-hopper *p* until it is again withdrawn, allowing the clay to be again fed into the feed-frame G before the clay is dropped into the mold-openings. The dies on the lower plungers, C, are sprinkled with sand by the sanding device in front of the feed-frame G, as hereinafter explained, and the surface of the clay in the mold-opening is again sprinkled

with sand on the return-stroke of the pitman *l*, so as to prevent any adhering of the clay to the dies on the plungers.

For the purpose of discharging the bricks from the molds after having been pressed by the plungers, the lower plungers, *C*, are made movable and provided with a roller, *c*². A discharging-lever, *u*, pivoted on shaft *u'*, bears against the roller *c*² at one end, and a roller, *u*², on the other end of the discharging-lever is acted on by a short arm, *w*, on the main shaft *O*, which moves along with the main drive-wheel *N*. When the roller *u*² at one end of the lever *u* is depressed, the other end of lever *u* rises, carrying with it the lower plunger, *C*, and raising the pressed bricks on the dies from the mold-openings to the level of the top of the discharge-table, when the forward motion of the feed-frame *G* causes the pressed bricks to be shoved by the side of the sand-box *F* onto the discharge-table *D*. When the lever *u* is released from the action of the arm *w*, the movable lower plungers, *C*, fall by the force of gravity into their normal position and are ready for a fresh supply of clay.

In Fig. 4, which is a detail of the sanding device, *p* is a hopper or compartment for holding sand, having a false bottom, 2, with sliding panel 3. This sliding panel is designed to cover a slit or opening in the bottom and to slide to one side, so as to permit sand to fall through into the sand-box *F*.

4 is a spindle journaled on the main frame, and 5 a dog with curved end rigidly attached thereto.

6 is a depression formed in the side of the reciprocating feed-frame *G*, designed to engage with the end of dog 5, and cause the panel 3 to slide by the rocking motion communicated to shaft 4, the end of fingers 7, rigidly attached to said shaft 4, being designed to engage against the sides of rings or holes 8, formed on said sliding panel. After the dog has been moved to one side it is drawn back into position by means of spring 13, attached to arm 14 on the spindle.

9 is a circular brush on a spindle, 10, journaled in the sides of the sand-box *F*. To each end of this spindle are rigidly attached the wheels 11, which are designed to rest on and move on the track 12. The guide rods *H*, rigidly attached to the main frame of the machine, are also designed to retain the reciprocating feed-frame *G* in position, so as to keep the wheels 11 on the tracks 12 and insure the delivery of the clay into the mold-openings *E*. The revolving brush 9 keeps the sand admitted into the box *F* in motion and distributes it in a uniform manner through the open or grated bottom of the sand-box *F* and over the bottom of the dies on the lower plungers, as well as the top of the clay in the mold-openings, prior to pressure by the plungers.

From the foregoing description it will be seen that clay is conveyed by the endless belt to the hopper. The reciprocating feed-frame carries it forward to the mold-opening at the

proper moment, the sanding device automatically sanding the top of the dies in the lower plungers and the top of the clay dropped into the mold-openings. The reciprocating feed-frame is withdrawn at once after having been thrust forward by the cam actuated system of leverage already referred to, and as shown by the shape of the cam-groove. The plungers then approach each other in the manner described and compress the clay in the molds. The movable parts of the lower plungers are then raised, discharging the pressed brick from the mold-openings and raising them up to the plane of the discharge-table, when the cam on the main shaft again causes the reciprocating feed-frame to move to the front with a fresh supply of clay to the molds and to push the clay just pressed into bricks onto the discharge-table, whence they are at once removed. At each revolution of the geared driving-wheel bricks are automatically shaped, pressed, discharged from the molds, and deposited on the discharge-table.

What we claim as our invention is—

1. A pressed-brick-making machine, constructed substantially as herein shown and described, comprising upper plungers in a frame adapted to move in vertical ways, compound levers, the same power or motion communicated from the main geared driving-wheel which causes the upper plungers to rise and fall causing the lower plungers to rise and approach the upper plungers to compress the clay in the mold-openings and to cause the upper and lower plungers to recede from each other after the clay has been pressed in the molds, threaded nuts and movable collars on pressure-rods for lower plungers, means, substantially as described, for regulating the amount of clay supplied to the molds by raising or lowering a movable frame for lower plungers, a reciprocating feed-frame adapted to carry clay from hopper to the mold-openings intermittently after the clay has been pressed into bricks and to shove the pressed bricks onto a discharge-table, a pivoted lever actuated by a revolving arm to raise the brick when pressed to the plane of discharge-table, a device for automatically sanding the top and bottom of clay before pressure, and a carrier or endless belt provided for carrying clay to hopper, substantially as described and specified.

2. The combination, with the crank-shaft *P*, driven by the main geared driving-wheel, of the pivoted lever-arms *a* and *b*, movable shaft *Q*, fixed eccentric cam shaft, hinged pressure-frame *R* and *R'*, pivoted on said cam-shaft, hinged at *Z*, and pivoted to upper plunger-frame, *S*, the movable arm *V*, pivotally attached to the shaft *Q* and pivotally connected with the cam shaft, and the upper plunger, *B*, and mold-opening *E*, designed to hold clay, substantially as specified.

3. The combination, with the crank-shaft *P*, driven by main geared driving-wheel, of pivoted arm *U*, movable shaft *Q*, movable arm *V*, pivotally attached to movable shaft *Q*, and ec-

centric-cam W, pivoted on fixed eccentric-cam shaft Y, pressure-rods X, fitted into caps d d' and designed to raise and lower in ways T the lower plunger-frame, C', and movable
5 plunger-frame C², carrying movable lower plungers, C, which are adapted to move in the mold-openings E, which hold the clay, substantially as specified.

4. The combination, with the crank-shaft P,
10 of the pivoted lever-arms a and b , movable shaft Q, hinged pressure-frame R and R', hinged at Z, the upper plunger-frame, S, and plungers B, ways T, the pivoted arm U, movable arm V, pivotally attached to movable shaft Q,
15 and eccentric cam W, pivoted on eccentric-cam shaft Y, pressure rods X, fitted into caps d d' and designed to raise and lower the lower plunger-frame, C', carrying lower movable plungers, C, which are adapted to move in
20 mold-openings E, which hold clay, substantially as and for the purpose specified.

5. The combination, with the pressure rods X, threaded at each end, of the cap d , pivotally attached to eccentric-cam W, the cap d' , nuts
25 f f' , movable collars g g' , with set-screws g^2 , and lower plunger-frame, C', adapted to move in ways, substantially as and for the purpose specified.

6. The combination, with the spindle h' , jour-
30 naled in main frame, of the hand-wheel h , mitered gear-pinions h^2 h^3 , shaft i , threaded at one end and working through a collar formed at one end of pivoted bar j , the link k , handle
35 l , adapted to move through slot m , and the movable lower plunger-frame, C², substantially as specified.

7. In combination with the pivoted bar j , the free end of which is designed to move up and down, as specified, the movable plunger-
40 frame C², the link k , connecting said frame with the bar j , the indicator m^2 , fixed to the free end of said pivoted bar j , and the graduated scale n , placed on the main frame of the

machine, substantially as described, and for the purpose specified.

8. The combination, with the compartment
45 for sand, p' , situate in front of and adjoining the clay-hopper, of the false bottom 2, with sliding panel 3, operated by fingers 7 on spindle
50 4, to which an intermittent and rocking motion is given by dog 5 engaging with depression 6 in reciprocating feed-frame G, and arm
55 14 and spring 13, whereby sand is intermittently admitted from the sand hopper or compartment to the sand-box F, and brush 9 on
60 spindle 10, journaled in the sand-box F, and wheels 11, fixed on said spindle and adapted to roll on track 12 and cause the brush to rotate and distribute the sand evenly through the
open or grated bottom of sand-box F, substantially as described, and for the purpose specified.

9. A device for sanding the top and bottom
of the clay in the mold-openings prior to compression into bricks, consisting of a hopper for
65 sand situate in front of and adjoining the clay-hopper, with a sliding panel in the bottom adapted to be moved to one side intermittently by spring and dog engaging with the reciprocating
70 feed-frame, so as to admit sand to a sand-box situate in front of and forming part of the feed-frame, and containing a brush on a
75 spindle journaled in said box and caused to rotate, for the purpose of keeping the sand in motion within sand-box and to distribute it evenly through the open or grated bottom of the sand box, so as to sand the top and bottom of the brick, substantially as described, and for the purpose specified.

Galt, September 28, 1887.

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In presence of—

W. X. SMITH,
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