2 Sheets—Sheet 1.

W. E. GARD.
Brick-Machine.

No. 195,923. Patented Oct. 9, 1877.

Fig. 1.

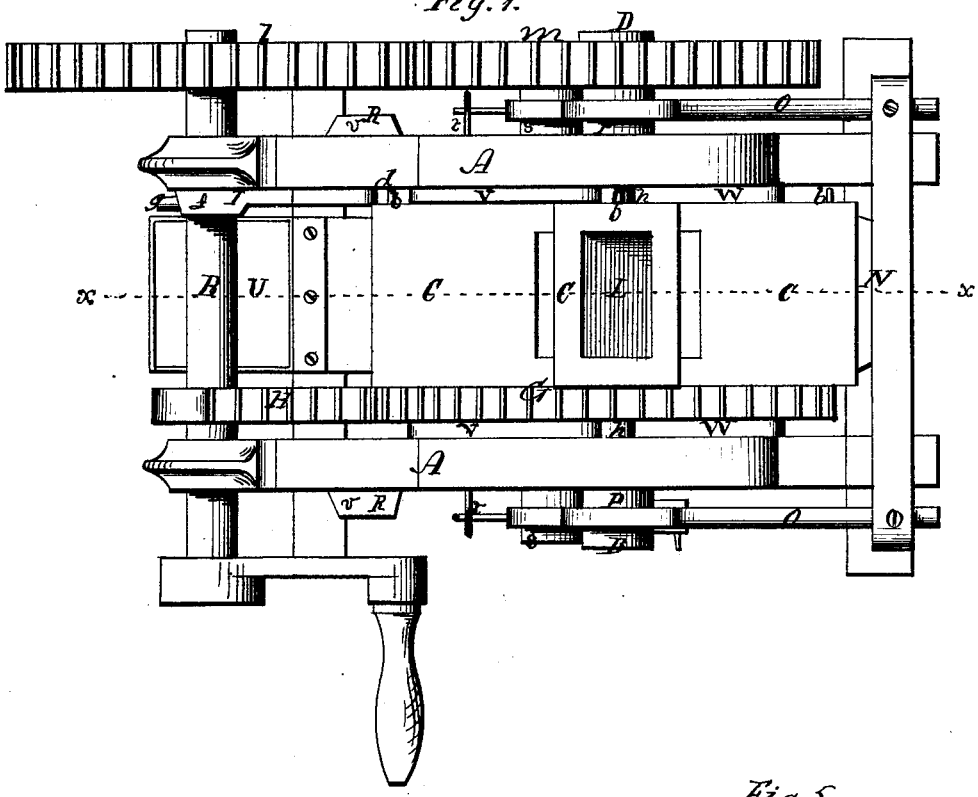


Fig. 5.

Fig. 4.

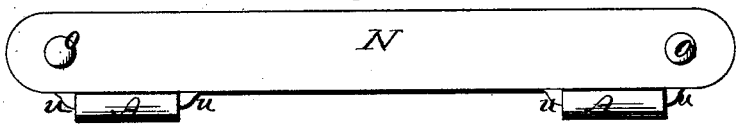
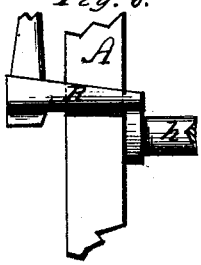


Fig. 6.



WITNESSES

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2 Sheets—Sheet 2.

W. E. GARD.

Brick-Machine.

No. 195,923. Patented Oct. 9, 1877.

Fig. 2.

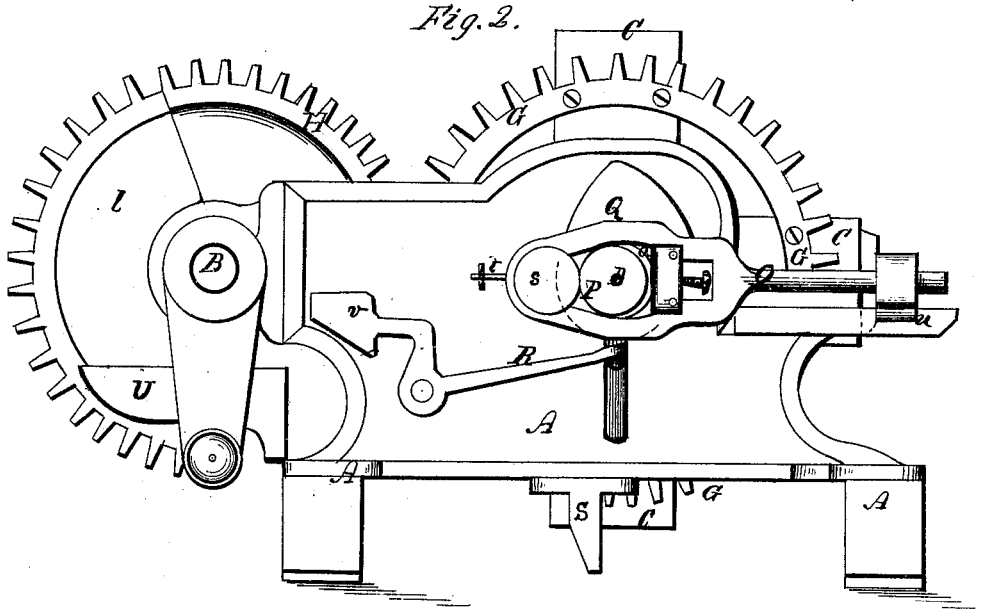
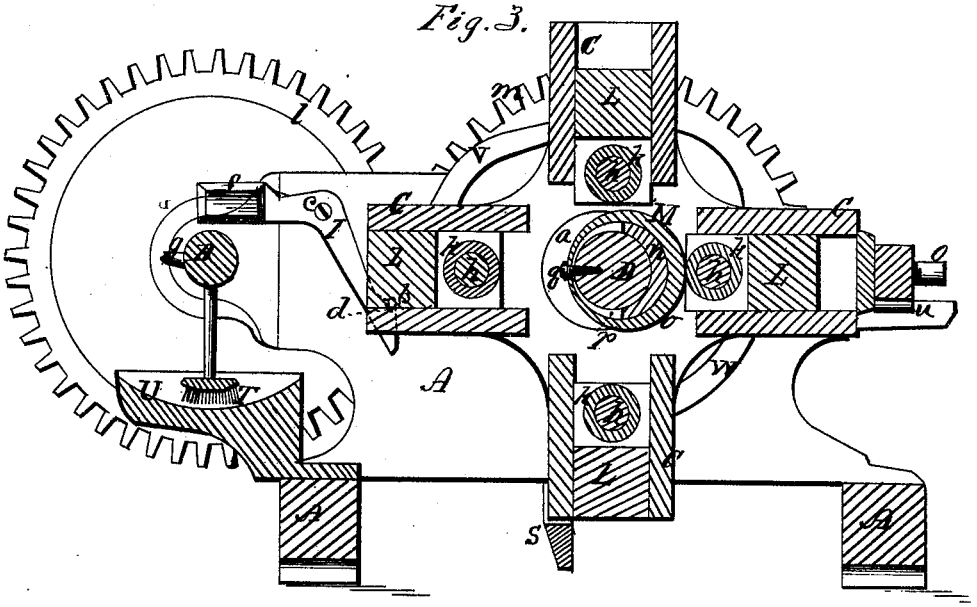


Fig. 3.



WITNESSES

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UNITED STATES PATENT OFFICE.

WALTER E. GARD, OF CROTON LANDING, NEW YORK.

IMPROVEMENT IN BRICK-MACHINES.

Specification forming part of Letters Patent No. **195,923**, dated October 9, 1877; application filed February 27, 1877.

To all whom it may concern:

Be it known that I, WALTER E. GARD, of Croton Landing, in the county of Westchester and State of New York, have invented an Improved Machine for Pressing Bricks; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this specification.

Figure 1 is a top view of the machine; Fig. 2, a side view thereof; Fig. 3, a vertical section of the same in a plane indicated by the line *x x*, Fig. 1; Figs. 4, 5, and 6, views of parts detached.

Like letters designate corresponding parts in all of the figures.

My invention consists in the peculiar organization of the machine, and in the construction and operation of various elements thereof, as hereinafter specified and defined.

In the general organization of this machine I employ two sets of elements: one a set of pressing-molds arranged to have regularly-interrupted revolving movements alternating with periods of rest; the other a continually-revolving set of active parts for producing the functional movements of the machine, the movements of the two sets being around a common center, or nearly concentric with each other, and receiving their motions from the same driving-shaft. The frame or stationary part in which the two sets of elements are mounted and have their operation has some passive functional parts, which enter also as elements of the entire organization.

The special features of improvement in these general elementary parts will be defined in the course of this specification.

In the drawings, A represents the frame in which all the parts are mounted; B, the common driving-shaft of all the moving parts of machine; C C C C, the intermittingly-revolving pressing-molds; and D, the continually-revolving shaft, to which the cams or active functional parts of the machine are attached, or with which they are directly connected, except one or two parts attached to the driving-shaft for effecting minor operations.

The molds C C C C, all connected together as one part by bearings and radial arms at the ends, are mounted and turn upon fixed pivots *a a* on the interior of the frame A. Through these pivots, which are tubular, the cam-shaft D extends, being somewhat eccentric in relation to the said pivots, the arrangement of the line of greatest eccentricity being horizontal, to bring the operative parts on the driving-shaft and cam-shaft both nearer their work.

The number of molds is conveniently as many as there are successive operations in different positions of the molds, so that all the operations may go on simultaneously, respectively, in the different molds, and no unnecessary movements be produced. Therefore, I have represented four molds, corresponding with the four successive operations which are performed in the machine—first, to insert or form the brick in its mold; second, to press it in the mold; third, to discharge it from the mold; fourth, to oil the follower of the mold after the pressed brick is discharged.

The molds are at rest during the performance of these operations, and hence, the molds, being situated centrally at the termini of four radial planes at right angles to one another, require a revolving movement of one-fourth of a circle between the successive pressing operations of the machine. To produce these intermittent movements, I have attached to the set of molds, at one side, a cog-wheel or circular rack, G, into which a segmental gear-wheel or rack, H, on the continuously-revolving driving-shaft A gears once at every revolution, the number of teeth on the segmental wheel H being just sufficient to give a quarter-revolution to the molds, which, at the end of each movement, are held stationary, in exact position, by stop-pins *b b* on one side thereof striking a bent-lever stop, I, pivoted at *c* to the frame A in a proper position to be adjacent to the driving-shaft B. The lower arm of this lever is formed with a notch, *d*, into which the stop-pins *b b* successively enter automatically, and are held for the time being, and it is swung toward the stops by a counter-weight, *f*, on the other arm of the lever, which projects in a direction approximating to a horizontal position toward the driving-shaft, where a cam or arm, *g*, on the said shaft comes around at the proper moment and lifts the arm so as to release the stop-pin in the notch of the other arm of the lever. Just at that time

the segmental gear-wheel H comes into gear with the circular rack G and moves the molds around to the next position.

Each mold C is provided with a pressing-follower, L, having a movement inward and outward in the mold sufficient for the purpose of pressing and expelling from the mold the bricks placed or formed therein. A shaft or pivot, *h*, is mounted in each follower, and extends through radial slots in the ends of the mold, the said slots being long enough to allow the requisite movement of the follower. There are or may be friction-rollers in the ends of the shafts, to run on certain fixed cams. There is also a friction roller or wheel, *k*, on the middle of the shaft to receive the action of the cam which forces the follower outward to give the pressure to the bricks.

The cam-shaft D receives a continually-revolving motion from the driving-shaft B, through cog-wheels *l m* on the respective shafts; and this shaft extends through the open center of the set of molds, and through both sides of the frame. On its middle part is secured the cam or eccentric M, which presses the several followers outward in their molds, to give the pressure to the bricks, acting directly against the friction-rollers *k k* on the several follower-shafts.

The construction of this cam M is peculiar. It is composed of two eccentric tubular rings, *n o*, the inner ring *n* fitting closely around the cam-shaft D, and the outer ring *o* fitting closely around the inner ring. The inner ring has a peripheral slot, *p*, of sufficient length to allow the ring to have a movement around the shaft of a semicircle or half of a revolution. The outer ring has a set-screw or bolt, *q*, extending through its thickness at one side, and through the slot *p* of the inner ring into the shaft D. This tightening-screw keeps the outer ring from turning on the shaft, and also serves to tighten both rings to the shaft.

By this construction the cam is rendered capable of the most exact adjustment from the least to the greatest throw of the cam required by simply loosening the set-screw and turning the inner ring upon the shaft and inside of the outer ring, which remains stationary, as far as required. There may be a knob, *r*, or its equivalent, on one end of the inner ring, to facilitate its adjustment. The set-screw *q* is then tightened.

The means of adjusting and securing the cam-rings above described are not essential, but convenient. If the two rings have equal eccentricity, the adjustment of the inner ring may be from a position where the two greatest degrees of eccentricity are exactly opposite, and exactly counteract each other, thus making the outer periphery of the outer ring a cylinder exactly concentric with the driving-shaft through all intermediate degrees to a position where the greatest degrees of eccentricity of both rings coincide, and give to the surface of the outer ring the greatest eccentricity.

The pressure is conveniently applied to the bricks when the mold is in a horizontal position in its descent from the uppermost position, as seen at the right hand in Figs. 1, 2, and 3, the bricks being placed or formed in the mold when in the said uppermost position.

The mouth or outer side of each mold is closed when the pressure is given to the bricks by a counter-pressure plate, N, located opposite to each mold when brought into position for imparting the pressure. This plate, in order not to interfere with the movements of the molds, has a slight movement imparted to it away from and then back to each mold just before the pressure is applied to the bricks therein. To effect this movement of the pressure-plate, two arms, O O, extend, respectively, from its two ends, one on each outer side of the frame, and are slotted, or otherwise formed, so as, respectively, to embrace or surround cams P P on the projecting ends of the cam-shaft D. These cams are formed and arranged to give the requisite movement to the pressure-plate, and at the proper time, one feature as to the time being that the pressure-plate shall move away from each mold not before, but soon after, the pressure is applied to the bricks, in order to allow the puffing of the bricks, if any, on withdrawing the pressure, to push the follower back, before any clay is allowed to escape on the receding of the pressure-plate; otherwise the escape of clay might spoil the bricks. There are friction-rollers *s s* on the arms O O where the cams P P act thereon, and there are stationary guides *t t* for the arms or extension-rods thereof to move in, to keep the arms steadily in place. The pressure-plate itself rests and slides on portions or extensions of the frame A, and there are lugs or shoulders *u u*, or their equivalents, on the under side thereof, close to the frame, to keep the plate steadily in position. After pressure has been given to a brick, the mold, in the next movement of the mold-set, descends to its third and lowest position, where the brick is discharged therefrom.

To prevent the descent of the follower in the mold and the premature discharge of the brick before the mold reaches the proper position, the projecting ends of the follower-shaft ride on tracks W, respectively on the sides of the frame, which tracks terminate so as to permit the descent of the follower in the right position.

When the molds have successively reached the lowest position, or that where the discharge of the bricks takes place, the followers, by a positive movement, are forced to the mouths of their molds to expel the bricks. This movement is produced by cams Q Q on the cam-shaft D, respectively, just outside of the frame on each side. These cams act on arms R R, pivoted to the frame, and each provided with a projection, which extends through the side of the frame and over the projecting ends of the follower-shafts as the molds successively come round into position. The cams

Q Q are so arranged as to depress the arms sufficiently to force the followers down, and expel the bricks.

The arms are counterweighted by weights *v v* on opposite counter-arms, to keep the arms close up to the cams at all times, and thus enable the cams to act smoothly and promptly.

The bricks, as they come from the molds, are automatically deposited upon a traveling belt, or a truck, or hack-plank, thus dispensing with attendance for that purpose. The machine is made to stand high enough to furnish room for taking the bricks, and for going underneath to attend to anything required.

To prevent the bricks from sticking to the followers, and insure their deposit in the right position, a stop-bar, S, is secured across the frame just at the side of the position where the bricks are dropped, in the direction toward which the molds move, so that any bricks having a tendency to stick to the followers are swept off without failure.

The molds next move forward to the fourth position, where the faces of the followers are oiled whenever necessary. For this purpose the followers should be pushed out at least flush with the outer surface of the molds; and to this end they are kept out after their outward movement for expelling the bricks until the molds reach the position for the oiling. Their gravity will ordinarily insure this; but there may be cams on the sides of the frame acting against the projecting ends of the follower-shafts to prevent any working inward of the followers.

For oiling the faces of the followers a brush, T, is conveniently attached to arms on the driving-shaft B, and dips into an oil trough or reservoir, U, under the shaft as it revolves. The brush is arranged to rise and sweep across the face of each follower while in the last stationary position of the molds.

After the oiling of the followers they are to be withdrawn into the backs of the molds for the reception of the next bricks in the molds; and this is done before the molds reach their uppermost positions, where the bricks are introduced therein. For this purpose cams V are secured to the inner sides of the frame, arranged to effect the result by the action of the projecting ends of the follower-shafts against the same, and thus the movements of the machine are completed.

This press, as organized, is applicable for compressing various other articles, such as peat, artificial fuel, soap, &c., and I intend its application to such uses.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a machine for pressing bricks, the combination of a set of pressure-molds, C C C C, having an intermittently-revolving movement, and a continually-revolving cam-shaft, D, for producing the principal functional operations of the machine, substantially as and for the purpose herein specified.

2. The combination of molds C C C C, having an intermittingly-revolving movement, a continually-revolving cam-shaft, D, and a frame, A, in which the other parts are mounted, and which is provided with stationary cams for performing some of the functional movements of the machine, substantially as herein specified.

3. The combination of molds C C C C, having an intermittingly-revolving movement, a continually-revolving cam-shaft, D, gear-wheels *l m*, and a driving-shaft, B, which imparts direct motion to the said molds and cam-shaft, substantially as herein specified.

4. The combination of the cam-shaft D and mold-pivots *a a*, the shaft being arranged eccentrically in the pivots, substantially as and for the purpose herein specified.

5. An eccentric cam, M, composed of two eccentric rings or cylinders, *n o*, one within the other, and one adjustable in a peripheral direction in or on the other, in combination with the shaft D and followers L L, substantially as herein specified.

6. The combination of the arms O O, of the pressure-plate N, arranged as described, with the cams P P on the cam-shaft D, substantially as and for the purpose herein specified.

7. The swinging counterweighted arms R R, in combination with cams Q Q on the cam-shaft D, for depressing the followers and expelling the bricks from the molds, substantially as herein specified.

8. The combination of stop-pins or projections *b b* on the molds, the swinging notched lever I, and cam or arm *g* on the driving-shaft B, substantially as and for the purpose herein specified.

WALTER E. GARD.

Witnesses:

W. E. TALLCOTT,

A. HYATT.