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A. J. HOYT.

Brick-Machines.

No. 151,491. Patented June 2, 1874.

Fig. 1.

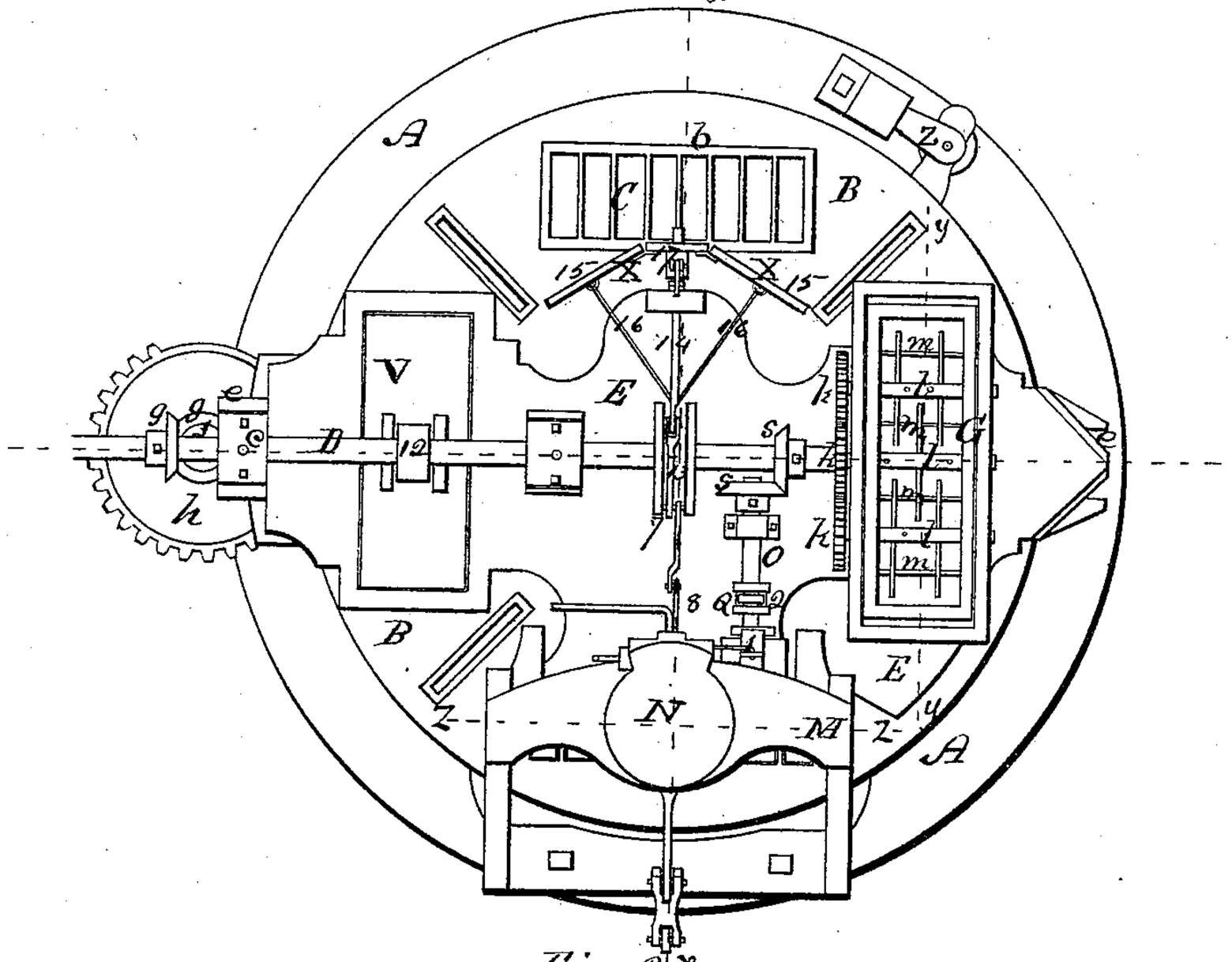

Fig. 2.

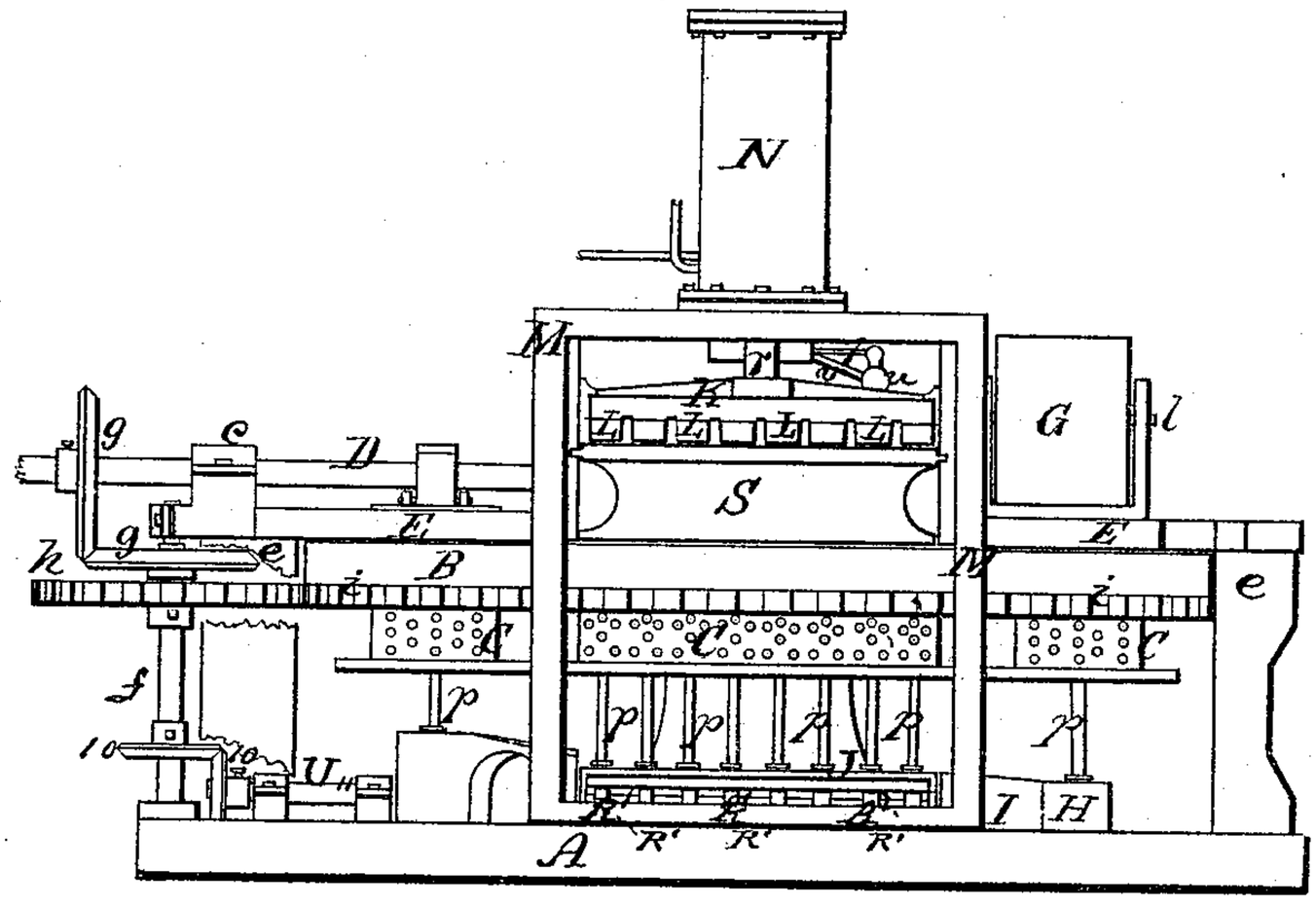

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Fig. 3.

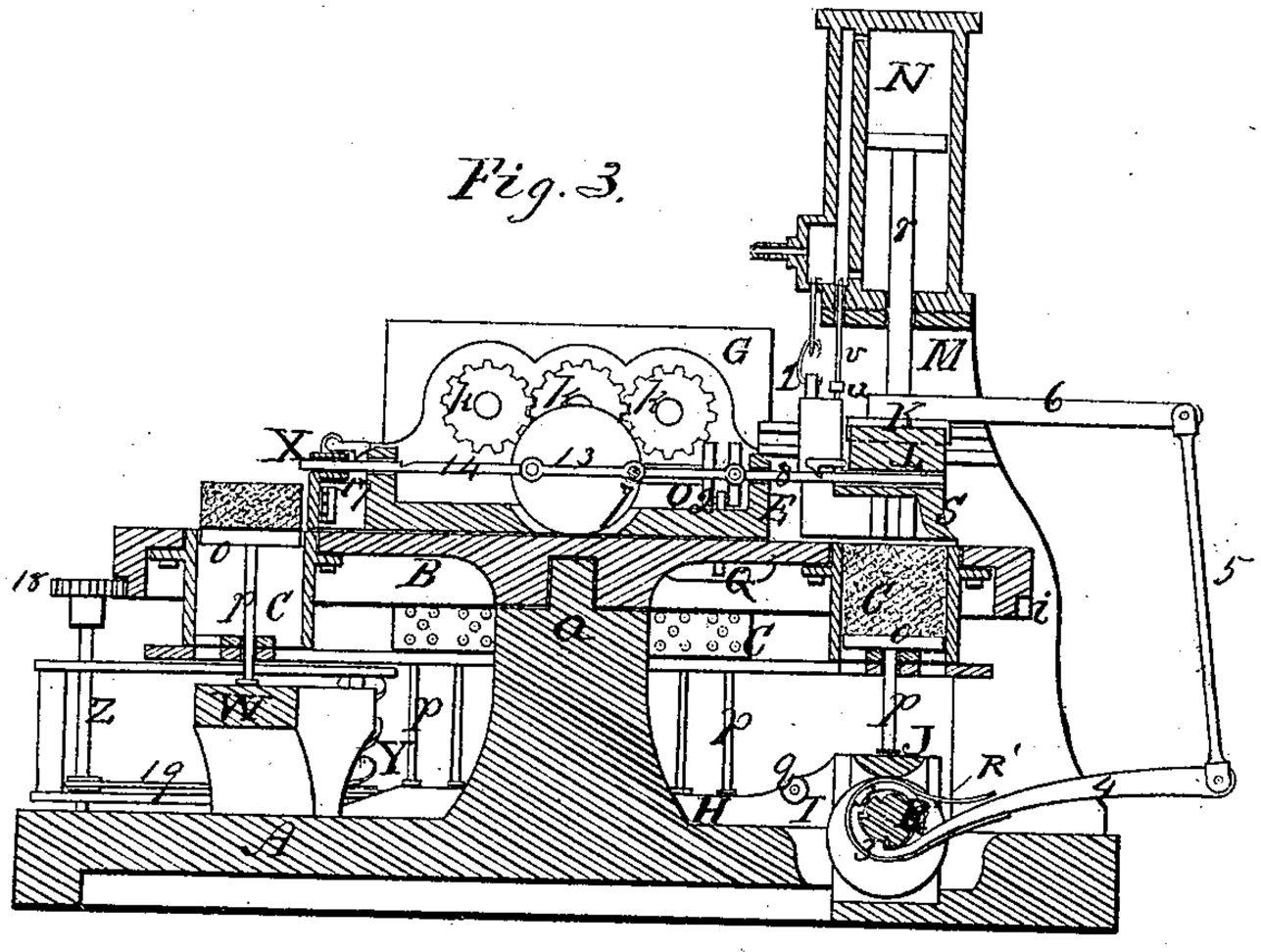

Fig. 4.

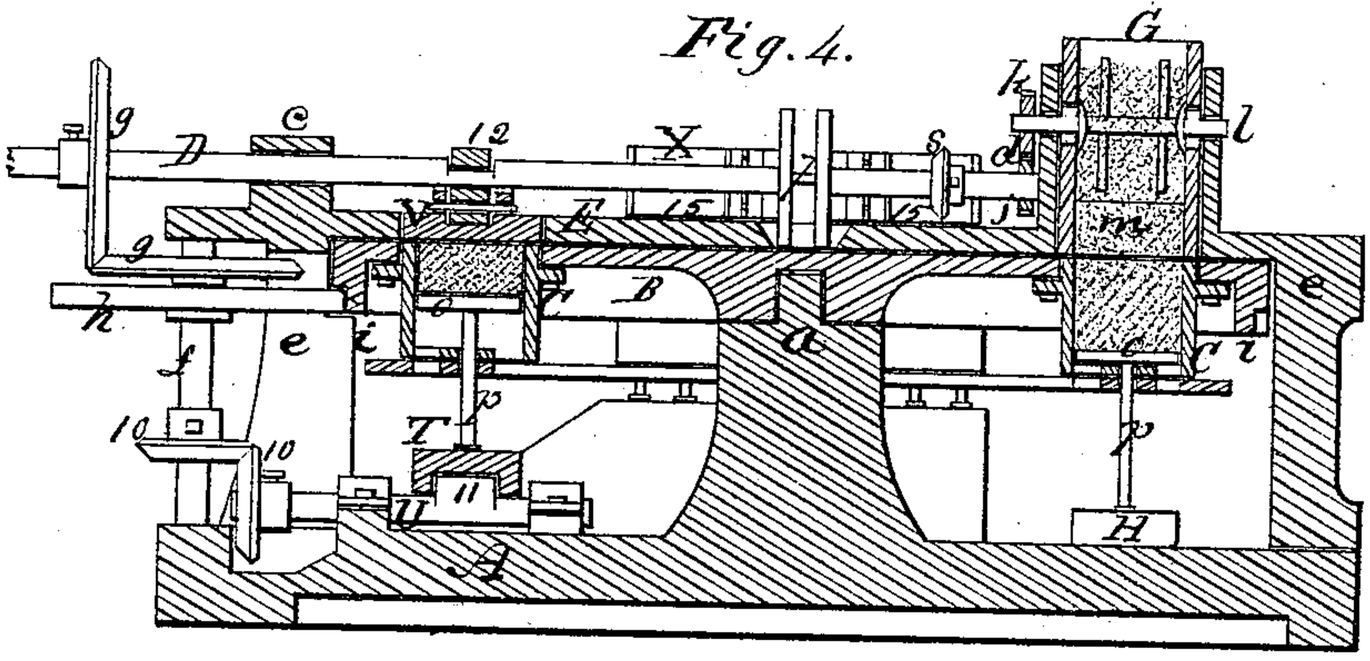

Fig. 5.

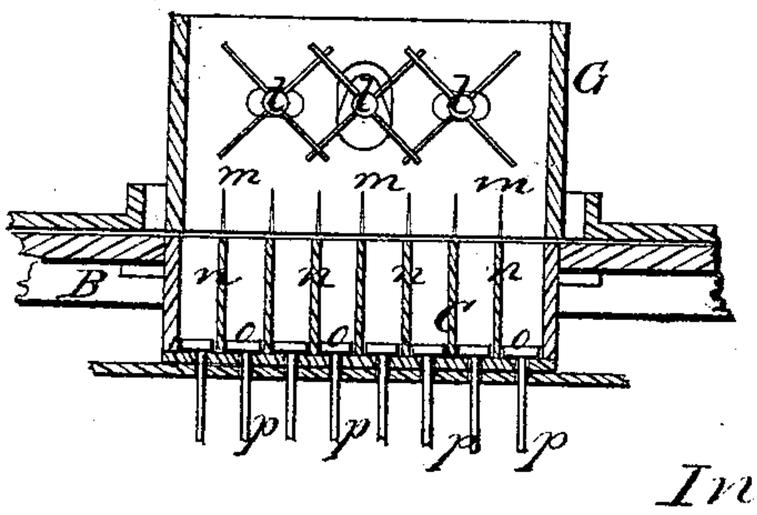

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Fig. 6.

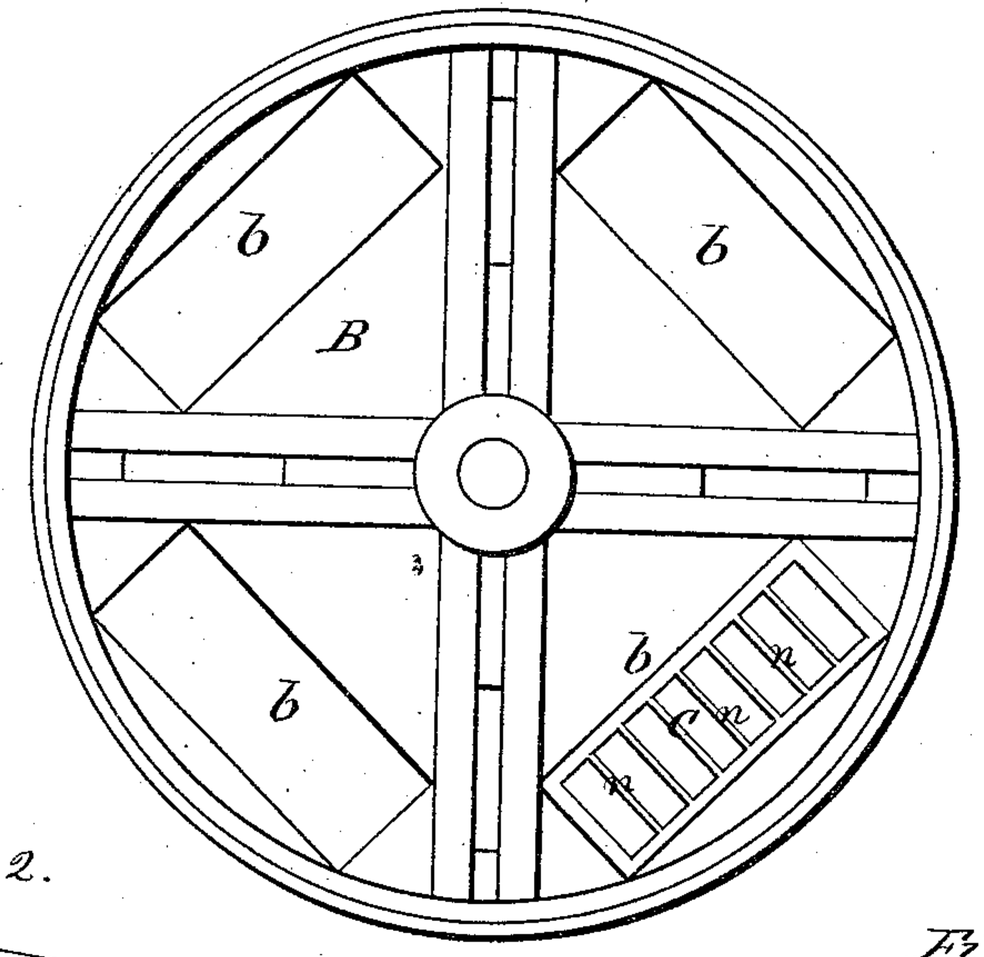


Fig. 12.

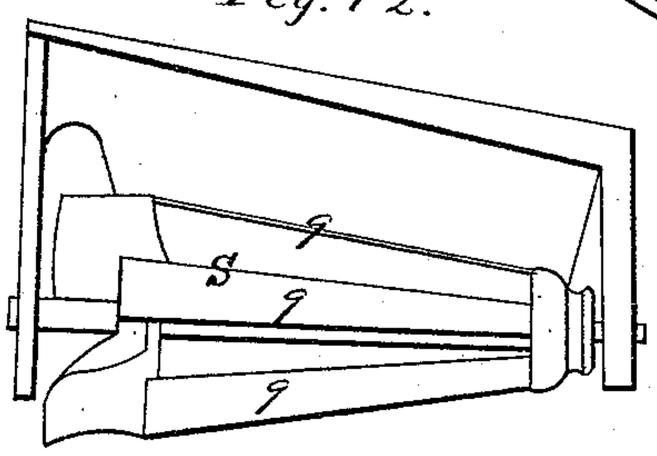


Fig. 13.

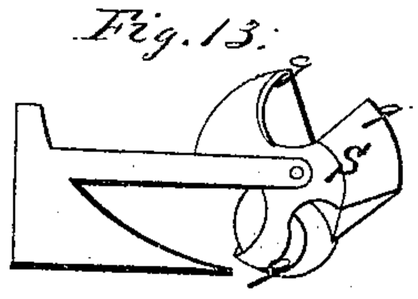


Fig. 7.

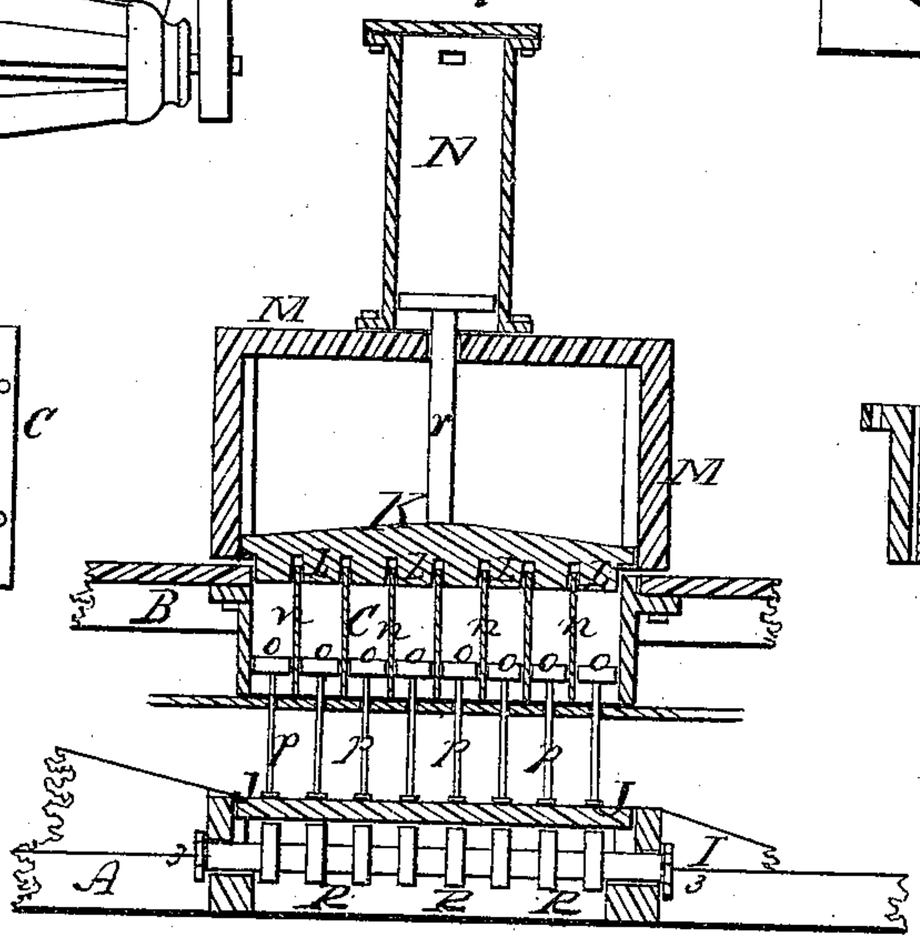


Fig. 8.

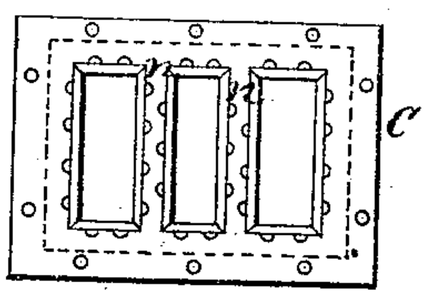
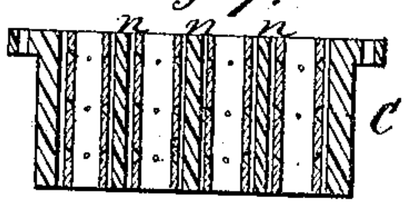


Fig. 9.



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Inventor,
Andrew J. Hoyt.

UNITED STATES PATENT OFFICE.

ANDREW J. HOYT, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN BRICK-MACHINES.

Specification forming part of Letters Patent No. **151,491**, dated June 2, 1874; application filed April 29, 1873.

To all whom it may concern:

Be it known that I, ANDREW J. HOYT, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented an Improved Brick-Machine; 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 being a top view of the machine; Fig. 2, a side elevation thereof; Fig. 3, a central vertical section thereof in a plane indicated by the line *x x*, Fig. 1; Fig. 4, a central vertical section thereof in a plane at right angles to the section in Fig. 3; Fig. 5, a vertical section in a plane indicated by the line *y y*, Fig. 1; Fig. 6, a view of the under side of the mold-wheel; Fig. 7, a vertical section in a plane indicated by the line *z z*, Fig. 1; Figs. 8, 9, 10, and 11, views of parts detached; Figs. 12 and 13, views of a modification of one of the parts.

Like letters designate corresponding parts in all of the figures.

My improved brick-machine is designed to make pressed bricks from untempered clay, the pressing to be effected both by the blows of beaters or plungers and by compression.

The special features of novelty will be set forth in describing the construction and operation of the machine.

A circular or any equivalent form of base or frame, A, is employed, on which the functional parts of the machine are mounted. Upon a central pivot or bearing, *a*, of this base or frame is placed a horizontal revolving mold-wheel, B, which has four (more or less) oblong apertures, *b b b b*, in which are inserted sets of molds C C, each containing eight (more or less) mold-compartments, so as to mold as many bricks at once. A horizontal driving-shaft, D, extending from the steam-engine or other driving-shaft inward over the center of the mold-wheel B, communicates the various motions to the machine. It has one bearing, *c*, on the base or frame of the machine, outside of the mold-wheel, and another bearing, *d*, over the said mold-wheel, the bearing supported by a cross bar or plate, E, which extends closely over the mold-wheel, and is supported by two frame-standards, *e e*, outside of the mold-wheel. An intermittent revolving motion is communicated from this driving-shaft to the mold-wheel by means of a vertical shaft, *f*, at one side thereof, geared by bevel-wheels *g g* to the driving-shaft, and provided with a half or partial pinion, *h*, which gears into cogs *i i* on the periphery of the mold-wheel, the number of teeth on the said pinion being sufficient to turn the mold-wheel one-fourth (more or less) of a revolution, and the number of teeth omitted from the pinion being sufficient to cause the mold-wheel to remain at rest while the beating and compression are being performed on the molded bricks. At the inner end of the driving-shaft is a cog-wheel, *j*, which turns a set of pinions, *k k k*, on as many shafts, *l l l*, which extend horizontally through the clay-feeding box or hopper G, there being on the said shafts arms for stirring the clay, and causing it to be fed down uniformly and without obstruction into the sets of molds C placed beneath. The shafts *l l l* have their bearings outside of the hopper, and supported by the cross-plate E.

The central shaft has cams thereon where it passes through the sides of the hopper, there being enlarged openings in the said sides with vertical edges, so that the revolution of the cams causes a slight horizontal reciprocating movement to be communicated to the hopper, there being oblong slots in the sides thereof, where the other shafts extend through the same to allow the said movement. There are thin-edged vertical partition-plates *m m* across the bottom of the hopper, placed respectively over the partitions *n n*, between the mold-compartments of the molds *c c*, as seen in Fig. 5. These partitions guide the clay evenly into the molds, and the reciprocating movement of the hopper assists the descent of the clay therein. The molds are partially supported by a shelf suspended under the mold-wheel, and is preferably formed so as to mold the bricks lengthwise across the same and the side edges upward. They have the usual sliding followers *o o* at the bottom, which require to have a reciprocating movement up and down in the molds for determining the width or thickness of the bricks, for gaging the extent of compression to be given thereto, and for finally expelling the same from the molds.

For these purposes, each follower has a stem, *p*, extending vertically downward, and terminating in a head or projection, as shown. The upward movements of the followers are produced by sections of a circular track beneath and concentric with the mold-wheel, some sections being fixed, and others having up-and-down movements produced by cams or other suitable means. The section H of the track beneath the clay-hopper is the lowest in position, so that there the followers are allowed to sink to the bottoms of the molds for filling the same. The first movement of the mold-wheel, after filling the molds of each set, is to carry the said molds one-fourth of a revolution to a position for beating and compacting the molded bricks therein. While the molds are making this movement the follower-stems pass up an inclined section, I, of the track, and preferably over a roller, *q*, across the same, for the purpose of condensing the clay in the molds, since it is in a somewhat loose state when first introduced into the molds, which are made deep enough to hold sufficient clay to form full-sized bricks when completely compacted and compressed. Directly over this inclined section of the track is situated one part of the cross-plate E, which serves as a counter-pressure surface to prevent the yielding of the mold-wheel to the upward pressure, and for smoothing the upper surfaces of the bricks. The molds are next moved into a position over a track-section, J, where the bricks are subjected to the action of beaters, for thoroughly compacting them in the molds. For this purpose, the direct action of steam is employed.

During the operation of beating the bricks in the molds it is necessary to hold the mold-wheel very accurately beneath the beaters. For this purpose, a coupling wedge or key, Q, Fig. 3, is caused to descend through the cross-plate E, and enter a slot or aperture in the top of the mold-wheel, this slot being inclined or narrowing edges, in which the descending key unfailingly enters and closely fits when finally driven down. This key is moved up and down by a crank or cam, 2, on the shaft O, or equivalent means.

In order to completely and surely compact the clay in the molds by the beaters, it is indispensably necessary to expel all the air from the molds, and also to prevent the forcing in of more air by the action of the beaters themselves.

To insure the first-named result, the sides and partitions of the molds are perforated with a sufficient number of small escape-orifices, made very small at the inner surfaces and larger at the outer surfaces, to prevent the escape of clay, and insure the exit of the air. The partitions are made of two thicknesses, with narrow spaces between, into which the apertures open, as seen in Fig. 9.

In order to prevent the introduction of air into the molds by the action of the beaters themselves, which fit very closely into the molds, the mold followers are first brought up to just the proper height to present the clay therein even with the upper edges of the molds, so that no air will remain over the clay inside of the molds, after the beaters strike the surfaces of the bricks, which, by the first blow of the beaters, are compressed below the upper edges of the mold. Therefore, the next blow of the beaters is not given till the followers are again raised, and the bricks brought flush with the upper edges of the molds to receive the next blow, and this raising of the bricks in the molds to the surfaces before each successive blow of the beaters is repeated until the beating is completed. To effect these successive raisings of the followers, the section J of the follower-track is successively raised by means of eccentrics R R on a shaft parallel with and beneath the said track-section, one eccentric under each beater; or a single eccentric roller extending the length of the molds may be employed. This eccentric shaft is turned a sufficient part of a revolution, after each stroke of the beaters, to lift the track-section to the required height for bringing up the bricks flush. A succession of hook-notches, 3 3, either at the ends or the middle of the shaft, is employed, into which a catch-lever, 4, hooks, being connected by a rod, 5, with arm 6, which projects from the cross-head K, so that as the latter ascends, the cam-shaft is revolved, as represented in Fig. 3. A suitable detent prevents the reverse turning of the cam-shaft, which makes, or may make, a revolution for the compacting of each set of molds. After the beating process has been completed a knife or scraper, S, is caused to pass close over the top of the molds, and to smoothly cut off the surplus clay, and leave the bricks of the proper size. As shown in the principal drawings, this knife is located so as to pass beneath the beaters previously raised above it, its motions being timed and produced by the driving-shaft D, by means of a crank or eccentric, 7, thereon, and a connecting-rod, 8, Figs. 1 and 2; or a revolving cutter-head, S, (shown in the modification, Figs. 12 and 13,) may be used, to be suitably located one-eighth of a circle farther along over the mold-wheel than position of the beaters. There are knives, 999, arranged somewhat conically on the shaft, as shown, the axis being placed radially over the mold-wheel, and the widest end outward, so as not only to cut off the surplus clay, but to throw it off from the mold-wheel by centrifugal action. This cutter-head may be rotated by a band extending from the driving-shaft D, and running around a pulley on its shaft.

The mold-wheel carries the molds around one-fourth of a revolution to a position beneath the driving-shaft, and opposite to the filling-hopper, in which position the final compression is given to the bricks in the molds. This compression is also produced by the raising of a section, T, of the track by means of a cam or eccentric, or their equivalent. A short horizontal shaft, U, near the base of the

machine, and parallel with the driving-shaft, is caused to revolve by the vertical shaft *f*, to which it is geared by bevel-wheels 10 10. On this shaft is the eccentric 11, which raises the track-section T, and thereby the followers, for compressing the bricks in the molds. Above the molds, in this position, is a counter-pressure plate, V, which fits in the cross-plate E, and has a slight up-and-down movement therein. When the pressure is applying beneath the molds this plate is forced close down upon the mold-wheel; but as soon as the pressure is relieved the counter-pressure plate is then raised a little by an eccentric and lifting-link, 12, on the driving-shaft D, in order to allow the molds to pass from under the plate without impediment or friction. Finally, the mold-wheel passes upon an inclined and elevated section, W, of the track, which lifts the followers to the top of the molds and discharges the bricks therefrom. At this moment the mold-wheel reaches its position at the fourth quarter of its revolution. Here the expelled bricks are automatically swept from the mold-wheel. This is effected by means of a sliding board, X, to which a reciprocating movement is communicated by a crank or eccentric on the driving-shaft D, it being here represented as the same crank 7 as moves the knife or scraper S on the opposite part of the machine. A connecting-rod, 13, extends therefrom to a sliding rod, 14, bearing the sliding or sweeping board, which is composed of two wings, 15 15, hinged together at the center. They are ordinarily swung back into oblique positions, as shown in Fig. 1, to allow the molds to swing around in the arc of a circle; but when the sweeping-board is driven outward, to sweep the bricks from the mold-wheel, the wings thereof are swung out into a straight line. This movement is effected by connecting the outer ends of the wings by rods 16 16 with the sliding rod 14 and a sleeve, 17, on the sliding rod, which prevents the inner ends of the wings pivoted to the sleeve from being drawn back farther than required, while the outer ends continue to recede. As the mold-wheel carries the molds from the last position to the first position again, beneath the filling-hopper, the track abruptly descends, allowing the followers to descend to the bottoms of the molds. In order to make descent certain and complete, I employ a revolving vertical shaft, Y, Fig. 3, with a spiral plate or cam thereon, the form, position, and motions of which are so arranged as to act upon the head or projection of each follower-stem in succession and force the follower down, each revolution of the spiral cam causing one follower to descend. Since each set of molds occupies, instead of an arc of a circle, the chord of the arc, the follower-stems would be at varying distances from the spiral cam-shaft, if not obviated. To do this the shaft swings on a pivot-shaft, Z, and it may be pressed by a spring or weight toward the followers. The revolution of the cam is produced by a pinion, 18, on the shaft Z gearing into the cogs *i i* on the mold-wheel, and by a band, 19, extending from a pulley on the said shaft to another pulley on the cam-shaft Y.

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

1. The combination, with the beaters for compacting the bricks in the molds, of a device, as herein described, for lifting the followers in the molds and bringing the upper surfaces of the bricks to the tops of the molds before each successive blow of the beaters, substantially as and for the purpose herein specified.

2. The reciprocating hopper or clay-feeding box G, in combination with the sets of molds C C, for the purpose herein specified.

3. The combination of the movable track-section J, revolving cam or cams R, lever 4, connections 5 6, and beater cross-head K, substantially as and for the purpose herein specified.

4. The spiral cam Y, operating substantially as described, for drawing the followers down to the bottoms of the molds after the discharge of the bricks, substantially as specified.

Specification signed by me this 24th day of April, 1873.

ANDREW J. HOYT.

Witnesses:

J. S. BROWN,

EDM. F. BROWN.