(No Model.) 3 Sheets—Sheet 1.

R. KNICKERBOCKER.

BRICK MACHINE.

No. 427,578. Patented May 13, 1890.

Fig. 1.

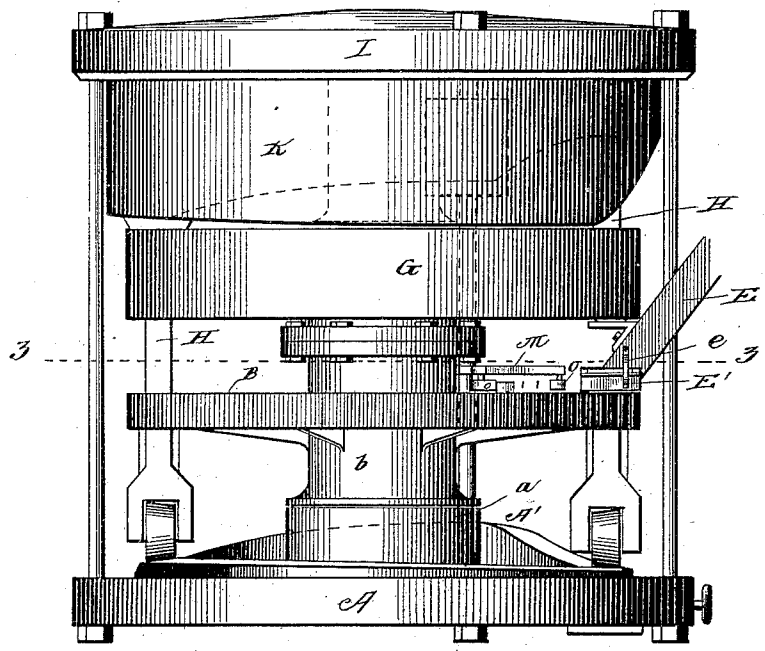
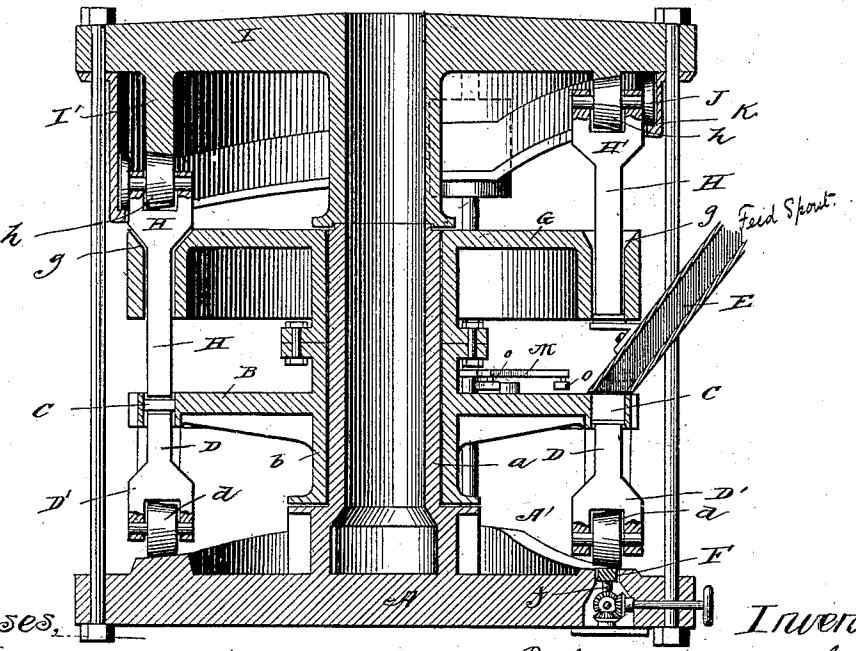


Fig. 2.



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R. KNICKERBOCKER.

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Fig. 3

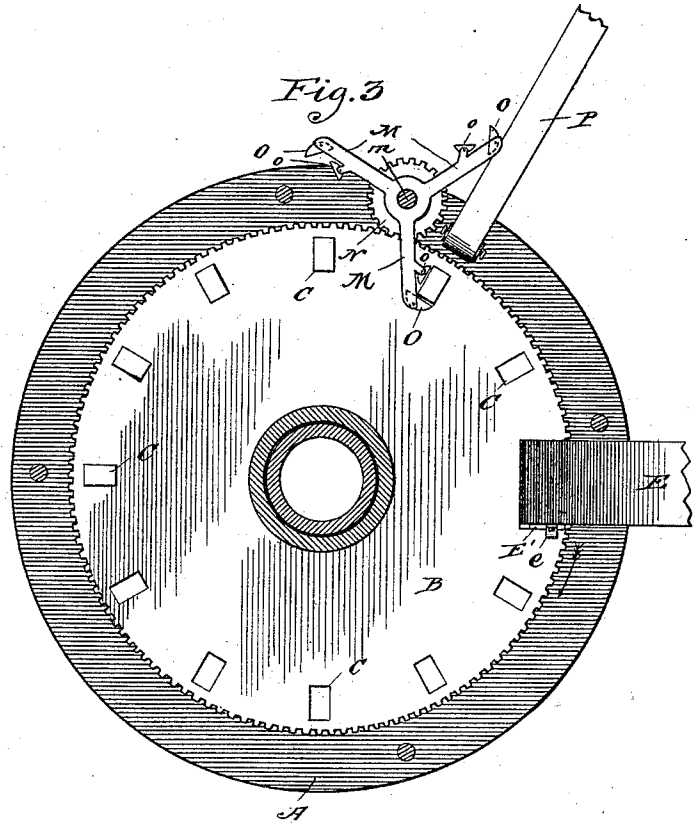


Fig. 5.

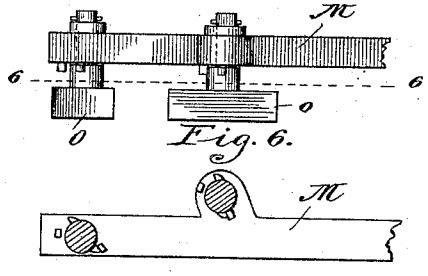


Fig. 6.

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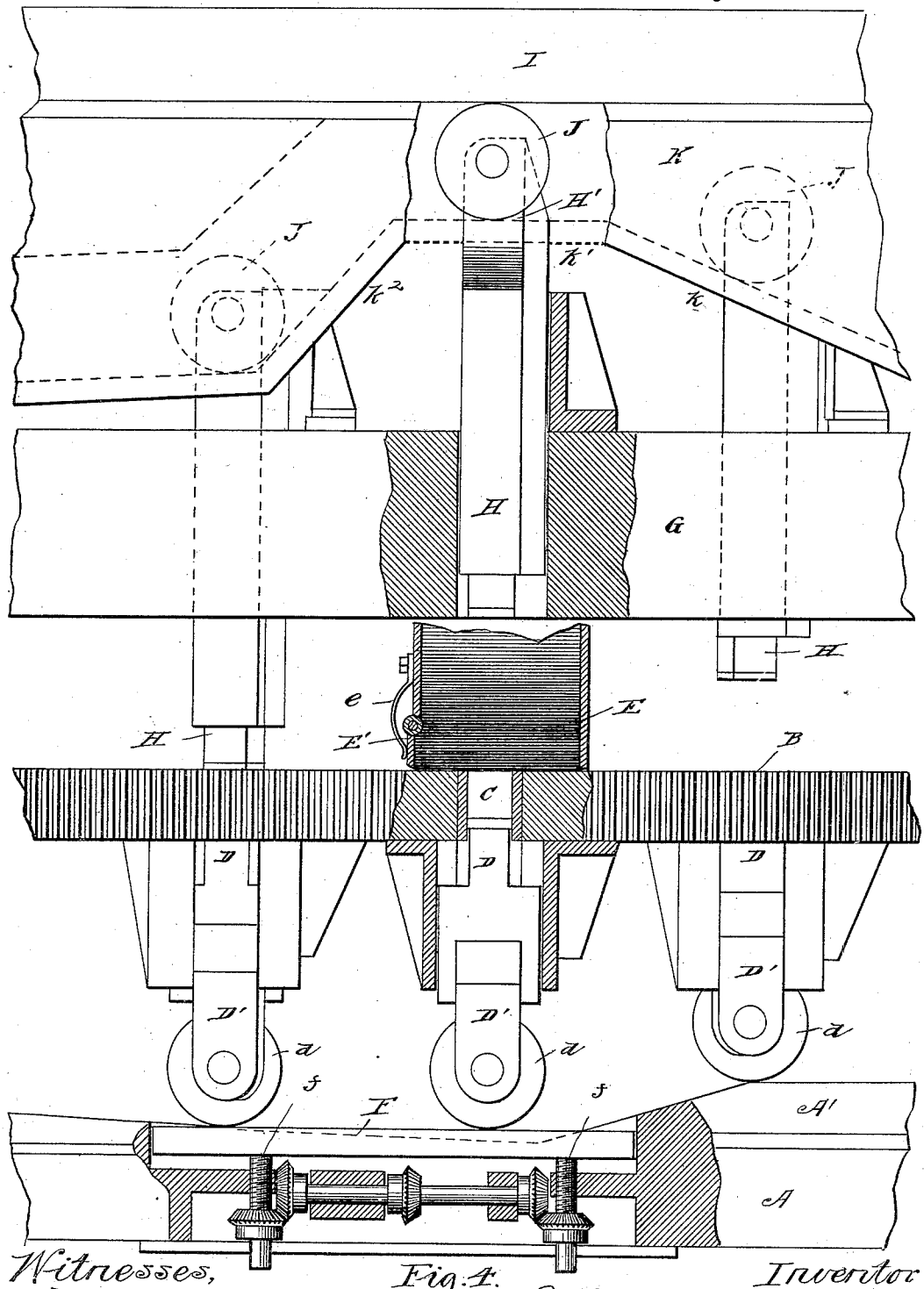
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(No Model.) 3 Sheets—Sheet 3.

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Fig. 4.

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UNITED STATES PATENT OFFICE.

ROBERT KNICKERBOCKER, OF BLUE ISLAND, ASSIGNOR OF ONE-HALF TO CHARLES F. WARDELL, OF CHICAGO, ILLINOIS.

BRICK-MACHINE.

SPECIFICATION forming part of Letters Patent No. 427,578, dated May 13, 1890.

Application filed May 7, 1889. Serial No. 309,922. (No model.)

To all whom it may concern:

Be it known that I, ROBERT KNICKERBOCKER, a citizen of the United States, residing at Blue Island, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Brick-Machines, of which the following is a specification.

My invention relates to the class of brick-machines in which is provided a rotary platen having mold-boxes therein, and having reciprocating dies adapted to depress the clay within the box to form the brick, and by a continuous movement of the dies to eject the same from the mold after it is pressed.

My invention relates to certain improvements in this class of brick-machines, which may be summarized as follows: first, the combination, with a rotating platen having mold-boxes therein, of lower or bed dies having bearings upon an inclined or cam track, whereby is imparted to them a vertical reciprocating movement, of a series of upper dies secured to rotate with an upper frame and adapted to be vertically moved by an inclined or cam track upon the under side of a stationary frame, in order to gradually press or form the brick between their lower faces and the upper faces of the bed-dies, and whereby ample time is given for the release of the air in the clay, and the operation is made continuous; second, the combination, with the upper dies, of a second cam-track upon which said dies also have a bearing, and which is adapted at one point of their circuit to elevate them in order to clear the feed-spout which delivers the clay to the mold-boxes; third, the provision of an adjustable section in the cam-track of the lower or bed dies, whereby the quantity of clay fed to the mold-boxes may be varied; fourth, an improved feed, which is of such construction as to permit ample time for the filling of the mold as it passes beneath the feed-spout, and having means for relieving itself in case of an obstruction—such as a stone in the clay—whereby danger of breaking the machine is obviated; fifth, in an improved form of knock-off device for removing the brick from the platen without injuring them.

My invention also consists in certain novel devices and combinations of devices for effecting these desirable ends, as hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in side elevation of my improved brick-machines, some of the parts being broken away, others showing in dotted lines, and a portion of the gearing omitted. Fig. 2 is a vertical central sectional elevation of the machine, taken through the feed-box and two of the molds. Fig. 3 is a plan view below the line 3 3 of Fig. 1. Fig. 4 is an enlarged detail, in side elevation, taken from that side of the machine having the feed-box and the adjustable track-section before mentioned. Fig. 5 is a side elevation of one of the knock-off arms with its adjustable blocks; and Fig. 6 is an inverted plan view of one of the knock-off arms, taken above the line 6 6 of Fig. 5.

In the drawings, A represents a stationary base having thereon the cam-track A′. *a* is an upward extension of said base, which forms the arbor for the rotating parts.

B is the platen or mold-table, which may be circular in outline and cast with a hub *b* and provided near its periphery with mold-boxes C. The edge of this platen may be provided with gear-teeth, with which a driving-pinion mounted upon a suitable power-shaft (not shown) enmeshes, whereby to impart a rotary motion to the platen.

D are the lower dies which preferably have in the lower ends of their shanks D′ the anti-friction travelers *d*, which latter bear upon the cam-track A′ of the stationary base. The upper ends of these dies enter the mold-boxes and have a movement therein equal to the depth of said mold-boxes, and the cam-track A′ is of such configuration that the upper end of the dies will be at the lowest point of their movement at the time the mold-box is brought beneath the feed-spout. The latter, which is marked E, is of peculiar construction. It may be a continuation of a suitable feed-hopper, (not shown,) and has an open lower end, which registers with the various mold-boxes as they are successively presented beneath it in the revolution of the platen. This feed-spout I prefer to make of a width at least twice the width of the mold-

box, as clearly shown in Fig. 4 of the drawings, so that ample time is given for the clay to fill the box while the latter is passing under the lower end of the feed-spout.

It frequently happens that hard substances—such as imperfectly-ground clay, stone, and other foreign substances—are delivered to the mold-boxes through the feed-spout, and if the latter be made solid some part of the machinery or the foreign substance must be crushed or broken. To avoid this I provide a hinged valve E′ in one side of the feed-box, which is held normally closed by means of the spring *e*. If an obstruction is presented to the mold in the operation, this hinged valve will open under the unusual strain, thereby relieving the pressure and obviating any danger of breaking the machinery.

F is a movable section in the cam-track A′, said section being supported upon adjusting-screws *f*, which are provided with a suitable gearing, such as shown in Figs. 2 and 4, whereby said screws may be turned to raise or lower the track-section, and thereby limit the downward movement of the dies D to vary the depth of the mold-box, and, in consequence, the quantity of clay. This adjustable track-section is located beneath the feed-box, as clearly shown in Fig. 4.

G is a circular guide-plate, which may be constructed integrally without being separately cast and bolted to the platen B. It has transverse guide-channels *g*, which register or coincide in position with the mold-box of the platen.

The upper dies (marked H) have a sliding bearing within the guide-grooves *g*, and the upper end of their shanks H′ preferably carry anti-friction travelers *h*, which latter bear through the major portion of their circuit upon a cam-track I′, preferably formed upon the lower side of a stationary plate I. This cam-track I′ is of such configuration that the upper dies are forced downward by it, so as to slightly enter the mold-box at the initial compression-point and so that the said upper dies rise gradually, being followed in their upward movement by the lower dies during the movement of the platen through a portion of its revolution.

In order to elevate the upper dies to cause them to clear the feed-spout, I have extended the journals of the anti-friction bearings of the upper dies, and secured on the outer ends of said journals travelers J, which are adapted to bear upon a circular cam-track K, which may be formed by a separate piece, bolted or otherwise secured to the under side of the top plate I or made integrally therewith. The path of this inclined track is indicated by dotted lines in Fig. 1, and is shown clearly in Fig. 4. At the point on said track at which which Fig. 4 is taken it has a sharp incline (marked *k*) which carries the die up to a height sufficient to clear the top of the feed-spout, and a straight portion of track *k*′ carries the die over the feed-spout, while a sharp decline k^2 permits the die to drop down after it has cleared the spout to enter the mold-box, at which point the cam-track I′ commences and the operation begins. The track K also acts as a support for the upper dies to prevent their dropping too far into the mold-box, and thereby serves as a stop for said dies.

The operation of the parts so far described is as follows: The material being fed into the feed-spout drops down by gravity and fills the mold-boxes as they are successively presented beneath the open lower end of said spout. At this point the upper die of the filling-mold will be held above the feed-spout and the lower die will be at the lowest point of its movement, its bearing being upon the adjustable track-section. As the revolution of the platen continues, the mold-box which has been filled emerges from beneath the feed-spout and the upper die drops down, entering the mold-box slightly and the compression begins. The lower die gradually rises under the influence of its cam-track, and the upper die being also gradually elevated, but preferably more slowly than the lower one, the pressing is gradually effected, giving time for the expulsion of air filling the interstices of the clay and also gradually elevating the forming brick while under pressure, and thus securing truer sides therein than can be attained in brick-machines having a mold of sudden action or in machines which eject the brick from the mold when not under pressure. When the top of the brick is raised flush with the top of the platen, the sharp incline of the track K raises the upper die clear of the brick and the lower die continues its upward movement until the bottom of the brick is finally brought flush with the top of the platen.

To remove the brick from the platen without injury, I have provided the knock-off device shown in Fig. 3 of the drawings, which consists of a series of sweep-arms rotatably mounted upon a stud bearing a gear enmeshed with the gear-teeth on the edge of the platen. M represents said sweep-arms, *m* their stud, and N the gear thereof. Each of said sweep-arms is preferably provided with pivoted blocks O *o*, which are adapted to engage, respectively, the end and side of the finished brick, and the revolution of the sweep-arms is so that these blocks engage the brick at the moment that it has cleared the mold-box and by their rotation operate to sweep the brick off the platen, preferably upon the traveling belt P, which will be adapted to conduct the brick to one side of the machine.

I have described my improvements as relating particularly to a brick-machine; but of course my invention is applicable to the pressing of blocks of any material—such as soap, artificial fuel, pulverized ore, and the like.

I do not claim in this application the particular configuration of the cam-tracks whereby the brick is formed while it is moved upwardly within the mold-boxes, said feature

being the subject of claim in a pending application filed by me in the United States Patent Office January 10, 1890, Serial No. 336,485.

I claim—

1. In a brick-machine having a stationary feed-box, the combination, with a rotary platen having mold-boxes therein, of reciprocating bed-dies, a circular cam-track upon which the bed-dies have a bearing, upper dies having a sliding bearing in a rotatable frame, a cam-track upon which the upper dies have a bearing, and a second cam-track upon which the upper dies also bear, said second track having a raised portion adapted to lift said upper dies at one point of their revolution over said stationary feed-box, substantially as described.

2. In a brick-machine having a stationary feed-box, the combination, with a rotary platen having mold-boxes therein, of a feed-spout whose lower end delivers over the path of the mold-boxes, reciprocating bed-dies, a circular cam-track upon which the bed-dies have a bearing, upper dies having a sliding bearing in a rotatable frame, a cam-track upon which the upper dies have a bearing, and a second cam-track upon which the upper dies also bear, said second track having a raised portion adapted to lift said upper dies at one point of their revolution over said stationary feed-box, substantially as described.

3. In a brick-machine having a rotary platen provided with mold-boxes, of reciprocating bed-dies having extended shanks, and a cam-track having an adjustable section mounted upon screws toward either end thereof, and gearing for rotating said screws to adjust said section, whereby the movement of the bed-dies may be regulated, substantially as described.

4. The combination, in a brick-machine, of a rotary platen having a series of mold-boxes therein, reciprocating bed-dies entering the bottoms of said mold-boxes, and a feed-spout having an opening of greater width than said mold-boxes and adapted to discharge material passed through said spout into said boxes, substantially as described.

5. The combination, in a brick-machine, of a rotary platen having a series of mold-boxes therein, reciprocating bed-dies entering the bottoms of said mold-boxes, and a feed-spout having an opening of greater width than said mold-boxes and adapted to discharge material passed through said spout into said boxes, said feed-spout having a hinged wall-section, substantially as described.

6. In a brick-machine having a rotary platen provided with mold-boxes and reciprocating dies adapted to discharge the brick from said boxes, in combination therewith a knock-off device comprising rotatable arms, having pivoted blocks thereon adapted to bear, respectively, upon the end and side of the finished brick, substantially as described.

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Witnesses:
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