

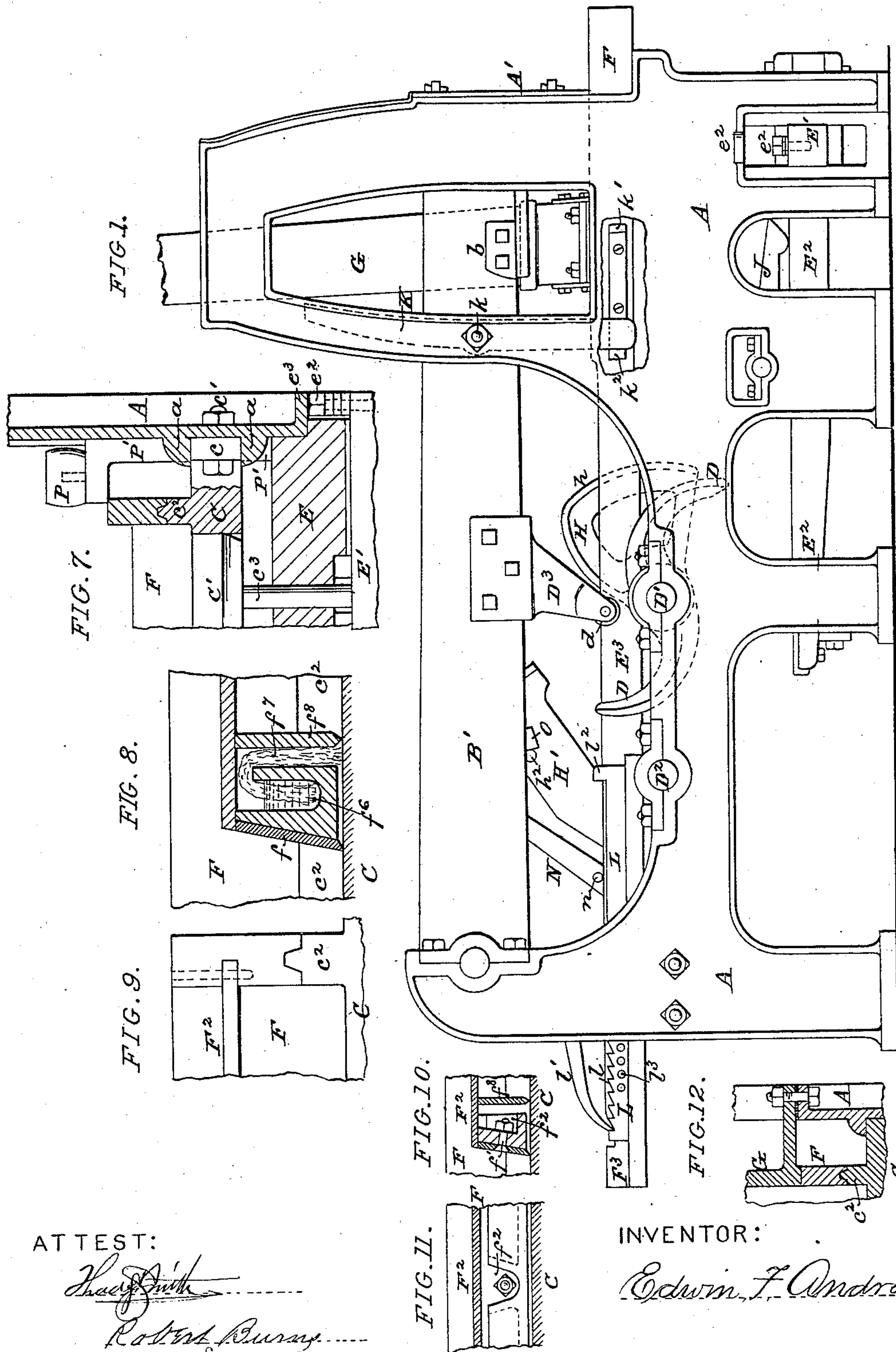
(No Model.)

2 Sheets—Sheet 1.

E. F. ANDREWS.
HAMMER BRICK MACHINE.

No. 257,126.

Patented Apr. 25, 1882.



ATTEST:

Robert R. Rury

INVENTOR:

Edwin F. Andrews

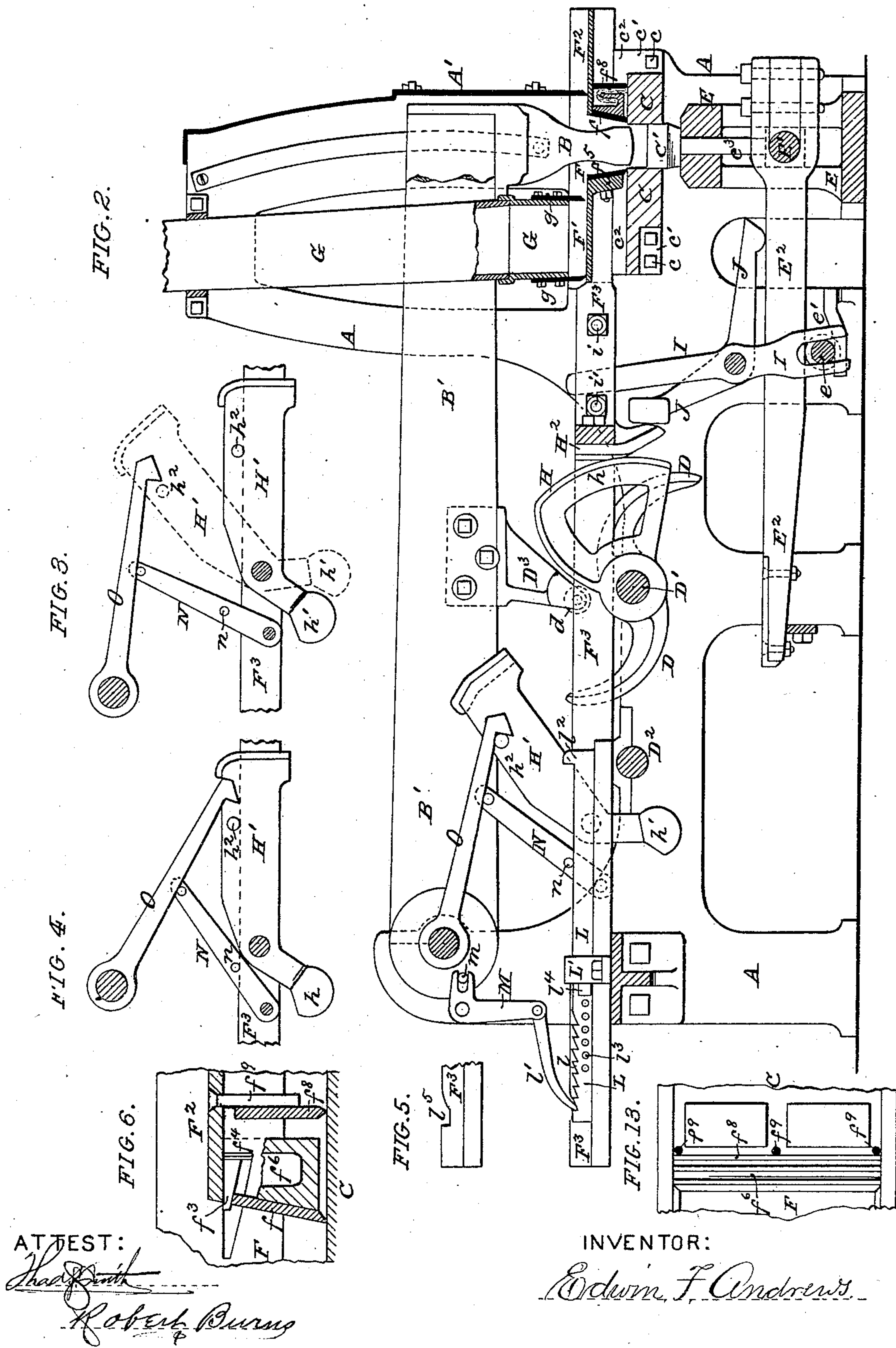
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UNITED STATES PATENT OFFICE.

EDWIN F. ANDREWS, OF ST. LOUIS, MISSOURI.

HAMMER BRICK-MACHINE.

SPECIFICATION forming part of Letters Patent No. 257,126, dated April 25, 1882.

Application filed December 10, 1881. (No model.)

To all whom it may concern:

Be it known that I, EDWIN F. ANDREWS, a citizen of the United States, residing at St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Hammer Brick-Machines; and I do hereby declare that the following is a full, clear, and exact description of the same, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

This invention relates to certain improvements in that class of brick-machines in which the clay is impacted into the molds by the blows of a hammer; and this invention consists, first, in the provision, in a brick-machine, of a latch or lever pivoted to the frame and operated by tappets on the side of the reciprocating charger, so that when the charger begins to make its backward movement said lever will be engaged under the hammer so as to prevent its descent while the charger is making its back and forward movements, the lever being automatically disengaged from the hammer when the charger has about completed its forward movement, all as will hereinafter more fully appear; second, in the provision, in a brick-machine, of an improved arrangement of levers, cams, &c., hereinafter more fully described, for lifting the mold-bottoms as the charger moves backward, so as to bring the bricks in a position to be discharged from the machine on the forward movement of the charger, all as will hereinafter more fully appear; third, in an improved arrangement of parts whereby a cam-block pivoted in the charger-frame is held up out of engagement with its operating cam while the desired number of blows are being given to form the bricks, and then automatically lowered so as to withdraw the charger and allow the brick already formed to be discharged from the machine, all as will hereinafter more fully appear; fourth, in the provision, in a brick-machine, of an improved arrangement of operating-pawl, ratchet-bar, tappets, &c., by means of which the number of blows given by the hammer to pressing brick is regulated, and by means of which the machine is caused to automatically perform its various movements, all as will here-

inafter more fully appear; fifth, in certain details of construction and arrangement of parts, as hereinafter more fully set forth.

In the accompanying drawings, in which similar letters of reference indicate like parts in the different figures, Figure 1 is a side elevation. Fig. 2 is a longitudinal vertical section. Figs. 3 and 4 are detail views of pivoted cam-block and connections in two different positions. Fig. 5 is a detail view of rear end of charger-frame, showing recess for play of ratchet-pawl. Fig. 6 is a detail longitudinal section, showing the mode of adjusting knife in charger. Fig. 7 is a detail section through the hammer-bumper. Fig. 8 is a detail longitudinal section of charger, showing oil-cellar, &c. Fig. 9 is a transverse section through charger, showing removable table. Figs. 10 and 11 are detail sections of charger, showing the mode of securing the knife in the charger. Fig. 12 is a detail transverse section, showing the mode of adjusting the clay-hopper. Fig. 13 is a detail top view of charger with table removed.

The machine consists of a frame, A, at the rear end of which is pivoted the helve B' of the hammer B, that impacts or forces the clay into the mold C, which is provided with one or more mold-openings, as desired, and which is operated by duplicate cams D on the cam-shaft D', which is geared to and driven by a driving-shaft, D². The mold C is stationary, and is secured at its sides to the frame A by bolts c, passing through its lugs or extensions c' and through the frame A; and in order to prevent any vertical movement of the mold it is arranged between lugs aa, cast on the frame, as indicated in Fig. 7. The mold C is provided with vertically-moving mold-bottoms C', which, when down, rest upon the anvil-block E, supported on a foundation separate from that of the frame A, the object being to prevent any jar caused by the impacting of the clay into the molds from being communicated to the main frame and the mechanism that it supports.

The molds C are supplied with clay by a reciprocating charger, F, which moves over the molds C and under the clay-hopper G, the charger being operated at suitable intervals by a cam, H, and movable cam-block H', with its connections, as hereinafter more fully set

forth. The movements of the charger are such that it will hold a supply of clay over the mold C during the time occupied by the hammer in forcing the same into the molds, after which it will be drawn back so as to obtain a fresh supply of clay from the clay-hopper. In performing this movement the charger trims off the surplus clay from the bricks in the mold, carrying the surplus clay back with it, and then causes the mechanism hereinafter described to lift the bricks out of the mold. On the charger again moving forward over the mold it pushes the bricks out of the machine onto a suitable receiving-table at the forward end of the mold.

The charger F has a knife, f , for trimming off the surplus clay from the tops of the bricks in the mold as said charger moves backward. This knife is held in place by a central bolt, f' , arranged in a recess, f^2 , of the charger, as shown in Figs. 10 and 11, and the knife is made adjustable by wedges f^3 and filling-pieces f^4 , arranged in recesses in the side of the charger, as shown in Fig. 6.

f^5 is an adjustable knife or scraper secured to the charger, and moving in contact with the rearward extension, C^2 , of the mold, so as to prevent any escape of clay from the charger.

F' is a rearward extension or table of the charger, which closes the bottom of the clay-hopper G and prevents the escape of any clay from the same when the charger is in its forward position, and the clay-hopper is provided with adjustable scrapers g g to form a close contact with the table and take up wear as it occurs.

F^2 is the forward table of the charger, which slides in contact with the front casing, A' , of the machine, and forms a close joint with the same in order to prevent an escape of clay at that point. This table is made removable from the charger by fitting in grooves in the same, as shown in Figs. 8 and 9, in order to allow for ready access to the lubricating-chamber, and for inserting, removing, and adjusting the knife f .

In order to lubricate the tops of the mold-bottoms C' so as to prevent the clay from adhering thereto, I have formed the charger with an open-topped oil-chamber, f^6 , for containing oil, which is carried to the mold-bottoms by the capillary attraction of wicks f^7 , as clearly indicated in Fig. 8. The charger is arranged to slide upon guides c^2 , forming part of the mold C, and which project upward, so as to bring the line of division between the charger and said slides some distance above the molds, the purpose being to prevent the clay from being forced out under the charger while the clay is being impacted into the molds. At its rear end the charger is connected to slides F^3 , which carry the stationary cam-block H^2 and the pivoted cam-block H' , against which the cam H acts to impart the forward and backward movements, respectively, to the charger.

f^8 is a vertical plate attached to the front

end of the charger for pushing the bricks onto the receiving-table. This plate has vertical play underneath the charger-table F^2 and between the charger proper and the confining pins or bars f^9 , and is arranged somewhat loosely between the same, so that as the bricks are being pushed out of the machine it will compress the lubricating-wicks f^7 so as to force the oil out of the same onto the mold-bottoms, and thus more perfectly oil the tops of the same, as the mold-bottoms are the only parts that require oiling to prevent the bricks adhering.

The mold-bottoms C' are connected by vertical rods c^3 to a cross-head, E' , which is guided in the anvil-block E, as shown, and to which is journaled the forward end of a lever, E^2 , that is operated by the cam H.

The manner in which the mold-bottoms are raised is as follows: As the charger is drawn backward (by the cam H acting against the pivoted cam-block H') the pivoted lever I is operated by the bolt or tappet i to force the fulcrum-rod e up the incline e' , so as to bring the rear end of the lever E^2 into the path of the cam H, which as it comes around rocks said lever and lifts the mold-bottoms, and with them the bricks already formed, onto a line with the top of the mold, so that when the cam H on its further movement pushes the charger again forward the charger will push said bricks out before it onto the receiving-table. When the charger has about attained its forward position the bolt or tappet i' comes against the lever I and operates it to force the fulcrum-rod e down the incline e' to carry the lever E^2 out of the path of the cam, when the mold-bottoms will descend by gravity.

In order to insure the descent of the mold-bottoms, I have arranged a bell-crank lever, J, pivoted on the pivot-rod of the lever I, one arm of which rests on the top of the mold-bottom lever E^2 and the other against the fixed cam-block H^2 , so that the last portion of the forward movement of the charger will operate the lever J to force down the mold-bottoms, if they have not already descended by gravity, as will be readily understood by an inspection of Fig. 2 of the drawings.

The cam H is formed with a circular face at h in order to hold the lever E^2 , and through it the mold-bottoms C' , in their "up" position while the charger is being moved forward to push the pressing of bricks already formed from over the mold-openings.

In order to cause the mold-bottoms to rise evenly to a level with the top of the mold and prevent one mold-bottom being below and the other above the level of the mold, I have provided the cross-head E' with adjustable stops e^2 at each end, which, coming against the lugs e^3 on the frame A, prevents either end of the lever E' from moving up too far, which would be apt to otherwise occur owing to the bricks adhering to the mold more on one side than on the other.

K is a lever or latch, pivoted at k to the frame A of the machine, and automatically operated by the tappet k' on the side of the charger to be forced under the projecting lug b of the hammer, so as to prevent the descent of said hammer while the charger is making its forward and backward movements.

k^2 is a tappet on the side of the charger, for automatically disengaging said lever from the hammer-lug b when the charger has about finished its forward movement. The tappets k' k^2 may be cast on the side of the charger, or made separate and bolted thereto, as desired.

Owing to the varying nature of clays used in making bricks, it is necessary to give a greater or less number of blows in order to finish the brick; and in order to meet such requirement a device as follows is provided, by which the number of blows given for each pressing of bricks can be changed and regulated:

L is a ratchet-bar arranged to slide upon a ledge upon the side of the charger-slides F^3 , and which has a series of ratchet-teeth, l , engaged by a ratchet-dog, l' , on one arm of a pivoted bell-crank lever, M, the other arm of which is operated by a pin, m , on the hammer-helve, as shown in Fig. 2, and which acts to move the ratchet-bar L one tooth of its ratchet at each stroke of the hammer. As the ratchet-bar L is gradually forced backward its hook-projection l^2 engages a pin, n , on the side of lever N and tilts said lever upward so as to cause it to disengage the hook-bar O from engagement with the pivoted cam-block H' and allow the same to drop into the path of the cam H, which in forcing the charger backward inaugurates the different movements of discharging the bricks and bringing a fresh supply of clay over the molds, the pivoted cam-block H' being provided with a counterpoise-weight, h' , to prevent a too sudden movement of the cam-block as it falls into the path of the cam.

The ratchet-bar L is provided with a series of screw-holes, l^3 , in any one of which may be placed the bolt l^4 , which, by coming in contact with the stop L' on the main frame A, will limit the forward movement of the said ratchet-bar with the charger, and the position of this bolt in the series of holes l^3 regulates the number of blows given by the hammer in each pressing of bricks, as by its means the distance that the ratchet-bar will have to move backward before it causes the cam-block H' to drop into the path of its cam can be adjusted and regulated.

In Figs. 2, 3, and 4 are shown the different positions of the cam-block H and its supporting-hook O. In Fig. 2 said block is shown as held up out of the path of the cam while the hammer is operating. In Fig. 3 it is shown in full lines down in the path of the cam and just before the charger has been pushed backward, its position just before dropping being shown in dotted lines. In Fig. 4 is shown the position of said cam-block and its connections when the charger has been pushed backward.

It is preferable to provide the cam-blocks D^3 of cams D with anti-friction rollers d , in order to avoid wear in both the cam and block.

The mold C, rearward extension or table C^2 , and guides c^2 are cast or forged in one piece, so to avoid any liability to loosening or displacement of the parts, which is a great difficulty met with where said parts are made separate and bolted together.

P are the bumpers for preventing the hammer from descending too far into the mold-openings and marring or destroying the mold-bottoms. They consist of rubber cushions P, supported on bracket-pieces P' , which extend down through a recess at each side of the mold and rest upon the top of the anvil-block, as clearly shown in Fig. 7.

The operation of the machine is as follows: The charger F being in the position shown in Fig. 2, with a supply of clay over the mold C, the cam-shaft is then set in motion, its cam D lifting the hammer, which by repeated blows impacts the clay into the molds. At each movement of the hammer the ratchet-bar L is pushed back one tooth of its ratchet l by the pawl l' and its connections until the hook-projection l^2 engages the pin n of lever N and tilts it backward, releasing the hook-bar O from engagement with the pivoted cam-block H' , which then drops into the path of its operating-cam H, and said cam, coming against said block, forces the charger backward.

The charger in its backward movement accomplishes the following results: It locks the hammer B in its up position by means of its tappet k' forcing the pivoted latch or lever K into engagement under the lug b of the hammer. It then trims the surplus clay off from the tops of the bricks in the mold by means of its knife f , carrying the surplus clay thus trimmed off back with it. It then brings the mold-bottom-operating lever E^2 into the path of the cam H (so that the same in its further rotation will raise the mold-bottoms, and with them the bricks already formed, out of the mold) by its bolt or tappet i acting against the lever I, to force the fulcrum-rod e up the incline e' , so as to bring the rear end of the lever E^2 into the path of the cam. As the cam H rotates it first lifts the brick out of the mold, as above described, and then on its further movement it comes against the cam-block H^2 , forcing the charger, with a fresh supply of clay from the clay-hopper G, forward.

The charger in its forward movement accomplishes the following results: It forces the bricks already formed forward from over the mold-openings. It then allows the mold-bottoms to descend by gravity, and its tappet or bolt i' , acting against the lever I, forces the fulcrum-rod e down the incline e' , so as to take the rear end of the lever E^2 out of the path of the cam H, in order that said lever will not be acted on by said cam at each rotation. Should the mold-bottoms stick, so as not to descend by gravity, the charger will, near the end of its

forward movement, operate the bell-crank lever J to force them down; and when the charger has about finished its forward movement its tappet or bolt h^2 comes in contact with the lever or latch K and forces it out of engagement with the hammer-lug b , so as to allow the hammer B to become again operative. During its forward motion the charger carries with it the ratchet-bar L until said bar is stopped by its adjusting-bolt h^4 coming in contact with the stop L' of the frame A, and the ratchet-pawl l' is held up from engagement with the ratchet-teeth by riding on the top of the charger, the charger being provided with a recess, h^5 , to allow the pawl l' to engage the ratchet-teeth l when the charger is in its forward position. The hook-bar O engages the pin h^2 of the pivoted cam-block H' and lifts it out of the path of the cam H as the charger moves forward, so that when the charger again reaches its forward position the parts will be reset, so as to allow for a repetition of the movements above set forth.

Having thus fully described my said invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with the hammer of a brick-machine, of a pivoted latch or lever automatically operated by tappets on the side of the charger to engage and disengage from under the hammer, substantially as described, and for the purpose set forth.

2. The combination, in a hammer brick-machine, of the pivoted cam-block H' with the hook-bar O and disengaging mechanism, substantially as described, for the purpose set forth.

3. The combination, in a hammer brick-machine, of the ratchet-bar L, having teeth l and adjusting holes and bolts h^3 h^4 , with the pawl l' , bell-crank lever M, pin m , and hammer-helve B', as described, and for the purpose set forth.

4. The combination, in a hammer brick-machine, of the pivoted cam-block H' and operating-cam H with the hook-bar O, disengaging-lever N, and sliding ratchet-bar L, operated by the hammer-helve B', substantially as described, and for the purpose set forth.

5. The combination, in a brick-machine, of a movable charger, vertically-moving mold-bottoms, lever E², and operating-cam H, having a holding-face, h , as described, and for the purpose set forth.

6. The combination, in a brick-machine, of a movable charger, vertically-moving mold-bottoms, with a lever, E², operated by cam H, substantially as described, and for the purpose set forth.

7. The combination, with a brick-machine, of the lever E², having a movable fulcrum that is automatically raised and lowered by the movement of the charger, substantially as described, and for the purpose set forth.

8. The combination, in a brick-machine, of a lever, E², movable fulcrum-rod e , incline e' , lever I, and tappets i i' with the mold-bottoms C' and charger F, as described, and for the purpose set forth.

9. The combination, in a brick-machine, of the charger F, having a removable table, F², as described, and for the purpose set forth.

10. The charger F, formed with an open-top oil-chamber, f^6 , in combination with the capillary wicks f^7 , removable table F², and plate f^8 , attached loosely to the charger, as described, and for the purpose set forth.

11. The bumper P, having its supporting-frame P' extending down to and resting on the anvil-block E, as described, and for the purpose set forth.

EDWIN F. ANDREWS.

Witnesses:

THAD. S. SMITH,
ROBERT BURNS.