

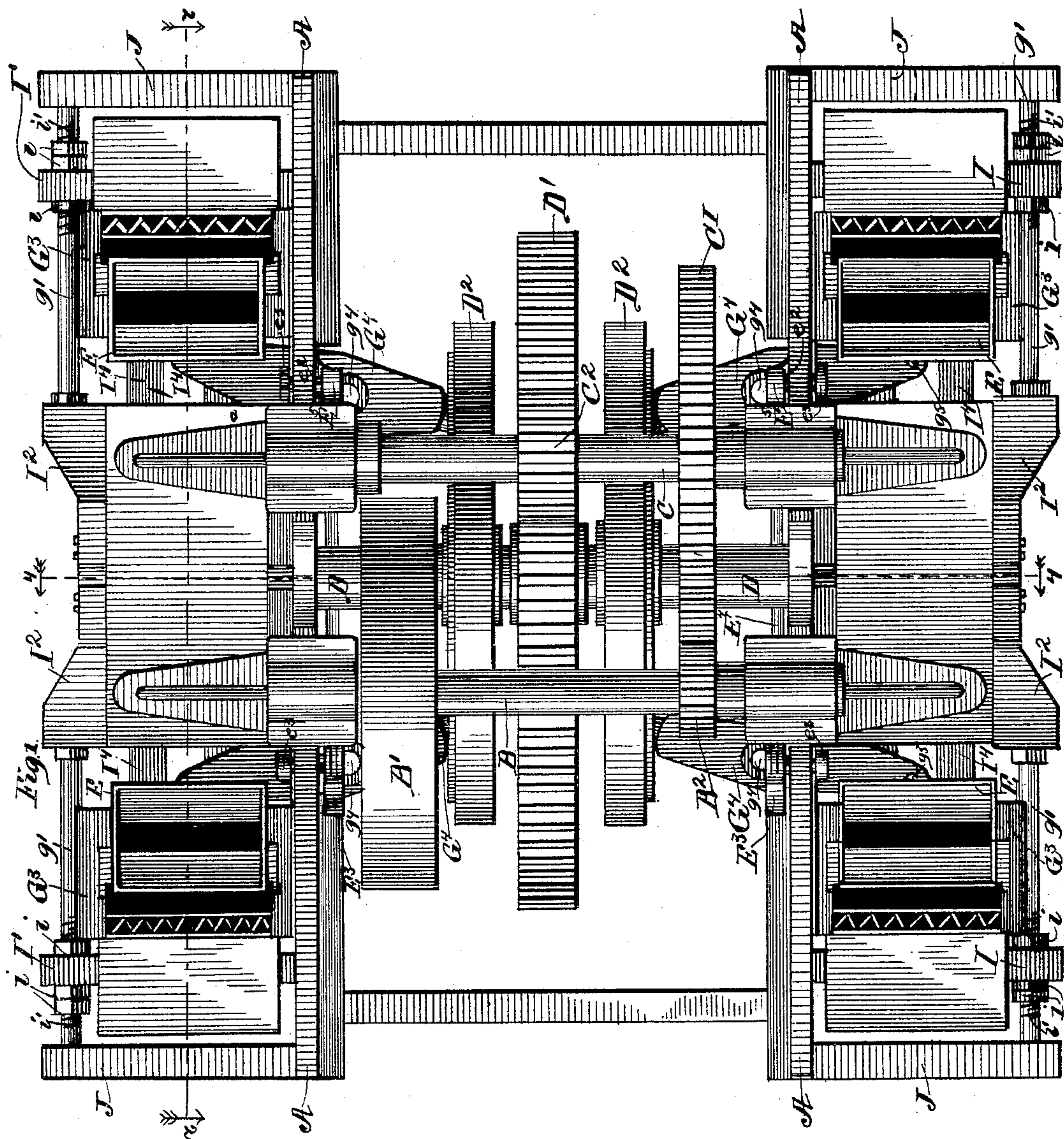
(No Model.)

6 Sheets—Sheet 1.

P. FOSS.  
BRICK MACHINE.

No. 459,153.

Patented Sept. 8, 1891.



Witnesses;  
Lute S. Alter,  
Flora L. Brown.

Inventor;  
Paul Foss,  
By Charles J. Brown  
Atty.



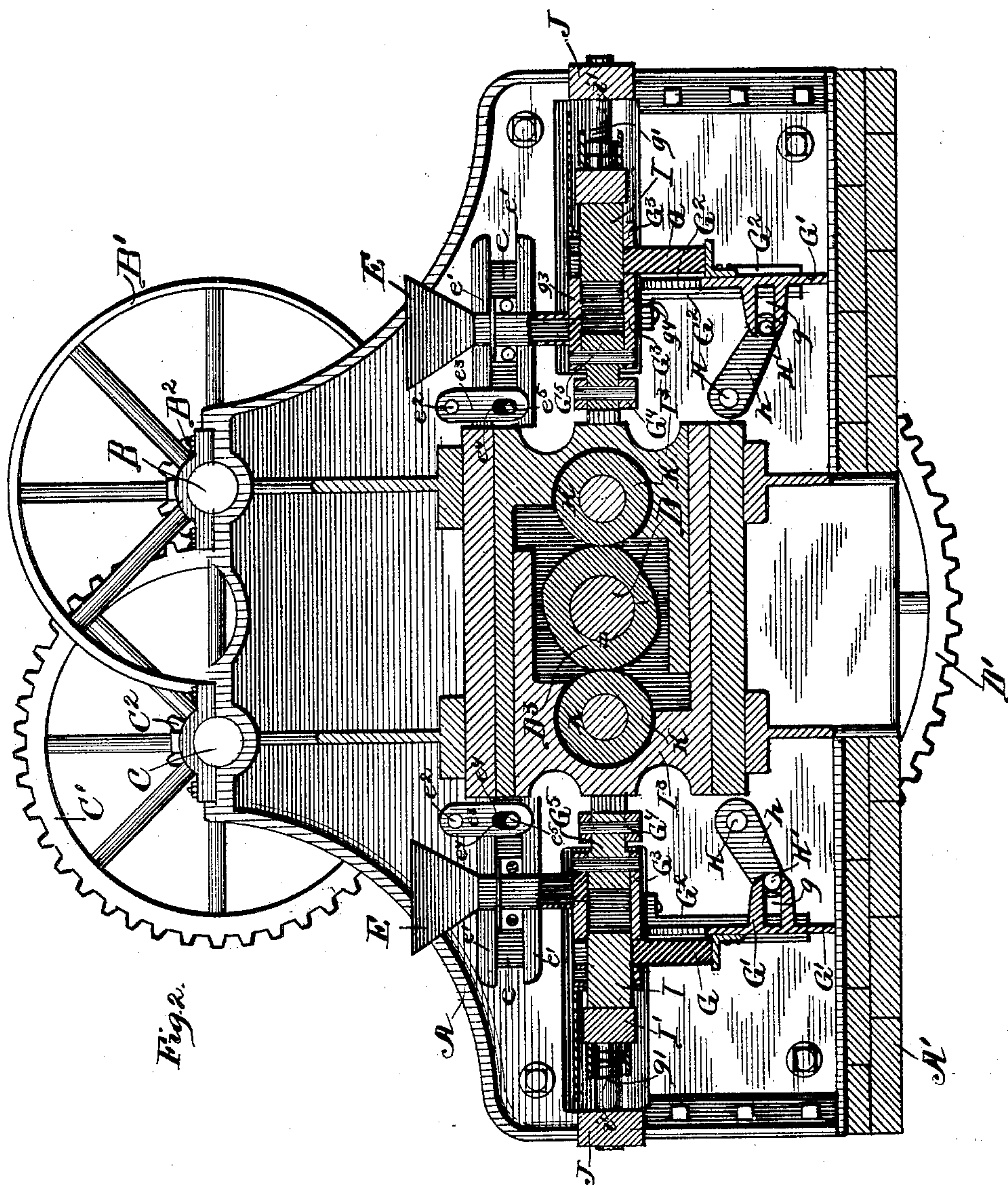
(No Model.)

6 Sheets—Sheet 2.

P. FOSS.  
BRICK MACHINE.

No. 459,153.

Patented Sept. 8, 1891.



Witnesses:  
Lute S. Alter,  
Flora L. Brown.

Inventor,  
Paul Foss,  
By Charles C. Brown  
Atty



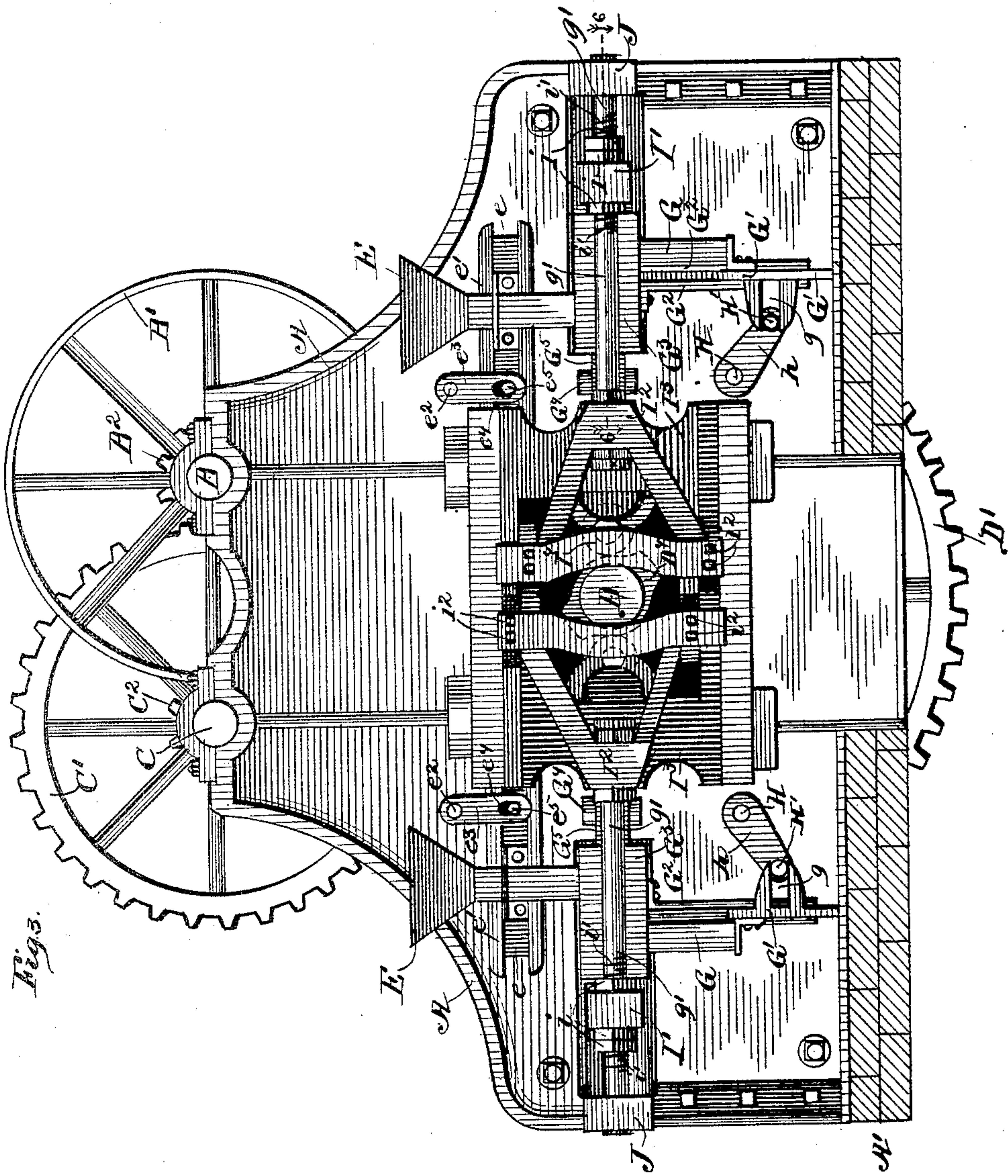
(No Model.)

6 Sheets—Sheet 3.

P. FOSS.  
BRICK MACHINE.

No. 459,153.

Patented Sept. 8, 1891.



Witnesses;  
Levi S. Alter,  
Flora L. Brown

Inventor,  
Paul Hoss,  
By Charles J. Brown

Atty

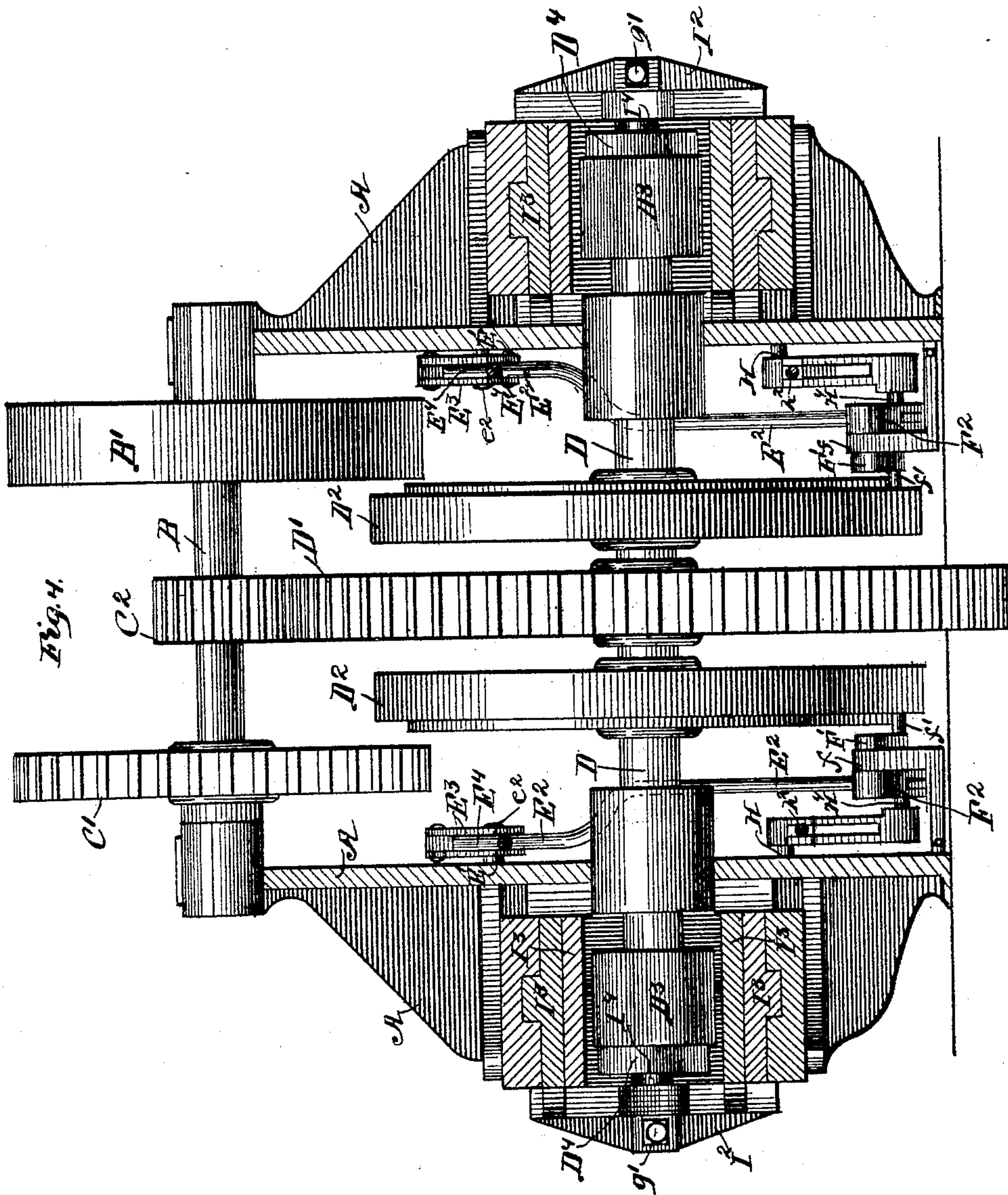
(No Model.)

6 Sheets—Sheet 4.

P. FOSS.  
BRICK MACHINE.

No. 459,153.

Patented Sept. 8, 1891.



Witnesses;  
Lute S. Alter.  
Flora L. Brown.

Inventor;  
Paul Foss,  
By Charles J. Brown  
Atty.



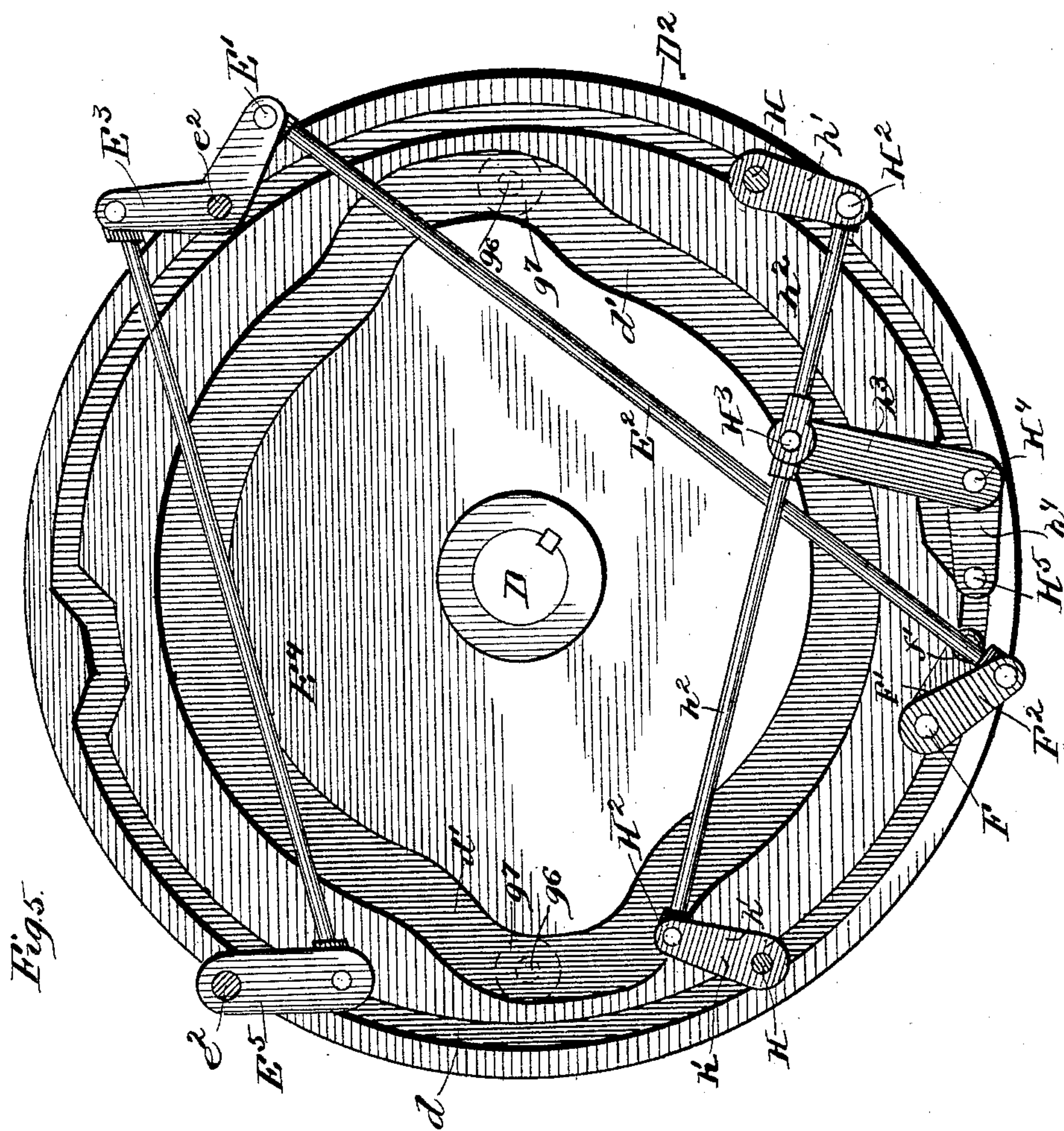
(No Model.)

6 Sheets—Sheet 5.

P. FOSS.  
BRICK MACHINE.

No. 459,153.

Patented Sept. 8, 1891.



Witnesses;  
Lute S. Alter  
Flora L. Brown.

*Inventor,*  
*Paul Foss,*  
*By Charles J. Brown*  
*Atty.*

(No Model.)

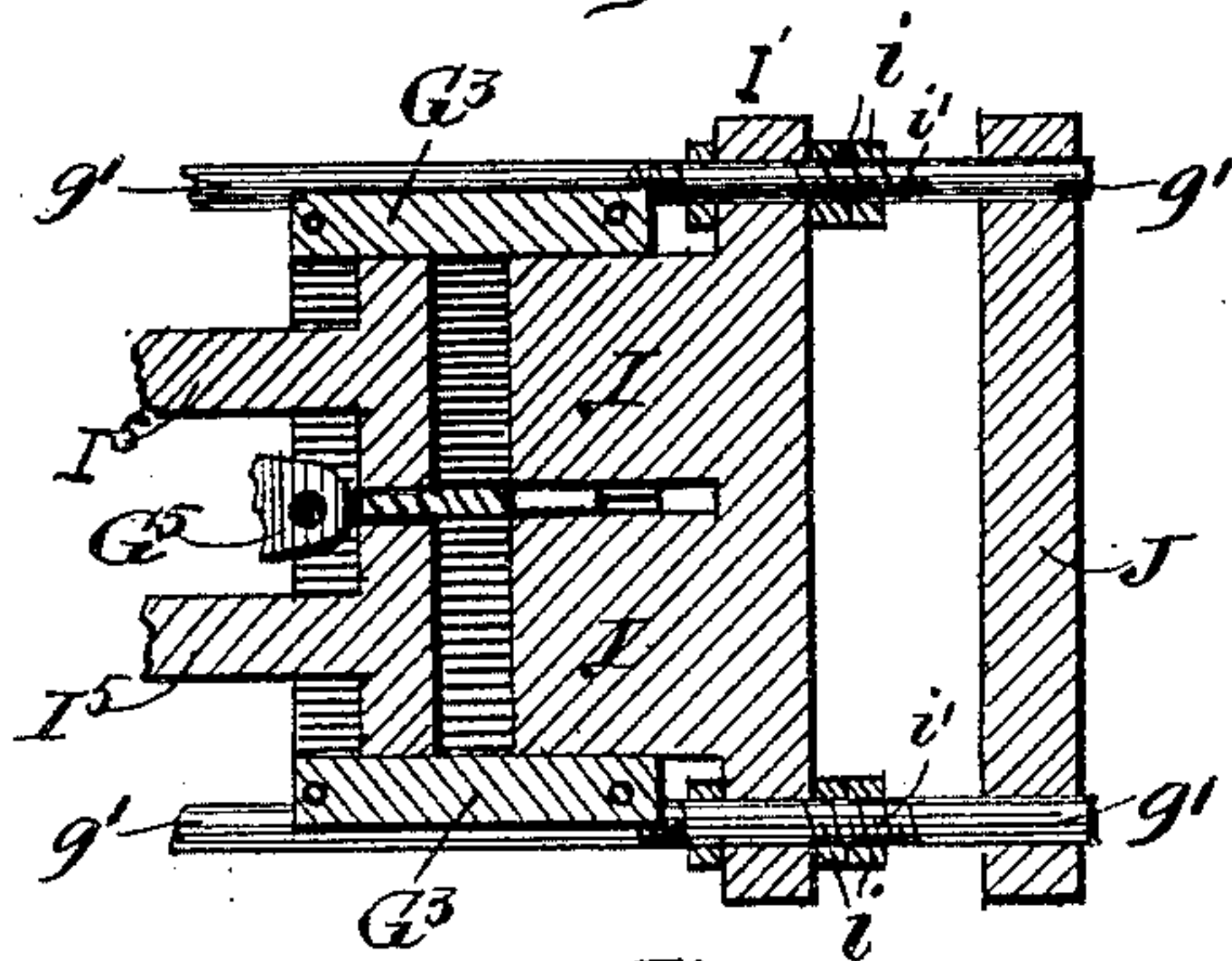
6 Sheets—Sheet 6.

P. FOSS.  
BRICK MACHINE.

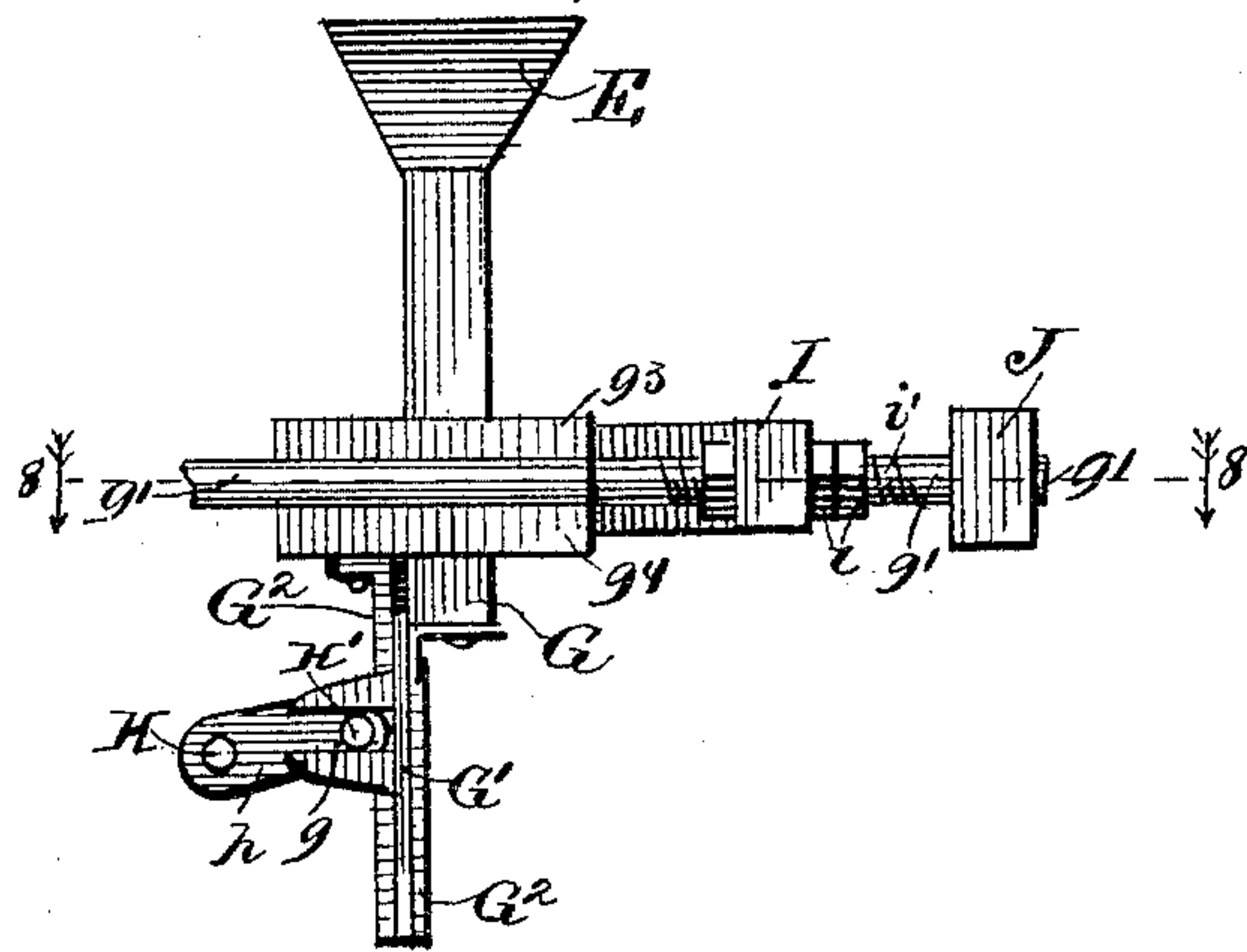
No. 459,153.

Patented Sept. 8, 1891.

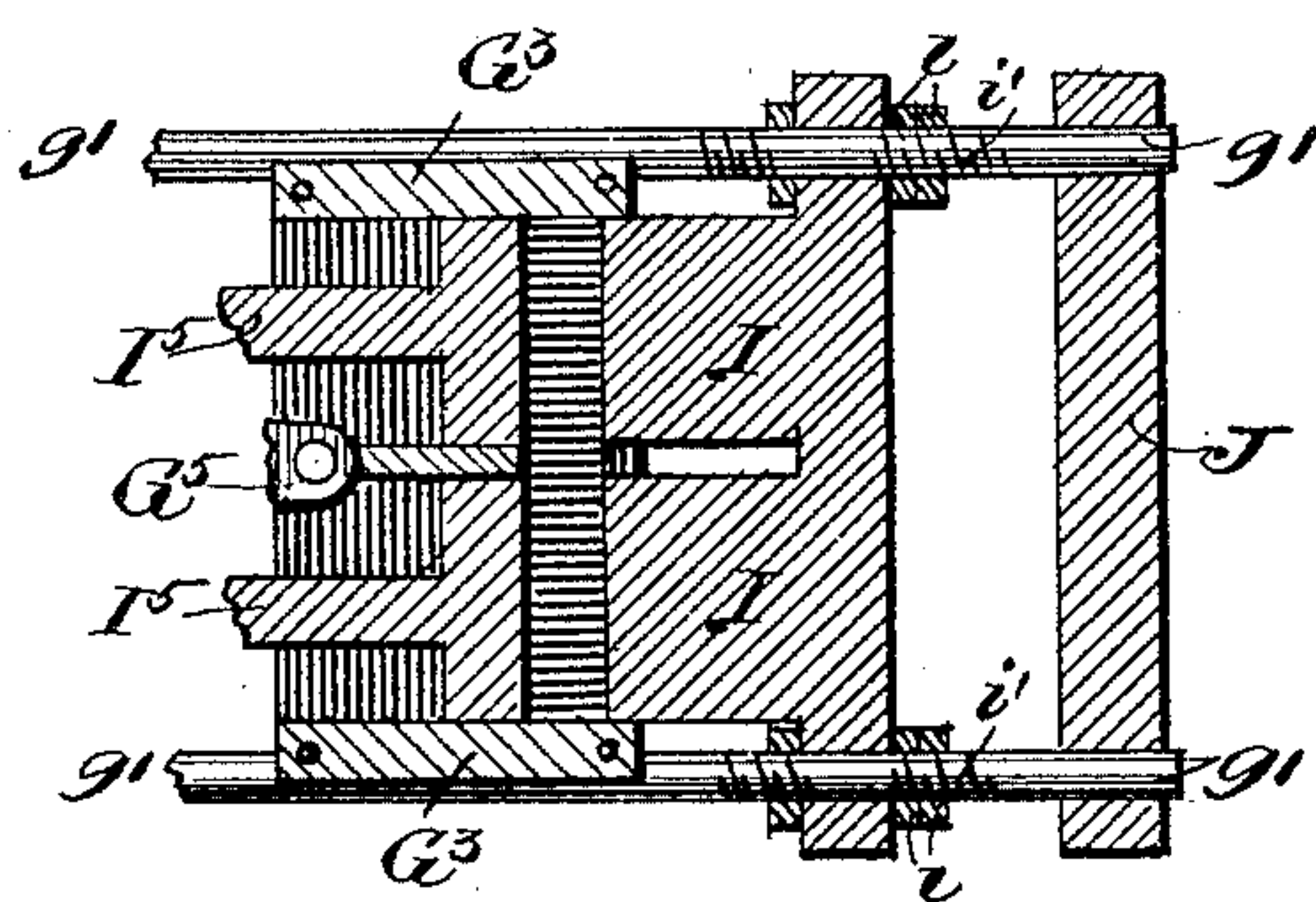
*Fig. 6*



*Fig. 7.*



*Fig. 8.*



*Witnesses;*

Lute, S. Alter,  
Flora L. Brown.

*Inventor;*

Paul Foss,  
By Charles J. Brown.



# UNITED STATES PATENT OFFICE.

PAUL FOSS, OF CHICAGO, ILLINOIS.

## BRICK-MACHINE.

SPECIFICATION forming part of Letters Patent No. 459,153, dated September 8, 1891.

Application filed May 6, 1891. Serial No. 391,747. (No model.)

*To all whom it may concern:*

Be it known that I, PAUL FOSS, residing in the city of Chicago, in the county of Cook and State of Illinois, have invented certain  
5 new and useful Improvements in a Brick-Making Machine, of which the following is a specification.

My invention relates to that class of machines in which clay properly ground and dampened is pressed into shape to form bricks;  
10 and the object of this invention is to obtain a machine whereby at small cost large number of bricks can be made and delivered therefrom ready for the kiln in a shape to produce,  
15 when burned, "pressed brick," as they are known in the art.

I have illustrated my invention by the drawings accompanying and forming a part of this specification, in which—

20 Figure 1 is a plan view of the machine. Fig. 2 is a cross-section of the machine on line 2 2 of Fig. 1, viewed in the direction of the arrows. Fig. 3 is a side elevation of the machine; Fig. 4, a lateral cross-section on line 4 4 of Fig. 1,  
25 viewed in the direction of the arrows; and Fig. 5, an elevation of cams by which certain movements necessary in the operation of the machine are obtained. Fig. 6 is a cross-section on line 6 6 of Fig. 3. Fig. 7 is an elevation  
30 of one corner of the machine with the several parts in the position they assume just prior to the reception of the properly prepared and dampened clay in the machine from the hopper, and Fig. 8 is a cross-section  
35 on line 8 8 of Fig. 7.

The same letter of reference is used to indicate a given part where more than one view thereof is given.

The parts of the machine are indicated in  
40 the same position throughout Figs. 1 and 6, both inclusive, of the drawings, such position being the one in which properly-prepared clay is contained in the molds thereof ready for and about to be pressed into a green brick—  
45 that is, a brick ready for the kiln.

As a brief explanation of the manner of operation of the machine will render the description of the several parts more intelligible, it is here given.

50 Clay properly ground and dampened extends from a spout or other conveyer into the hopper of the machine, and from such

hopper is drawn at the proper time into the machine in front of the mold of the machine by the retraction of a plunger. After the  
55 clay has left the hopper and is contained in the machine in front of the mold the opening through which the clay has passed is closed by an outward horizontal movement of the mold, and after the closing of such passage  
60 the clay contained in the molds is firmly pressed into the desired shape of a green brick by dies which move toward each other into the mold, and after the proper shape has been  
65 given to the clay for the green brick such green brick is forced out of the mold by the dies and then raised from the receptacle in front of the mold by the same plunger which  
70 drew the clay into the machine in front of the mold. The hopper is then moved over the opening to the machine at the time of such movement, forcing the green brick to one  
75 side, where it can be cared for by the person operating the machine, and after the hopper has arrived in suitable position the plunger is again withdrawn and fresh clay thereby  
80 brought down in front of the mold to be forced thereinto and formed into a green brick as the operation of the machine is continued.

The machine illustrated is constructed to press into shape two bricks at each corner thereof at each half-revolution of the main shaft—that is, the shaft on which the several  
85 cams are secured, hereinafter termed the "cam-shaft"—and the moving parts required at one corner of the machine are duplicates of the movable parts at each of the other corners, and hence to avoid repetition and cumbersomeness in the description of the machine  
90 such parts are described without special reference to the duplication thereof required in the machine itself.

A is the frame of the machine, and A' is a portion of the foundation on which the machine is set.

B is a shaft rotatably journaled in frame A, and B' is a pulley rigidly secured on shaft B, adapted to have a belt placed thereon by which the shaft B can be turned and the machine operated.

B<sup>2</sup> is a small gear wheel or pinion rigidly secured to the shaft B, intermeshing with geared wheel C' on shaft C. Shaft C is ro-



tatably journaled in frame A, and has rigidly secured thereto gear-wheel C' and small gear wheel or pinion C<sup>2</sup>.

D is the cam-shaft of the machine, and is rotatably journaled in the frame A.

D' is a gear-wheel rigidly secured to cam-shaft D, intermeshing with the small gear wheel or pinion C<sup>2</sup> on shaft C.

It will be observed that by the rotation of wheel B' and pinion B<sup>2</sup> on shaft B wheel C' and shaft C are rotated with pinion C<sup>2</sup> thereon, and pinion C<sup>2</sup>, intermeshing with gear-wheel D', will produce rotation in cam-shaft D.

D<sup>2</sup> is a cam rigidly secured to main shaft D, and D<sup>3</sup> D<sup>4</sup> are cams of smaller diameter also rigidly secured to shaft D.

E is the hopper of the machine.

e is a sliding frame in which hopper E is held, and e' are ribs on frame A, forming guides in which frame e slides. The movement of the slide e is obtained and controlled by the rocking movement of shaft e<sup>2</sup> through the lever e<sup>3</sup>, such lever e<sup>3</sup> being rigidly secured at one end to the rocking shaft e<sup>2</sup> and at the other end having slot e<sup>4</sup>, into which slot the pin e<sup>5</sup> enters, such pin e<sup>5</sup> being rigidly secured in sliding frame e.

The rocking motion to the crank-shaft e<sup>2</sup> on one corner of the machine is obtained (see Fig. 5) by rigidly securing thereto the arm E' and connecting such arm by rod E<sup>2</sup> to arm F<sup>2</sup> of crank-shaft F, such crank-shaft F having arm F' rigidly secured thereto, and pin f' extending from arm F' into the groove d of the cam D. Crank-shaft F is journaled in bearing f. The arm E', which is rigidly secured, as last described, to crank-shaft e<sup>2</sup>, is extended into arm E<sup>3</sup>, and rocking motion is obtained to the crank-shaft e<sup>2</sup> in the other corner of the machine on the same side thereof by extending the rod E<sup>4</sup> from arm E<sup>3</sup> to arm E<sup>5</sup>, such arm E<sup>5</sup> being rigidly secured to such other crank-shaft e<sup>2</sup>, as will be readily observed by inspection of Fig. 5.

When properly ground and dampened clay is contained in the hopper E and such hopper has, by the rocking movement of shaft e<sup>2</sup> in the manner last described, been slid over the opening in front of the mold of the machine, the clay is, as hereinbefore stated, drawn into the opening in front of the mold by the retraction of a plunger. G is such plunger, and is rigidly secured to vertically-movable frame G'.

G<sup>2</sup> are ways or guides secured to horizontally-sliding frame G<sup>3</sup>. Frame G' slides vertically in the guides or ways G<sup>2</sup>, carrying with it the plunger G. The horizontally-sliding frame G<sup>3</sup>, to which these ways G<sup>2</sup> are secured, slides freely on rods g' g', for a purpose hereinafter described. The vertical movement of the frame G' and plunger G, secured thereto, is determined and controlled by the rocking movement of crank-shaft H, having arm h secured firmly thereto, such arm h having pin H' in slot g of the frame G'. The slot g is sufficiently long so that the horizontal move-

ment of the sliding frames G', G<sup>2</sup>, and G<sup>3</sup> will not allow such pin to become released therefrom.

The rocking movement of the shaft H is obtained, as will be readily understood by reference to Fig. 5, by rigidly securing to such shaft H arm h', and from such arm h' extending rod h<sup>2</sup> to arm h<sup>3</sup>, rod h<sup>2</sup> being secured to arm h' by pivot H<sup>2</sup> and to arm h<sup>3</sup> by pivot H<sup>3</sup>.

H<sup>4</sup> is a crank-shaft, on which arm h<sup>3</sup> is rigidly secured, and arm h<sup>4</sup> is also rigidly secured to the crank-shaft H<sup>4</sup>.

H<sup>5</sup> is a pin extending from arm h<sup>4</sup> into groove d on cam-wheel D.

By the above description of the movement of the hopper E and the manner in which it is obtained and the movement of the plunger G and the manner in which such movement is obtained it will be observed that the single groove d on cam-wheel D imparts, by pin f' and pin H<sup>5</sup> extending thereinto, respectively, movement to both the hopper E and the plunger G.

In Figs. 1, 2, 3, and 4 the plunger is illustrated as withdrawn from the opening in front of the mold and such opening closed by the frame G<sup>3</sup>, in which is contained the mold of the machine and on which is suspended the frame G<sup>2</sup>, carrying frame G', and plunger G having been slid on rods g' g' outward from the cam-shaft D of the machine, so that the plate g<sup>2</sup> closes the hole at the bottom of the plunger E and forms the top of the receptacle in which is contained the clay, and plate g<sup>3</sup> replaces the upper surface of the plunger G and forms the bottom of such receptacle, such receptacle being thereby converted into the mold in which the green brick is pressed in the manner as hereinafter described. The plates g<sup>2</sup> g<sup>3</sup> are rigidly secured to and form part of the sliding frame G<sup>3</sup>. The sliding movement of the frame G<sup>3</sup> is obtained by the movement of arm or lever G<sup>4</sup>, which is pivoted or fulcrumed on vertical pivot g<sup>4</sup> and linked to frame G<sup>3</sup> by link G<sup>5</sup>. At the other end of this arm or lever G<sup>4</sup> there is placed the pin g<sup>6</sup>, extending into groove d' of cam-wheel D<sup>2</sup>, and to reduce the friction in the working of the machine wheel g<sup>7</sup> is rotatably mounted on pin g<sup>6</sup> in this groove d'. After the properly ground and dampened clay has been conveyed into the receptacle in front of the molds of the machine and the aperture or opening through which the clay so placed in its position has been closed by the sliding movement of the frame G<sup>3</sup>, as last described, such clay contained in the mold is pressed in the mold by the dies therefor into green brick, and for producing the movement in the dies much smaller and more powerful cams are used than for effecting the movement of the hopper E, the plunger G and the horizontal movement of the sliding frame G<sup>3</sup> forming, as described, the mold and carrying the frame in which plunger G slides vertically.



I I are dies which are rigidly secured to rods  $g' g'$  by cross-bar  $I'$  and by nuts  $i i$  on rod  $g'$ , which fit on thread  $i'$  and are turned up against such cross-bar  $I'$ . It will be observed that the screw-thread  $i'$  extends but a short distance on the rod  $g'$ , so that the rod shall present a smooth surface at the portion of the end thereof which slides in the brackets J, supporting one end of such rod. The inner end of the rod  $g'$  is secured firmly to sliding frame  $I^2$ . The frame  $I^2$  is bolted to the sliding head or frame  $I^3$  by bolts  $i^2$ . It will be observed that the sliding heads  $I^2$  are duplicated on each end of the machine, and each one thereof is forced outward—that is, away from the cam-shaft D—by cam  $D^4$  on such cam-shaft D coming in contact with pulleys  $I^4$  on frames  $I^2 I^2$ , and such frames are brought inward or toward the cam-shaft D by the sliding heads  $I^3$  being forced outward by cam  $D^3$  on cam-shaft D, the frame  $I^3$  to the left-hand end of the machine, as viewed in Figs. 2 and 3, actuating the frame  $I^2$  and die I, secured to cross-bar  $I'$  on the right-hand side of the machine. The inward and outward movements of the die I are thus provided for by the cams  $D^3 D^4$ .

$I^5$  are dies rigidly secured on heads  $I^3 I^3$ , so as to follow the movements of such heads, the die  $I^5$  on the right-hand side of the machine following the movement of the movable head  $I^3$  on the same side of the machine. It will thus be seen that as the frame  $I^3$  is forced forward by cam  $D^3$  the die  $I^5$  is forced forward and the green brick is formed between the dies  $I I^5$  in the mold formed by the top and bottom  $g^3 g^4$  and frame  $G^3$ . The die  $I^5$  will of course be retracted by the sliding head  $I^3$ , as such head is moved by frame  $I^2$ , secured thereto, as heretofore described.

The operation of this machine is: When properly-prepared clay is contained in the hopper E, sliding frame  $G^3$  being underneath the hopper E and the plunger G in the position illustrated in Figs. 7 and 8, such plunger G is moved downward, drawing, as by suction, the clay from the hopper E, thereby insuring greater uniformity in the quantity of clay drawn into the machine than if the same were allowed to fall thereinto by gravity alone from such hopper. The sliding frame  $G^3$  is then moved horizontally outward from the cam-shaft D, the hopper E at the same time being moved inward toward such cam-shaft, and the opening through which the clay extends into the mold formed by the top and bottom  $g^3 g^4$  and sliding frame  $G^3$  is thereby closed. The dies  $I I^5$  are then forced toward each other by the cam  $D^4$  in such mold and the green brick formed thereby, after which the dies  $I I^5$  are separated by the cams  $D^4$  on cam-shaft D. The sliding frame  $G^3$  is then brought into its initial position, so that the top and bottom  $g^3 g^4$  are respectively over and under die  $I^5$ , and the green brick is thereby left resting upon the top of the plunger G. Plunger G is then forced upward, the green

brick being carried upward therewith out of the machine and to one side of the hopper E, after which the hopper E moves outward into its initial position, thereby shoving the green brick to one side, when the plunger G again descends and fresh properly-prepared clay brought into the machine in position so that the above operation can be repeated. Green bricks are thus continuously made in the operation of the machine at each of the corners thereof, and by the making of bricks on both sides of the cam-shaft D all strain upon the frame of the machine is obviated, such strain coming upon the clay contained in the mold and being formed into green bricks. One revolution of cam-shaft D will cause the dies  $I I^5$  at each corner of the machine to press and deliver two sets of green brick, and the cams on cam-shaft D are so set and secured that green brick are being pressed into shape alternately on one side and the other of the machine. The rollers K K are rotatably mounted in sliding heads  $I^3 I^3$ , respectively, to come in contact with the cam  $D^3$  to lessen the friction resulting from the operation of the machine; but such rollers are not essential in the construction of the parts  $I^3 I^3$ .

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

1. In a brick-making machine, the combination of a frame, a cam-shaft journaled in the frame, a hopper contained on horizontally-movable slide, a crank-shaft actuated by a cam on the cam-shaft, connected to and controlling the position of the hopper-slide, a horizontally-movable mold underneath the hopper, a lever attached to the movable mold and extending therefrom to and intermeshing with a cam on the cam-shaft of the machine, a vertically-movable plunger contained in slides suspended from the horizontally-movable mold, a crank-shaft engaging with the vertically-movable plunger, levers extending from such crank-shaft to and intermeshing with a cam on the cam-shaft of the machine, horizontally-movable dies extending into the mold from each end thereof, arms extending from such dies to horizontally-movable heads, and cams on the cam-shaft of the machine, arranged so that as one of such horizontally-movable dies is brought inward toward such cam by the cam-wheel the other of such dies is simultaneously forced outward from the cam-shaft by the same cam, and the clay contained in the mold is thereby pressed into a green brick, substantially as described.

2. In a brick-making machine, the combination of a frame, a cam-shaft rotatably journaled in the frame, a cam secured to the cam-shaft, a horizontally-movable mold, a lever extending from such horizontally-movable mold to and intermeshing with the cam on the cam-shaft, horizontally-movable dies extending into the mold from opposite ends thereof, a cam secured on the cam-shaft of the machine in contact with such dies, where-



by the dies are simultaneously forced into the mold from opposite sides thereof by a single cam, a vertically-movable plunger contained in slides suspended from the horizontally-movable mold, and a crank-arm connected to the vertically-movable plunger, such crank-arm connected to and actuated by a lever intermeshing with the first-named cam, whereby green brick pressed into shape in the mold by the dies can be forced out of such mold by such vertically-movable plunger, substantially as described.

3. In a brick-making machine, the combination of a frame, a cam-shaft rotatably journaled in the frame, a cam secured to the cam-shaft, a horizontally-movable mold, a lever extending from such horizontally-movable mold to and intermeshing with the cam on the cam-shaft, horizontally-movable dies extending into the mold from opposite ends thereof, and a cam secured on the cam-shaft of the machine in contact with such dies, whereby the dies are simultaneously forced

into the mold from opposite sides thereof by a single cam, substantially as described. 25

4. In a brick-making machine, the combination of a frame, a cam-shaft rotatably journaled in the frame, a cam secured to the cam-shaft, a horizontally-movable mold, a lever extending from such horizontally-movable mold to and intermeshing with the cam on the cam-shaft, horizontally-movable dies extending into the mold from opposite ends thereof, and cams secured on the cam-shaft of the machine in contact with such dies, whereby the dies are simultaneously forced into the mold from the opposite sides thereof by one of such cams and are simultaneously withdrawn from the mold on opposite sides thereof by the other of such cams, substantially as described. 35 40

PAUL FOSS.

Witnesses:

FLORA L. BROWN,

CHARLES T. BROWN.