

(No Model.)

5 Sheets—Sheet 1.

H. AIKEN.
BRICK MACHINE.

No. 459,878.

Patented Sept. 22, 1891.

Fig. 1.

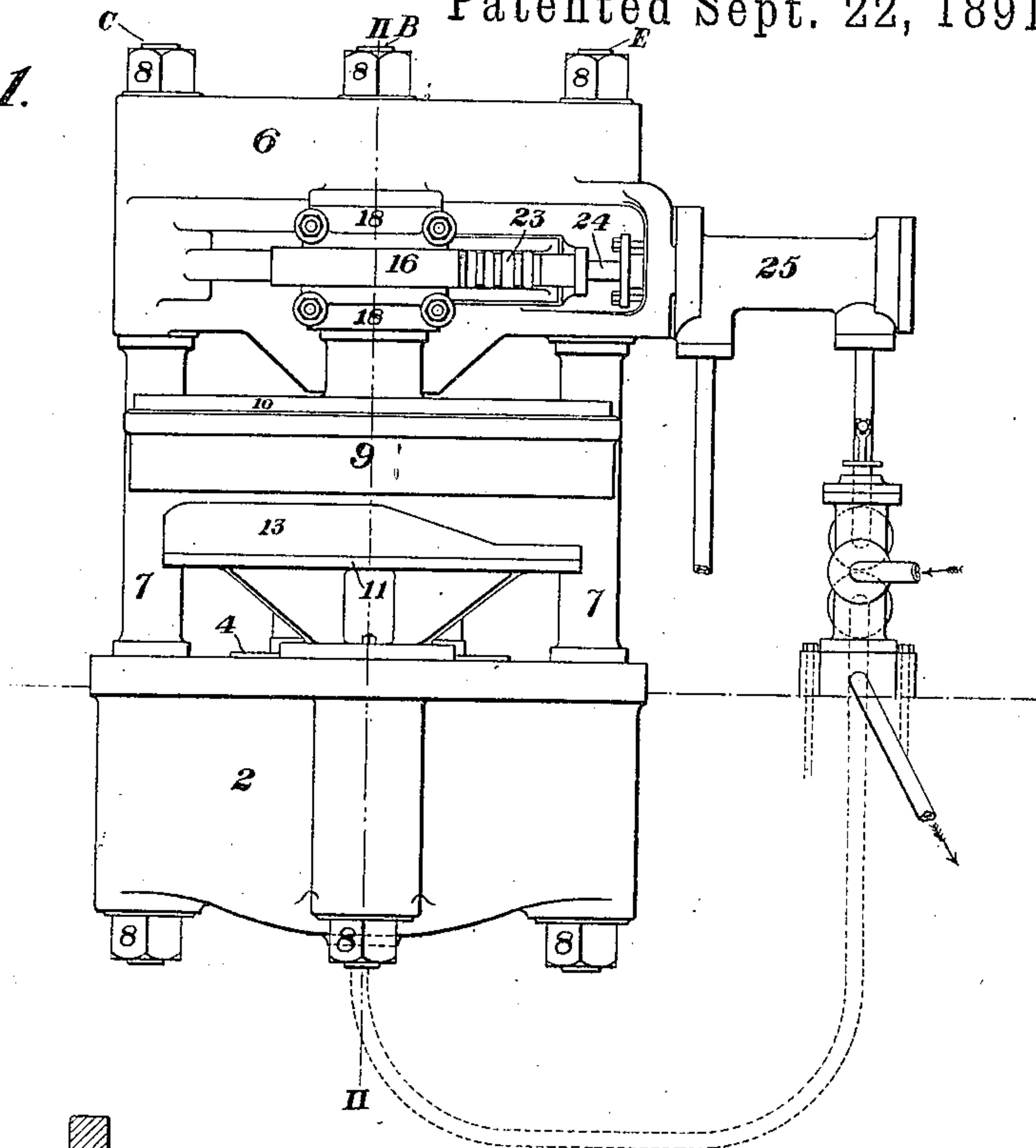


Fig. 4.

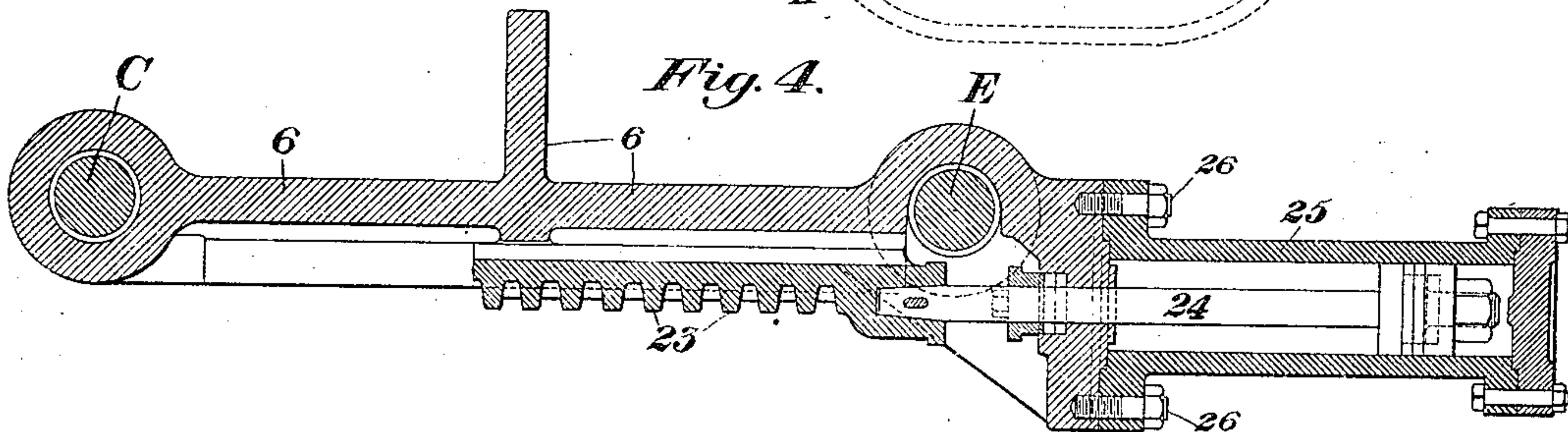
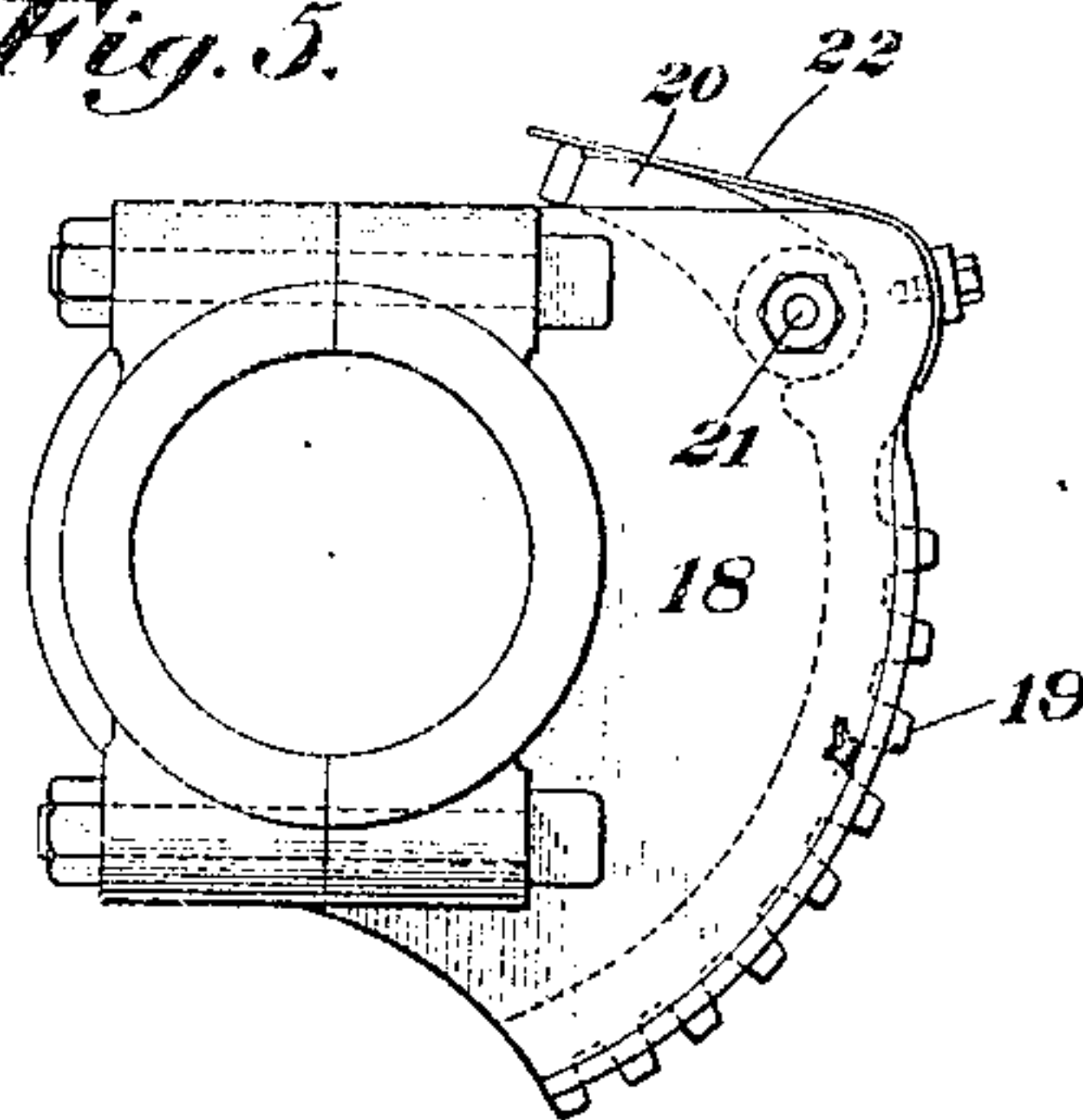


Fig. 5.



Witnesses

Thomas W. Baxwell

James H. Baxwell

Inventor

Henry Aiken

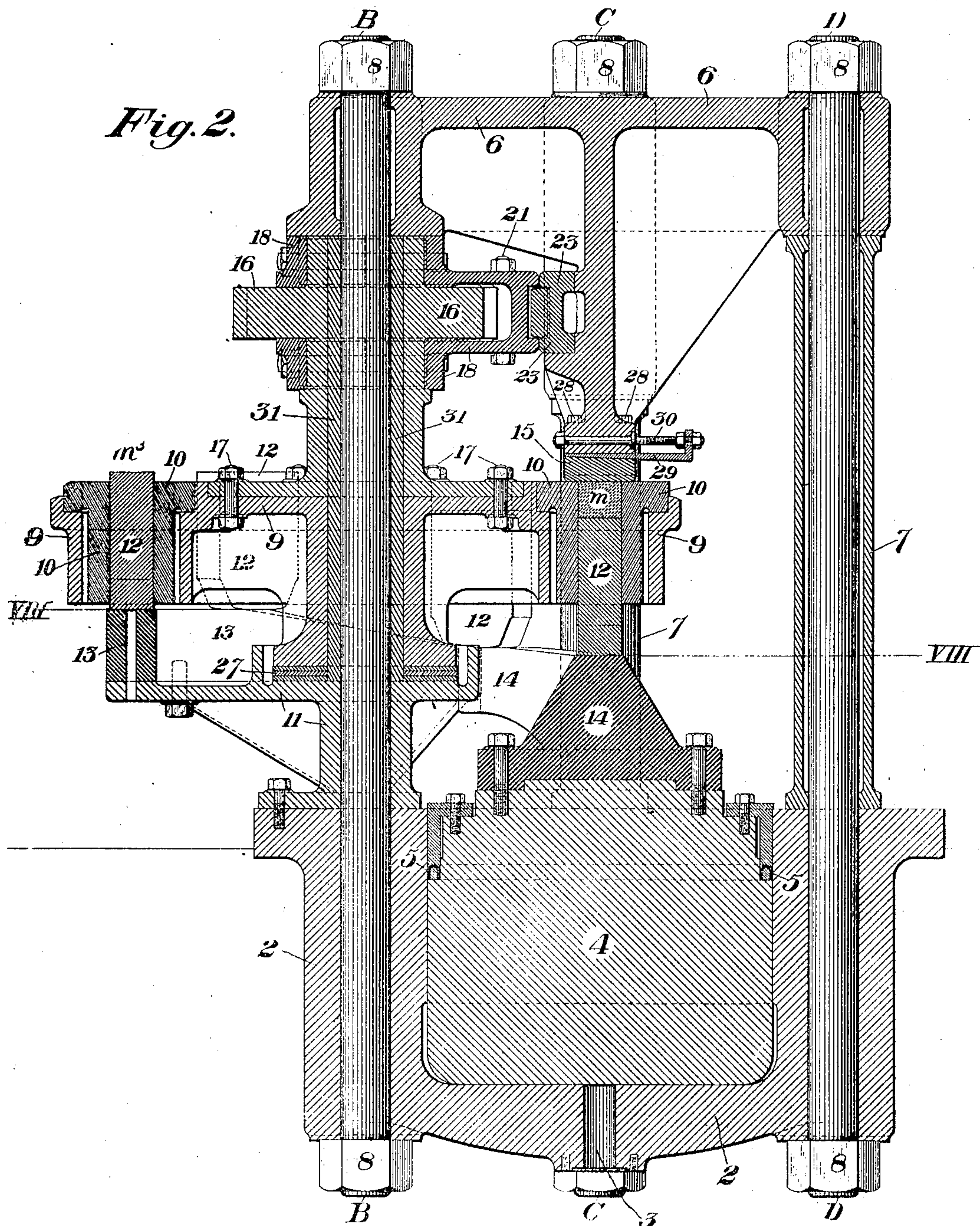
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WITNESSES.

James K. Batewell
Thomas W. Batewell

INVENTOR.

Henry Aiken

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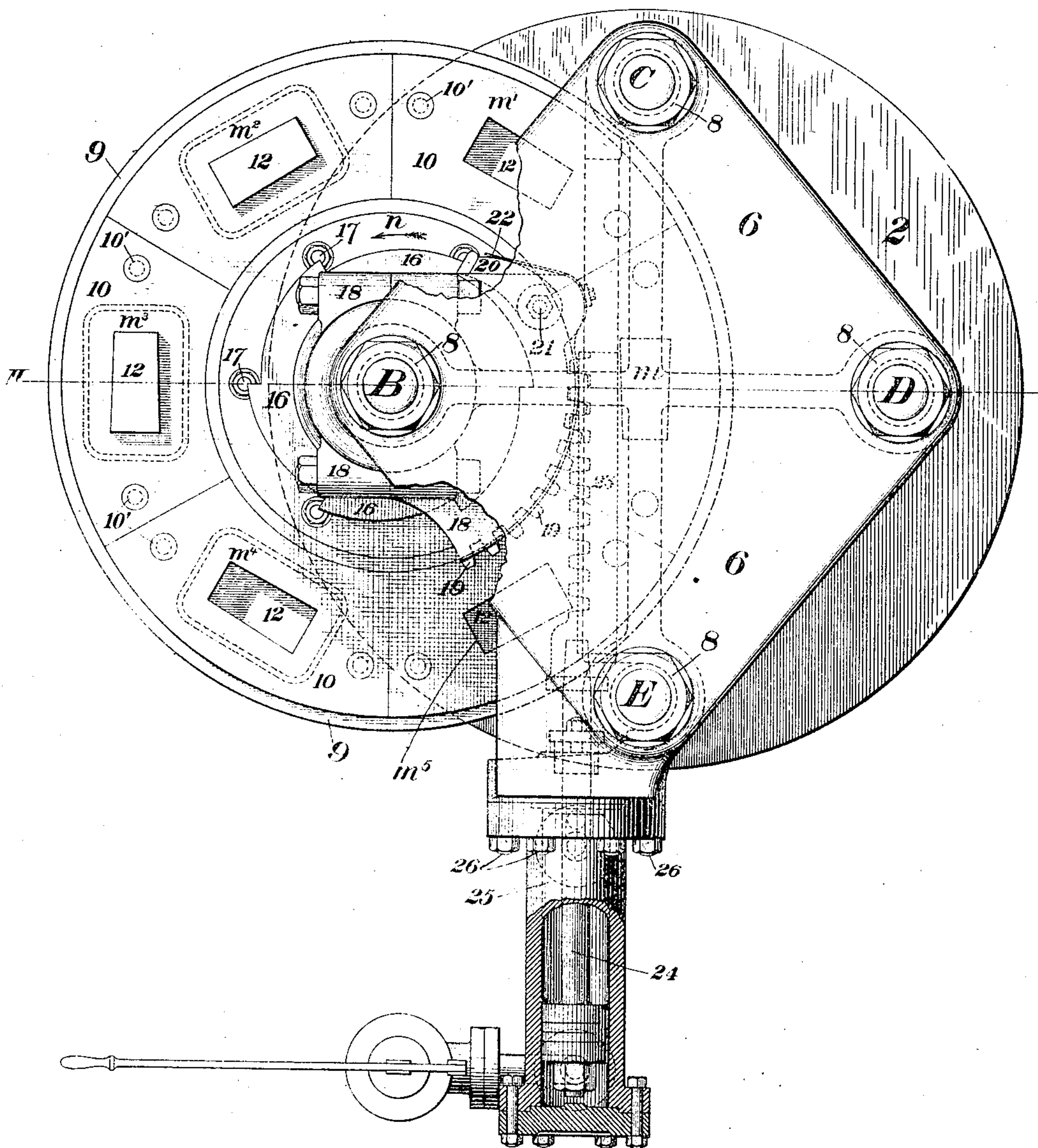
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Fig. 3



WITNESSES

Thomas W. Baxwell
James R. Baxwell

INVENTOR.

Henry Aiken

(No Model.)

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Fig. 6.

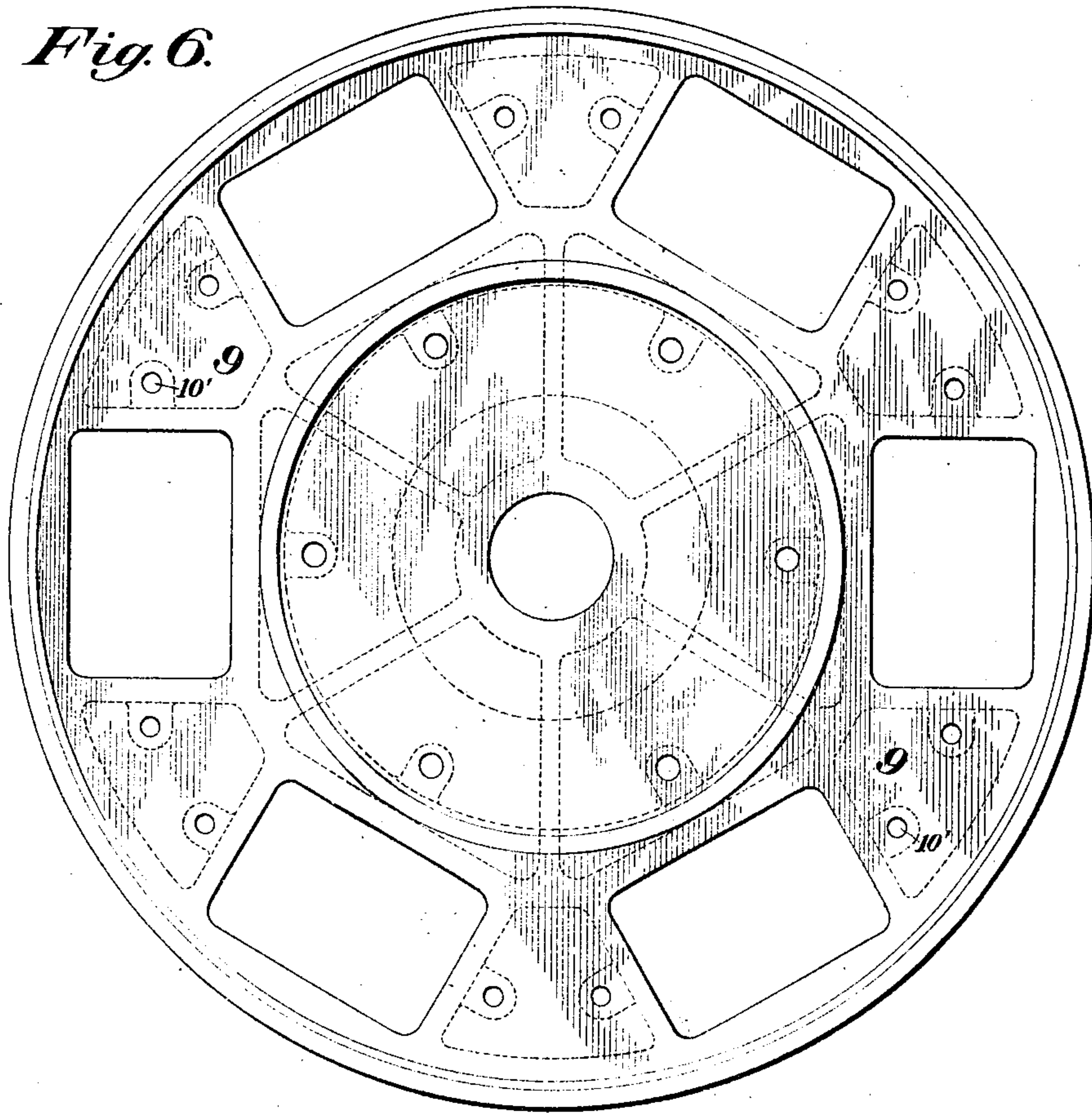
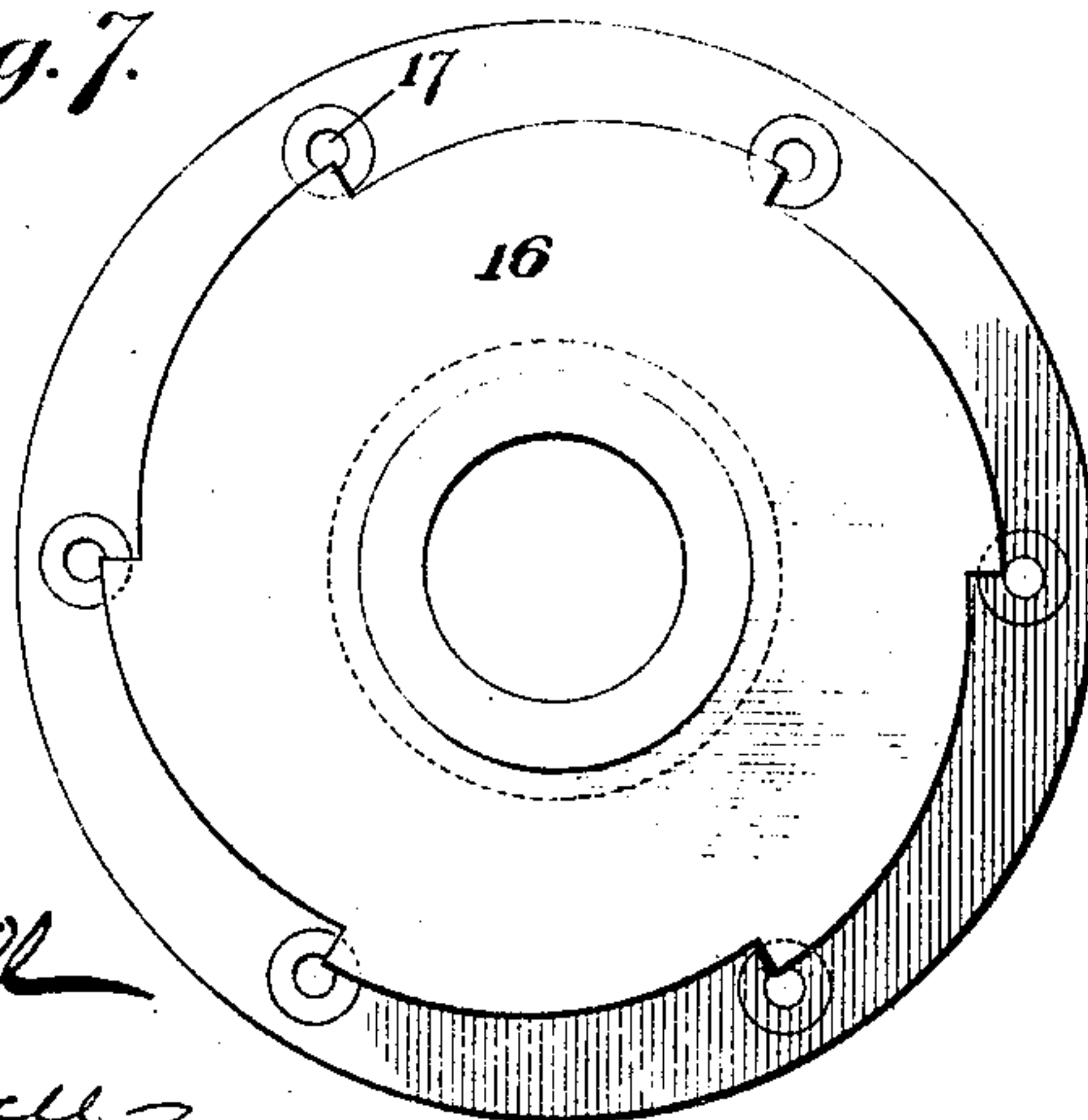


Fig. 7.



Witnesses

Thomas W. Baskett

James K. Baskett

Inventor

Henry Aiken

(No Model.)

5 Sheets—Sheet 5.

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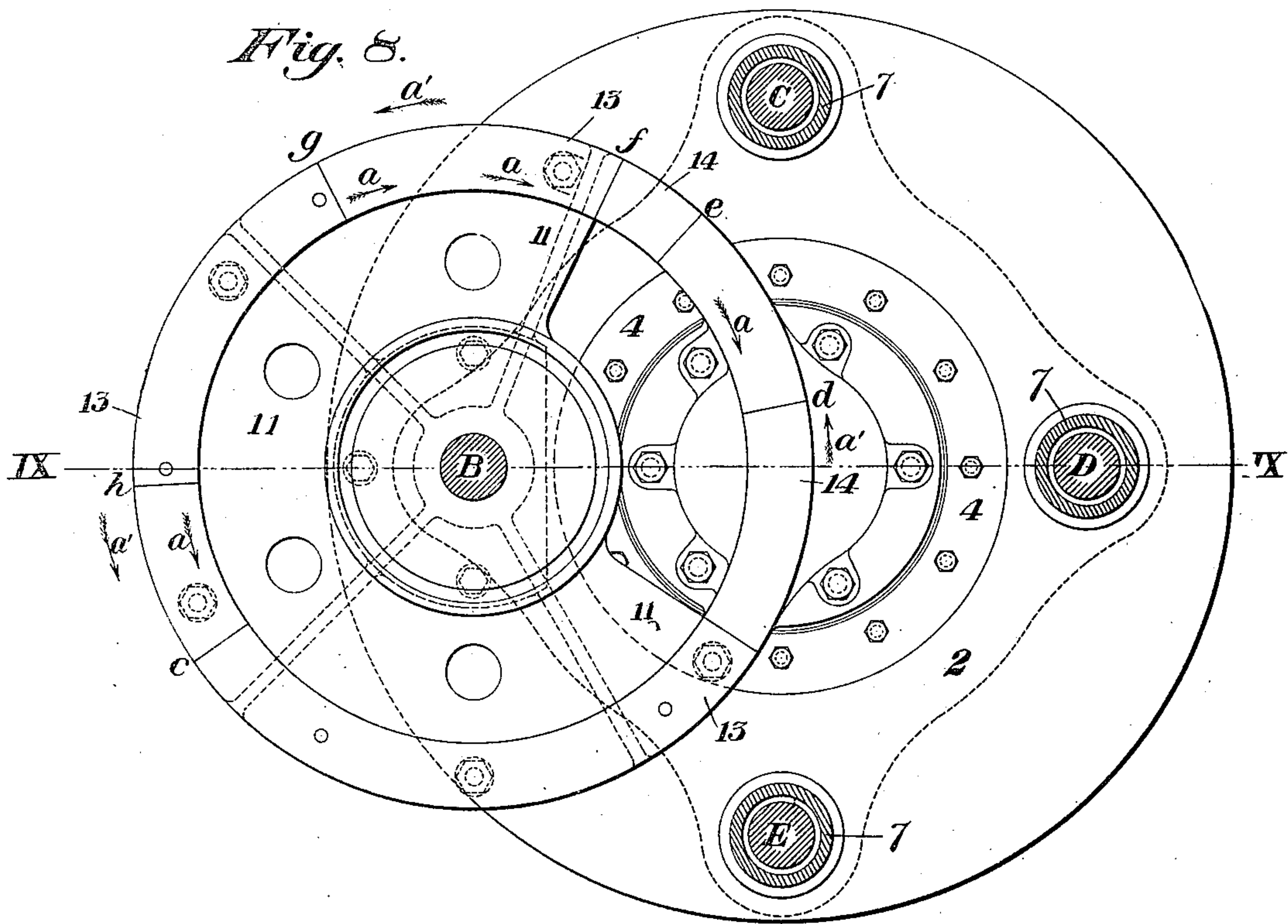
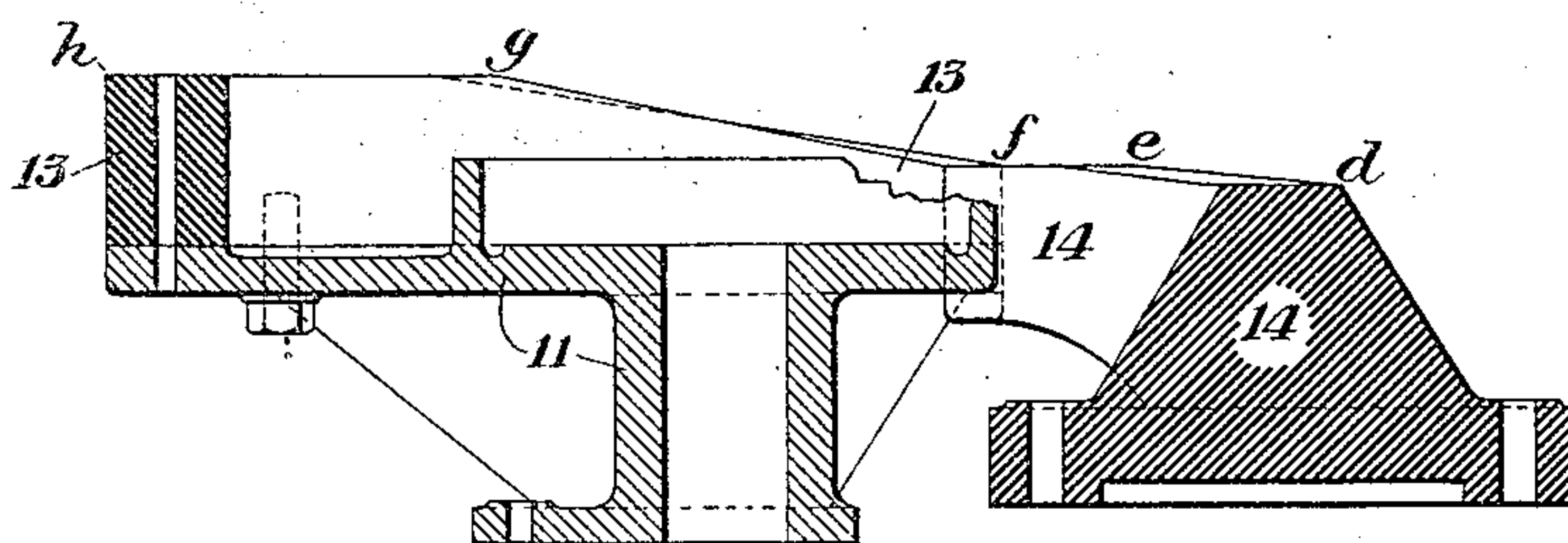


Fig. 9.



WITNESSES.

Thomas H. Baxwell
James H. Baxwell

INVENTOR.

Henry Aiken

UNITED STATES PATENT OFFICE.

HENRY AIKEN, OF HOMESTEAD, PENNSYLVANIA.

BRICK-MACHINE.

SPECIFICATION forming part of Letters Patent No. 459,878, dated September 22, 1891.

Application filed April 20, 1889. Serial No. 307,926. (No model.)

To all whom it may concern:

Be it known that I, HENRY AIKEN, of Homestead, in the county of Allegheny and State of Pennsylvania, have invented a new and useful
5 Improvement in Brick-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

10 Figure 1 is a front elevation of my improvement. Fig. 2, Sheet 2, is a vertical section on the line II II of Figs. 1 and 3. Fig. 3 is a plan view of the machine. Fig. 4 is an enlarged horizontal section of the mechanism for rotating the mold-wheel. Fig. 5 is an enlarged
15 plan view of the pawl-segment operated by the rack shown in Fig. 4. Fig. 6 is a plan view of the mold-wheel. Fig. 7 is a plan view of the ratchet-wheel operated by the pawl shown in Fig. 5. Fig. 8 is a horizontal section on the line VIII VIII of Fig. 2. Fig. 9 is a vertical section on the line IX IX of Fig. 8.

Like symbols of reference indicate like parts in each.

25 In the drawings, 2 represents the power-cylinder of the press, which forms the base of the machine and may be supported by a suitable flange, as shown in Fig. 2.

3 is the fluid-supply port, and 4 the ram, provided with suitable packing 5.

30 The frame-work of the press is constituted by upright rods or bolts B C D E, which pass through wings of the cylinder 2 and at their upper ends are provided with a cap-plate or entablature 6, which is supported from below
35 by tubular separators 7, interposed on the bolts C, D, and E between the entablature and the cylinder.

8 8 are nuts at the ends of the upright bolts
40 by which the parts of the machine are drawn and held together.

9 is the mold-wheel, made in circular form and adapted to rotate on the bolt B as an axis, as shown in Figs. 2 and 3. The wheel is in
45 structure a hollow frame, and is provided with a series of mold-matrices 10, securely bolted therein by bolts 10'. The base of the hub of the mold-wheel rests upon the surface of a frame 11, at the periphery of which is bolted
50 a block 13, which is formed in the segment of a circle whose center is the bolt B and serves as a guide for the plungers 12 of the mold-

matrices. These plungers are simple blocks made of substantially the same cross-section as the matrices within which they fit, their
55 bases projecting below the mold-wheel and resting on the surface of the guide 13. The frame 11 encircles the bolt B and at the base is bolted to the power-cylinder, as shown in Fig. 2. The guide 13 is not a complete circle in per-
60 ripheral outline, (see Fig. 8;) but the complete circle is made up by the head-piece 14 of the ram 4, which is of segmental form and fits within the gap of the guide. The complete guide 13
65 14 thus formed constitutes a circular track on which the bases of the plungers 12 travel during the rotation of the mold-wheel, and which is so inclined that it shall automatically effect the elevation of the matrix-plungers to
70 eject the compressed and molded bricks and shall permit their descent to enable fresh material to be charged into the matrices. Thus, referring to Figs. 2, 8, and 9, (in Fig. 8 of which the arrows *a* indicate the direction of
75 inclination, and the arrows *a'* the direction of motion of the mold-wheel,) the part *c d* of the guide, including part of the ram-head, is level, the part *d e* on the ram-head is inclined, the part *e f* on the ram-head is level, the part
80 *f g* is inclined, the part *g h* is level, and the part *h c* is inclined.

In the drawings I have shown the machine provided with six matrices, and by mechanism hereinafter described the mold-wheel is adapted to be rotated intermittently through-
85 out one-sixth of a revolution, so that at each partial revolution it shall bring one of the matrices upon the ram-head at the middle of the ram and directly beneath a stationary block 15 at the base of the entablature.

I shall now describe generally the operation of the machine in pressing bricks, and shall then describe particularly the mechanism by which the motions of the machine are effected. Suppose one of the matrices in the
95 mold-wheel to be directly above the ram in the position marked *m* in Fig. 3 and to be charged with the material from which the bricks are made. The fluid under pressure is now admitted into the cylinder 2, and the
100 ram is thus elevated, so as to raise the mold-plunger 12 and to cause it to compress the brick-stuff within the matrix against the base of the block 15. The ram is then retracted

by exhausting the motive fluid, and the mold-wheel is turned through a sixth revolution, so as to carry the matrix under consideration from beneath the block 15 into the position m' . In this motion the passing of the plunger over the inclined portion de raises the plunger somewhat in the matrix and partially ejects the compressed brick. The ejection of the brick may be aided by further raising the hydraulic ram slightly after the mold has passed the position m . This is very frequently necessary when great pressure is applied to the brick, since as a result of such pressure the brick may stick in the mold so tightly as to resist the upward force occasioned by the movement of the mold-plungers over the incline. The mold-wheel now remains at rest until another brick is pressed. Then a second sixth revolution carries the matrix first mentioned into the position m^2 , the plunger then resting on the incline fg . The next sixth revolution of the mold-wheel carries the matrix into the position m^3 , which is illustrated in Fig. 2, the plunger being now elevated on the flat portion gh to its highest position, so as to have ejected the brick, which is then removed. At the next sixth revolution the matrix-plunger, during the passage of the matrix over the incline hc into the position m^4 , descends to its lowest position, and when in such position the matrix is charged with brick-stuff. During the next two partial revolutions the matrix passes on the flat portions cd of the guide into the positions m^5 and m successively, and in the latter position is again in readiness to form a brick. This completes a cycle of operation of the mold-wheel, during which six bricks (the number corresponding to the number of matrices) are formed.

I shall now describe the mechanism by which the mold-wheel is rotated. 16 is a ratchet-wheel, which is mounted axially on the upright bolt B and is fixed to the mold-wheel by bolts 17 or otherwise. The shape in vertical section of this ratchet-wheel is shown in Fig. 2 and its shape in plan view is shown in Fig. 7. There are six teeth on the ratchet, corresponding in number to the matrices of the mold-wheel, and the pawl, which is adapted to engage said teeth, is carried by an annular collar 18, which loosely encircles the hub of the ratchet, being for this purpose made in separable parts, as shown in Fig. 5, and provided at its periphery with a segmental series of gear-teeth 19. The collar 18 is preferably made in the form of a hollow annular shell, as shown in Fig. 2, the toothed flange of which fits over the periphery of the ratchet-wheel, while the other portions of the collar fit around the hub of the ratchet on each side of the latter. The pawl 20 consists of an arm pivoted by a bolt 21 within the hollow flange 18 and provided with a spring 22, which tends to press its projecting outer end against the toothed periphery of the ratchet, as shown in Fig. 3. The ratchet is

operated by rotation of its collar 18 on its hub in the direction of the arrow n in Fig. 3, and the reverse rotation of the collar on the ratchet does not produce motion of the latter, but merely causes the pawl to slip idly over the ratchet-teeth. The rotation of the collar 18 is effected by means of a rack 23, which is supported by the entablature 6, so as to be free to move horizontally, as shown in Fig. 4. This rack is actuated by a piston 24 of a power-cylinder 25, which is suitably secured by bolts 26 or otherwise to the entablature or frame of the machine. If the valve of this cylinder be put into position to admit motive fluid to the rear of the piston and to project the latter to its full extent, the longitudinal movement of the rack 23 thereby produced rotates the collar 18 and by means of the pawl 20 produces a one-sixth revolution of the ratchet 16 and of the mold-wheel to which the ratchet is secured, and by admitting the motive fluid to the forward side of the piston, and thereby retracting it and the rack-bar, the collar 18 is caused to rotate idly on the ratchet and to retract the pawl into position for engagement with the next tooth of the ratchet, as will be readily understood.

The valves by which the fluid-supply to the pressure-cylinder and to the motor-cylinder 25 is governed are situated in a convenient place, so as to be under the control of one man.

I shall now describe certain details of construction of the machine which increase its efficiency and ease of operation. A tubular lining or sleeve 31 is preferably interposed between the bolt B and the hubs of the ratchet and mold-wheel, bearing at one end on the under side of the entablature and at the other end on the surface of the block 11. The mold-wheel is adjusted vertically in proper position by means of annular washers or liners 27.

In order that the bricks may be properly formed by the machine, it is necessary that the block 15, against which they are pressed, should fit neatly on the surface of the matrices. For this purpose I employ the adjusting mechanism illustrated in Fig. 2. The block 15 is secured to the under side of the entablature by means of vertical bolts 28, and to adjust the block vertically I employ a wedge-shaped plate 29, which fits between the block and the entablature and is connected to the latter by means of a horizontal bolt 30, which projects from the entablature and passes through a head at the end of the wedge-plate. By turning the bolt 30 the wedge-plate may be projected or retracted to permit vertical motion of the block 15 in either direction, and when properly adjusted by these means the block may be locked in position by tightening the bolts 28.

The construction of the entablature by which it is caused to serve as a support for the rack 23 and as a resistance piece or frame against which the brick is pressed is shown

in the several figures of the drawings. It consists of a strong metal plate provided with collars adapted to fit on the heads of the bolts B C D E and provided with vertical strengthening webs or ribs radiating from the center of the plate to said bolts.

The advantages of my invention will be appreciated by those skilled in the art.

The machine may be varied in many ways by the skilled mechanic without departing from the principles of my invention, the items of which are stated distinctly in the following claims.

By means of the machine which I have shown very great pressure can be exerted upon bricks in the mold-matrices and bricks of great density of composition can be produced.

I claim—

1. In a brick-machine, the combination of the rotatory mold-wheel having matrices and plungers, the reciprocating hydraulic ram, a cylinder in which the ram moves and which forms the base of the machine, and a guide for the plungers, part of said guide being on the machine-frame and part on the ram, substantially as and for the purposes described.

2. In a brick-machine, the combination of the reciprocating pressure-motor comprising a cylinder, ram, and an entablature, bolts connecting them, a mold-wheel carrying plungers, and a guide for the plungers mounted axially on one of the bolts and supported by the cylinder, substantially as and for the purposes described.

3. In a brick-machine, the combination, with the pressure-motor consisting of cylinder and ram, of a cap or entablature against which the pressure of the machine when in action is exerted, bolts or rods connecting the same with the stationary element of the motor, and a mold-wheel mounted axially on one of said bolts or rods, and supported by the

cylinder, substantially as and for the purposes described.

4. In a brick-machine, the combination, with the pressure-motor consisting of cylinder and ram, of a cap or entablature against which the pressure of the machine when in action is exerted, bolts or rods connecting the same with the stationary element of the motor, a mold-wheel, and a power-cylinder mounted on the entablature and adapted to rotate the mold-wheel, substantially as and for the purposes described.

5. In a brick-machine, the combination, with a rotatory mold-wheel, hydraulic-pressure cylinder, and ram, of a ratchet secured to the mold-wheel, and a pawl loosely mounted on the ratchet, and mechanism for actuating the pawl, substantially as and for the purposes described.

6. In a brick-machine, the combination, with a rotatory mold-wheel, of a ratchet-wheel, having a hub secured to the mold-wheel, and a rotatory pawl-collar mounted on the ratchet-wheel, substantially as and for the purposes described.

7. In a brick-machine, the combination, with a rotatory mold-wheel, of a ratchet secured thereto, a pawl loosely mounted on the ratchet, gear-teeth connected with the pawl, and a toothed rack, substantially as and for the purposes described.

8. In combination with the ratchet-wheel, a pawl-collar made in two or more parts, said pawl-collar being hollow or double, so as to fit on the ratchet-wheel on both sides and over a part of the periphery thereof, substantially as and for the purposes described.

In testimony whereof I hereunto set my hand this 12th day of April, A. D. 1889.

HENRY AIKEN.

Witnesses:

W. P. POTTER,
JNO. K. SMITH.