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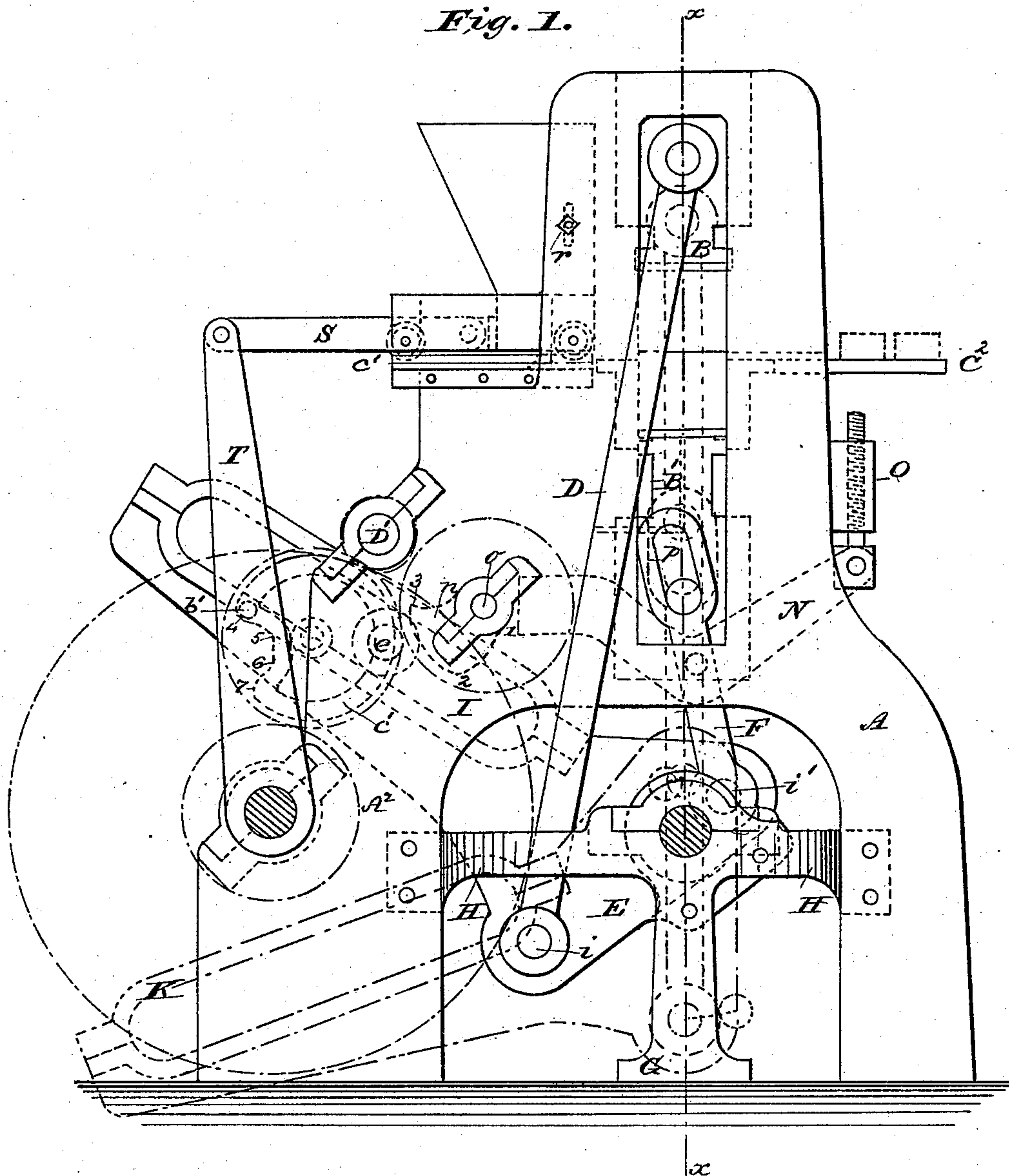
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W. ANDRUS.  
BRICK MACHINE.

No. 286,892.

Patented Oct. 16, 1883.

*Fig. 1.*



Witnesses:

*T. C. Brecht,*  
*E. S. Emmons.*

*Inventor:*

*William Andrus,*  
*By S. H. Ginsbaugh*  
*Attorney.*

(No Model.)

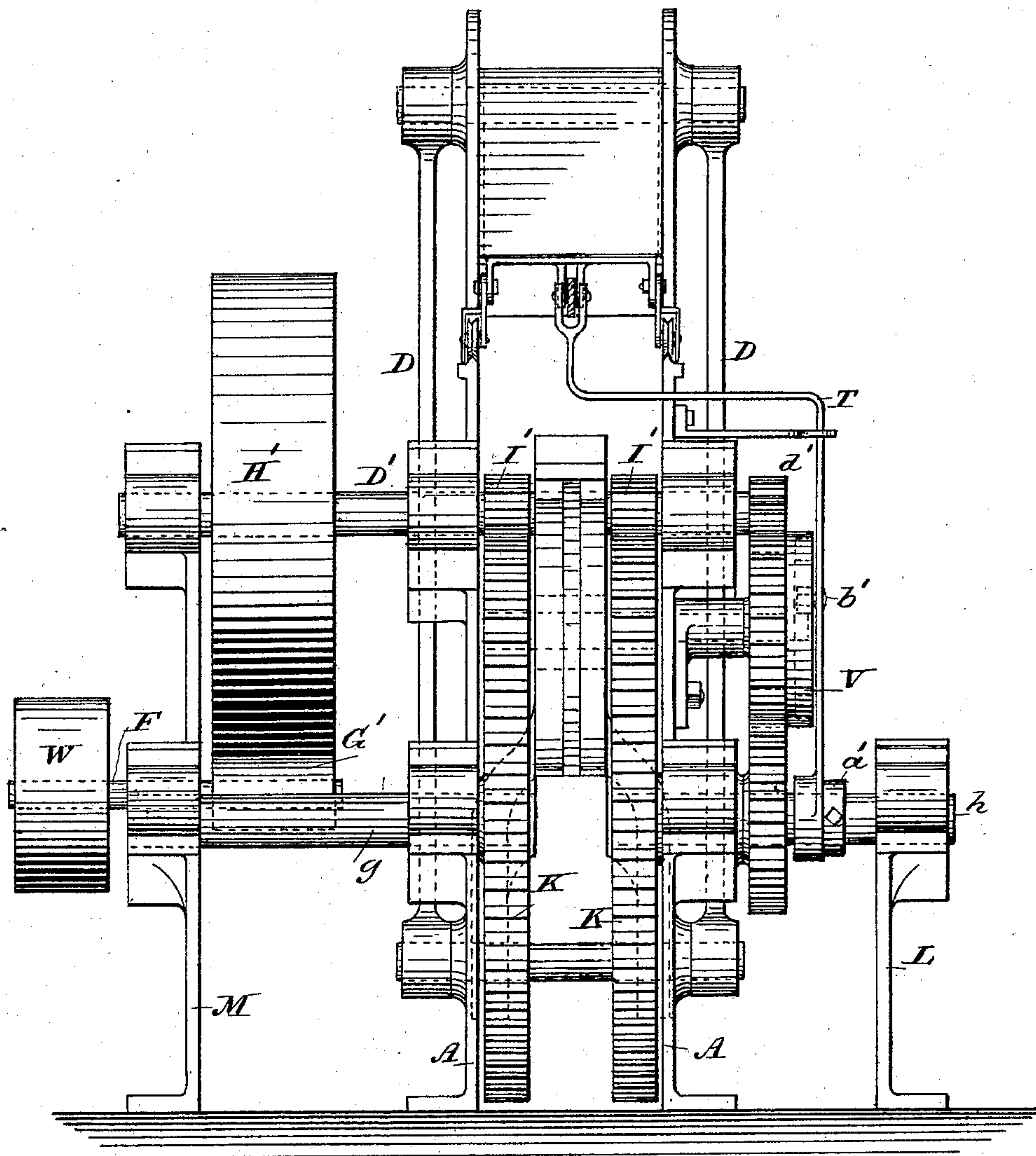
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W. ANDRUS.  
BRICK MACHINE.

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Patented Oct. 16, 1883.

*Fig. 2.*



Witnesses:

*J. C. Brecht,*  
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*William Andrus,*  
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(No Model.)

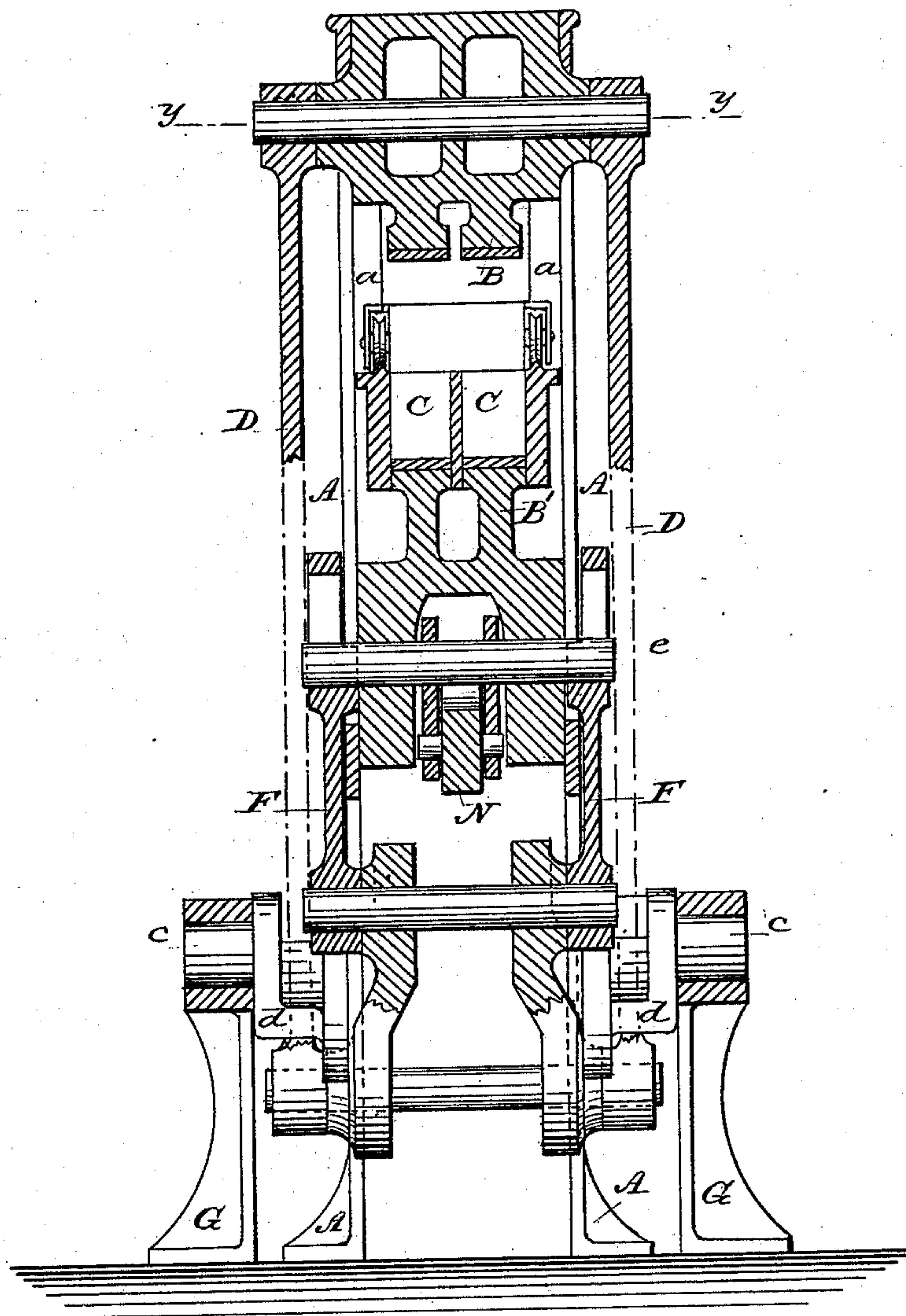
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W. ANDRUS.

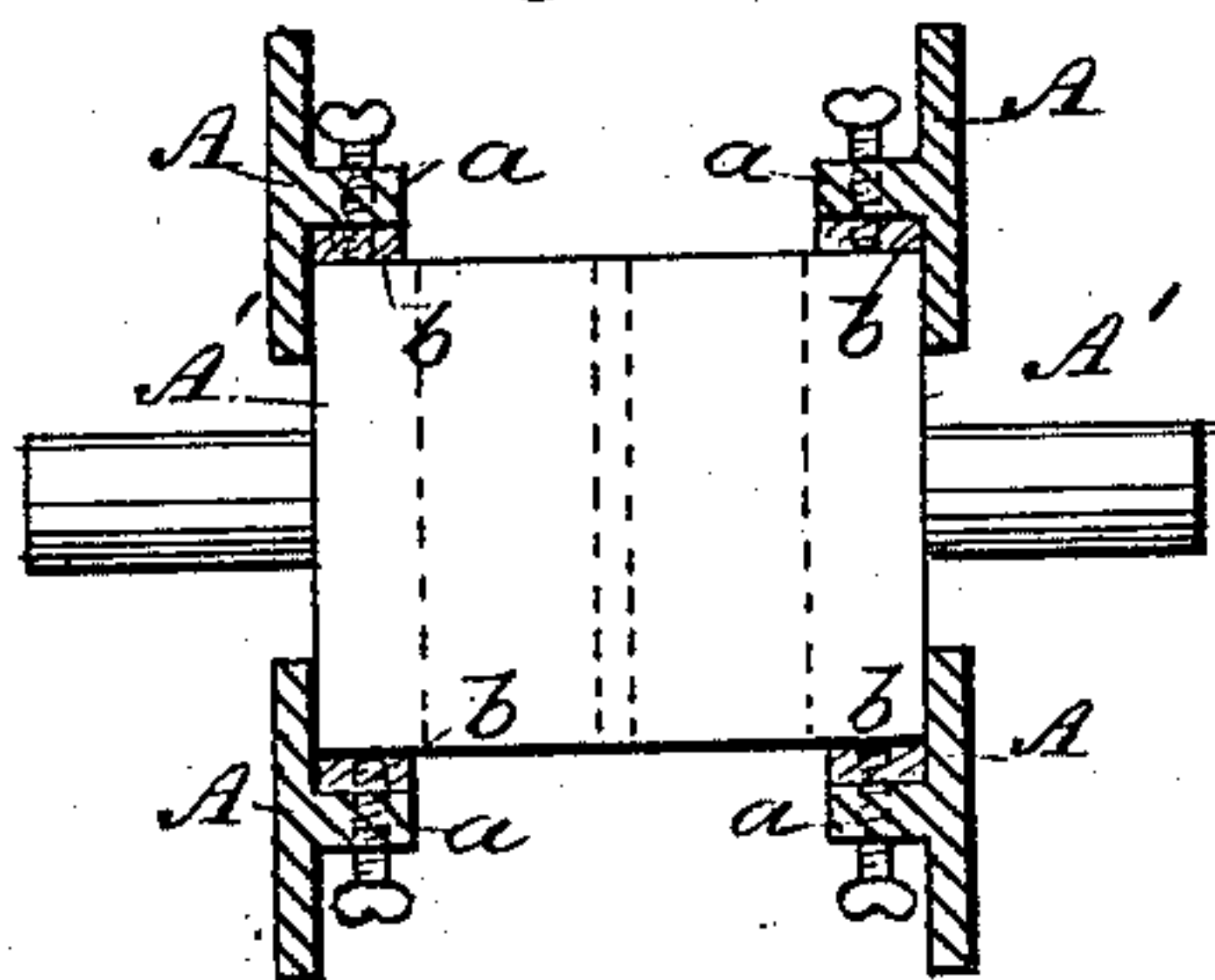
BRICK MACHINE.

No. 286,892.

*Fig. 3.* Patented Oct. 16, 1883.



*Fig. 4.*



Witnesses:

*J. C. Brecht,*  
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*Inventor:*

*William Andrus,*  
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(No Model.)

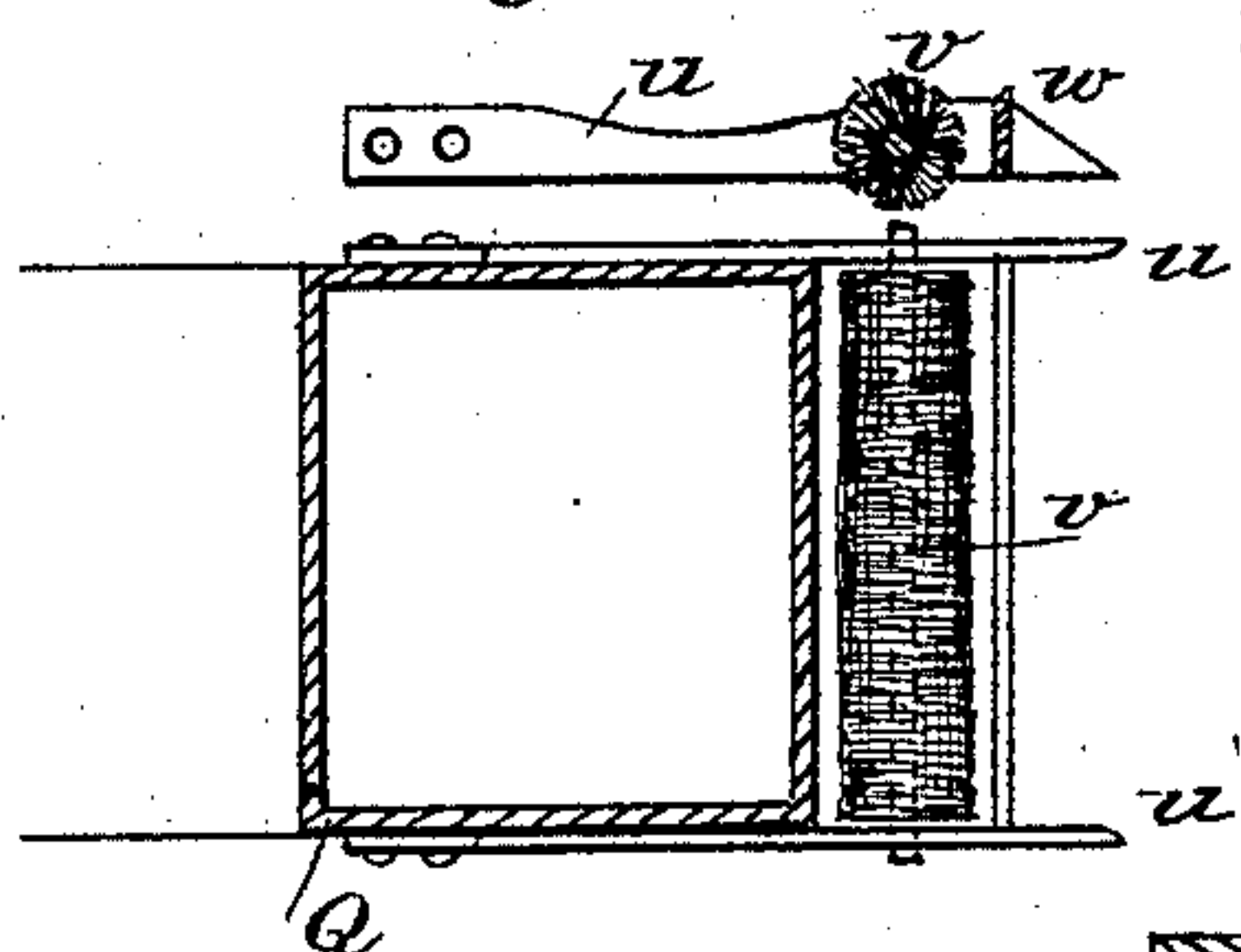
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W. ANDRUS.  
BRICK MACHINE.

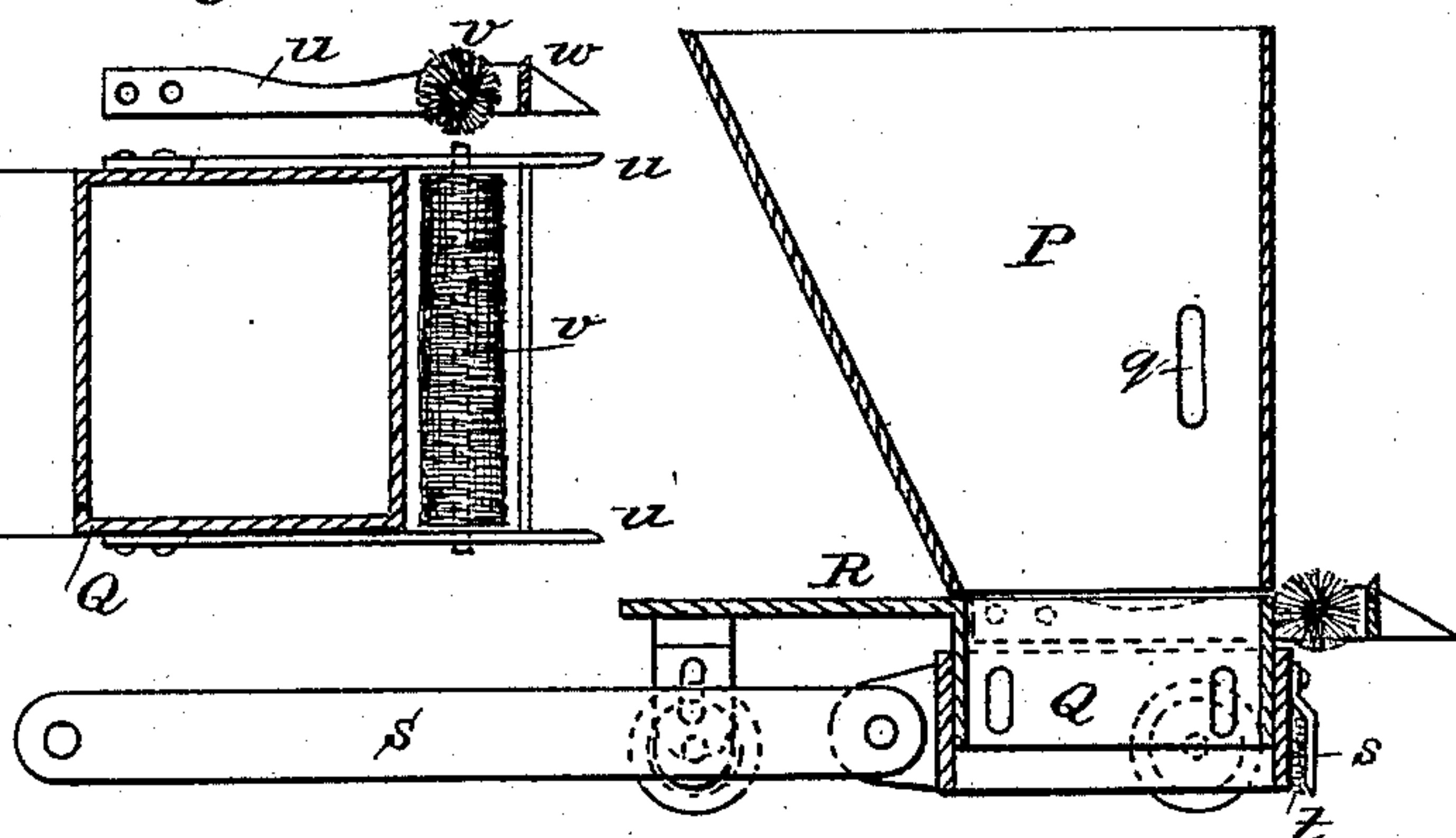
No. 286,892.

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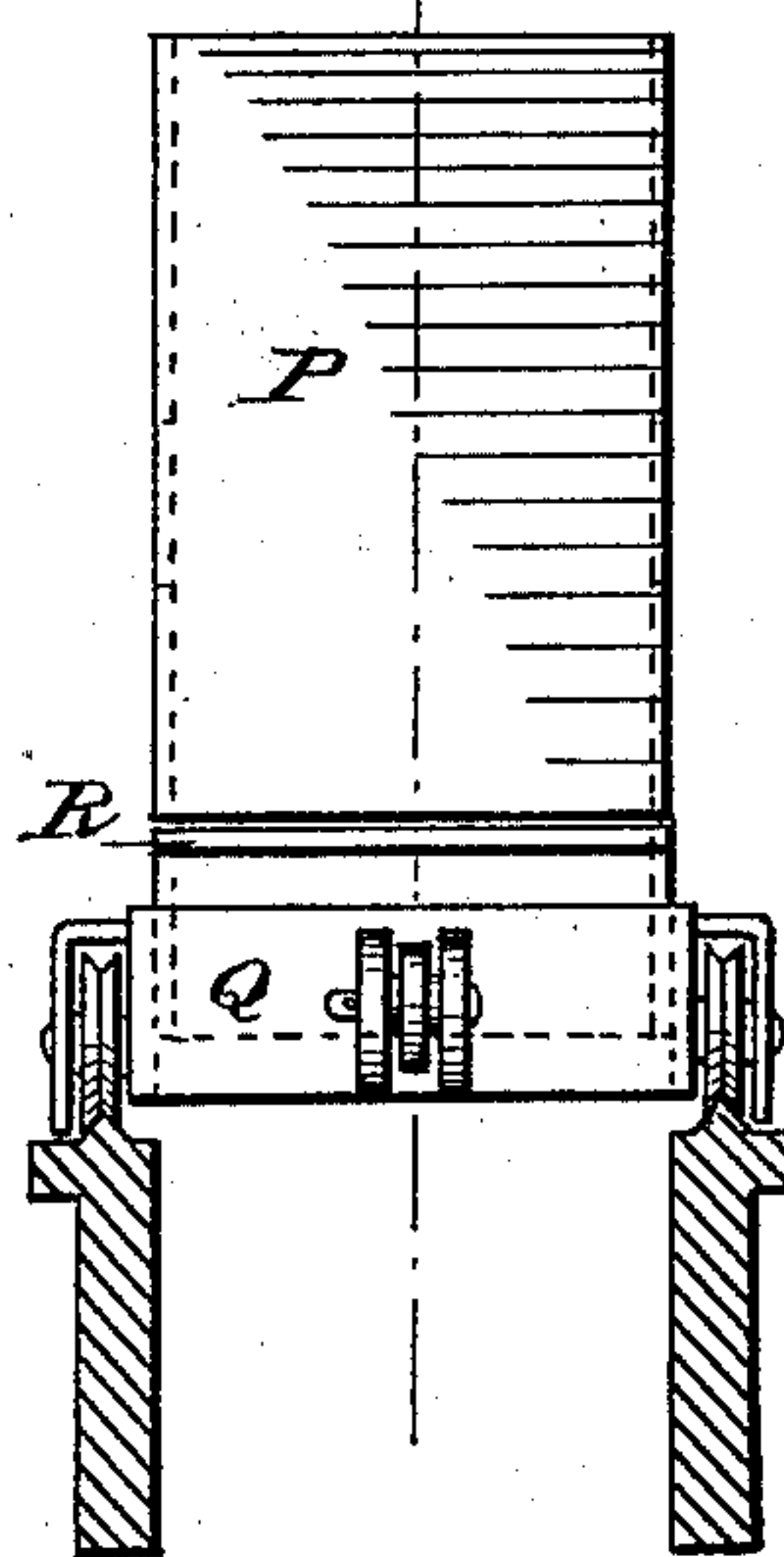
*Fig. 7.*



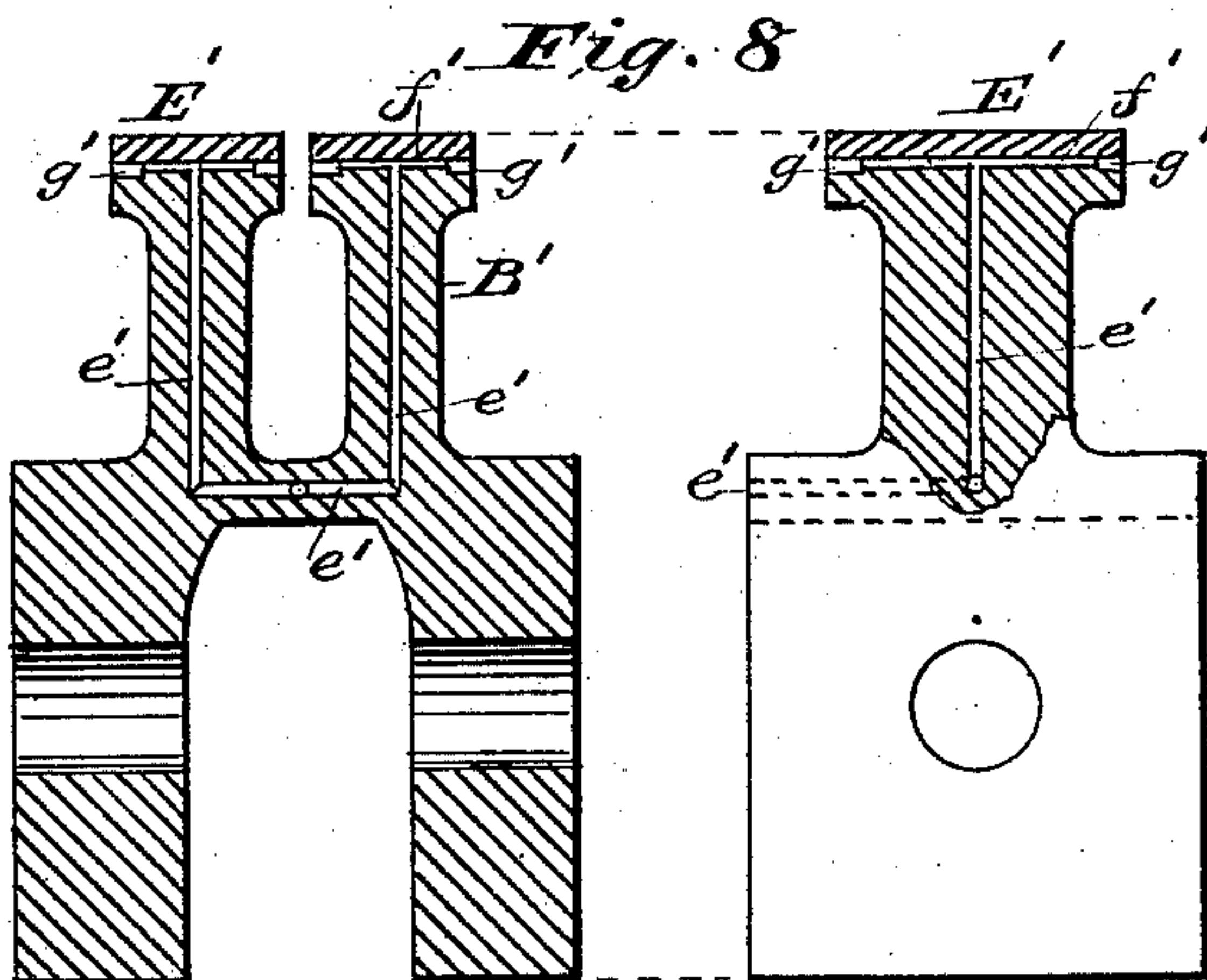
*Fig. 5.*



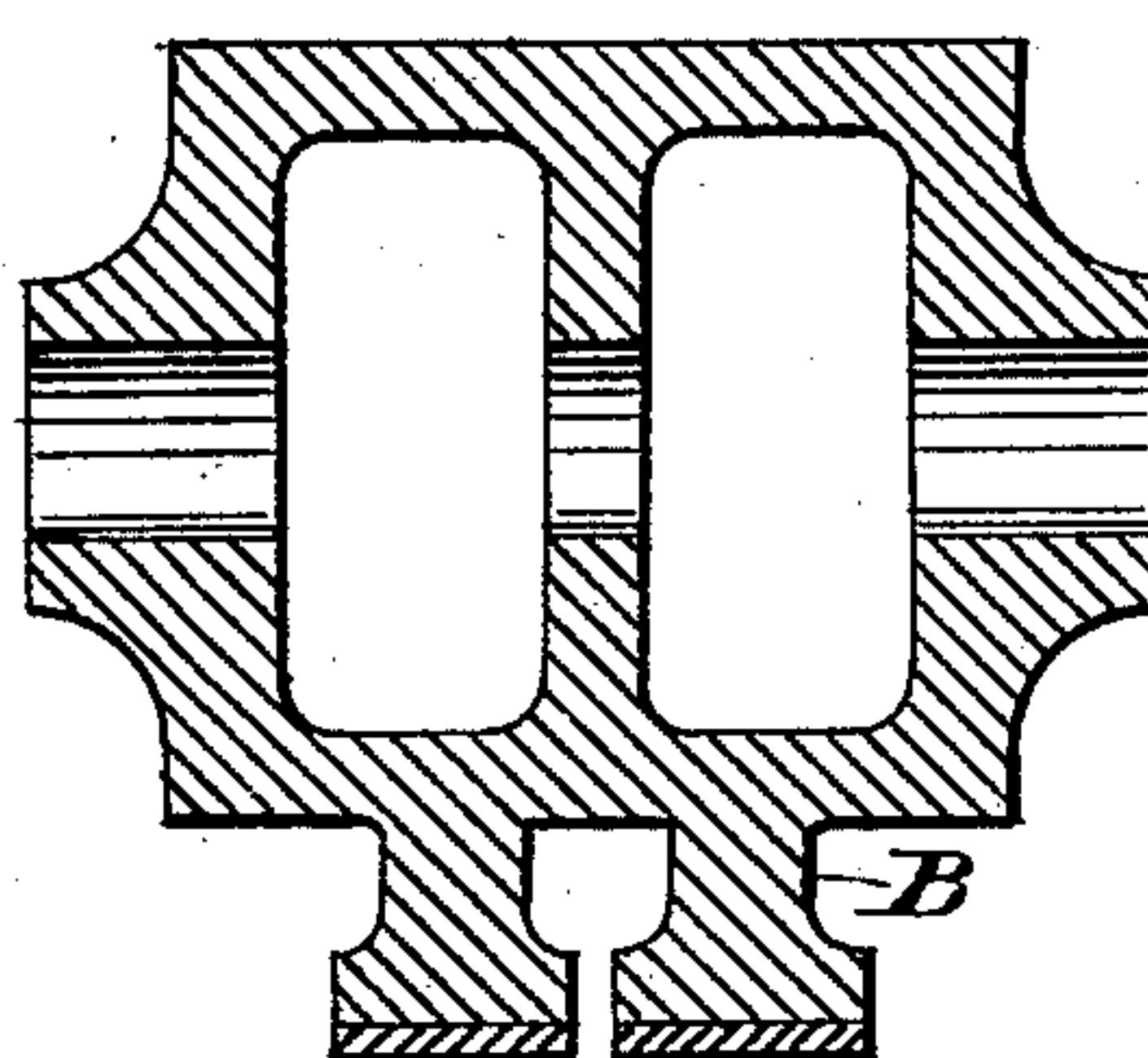
*Fig. 6.*



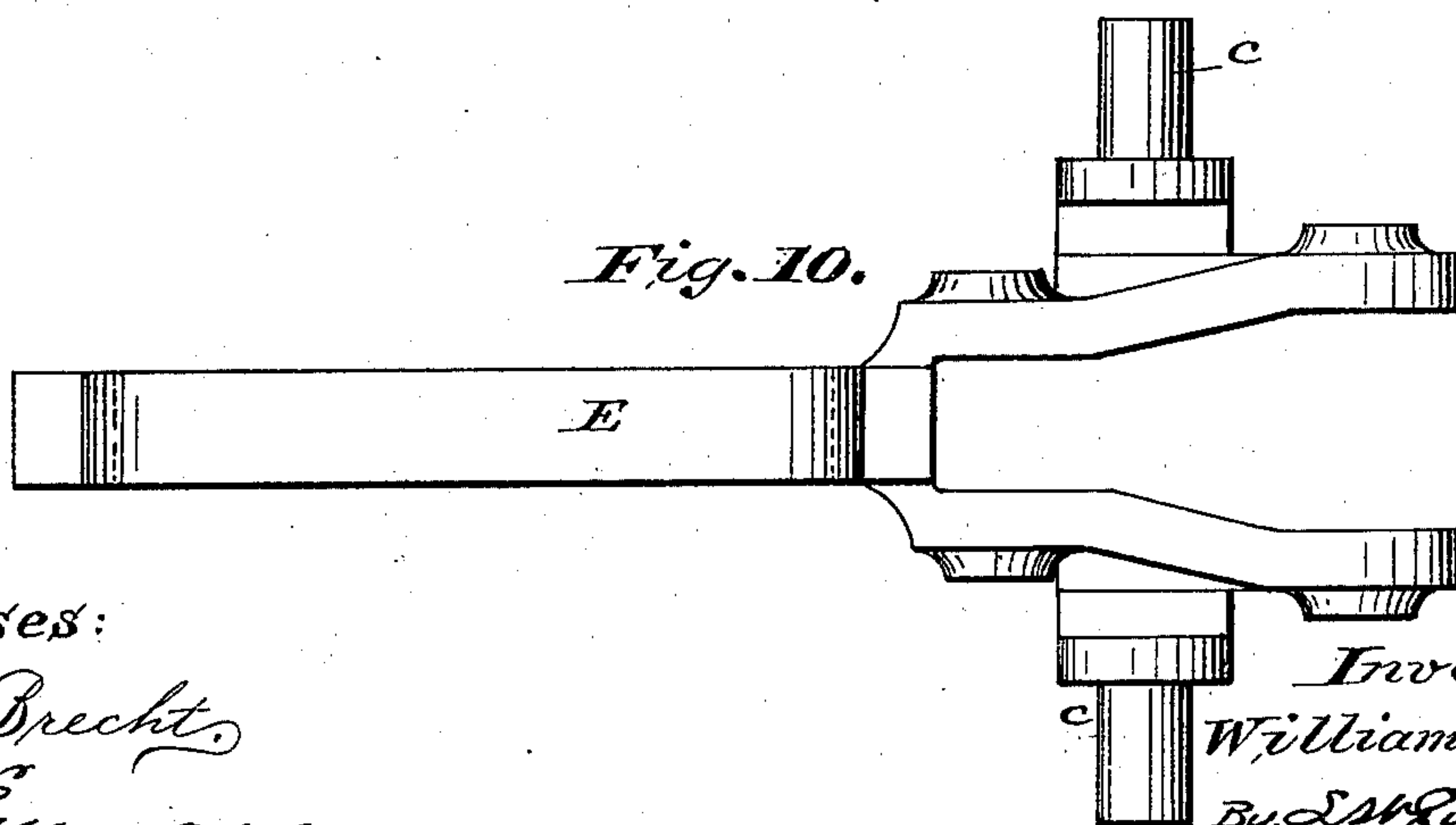
*Fig. 8.*



*Fig. 9.*



*Fig. 10.*



Witnesses:

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# UNITED STATES PATENT OFFICE.

WILLIAM ANDRUS, OF KEOKUK, IOWA.

## BRICK-MACHINE.

SPECIFICATION forming part of Letters Patent No. 286,892, dated October 16, 1883.

Application filed September 17, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM ANDRUS, a citizen of the United States, residing at Keokuk, in the county of Lee and State of Iowa, have invented certain new and useful Improvements in Brick-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to improvements in what are known as "dry-clay brick-machines," and is designed as an improvement on that class of machines for which Letters Patent were granted to me November 14, 1882, No. 267,392.

The object of my invention is to dispense with the rotary mold-wheel, as embraced in my patent heretofore referred to, for the reason that it consumes an unnecessary amount of time and power in the frequent stopping and starting of the mold-wheel, in order that the plungers can be brought into play, and also to locate as much as possible all bearings and axles at one side and not under the mold, whereby the dirt and grit is not so liable to get into the bearings and axles, and obviate in a great measure the rapid wearing and loosening of the parts.

My invention consists in a lever of peculiar construction, to which the rods for operating the upper and lower compression-plungers are secured, said lever being operated to throw the rods past the point at which they produce the greatest pressure on the brick, thus momentarily relieving the brick from pressure, by the slight withdrawal of the plungers in order to permit of the escape of air from the brick and mold, then returning the rods back to the point of greatest compression, whereby the bricks have two separate and distinct pressures given to them, and an interval of rest to permit the escape of air, and thus produce a brick uniform and homogeneous in all its parts.

My invention consists, further, in providing the connections of the under pressure-plunger with slots which admit of the plunger being carried up by means of a pivoted and adjustable arm or lever, to expel the newly-formed brick from the mold and hold the plunger in an elevated position until the brick has been removed, the upper surface of the

plunger oiled, and the mold-filler brought into position for depositing the clay in the mold.

My invention consists, further, in providing a measure or mold-filling device which is capable of being adjusted to meet the requirements of the different kinds of clay, and also to regulate the amount of clay for making bricks of different sizes.

My invention consists, further, in so timing the movement of the mold-filling device that it shall have a short period of rest when brought over the mold-cavity, in order that the clay will have sufficient time to fall into the mold-cavity.

My invention consists, further, in certain details of construction which will be more fully described and claimed hereinafter.

Figure 1 is a side elevation of my improved brick-machine. Fig. 2 is an end view. Fig. 3 is a sectional view on the line *xx* of Fig. 1. Fig. 4 is a sectional view on the line *yy* of Fig. 3. Fig. 5 is a sectional view of the feed or clay hopper, mold-filling boxes, cut-off, and carriage, taken on the line *zz* of Fig. 6. Fig. 6 is an end view of the clay-hopper and mold-filling devices. Fig. 7 is a top or plan view of the clay-hopper, showing the oiling brush or cylinder and the scraper for cleaning and oiling the pressing-surface of the upper plunger. Fig. 8 is a sectional view of the lower plunger, showing the oiling ducts or passages. Fig. 9 is a sectional side view of the upper plunger. Fig. 10 is a top or plan view of the eccentric-lever which operates the upper and lower plungers.

Referring to the drawings, *A A* are the castings which form the sides of the machine, and are secured to a suitable base, so as to give strength and rigidity to the machine, while the sides *A* are connected together or braced at suitable intervals in any desirable manner.

The sides or frames *A* are provided with slots or openings *A'*, which admit of a free vertical movement of the trunnions to which the plunger-operating devices are attached. The sides *A* are provided with inwardly-projecting flanges *a*, which serve as guides or ways to steady and direct the plungers, while suitable gibs or filling-pieces, *b*, made adjustable by suitable set-screws, serve to compensate for the wear on the plunger-heads, and



keep them in proper alignment with the mold-cavity and in good working condition.

B is the upper and B' is the lower compression-plunger, which are operated by devices 5 which will be fully described hereinafter.

C C are the molds, which are rigidly secured between the side frames, A, and to one side of which is secured a plate or table, C', which serves as a bottom and also as a guide for the 10 mold-filling box.

C<sup>2</sup> is a table secured to the frame on the opposite side of the molds, on which the finished brick is pushed by the forward movement of the mold-filler.

15 D D are rods, which connect the upper plunger with the operating-lever E, and F F are bars or links, which connect the lower plunger with the same operating-lever.

E is the main operating-lever, which is 20 mounted eccentrically in the supports G, said supports being stayed or connected to the main frame or sides of the machine by the wings H. The lever E is essentially of the same construction as the lever shown, described, and 25 claimed in my patent heretofore referred to, and is operated in substantially the same manner. As before stated, the lever E is mounted in the supports G on the trunnions *c*, which are cast or otherwise secured to the brackets 30 *d*, forming a part of said lever. The outer end of said lever is provided with a slot, I, through which a pitman, *e*, passes, said pitman being provided with a friction-wheel, *f*. The outer ends of the pitman or bolt *e* are secured to the cog-wheels K, each cog-wheel K 35 being supported on separate axles *g* and *h*, mounted in the frame and in the standards L and M, so as to permit the lever to pass up and down between them in their revolution, thus raising and lowering the outer end of the 40 lever.

The cog-wheels K K are driven by pinion-wheels I' I', mounted on the main driving-shaft D'.

45 The inner end of the lever E is of peculiar construction, and is mounted or pivoted eccentrically, as shown. The bars D, which connect the upper plunger with the lever E, are pivotally secured to the lower edge of said 50 lever at *i*, while the rods or links which connect the lower plunger with the lever E are similarly secured to the upper edge of the lever at *i'*.

It will be seen that by depressing the outer 55 end of the lever E, as shown in dotted lines in Fig. 1, the plunger B will be depressed and the plunger B' will be raised to press and compact the clay within the molds.

It will be noticed that when the links and 60 rods D and F lie in the same vertical line the point of greatest compression has been reached, and by a further depression of the outer end of the lever E the rods are thrown beyond the vertical line, thus slightly and 65 momentarily relieving the partially-formed brick from the pressure of the plungers, which permits the air to escape from the mold, and

that by the upward movement of lever E the same point of greatest compression is again reached, and the brick subjected to a second 70 and final pressure, which has the effect of producing a very firm, compact, and well-formed brick, which will not be liable to crack in the process of burning.

The brick having been formed by the operation of the devices just described, I will now 75 proceed to describe the devices by which the brick is ejected from the mold.

N is a bent lever, one end of which is pivoted to a screw-bolt, K, and adapted to be adjusted 80 up and down in the bracket O. The lever N, by means of the plates *m*, is secured to the bolt *l*, by which the lower plunger is connected to the links or bars F, while the free end of the lever N projects over into the path of the cam 85 *n*, secured to the shaft *o*, and by which it is raised, carrying with it the lower plunger, which ejects the brick from the mold, the slots *p* in the links or bars F permitting this further upward movement of the plunger. 90

It will be noticed that the upper and lower plunger in their upward movement move together, holding the newly-formed brick between them until the brick is out of the mold, when the upper plunger readily parts from 95 the brick without distorting, blistering, or injuring it, as is the case when the plungers are withdrawn from the brick while in the mold, the damage being done by the force of suction, as is well known. 100

The lever N is raised with the lower plunger by the links or bars F until the compression on the brick has been exerted, when the cam 105 *n* comes in contact with the inner end of the lever N, and raises the lower plunger up to the top of the mold, and holding it there until the mold-filler has taken its position over it, when the bar N is released from the upward pressure of the cam by coming in contact with 110 the reverse or concave side of said cam, and the lower plunger is permitted to return to the bottom of the mold, while the clay from the mold-filler follows the plunger down and fills the mold-cavity evenly and uniformly. That portion of the cam *n* from 1 to 2 raises 115 the end of the lever and the lower plunger to the top of the mold, and while the lever N is traversing the portion of the cam from 2 to 3 the plunger B' is held in a state of rest while the mold-filler is making its forward movement, which pushes the newly-made brick on 120 to the table C<sup>2</sup>, and scrapes and oils the upper surface of the lower plunger, as will more fully appear.

I will now proceed to describe the mold- 125 filling devices.

P is the hopper, into which the finely-powdered and disintegrated clay is placed, while Q is the measure or mold-filling box, adapted to be slid back and forth on ways underneath 130 and in close proximity to the bottom of the hopper. The filler Q is provided with an extension, R, which closes the bottom of the hopper during the forward movement of the



mold-filler, thus preventing the escape of clay from the hopper.

The mold-filler Q is composed of two square or rectangular frames of different sizes, so that one will fit within the other, and adapted to be adjusted therein by means of slots and set-screws, or by other convenient means, so that the holding capacity of the mold-filler can be changed to suit the different qualities of clay or to measure the clay for bricks of different sizes. This is an important feature of my invention and one of great practical utility, as I am enabled at all times to put the exact quantity of clay in the mold, and an over or under charge of clay, which is more or less injurious to the pressing mechanism, is obviated, and as a result bricks of uniform size and density are produced. The hopper P is also made adjustable to conform to the adjustment of the filler-box by means of slots *q* and screw-bolts *r*, secured in the frames or sides A of the machine.

To the front end of the mold-filling box Q is secured a knife or scraper, *s*, which pushes the newly-formed brick from off the lower plunger and removes any clay which may have adhered thereto, while an oiling-pad, *t*, located in the rear of the scraper *s*, serves to oil the upper surface of the lower plunger.

*u u* are spring-arms, secured to the sides of the mold-filler, in which is secured the lubricating or oiling roller *v* and scraper *w*, for cleaning and oiling the lower or pressing surface of the upper plunger. The spring-arms are beveled at their front ends, so they will slide under the upper plunger in its upward movement, and by the force or tension of the spring-arms be held against the plunger until the back-and-forth movement of the filler has been made.

To the rear end of the filling box or boxes Q is secured a bar, S, which in turn is secured to a bent lever, T, the lower end of which encircles the shaft *h*, and is held in position by means of a collar, *a'*, which is secured to the shaft *h* by a set-screw. The lever T is provided with an anti-friction stud or projection, which engages with a cam-slot, *c'*, formed in the side of the pinion-wheel V, said pinion-wheel being driven by a spur-wheel, *d'*, on the main driving-shaft D'.

The operation of moving the mold-filler forward to deposit the clay in the mold and return it again for a fresh charge of clay is effected by means of the cam-groove *c'*, acting on the stud *b'* of the lever T, the operation of which I will now describe in detail.

While the stud *b'* of the lever T is traversing that portion of the cam-groove between the points 4 and 5, the mold-filler is thrown forward over the mold-cavity, and in traversing the cam-groove from 5 to 6 the mold-filler is at a state of rest. The lower plunger now takes its place in the bottom of the mold-cavity. This momentary pause of the mold-filler permits the clay to fall into and fill the mold in a uniform manner. The filler is now returned

to its former position by the stud traversing the space in the cam-groove between the points 6 and 7, and while the stud is traversing the remaining portion of the cam-groove *c'* the filler-box remains under the hopper and receives its charge of clay.

I have already described the devices by which the pressing-faces of the plungers are cleaned and lubricated. I will now describe the devices by which the sides of the mold are lubricated.

The lower plunger, B', is provided with ducts or passages *e*, which lead from the exterior of the plunger up to and under the pressure-plate E'. That portion of the plunger under the pressure-plate is provided with grooves *f'*, which radiate from the ducts or passages *e'* to a peripheral groove or cavity, *g'*, in which is placed cotton waste or other oil-absorbing packing. The ducts *e'* are connected by a rubber tube, or in any other suitable manner, to an oil-reservoir or other suitable source of supply. By this arrangement it will be seen that the interior of the molds will be most thoroughly and uniformly lubricated, both in the upward and downward movement of the plunger, and the brick will be readily ejected from the mold, and have clear and well-defined corners and edges.

W is a belt-pulley mounted on shaft F', to the outer end of which is secured a friction-drum, G, which imparts motion to the main driving-wheel H' on the shaft D'. The friction-drum is mounted in bearings, so it can be readily thrown in and out of contact with the wheel H', and by this means the machine can be readily started and stopped.

I do not confine myself to the exact devices shown and described for imparting power to the machine, as these may be varied in a number of ways which will suggest themselves to the skilled mechanic.

It will be observed that the sides A are provided with extended portions A<sup>2</sup>, which project toward the front of the machine, and in which the main driving-shaft, the auxiliary shafts, together with the pinion and gear-wheels are located. By this arrangement these parts above mentioned are brought away from under the hopper and the mold, and are less liable to become choked or affected by the dirt and grit falling upon them.

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

1. A brick-machine having upper and lower compression-plungers, operated by devices, substantially such as described, to impart to said plungers two pressure movements and a slight releasing or withdrawing movement, which is exerted between the pressure movements, whereby the air confined within the mold and within the clay is permitted to escape, as set forth.

2. In a brick-machine of the character described, the lower compression-plunger, adapted to be carried up to eject the brick



from the mold, and be momentarily held in the elevated position by means of the adjustable lever N, operated upon by means of the cam *n*, as and for the purpose set forth.

5 3. In a brick-machine, the lower compression-plunger, provided with the slotted links or rods F, which connect the plunger with the operating-lever, in combination with the pivoted and adjustable lever N, and the cam *n*,  
10 whereby when the requisite pressure has been exerted on the brick the lower plunger will be carried up to eject the brick from the mold, as set forth.

4. The combination of the cam *n*, lever N,  
15 and plunger B', with the cam-groove, constructed as described, arm T, bar S, mold-filler Q, scraper *s*, and oiling-pad *t*, whereby the lower plunger is raised to the top of the mold, the newly-formed brick removed,  
20 the top of the plunger oiled and scraped, and the mold-filler brought into the desired position.

5. The combination of the mold-filler Q, bar S, lever T, and stud *b'*, with the cam-groove  
25 *c'*, constructed substantially as described, whereby the mold-filler is pushed over the mold-cavity and held there for a short time, until the clay has fallen into the mold-cavity, as set forth.

30 6. In devices for measuring clay for making brick, the mold-filler Q, composed of two sections adapted to be adjusted one within the

other, whereby the holding capacity of said mold-filler is reduced or enlarged at will, as set forth.

7. An adjustable mold-filler of the character described, in combination with a clay-receiving hopper, which is also adjustable to meet the requisite adjustment of the mold-filler, as and for the purpose set forth.

8. The mold-filler adapted to slide forward over the mold-cavity, and provided with the scraper *w* and oiling-roll *v*, in combination with the pivoted arm T and cam-wheel V, whereby the lower face of the upper plunger  
45 is scraped and oiled in its upward movement, as and for the purpose set forth.

9. The mold-filler Q, adapted to be moved forward over the mold-cavity, in combination with the spring-arms *u*, scraper *w*, and oiler  
50 *v*, as and for the purpose set forth.

10. The lower plunger, B', provided with the oil-duct *e'*, leading up under the pressure-plate E', and connecting with the radial cavities *f'* and peripheral grooves *g'*, in which is  
55 placed an oil-absorbing packing material, in combination with a suitable oil-supply or oil-reservoir, as and for the purpose set forth.

In testimony whereof I have affixed my signature in presence of two witnesses.

WILLIAM ANDRUS.

Witnesses:

H. O. WHITNEY,  
PETE T. MCCRECHI.