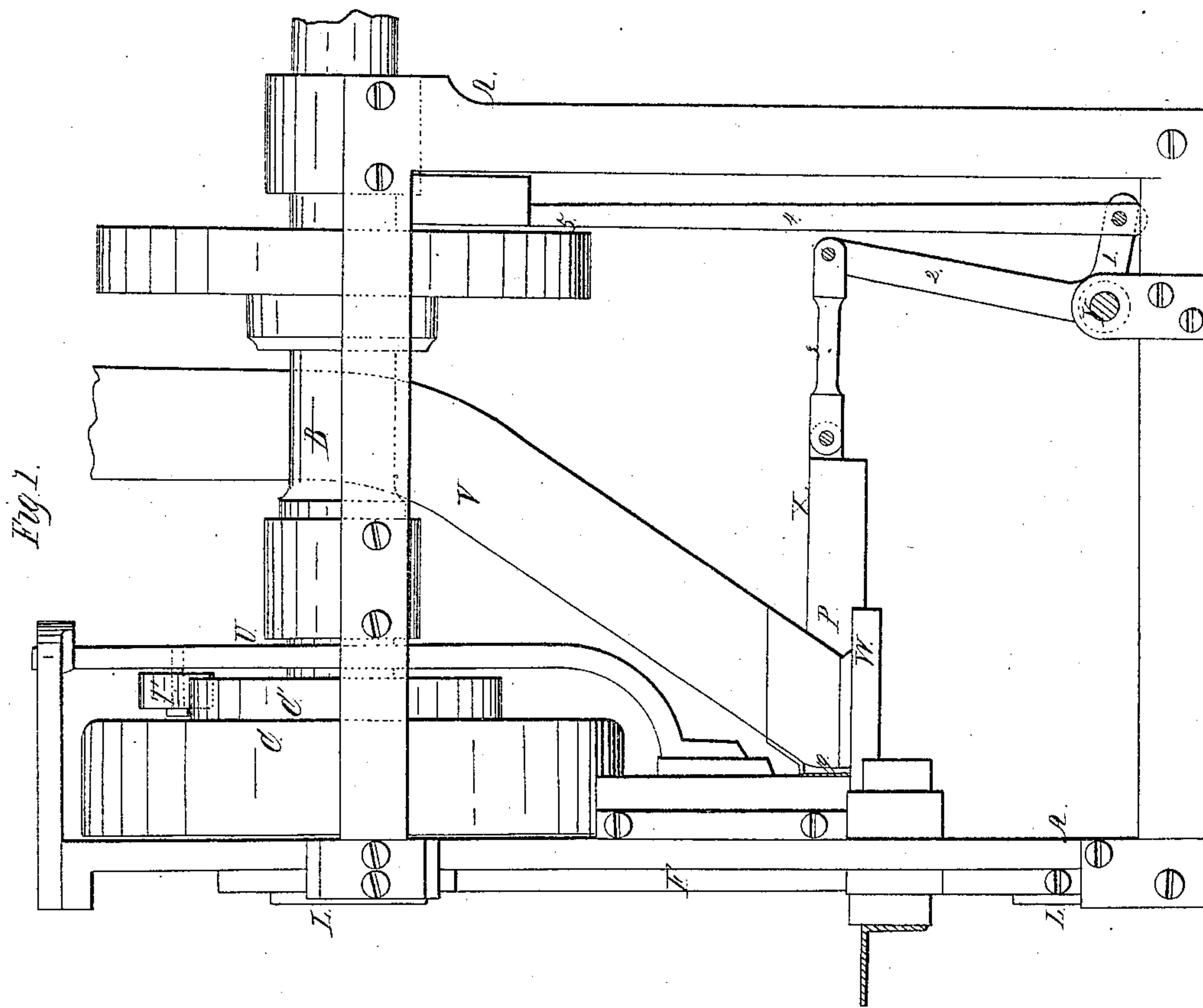
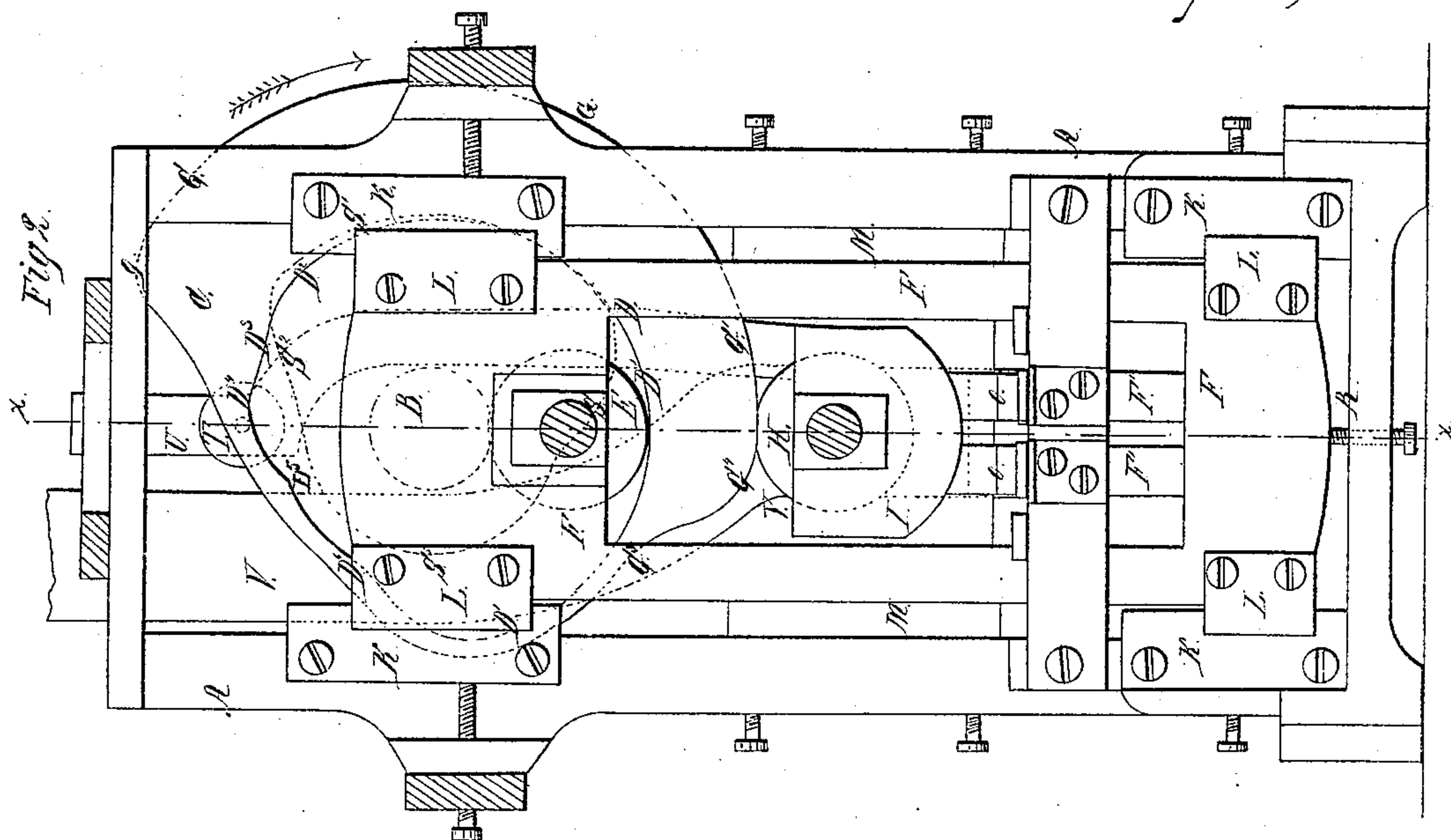


S. Ustick,
Brick Machine,
No 13,239, *Patented July 10, 1855.*



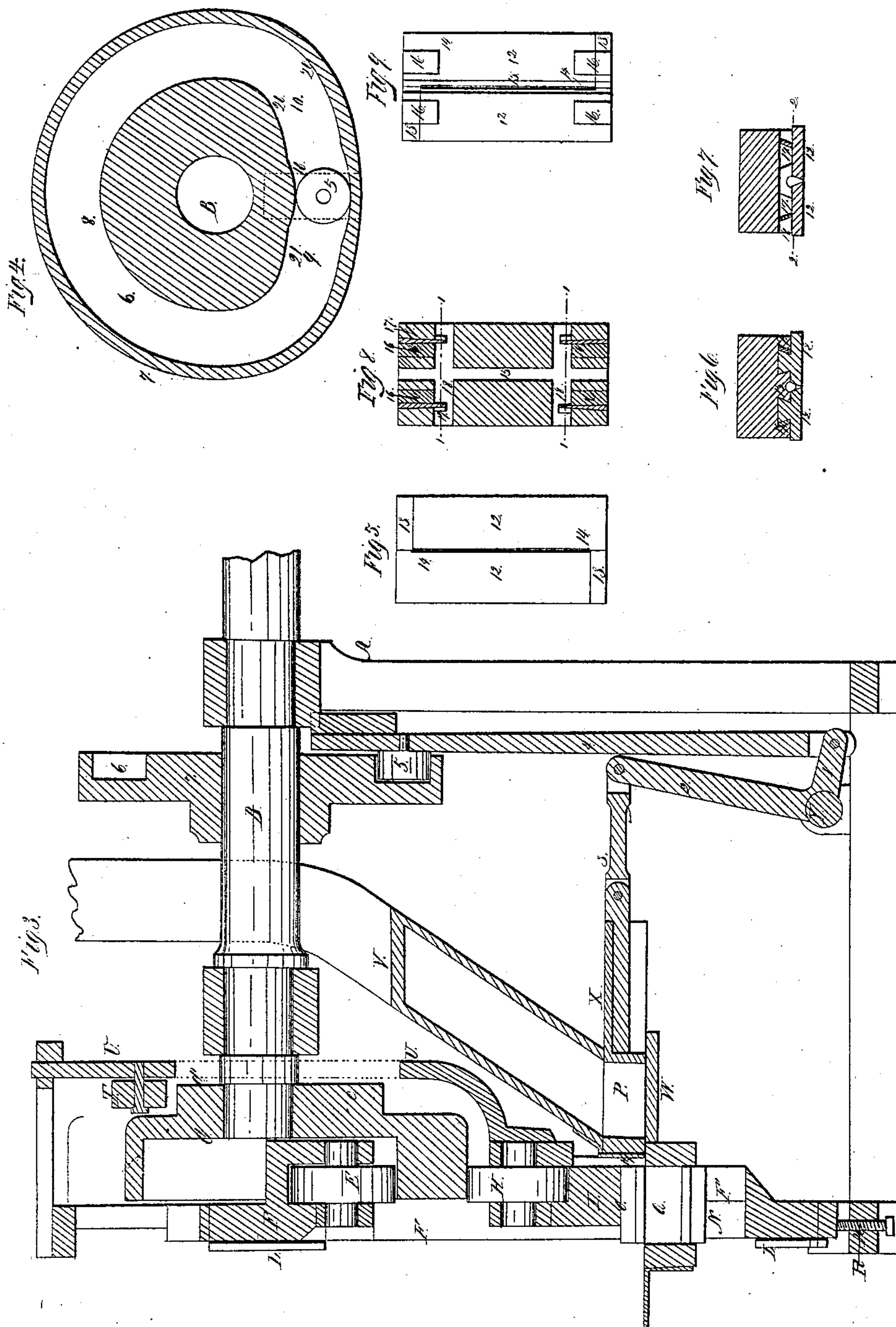
S. Ustick,

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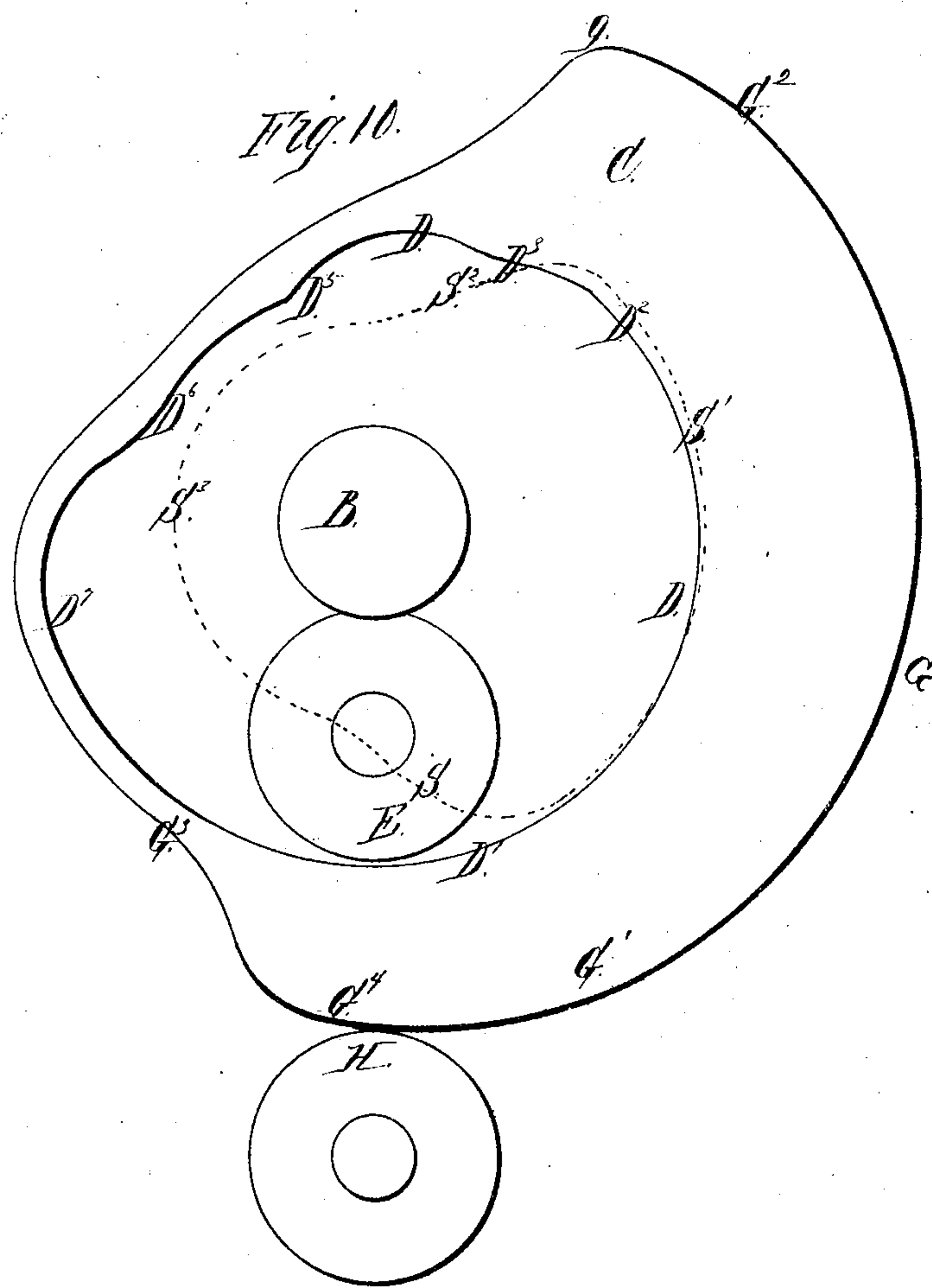
Brick Machine,

No. 13,239,

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Brick Machine,
Nº 13,239, Patented July 10, 1855.



UNITED STATES PATENT OFFICE.

STEPHEN USTICK, OF PHILADELPHIA, PENNSYLVANIA.

BRICK-PRESS.

Specification of Letters Patent No. 13,239, dated July 10, 1855.

To all whom it may concern:

Be it known that I, STEPHEN USTICK, of the city and county of Philadelphia and State of Pennsylvania, have invented new and useful Improvements in Brick-Machines; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making part of this specification.

Figure 1 is a side elevation of the improved machine. Fig. 2 is a front elevation of the same. Fig. 3 is a vertical longitudinal section of ditto, at the line $x x$ of Fig. 2. Fig. 4 is a view of the back part of the cam-wheel, for giving the necessary reciprocating motion to the filling boxes, for supplying the condensing chambers or molds with clay, and pushing the previously formed bricks from the pistons, and cleaning and oiling the pressing surfaces of the said pistons. Fig. 5 is a plan of the pressing surface of one of the pistons, on an enlarged scale. Fig. 6 is an end view of one of the pistons. Fig. 7 is a section of ditto at the line 1, 1, of Fig. 8. Fig. 8 is a horizontal section of the same at the line 2, 2 of Fig. 7. Fig. 9, is a plan of the dove-tailed surfaces of the plates, forming the face or pressing surfaces of the pistons. Fig. 10, is a front elevation of the casting and upper and lower friction wheels E, H, detached from the machine.

Where the same letters occur in the several figures they indicate corresponding parts.

The nature of this invention and improvement consists in so forming the cams on the wheels, through which the pressure is exerted on the bricks, and combining the pistons and the parts to which they are attached with the same, as to cause the cams to act upon the friction wheels of the upper and lower pistons, after the manner of a wedge, and the strain to be confined to the body of metal between the cams; and also in so forming the pistons as to allow the escape of the condensed air through them from the clay, while being formed into bricks, and enable the area of the pressing surfaces to be enlarged to compensate for the slight wear on their edges; together with a novel combination of parts for supplying the condensing chambers or molds with clay,—discharging the bricks from between the pistons, and cleaning and lubricating the

faces of the pistons, to prevent the adhesion of clay to their surfaces.

To enable others skilled in the art to make and use my invention I will proceed to describe its construction and operation.

The frame A is made of a rectangular form of suitable size, strength and material, to contain and support the several parts of the machine, and is provided at its upper part with boxes, in which rest the main horizontal driving shaft B. This shaft is arranged midway between the top side beams of the frame, its rear end extending sufficiently far beyond the back beam of the frame to receive a band wheel or other device, desired to be secured to this end, for giving the motion to the machine, and its front end terminating a short distance back of the uprights of the said frame, so as to enable an irregular formed casting C, on which the cams for moving the pistons are formed, to be secured on this front end, immediately back of the said front uprights. On the front of this casting and around the circumference of the same, is formed an irregular shaped rim, on the inner and outer surfaces or peripheries of which are formed a series of cams, for respectively pressing the pistons together in the condensing molds to form the bricks, and raising the pistons together with the bricks in the molds, until the upper surface of the bricks are even, or nearly so, with the upper surface of said molds, when the bricks are relieved of the weight or pressure of the upper pistons, and the parts attached to the same, by the cam or curve on the projection C', formed on the back part of the casting, in the manner hereinafter stated.

The cams D, G, for pressing the bricks extend around a portion of the inner and outer periphery of the rim of the casting and are in the form of segments of a circle scribed from points eccentric with the center of the driving shaft on which the casting is secured. The inner cam D, for pressing the lower pistons upward, extends from the point D', to the point D², being about one third of the circle of which it is a segment, the point D', where the pressing commences, being situated farther from the center of the driving shaft than the point D², where the pressing terminates, in such a manner as to cause it in its revolution under the friction wheel E, of the lower piston frame F, to raise the same the required distance to

press the lower portions of the bricks. The outer cam G, extends from the point G', in the form of a segment of a circle, scribed from a point eccentric with the driving shaft of the casting, to the point G², the point G' being nearer to the center of the driving shaft than the point G², in such a manner as to depress the friction wheel H, and the frame or block I, and upper pistons O in its revolution over the same, in the same degree as the friction wheel E, of the lower frame F, was raised. This frame F, is placed between upright adjustable guides K, whose tongues enter grooves in the sliding boxes L, secured to the uprights of the said frame F, and has upright posts F', to which the pistons N, are secured to its lower cross part. The frame or block I, to which the upper pistons are secured, has tongues on its sides, which move in upright adjustable guides M, fastened to the sides of the front part of the main frame A. The curved surface of the inner periphery of the rim, from the point D², to the point D³, extends in its course around, slightly toward the center of the driving shaft, in the form of a segment of a circle, so as to bring the point D³, nearer to the center of the shaft than the point D², and enable the curved surface between the two points, to raise the friction wheel E, of the lower piston frame F, to bring the upper surfaces of the bricks on a line or nearly so with the top of the condensing molds Q. The upper pistons O, being held upon the upper surfaces of the bricks with their full degree of pressure by the segmental surface from G² to g which is parallel with the surface from D² to D³, thereby causing the bricks to be held in a compressed state, until the lower pistons are raised sufficiently high, to bring the upper surface of the bricks to the top of the molds. From the point D³, of said inner periphery to the point D⁴, the surface is in the form of a segment of a circle, scribed from the center of the driving shaft B, so as to simply keep the friction wheel E, of the lower piston frame F, and the lower piston N, in a state of suspension, during the passage of this segmental portion under the friction wheel E, to enable the upper pistons O, to be removed from the upper surfaces of the bricks, while the bricks are held in a state of suspension within the molds, and allow the escape of any condensed air that may remain in the bricks, from their upper surfaces, while their edges are confined in the molds, and thus prevent the said edges of the bricks being broken, by the escape of such air through the same, when not held compactly together, by the sides of the molds. After the said segmental portion between D², and D³, passes the friction wheel E, the curve or cam S, represented by the red lines in Figs. 2, and

10, on the projection or cam C', of the casting C, operates on the friction wheel, T, and raises the pistons O, sufficiently high to allow the filling boxes P, to pass under the same. From the point D⁴, the surface extends in its curved course, to the point D⁵, which being nearer the center of the driving shaft than the point D⁴, causes the upper surface of the lower pistons to be raised even with the top of the molds, by its passage under the friction wheel E, where they are held in a state of suspension, until the bricks are discharged from the surface of the pistons, by the reciprocating filling boxes P, for supplying the clay, the said lower pistons N, being held in the position stated, during the reciprocating movement of the filling boxes P, forward, over the same by the friction wheel E, resting on the portion of the periphery of the rim, from the points D⁵, to D⁶, which is in the form of a segment of a circle, scribed from the center of the driving shaft B. From the point D⁶, to the point D⁷, the inner irregular formed periphery of the rim of the casting, curves outward in its course around the point D⁷, being a sufficient distance farther from the center of the driving shaft than the point D⁶, to enable the friction wheel E, to descend over the surface between D⁶, and D⁷, in its passage under the same, by the gravity of the lower piston frame F, pistons N, and friction wheel E, until the lower part of the said frame rests upon the upper end of the adjustable vertical screw R, passing through the lower cross beam of the frame, which screw, is capable of being raised and lowered in said cross beam, to regulate the distance of descent of the lower pistons in the condensing molds Q, and consequently the quantity of clay admitted into the same, to be pressed or condensed into bricks.

From the point D⁷, to the point D', where the pressing cam commences, the surface of the rim of the casting is in the form of a segment of a circle, scribed from the center of the main driving shaft. The outer periphery of the rim of the casting from the point G², to the point (g) extends in a segmental direction slightly toward the center of the shaft B, and parallel with the inner curved surface of the rim, from the point D², to D³, in such a manner as to cause the segmental surfaces to keep the pistons pressed upon the bricks in the molds, until the upper surfaces of the bricks, are raised even, or nearly so, with the tops of the molds, and the remainder of the said outer periphery of the rim of the casting, from the point g, around to the point G³ extends in irregular curves in part of its course, being parallel or nearly so with the inner periphery, and as it is not designed to perform any particular function, it may be shaped to

suit the views of the constructor, care being observed that it shall not project at any of its parts, so far from the center of the driving shafts as to touch the lower friction wheel H. From the point G^3 , to the point G^4 , the outer surface of the rim takes rather an abrupt curve outward, somewhat after the manner of a cima-reversa, and from the point G^4 , to the point G' , the point of beginning of the segmental pressing surface G, the outer surface of the rim assumes a gradual curve, the abrupt curve or cam, from G^3 , to G^4 , serving to force the upper pistons O, down to the surface of the clay in the condensing molds, in case the binding on the edges of their frames should prevent them descending by the gravity of the frame F and its attachments the gradual curve from G^4 to G' continuing the force of the upper pistons with increased power.

The upper pistons O, and frame or block I, to which they are secured, are raised sufficiently high above the bricks, to enable the reciprocating filling boxes P, to pass under the same, and discharge the formed bricks, and fill the condensing molds Q, with clay, by means of the curved surface or cam S, on the projection C' , on the back surface of the castings C, operating on the friction wheel T. This projection is represented in section in Fig. 3, and with red lines in Fig. 2, and about one third of its periphery is in the form of a segment of a circle S' , scribed from the center of the driving shaft B, and of about the same radius as the segmental cam D, on the inner periphery of the rim, and situated immediately in the rear of the same. The surfaces S, S^2 , at the ends of this segmental portion of the projection, are curved and extended inward, so as to connect with the segmental portion S^3 of the periphery scribed from the center of the driving-shaft, from a smaller radius than the first mentioned segmental portion S, on the opposite side to which it is situated. The various curves S, S' , S^2 , S^3 , of the periphery of this projection C' , are situated in such relation to the curves or cams on the inner and outer peripheries of the rim of the casting C, as to raise the upper pistons O, soon after the friction wheel H, of their frame or block I, is cleared of the pressure of the segmental cam extending from G' , to G^2 , on the outer periphery of the said rim, sufficiently high, as to enable the reciprocating filling-boxes P, to be moved under the same, and to be suspended in this position by the friction wheel T, resting on the segmental surface, until the latter in its revolution has passed entirely under the said wheel T, which raising is effected by the cam S, operating on the friction wheel T, on the side of the curved upright U, attached at its lower end to the frame or block I, of the said upper pistons O.

The reciprocating filling boxes P, for supplying the condensing molds Q, with clay, are arranged immediately under an inclined trunk or trough V, through which the supply is received from above, and it may have as many apartments as there are condensing molds, and being open at the top and bottom receive a supply from the trunk or trough V, every time they are brought under the same—the horizontal board W on which they rest and slide forming a bottom to retain the clay within them as they are moved toward the condensing molds Q, and the horizontal board X or flat surface, extending backward from their upper edge, moving under the trunk or trough, as they are moved from the same, forms a bottom to prevent the escape of the clay from the said trunk or trough. These supply boxes P, receive their reciprocating movement through a rock-shaft Y, arranged crosswise at the rear of the machine, and having radial arms 1, 2, extending backward and upward from its center—the arm (2) extending upward, being much longer than the other arm (1) and attached by a joint pin, to a rod 3, connecting its upper end with the rear of the boxes P, and the smaller radial arm (1) being attached at its outer end, to an upright sliding rod 4, moving in guides at its upper end, and having a friction wheel 5, on its end, situated within a groove 6, formed in the rear part of a wheel 7, secured on the driving-shaft B. This groove is formed near the periphery of the wheel, and its peripheries are made in the form of a circle 8, about two thirds of its whole extent, the remaining segment being cut off and the ends of the others joined by curves 9, 10, of greater radius and approaching nearer the center of the driving shaft—their peripheries nearest the shaft being made in the form of a segment of a circle 11, scribed from the center of said shaft for a short distance, so as to allow this last mentioned segmental portion of the groove, to pass by the friction wheel 5, without either raising or lowering the same, and thus during the passage of the said portion, keep the supply or filling boxes P, immediately over the condensing molds Q, to allow them sufficient time to discharge their contents into the said condensing molds—and in the same manner the segmental portion 8, of the groove passes by the friction wheel 5, in its revolution, without either raising or lowering it, so as to keep the filling boxes under the trunk or trough V, to be filled, during the time the bricks are being pressed and raised from the molds.

The pressing faces of the pistons are formed of rectangular longitudinal plates 12, having transverse plates 13, of the same thickness, arranged at one of their ends, on the same line with their surfaces, in such a

manner as to enable the end edges of the transverse plates 13 to be brought against the side edges of the longitudinal plates 12, at right angles with their sides, and the four plates, thus put together, to form a surface of a size and form, corresponding with the size and form of the condensing molds, and exactly fitting in the same. The longitudinal plates 12, are separated a short distance from each other, by thin plates or shoulders 14, inserted or otherwise placed between their edges, at the ends, so as to leave a slit between them of sufficient capacity, to allow the escape through it of the condensed air, at the upper and lower parts of the brick, during the operation of pressing the same, but not of sufficient width to allow the passage of any material part of the clay. These spaces between the plates, extend nearly their whole length, and are increased in width, as they extend to the opposite surface of the plates, by the edges of the same between which they are situated, being made inclined or beveled—a channel 15, being formed in the body of the piston to which these plate are secured, immediately next, and in continuation of this space, for affording a free passage for the escape of the air at the ends of the pistons, and enabling them to be cleaned by the insertion of wires, or other devices, in case the clay should enter them. These plates 12, are secured firmly to the surface of the block or main body of the piston, by means of dove-tailed projections or tongues 16, cast or secured on the ends of the longitudinal plates 12, and at the centers of the transverse plates 13, and inserted in corresponding mortises or grooves formed in the surface of the block or body of the piston, against which they are placed, which mortises or grooves, are larger than the tongues or projections, and made slightly tapering on one of their sides, so as to admit a wedge or gib 17, between the tapered sides and the sides of the tongues or dove-tailed projections 16, for securing the plates 12 and 13 firmly in their places—the inner ends of said wedges or gibs 17, extending beyond the dove-tailed projections or tongues, into transverse spaces 18, formed in the surface of the block or body of the piston, and extending the full distance across the same, so as to enable the end of a tool to be inserted in the said transverse spaces, and the wedges or gibs to be forced from their position to remove the plates in case of wear, to insert strips of metal or thin plates, between the ends of the longitudinal plates and the transverse plates, and the beveled or inclined edges, and again inserting thinner wedges or gibs, to secure them together, and by thus enlarging the area of the pressing surface of the piston, compensate for the wear of its edges,

and adjust it to fit the condensing molds at all times.

The operation is as follows: Motion being communicated to the main driving shaft B, by means of a band leading from steam or other power to a band wheel on said shaft, or through any desired agency, the filling boxes P filled with pulverized clay from the inclined trunk or spout V, are forced out over the condensing molds, by means of a curved surface 20 of the groove 6 in the wheel 7, between the larger segmental portion 8, and smaller segmental part 11, operating on the friction wheel 5, and raising it and the upright sliding bar 4, to which it is attached and consequently giving the forward motion to the filling boxes, and causing the leather 19, which may be kept moistened with oil if desired, on their front, to scrape or rub the surfaces of the pistons in their movement, and clean them of any clay that may have adhered to them, from their previous operation—the upper and lower pistons being held suspended during this movement of the filling-boxes the former with their lower surfaces on a line or nearly so with the top of the leather, by means of the friction wheel T, resting on the segmental portion of the periphery of the projection C', and the latter with their upper surfaces on a line with the top of the condensing molds Q, by the friction wheel E, resting on the segmental cam D⁵, D⁶, on the inner periphery of the rim of the casting. After the cam D⁵, D⁶, in its revolution passes under the wheel E, the lower pistons N, descend in the molds Q, through the weight of their frame F, and its attachments, the friction wheel E descending over the curved surface of the rim from D⁶ to D⁷, as it passes under the same until the lower part of the frame F, rests upon the top of the screw R, for regulating the quantity of clay admitted to the molds. During the descent of the pistons N, to receive the clay, the filling boxes P, are held over them, by the smaller segmental portion 11, of the groove, passing the friction wheel 5, and after the molds are filled, the curved portion 21, of the groove 6 next the smaller segmental portion operates on the said friction wheel 5 and draws the filling-boxes again under the trunk or spout V where they are retained, to be again filled during the passage of the larger segmental portion 8, by the friction wheel 5. Immediately after the filling boxes are drawn back from under the pistons O, the said upper pistons are caused to descend into the condensing molds by the gravity of themselves and the frame F, and its attachments combined—the upper friction wheel T, being in the meantime relieved of the segmental portion of the cam or projection C', on the back

portion of the casting, and said wheel in its descent rolling over the surface of said cam or projection, as it passes under the same.

In case the pistons and frame should fail to descend, by their gravity from any cause, they will be forced down by the curved surface or cam, on the rim of the casting C, between the points G^3 and G^4 operating on the friction wheel H, during its revolution. The upper pistons O, continue to descend, through the agency of the cam or curve from G^4 , to G' , on their friction wheel H, and from the points D' and G' , on the inner and outer periphery of the rim, to the points D^2 , and G^2 , the eccentric segmental curves D, G, operate on their respective friction wheels E, H, and cause the upper and lower pistons to be drawn together in the molds, to condense the clay therein into bricks, with a force corresponding with the taper of the wedge, which the two segmental surfaces or cams assume in relation to the friction wheels in their passage between them. After the bricks are formed the pistons are raised, and the bricks discharged in the manner before stated, in the body of the specification.

The plan of the machine above described, may be made to press double the number of bricks as is formed by the machine described, and represented, by securing another casting similar to the casting C at the opposite or back end of the driving shaft, and applying the motive power to the shaft between the two castings, and arranging another set of molds, upper and lower pistons, and duplicates of all the other parts necessary to the producing of the bricks, in the same relation to the back casting, as the others are to the casting C, making the machine in fact a double one instead of a single one, as represented and described, the number of molds and pistons operated upon by the casting C, may be moreover increased or diminished at the will of the operator.

Having thus fully described the construction and operation of the several parts of the brick-machine as improved by me, what I claim therein as my invention and desire to secure by Letters Patent is—

1. Combining the inner and outer peripheries of the rim of the revolving casting, shaped in segmental curves, eccentric with each other, and with the center of the shaft on which the casting is secured, in such relation to the upper and lower pistons, for pressing the brick frames, to which they are attached, and to the friction wheels in said frames, as to cause the said segmental surfaces, to operate on the friction wheels, in their revolutions between the same, after the manner of a wedge, and thus avoid all liability of strain on the shaft B, arising from the resistance of the pressure exerted in pressing the bricks, by confining it to the body of metal between the two surfaces, substantially in the manner herein set forth.

2. I claim forming the faces of the pistons, of longitudinal and transverse plates, secured to the blocks or main body of the pistons, by dove-tailed tongues or grooves, and wedges or gibs, and capable of being moved outward, sidewise and endwise, so as to increase the area of the face of the pistons, in case of wear as before described.

3. I claim forming a narrow slit, in the center or other part of the face of the piston, widening as it extends from the face, or not, as desired, and communicating with the outside of the pistons, through their ends, for allowing the air confined in the molds to escape during the pressing of the clay into bricks, as herein described.

STEPHEN USTICK.

Witnesses:

JNO. B. KENNEY,
JOHN P. OWENS.