Sheet 1-3 Sheets.

J. W. Osgood,

Brick Machine

No. 76,341, Patented Apr. 7, 1868.

Fig. 3

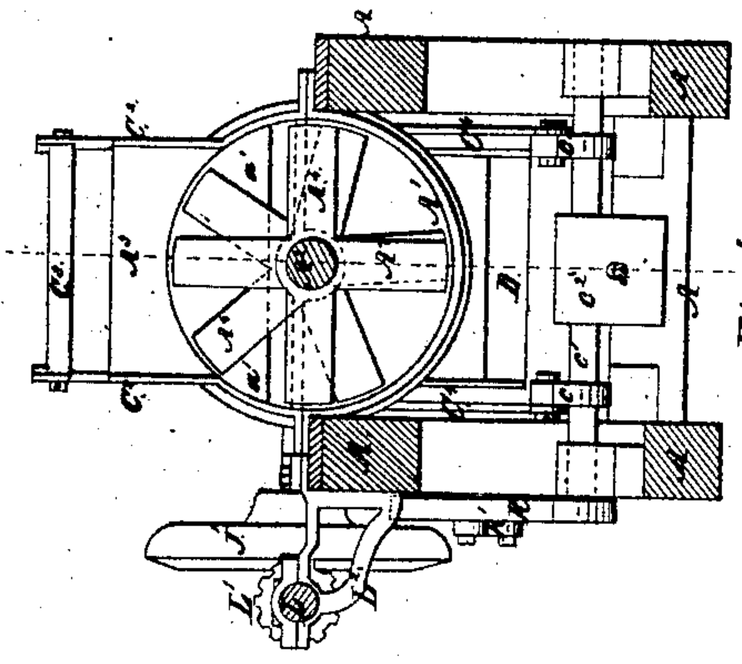


Fig. 4

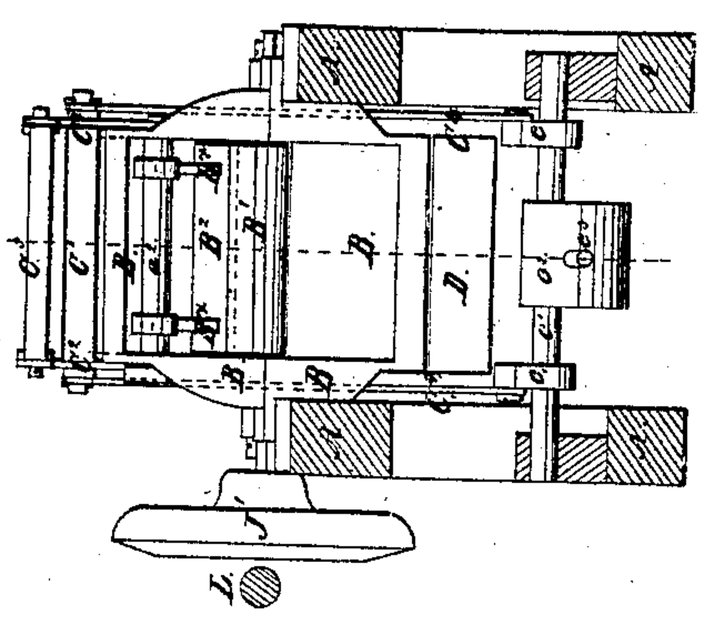


Fig. 1

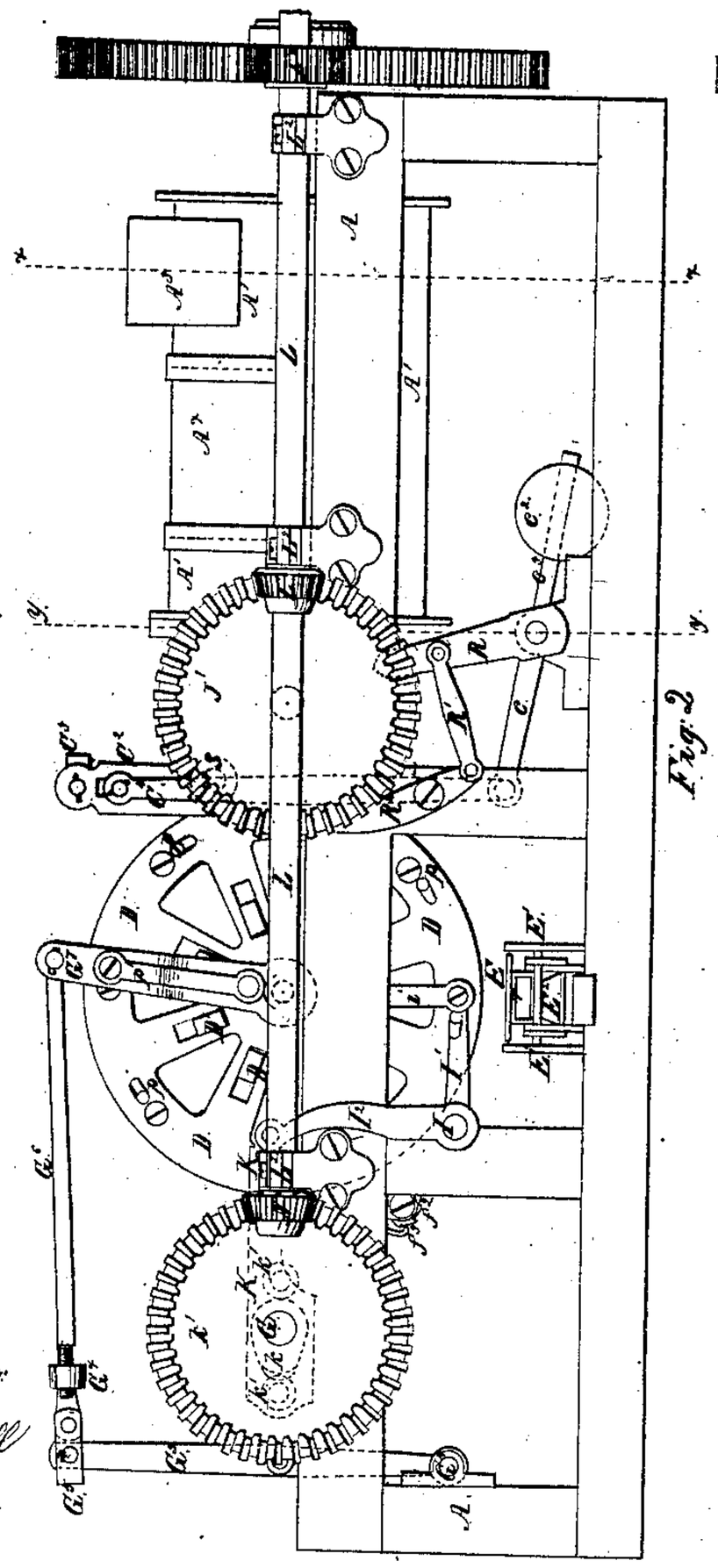
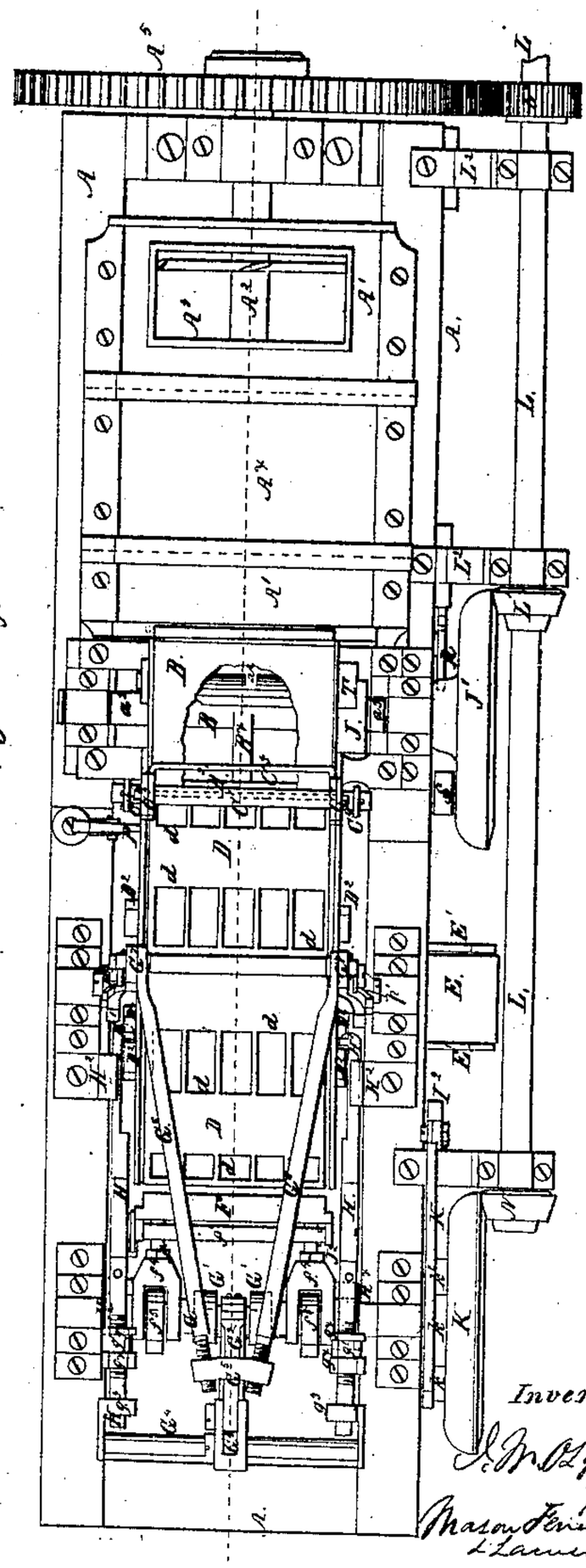


Fig. 2



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Sheet 2-3 Sheets.

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No 76,341, Patented Apr. 7, 1868.

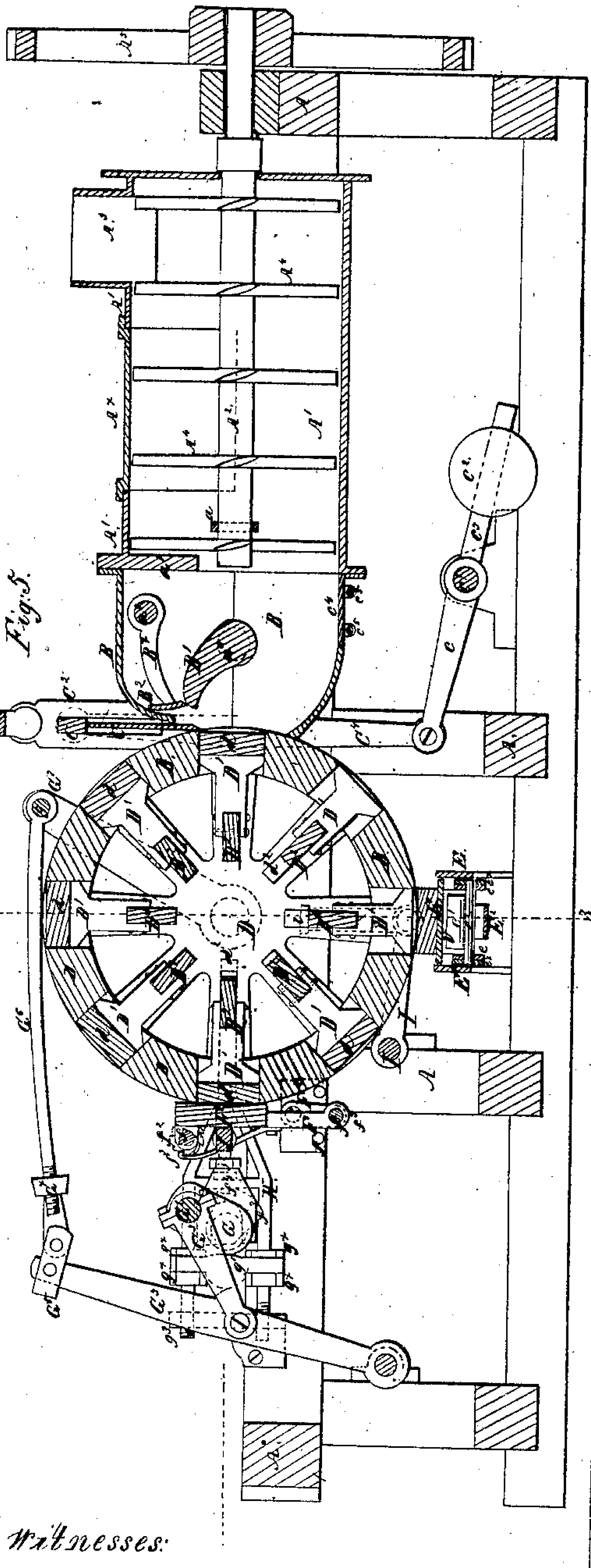

Fig: 5.

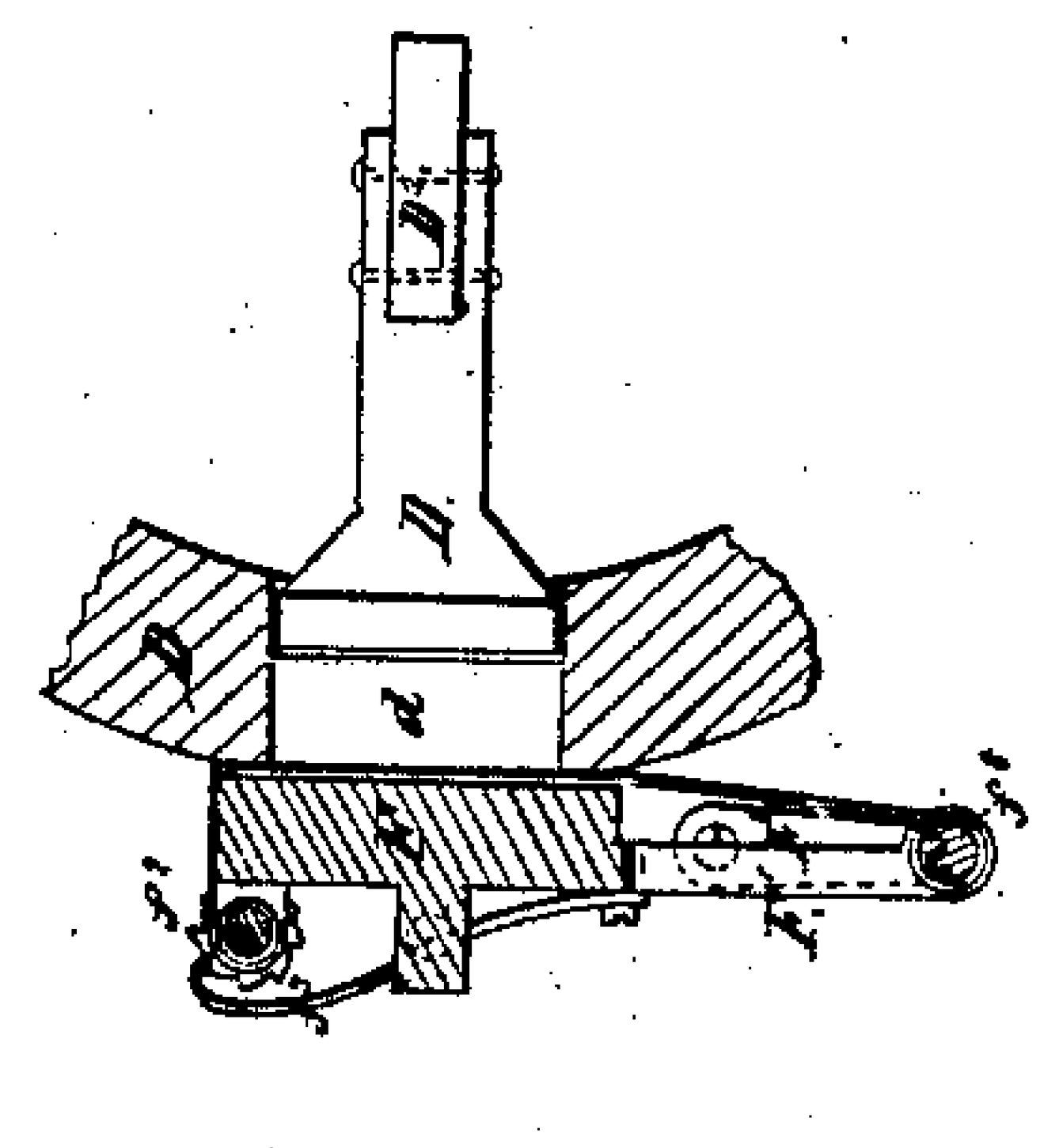

Fig: 7.

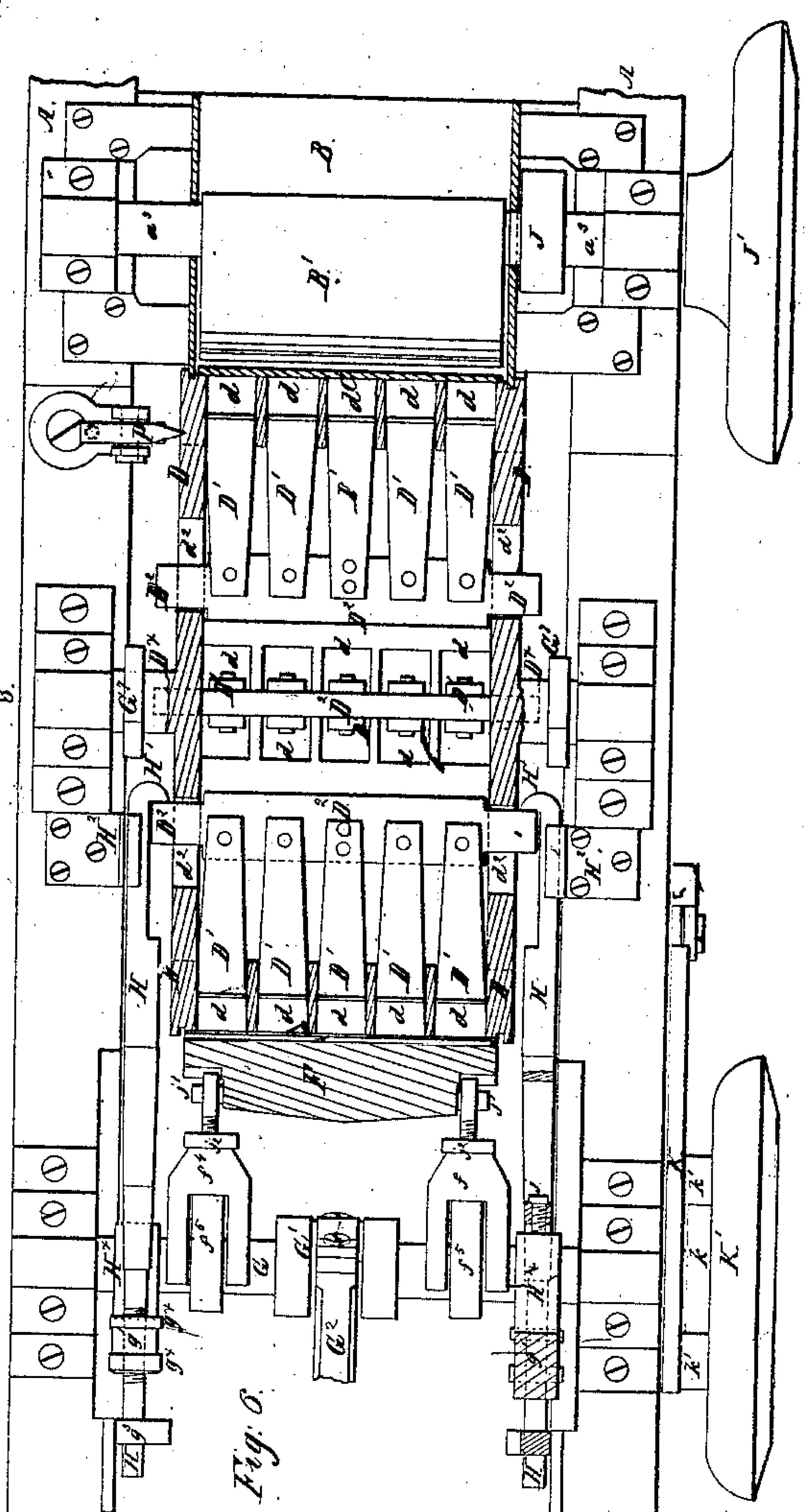

Fig: 6.

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Sheet 3 - 3 Sheets.

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Brick Machine,

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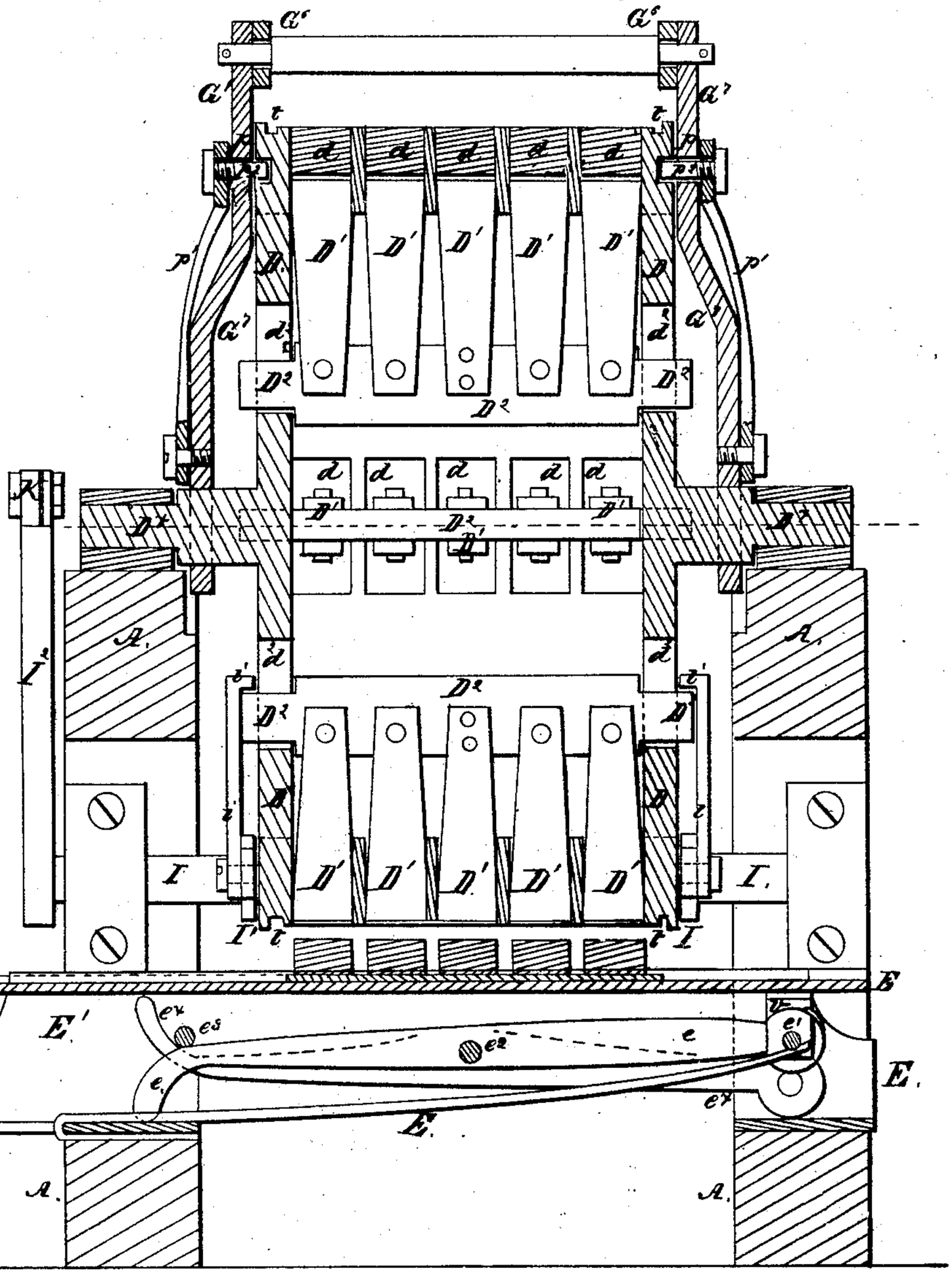

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United States Patent Office.

JAMES W. OSGOOD, OF COLUMBUS, OHIO, ASSIGNOR TO HIMSELF AND S. V. R. CARPENTER, OF SAME PLACE.

Letters Patent No. 76,341, *dated April* 7, 1868.

IMPROVED BRICK-MACHINE.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, JAMES W. OSGOOD, of Columbus, in the county of Franklin, and State of Ohio, have invented certain new and useful Improvements in Machinery for Making Bricks; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1, sheet 1, is an elevation of one side of the improved machine complete.

Figure 2, sheet 1, is a top view of the machine with a portion of the crown of the filling-box broken away, to show the filling-cam and wiper.

Figure 3, sheet 1, is a transverse section taken in the vertical plane indicated by red line *x x* in fig. 1.

Figure 4, sheet 1, is a transverse section taken in the vertical plane indicated by red line *y y* in fig. 1.

Figure 5, sheet 2, is longitudinal section taken in a vertical plane through the centre of the machine.

Figure 6, sheet 2, is a horizontal section through the mould-wheel and filling-box.

Figure 7, sheet 2, is a view in detail of the hinged platen and a portion of the mould-wheel, showing the manner of stretching cloth over the face of the said platen to prevent clay from adhering to it.

Figure 8, sheet 3, is a transverse section taken in the vertical plane indicated in fig. 1 by red line *z z*.

Similar letters of reference indicate corresponding parts in the several figures.

This invention relates to certain novel improvements on that class of brick-making machinery for making pressed bricks, wherein a horizontal pug-mill is employed, in conjunction with a revolving polygonal drum, having rectangular mould cavities in its perimeter, which consecutively receive the clay at one point and discharge it at another point in the form of compressed bricks.

The nature of my invention consists in interposing between a pug-mill or feeding-device, and an intermittent revolving mould-drum, a revolving filling-cam and a wiper, which are so constructed and operated that during the reposes of the mould-drum, after each operation of discharging the bricks from some of its moulds, said filling-cam will forcibly press the clay into the mould-boxes or cells in front of it, at the same time leaving a space in the mass of clay in the filling-box which will prevent the clay from crowding against the mould-drum while in motion, as will be hereinafter described.

It also consists in preventing the clay, which is being moved forward in the pug-mill to the filling-box, from entering this latter box, so as to obstruct the motions of the filling-cam and wiper, by the employment of a guard or division-plate above the shaft of the pug-mill, which will cause all the clay to pass beneath it in a position to be carried forward to the moulds by the filler; and beneath the axis thereof, as will be hereinafter described.

It also consists in providing the filler with a wiper, which will operate upon the upper face of the former, and prevent the clay from being carried backward and around with the filler, as will be hereinafter described.

It also consists in the employment of a knife which will descend and separate the clay which has been forced into the mould-cells from that which is left in the filling-box, after each filling operation, and then suddenly rise out of the way during the movement of the mould-drum or wheel, and the succeeding filling operation, as will be hereinafter described.

It also consists in providing means which will prevent the followers or pistons which work in the mould-cells from binding and working hard therein, by attaching the central follower of each gang rigidly to its guide-bar, and having the other followers of the same gang attached loosely to said bar, as will be hereinafter described.

It also consists in the employment of a platen, in conjunction with devices which will compress the clay, while in the moulds, against said platen when the latter is brought up squarely and held firmly against the mould-wheel, for the purpose of compressing the clay preparatory to discharging it from the mould-wheel in the form of bricks, as will be hereinafter described; said platen being hung in such manner that it will accommodate itself to the surfaces of the mould-wheel around the moulds, and always fit snugly against said surfaces when forced up to its place.

It also consists in a certain arrangement of cams and compressing-devices, in conjunction with a movable platen and an intermittent rotating mould-wheel or drum, whereby the platen will be firmly held against the mould-wheel over the moulds during the operation of the cam-pressing devices, and also in compressing the clay in the moulds during the retrocession of these devices, as will be hereinafter described.

It also consists in a yielding receiving-board, which is arranged beneath the mould-drum in such manner as to receive the bricks as they are extended therefrom and descend by the weight of the bricks upon it, thereby supporting the bricks during this operation, and preventing them from dropping or otherwise becoming injured, as will be hereinafter described.

To enable others skilled in the art to understand my invention, I will describe its construction and operation.

In the accompanying drawings, A represents the frame of the machine, which is adapted for receiving and supporting the devices which are employed in the operation of making bricks. Near one end of the frame A is the pug-mill, into which the clay is put through a hopper, A^3, to be fed up to the filling-box, and from thence forced into the moulds. Previously to putting the clay into the pug-mill it is properly moistened, worked, and tempered, so that the pug-mill of the brick-moulding machine shall not have this preliminary work to do. This mill consists of a hollow cylinder, A^1, arranged in a horizontal plane, and secured in place upon frame A. One of the upper sections, $A^\times$, of this cylinder is removable, for the purpose of obtaining access to its interior should anything therein require attention. A^2 is a shaft arranged in the centre of cylinder A^1, and supported in part by the end of frame A, and in part by the cross-bridge *a*, which latter is arranged near the filling-box B, as shown in fig. 5. The shaft A^2 carries a number of radial arms, A^4, arranged in any suitable manner so as to propel the clay from the hopper into the filling-box B. The large spur-wheel A^5, on the propeller-shaft A^2, receives motion from a pinion spur-wheel, $L^\times$, on the longitudinal main driving-shaft L, as shown in figs. 1 and 2.

From the pug-mill the clay is forced slowly, and in suitable quantities, into the filling-box B, through a space which is below a vertical transverse guard-plate, a^1, shown in fig. 3. This box is rectangular in cross-section, and in longitudinal section it converges toward the mould-drum D, against the periphery of which its vertical sides and bottom plate abut.

The edge of the upper plate or crown of this box is formed as shown in fig. 5, so as to abut snugly against the face of a wide reciprocating knife, C, thus preventing clay from being forced out of the filling-box at its joints. The bottom section, c^4, of this box B, is confined in place by transverse clamping-bolts, c^5, by removing which the said section can be taken out and access had to the interior of the box B.

Within the filling-box is a revolving filler, B^1, which is upon a horizontal transverse shaft, a^3, figs. 2, 4, 5, and 6. Shaft a^3 has its bearings upon frame A, and receives a rotary motion from main shaft L, through the medium of the bevelled spur-wheels L^1 J^1, as shown in figs. 1 and 2. The filler is in the form of a thick-curved blade, its convex surface being that surface which is presented to the clay, and which receives the clay from the blades A^4 of the pug-mill, and forces it forward and into the moulds or brick cells *d d*, in the wheel D. Above this filler B^1 is a blade, B^2, which is applied to arms $B^\times$ upon a horizontal rock-shaft, a^2, within the filling-box. The blade B^2 is designed to wipe or scrape the clay from the convex surface of the filler B^1, as the latter rises, after filling a set of mould-cells, and also to prevent this filler from pressing any clay backward. In fig. 5 the wiper-blade B^2 is represented in a position where the filler is just about to leave it, the former having prevented any clay from being carried upward and backward by the latter. In order to have the wiper descend at the proper time upon the filler, a toe, T, fig. 2, is keyed upon one end of the shaft a^2, which is struck by a cam, J, on the shaft a^3, once in every revolution of this shaft. This cam and the toe are arranged in such manner that as soon as the filler commences to rise, the wiper will be forced down upon it and left to rise with it.

By this arrangement of a revolving-filling device between the pug-mill and the mould-wheel, it will be seen that there will be a space left in the mass of clay in the filling-box, after every operation of the filler, which will prevent the clay from being forced against the periphery of the mould-drum while this drum is turning. The speed of the propellers in the pug-mill and that of the filler should be such that the amount of clay forced into the filling-box will be the required quantity to fill, in a proper manner, each row of mould-boxes, as they are successively presented to said box.

It will be seen that the convex or curved form given to the filler B^1 causes it to operate upon the principle of a press, at the same time that it forces the clay before it into the rows of mould-cells. This filler forces the clay forward and upward, but this upward tendency of the clay is prevented by the wiper B^2, which also assists in the filling operation by its arresting the clay in front of the mould-boxes or cells. As soon as the operation of filling the mould-cells ceases, a wide knife, C, descends through the clay, and separates the clay which is in the mould-cells from the mass which is in the filling-box, after which this knife C quickly ascends, so as not to be in the way when the mould-drum moves another row of cells in position to be filled. This knife is secured fast at its upper edge to a vertically-reciprocating cross-head, C^1, which moves in slotted guides C^2, rising perpendicularly from the frame A, on each side of the filling-box, which guides are connected together at their upper ends by a cross-brace, C^3, as shown in figs. 2, 3, 4, and 5. To the extremities of the cross-head C^1, pitman-rods C^4 are attached, which proceed downward beneath the box B, outside of it, and are connected to arms *c*, projecting from a transverse rock-shaft, c^1. This rock-shaft c^1 also carries an arm, c^3, which has a weight, c^2, upon it, sufficient to counterbalance the knife C, and allow this knife C to rise suddenly, when it has completed its work. On one end of the rock-shaft C^1 an arm, R, is fixed, shown in figs. 1, 2, and 3, and to this arm a tripping-lever, R^2, is connected by a rod, R^1, shown in fig. 1. Upon the inner side of the bevel-wheel J′ a cam-pin or stud, S, is applied, so as to act upon said parts once in every revolution of this wheel. The pin S first presses upon the arm R, and thus depresses the knife, after which it acts upon the lever R^2, and assists the weight C^2 to throw up the knife.

The polygonal mould-drum may be constructed with any required number of transverse rows of cells, *d*, in it, and any number of cells in a row, according to the diameter and length required of it. That which I have represented in the drawings has eight rows of moulds or cells, and five cells in each row. These cells *d d* are made radially through the solid rim of this wheel or drum, as shown in figs. 5, 6, and 8, and these cells are all provided with plungers or pistons D^1, the inner ends of which are attached to horizontal transverse bars D^2, which work in radial slots d^2, in the arms or heads of the cylinder. The central plunger D^1 of each set or row of plungers is secured fast to its bar D^2, and its pressing-head works snugly in its cell, but the other plungers D^1 of each row are attached loosely to their bar D^2, and their pressing-heads do not fit so tightly in their respective cells. By this arrangement of fast and loose plungers, the central or fast plungers act as guides for the others, which, being loose, will accommodate themselves to any variation in the parallelism of the bars D^2, and thus prevent binding or working hard in advancing or receding toward and from the circumference of the drum D.

The extremities of each plunger-bar D^2 project through the radial slots d^2, to be acted upon by hooks H^1 and *i*, as will be hereinafter described. And to the ends of each slot d^2, or into the edge of each plunger-bar, a set-screw or other suitable device may be applied for regulating the capacity of the cells for receiving the clay, by allowing the plungers to recede more or less in their cells, according to the amount of stock required to be compressed into the bricks, and the thickness of the bricks required.

The mould-drum D receives an intermittent motion about its axis from a horizontal transverse crank-shaft, G, which is supported upon that end of the frame opposite the end carrying the pug-mill. The two arms G^7 G^7, which are arranged on the sides of the drum D, and which vibrate loosely upon the gudgeons $D^\times$ $D^\times$ of this drum, carry spring-latch pins p^2, which are fixed to the upper ends of the springs p^1 on arms G^7, and pass through these arms, as shown in fig. 8. These pins p^2 catch into holes *p*, made concentrically in the sides of the drum D, at regular intervals apart, and thus cause the arms G^7 to move the drum the proper distance at every forward stroke of these arms. The pin-holes *p* are levelled in one direction, and the latch-pins p^2 are also levelled, so that when the arms G^7 move backward, they leave the drum D in the position to which it was carried. The spring-pawl P, shown in figs. 2 and 6, catches into the holes *p* in one side of the drum D, and prevents any liability of this drum being turned backward during the operation of the machine. The upper ends of arms G^7 G^7 are both connected to a vertically-vibrating lever, G^3, by means of the forked pitman-rod G^6, which rod or rods are adjustable, either by turn-buckles or otherwise, for shortening or lengthening the throw of said arms, as may be required to compensate for any wearing of the parts.

The lever G^3 is pivoted at its lower end to a transverse rock-shaft, G^4, and connected, at an intermediate point between its ends, to the crank G^1, on shaft G, by means of pitman-rod G^2, as clearly shown in fig. 5.

The crank-shaft G carries on one end a bevel-spur wheel, k^1, which engages with a pinion-spur wheel, N, on the main shaft L; thus the crank-shaft G, as well as the filler-shaft, and the shaft of the pug-mill, receive motion from said main shaft, and this crank-shaft makes one revolution at every stroke of the drum D. This crank-shaft carries two short throw-cams, $H^\times$ $H^\times$, and two intermediate long-throw cams, f^5 f^5, which latter operate upon yokes f^4 f^4, to force a platen, F, against the filled mould-cells, as these cells are successively moved around in front of the platen, and to hold the platen firmly in this position during the operation of the cams $H^\times$ to effect the compression of the clay in the said cells. This platen is supported by pivoting its arms F^1, as at f^8, to short swinging arms F^2, which are hung from the frame A, between stop-pins *f f*, as shown in fig. 5. By thus supporting the platen it will accommodate itself to the surface against which it is forced, and thus fit so snugly over the mould-cells as to prevent clay from escaping thereform during the pressing operation. This platen is also so hung that it will fall back when the pressure of the cams against it is removed. The nuts j^2, on the short screw-rods, which connect the yokes f^4 to the pins j^1 on the platen, are designed for adjusting the length of these rods for setting the platen to work squarely and properly.

The face of the platen next the drum D is first covered with a sheet of rubber, and over this a cloth is stretched, by means of the rollers f^1, and their ratchets and pawls, as shown in fig. 7. The rubber backing prevents the cloth from being cut while pressing it forcibly against the edges of the mould-cells, and the cloth prevents the clay from adhering to the platen. In practice, each one of the followers D will be faced with cloth to prevent the clay from adhering to it.

The cams $H^\times$ $H^\times$ act upon cross-heads g^1, and adjusting-pins *j*, which are applied to yokes upon reciprocating press-rods H, as shown in figs. 2, 5, and 6. These rods extend along the sides of the drum D in guides H^2 H^2, and have their ends hooked, as shown, for the purpose of taking hold of the projecting extremities of the plunger-bars D^2, as these bars, with their respective mould-cells, come opposite the platen F, and moving the plungers D^1 toward the platen, thereby compressing the clay.

The cams f^5 and $H^\times$ are so constructed and adjusted upon their shaft G that the platen F will dwell or remain in its place against the mould-drum during the compression of the clay in the cells, and until the hooked press-bars H H recede and leave the bars D^2 free, after which the platen will be allowed to fall back out of the way during the movement of the mould-wheel.

The screws *j* and the cross-heads *g'*, which are applied to the yokes of the press-bars H, are adjustable for the purpose of giving more or less pressure to the clay in the moulds, and for the purpose of compensating for any wearing away of the parts.

On the outer end of the crank-shaft G, next the bevel-spur wheel K', is a cam, *k*, which operates upon rolling-studs *k' k'* upon the side of a slotted bar, K, and gives an intermittent endwise motion thereto. This bar K is pivoted to the upper end of an arm, I^2, which is keyed on one end of a horizontal transverse shaft, I, arranged below the mould-drum, as shown in figs. 1 and 5. Shaft I has two arms I^1 projecting from it, and extending alongside of the drum D, on both sides thereof, and to the ends of these arms I^1, hooked rods *i* are pivoted,

which are suitably guided in vertical lines. The hooked rods *i i*, shown clearly in fig. 8, are arranged below the axis of the drum D, in such relation to the projecting ends of the plunger-bars D^2 of the filled moulds, as these moulds are successively brought to a position for discharging the bricks, that the hooks on these arms will take hold of the ends of said bars D^2, and cause an expulsion of the bricks from their mould-cells upon a yielding platform, E, as shown in figs. 5 and 8.

This operation of discharging the bricks from the moulds takes place during the operation of filling one set of moulds, and compressing the clay in another set of moulds, while the mould-drum D remains at rest.

The board or platform E is arranged transversely across the frame A, directly beneath the drum D, as clearly shown in figs. 5 and 8. This board E is sustained in a plane parallel to the axis of the drum D, and moves up and down between the perpendicular side-plates E^1, which form a box for guiding the said board, and supporting the devices upon which it is mounted. Near one end of the board E, a bracket, *v*, is secured, to its bottom side, through which a pin, e^1, passes, and to this pin two curved arms *e* are pivoted, the opposite ends of which bear upon the frame A. Below the pin e^1, two curved arms $e^\times$ are pivoted to the side-plates E^1 E^1, and, at their opposite ends, they bear upward against a fixed pin, e^3. These arms e $e^\times$ are connected together at the middle of their length by means of a pin, e^2, as shown in fig. 8. Thus it will be seen that the board E is supported at one end by the ends of the levers or arms *e*, and at the other end by the upturned ends of the arms $e^\times$. The long spring E^2, which is secured at one end to frame A, presses upward at the other end against the pin e^1; consequently the board E will be allowed to rise and descend, and will be always held in a horizontal plane by the levers or tongs e $e^\times$. The board E may be held up by means of weights hung from cords attached to this board, or other equivalent means may be employed for allowing this board to yield under pressure. In practice, the pressure by which the board E is held up should be such that it will be overcome or counteracted by the weight of the bricks discharged upon it from each row or set of mould-cells, and this board should be arranged sufficiently close to the periphery of the drum D to receive the bricks upon it during the act of expelling these bricks from the mould-cells, not only to prevent the bricks from dropping upon said board, but also to afford a support for them during their discharge from their moulds.

The wide vertically-reciprocating knife C, which is used for separating the clay forced into the moulds from that left in the filling-box B, may be provided with means for keeping one or both surfaces well oiled, so that this knife shall not adhere to the clay, nor cause undue friction in rising and descending. This may be done by arranging an oil-box just above the point where the crown of the filling-case touches the knife, and suitably packing this box, so as to allow it to hold oil, and supply it to both sides of the knife as this knife reciprocates.

The bricks are received, as they are expelled from the mould-drum, upon carrying-boards, which are of such length as to receive upon it the several bricks of each set of moulds, and the empty boards are pushed under the mould-drum as fast as they are required, and the filled boards are removed from the opposite side of this drum.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is--

1. A revolving feeding-cam B^1, applied within a filling-box B, and interposed between a pug-mill and a rotary mould-drum, substantially as and for the purpose described.

2. A reciprocating knife, C, arranged in combination with the filler B^1 and the movable mould-wheel, substantially as and for the purpose described.

3. A wiper or scraper, B^2, in combination with a filler, B^1, operating substantially as described.

4. The guard or division-plate a^1, in combination with a horizontal cylindric pug-mill and filling-box, arranged substantially in the manner and for the purpose described.

5. Securing the central follower D^1 of each gang or series of mould-cells *d* rigidly to bar D^2, and having the other followers of the same gang attached loosely to said bar, for the purpose of preventing the followers from working hard or binding in their mould-cells, substantially as described.

6. A platen, F, hung by means of arms F^2, which are pivoted to the frame A, and jointed, as at f^3, to arms F^1 of the platen, so that the face of this platen shall fit squarely against the mould-drum D, notwithstanding that the platen swings on a pivot or pivots, substantially as described.

7. Providing the platen F with cloth rollers f^1, ratchet-wheels f^2, and pawls f^3, substantially as described.

8. Effecting the compression and condensation of the clay in the mould-cells, by means of reciprocating hooked press-rods H acting upon the extremities of the follower-bars D^2, in combination with a platen F, said bars H and platen F being operated by means of cams upon a crank-shaft, G, substantially as described.

9. The arrangement of the expelling-hooks *i*, and the specified mechanism for operating these hooks, to wit, the cam *k*, yoke K, and bell-crank I^1 I^2, substantially as described.

10. The combination and arrangement of devices specified, whereby the mould-drum D, the platen F, the press-bars H, and the expelling-hooks are operated from a single shaft, G, substantially as described.

11. The combination and arrangement of the cam $H^\times$ and f^5, the crank-shaft G, lever G^3, press-rods H, mould-drum D, and platen F, substantially as and for the purpose described.

12. The adjustable cross-head g^1 and adjusting-pin *j*, applied to the yoke of each one of the pressing-rods H, substantially as described.

13. A yielding receiving-platform, E, constructed and arranged beneath the mould-drum D, and supported in such a manner as to receive the bricks as they are expelled from said drum, and descend and yield under the weight of the bricks, substantially as described.

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