2 Sheets, Sheet 1.

C. G. Brown,

Brick Machine.

No. 2,312. Patented Oct. 11, 1841.

Fig. 2.

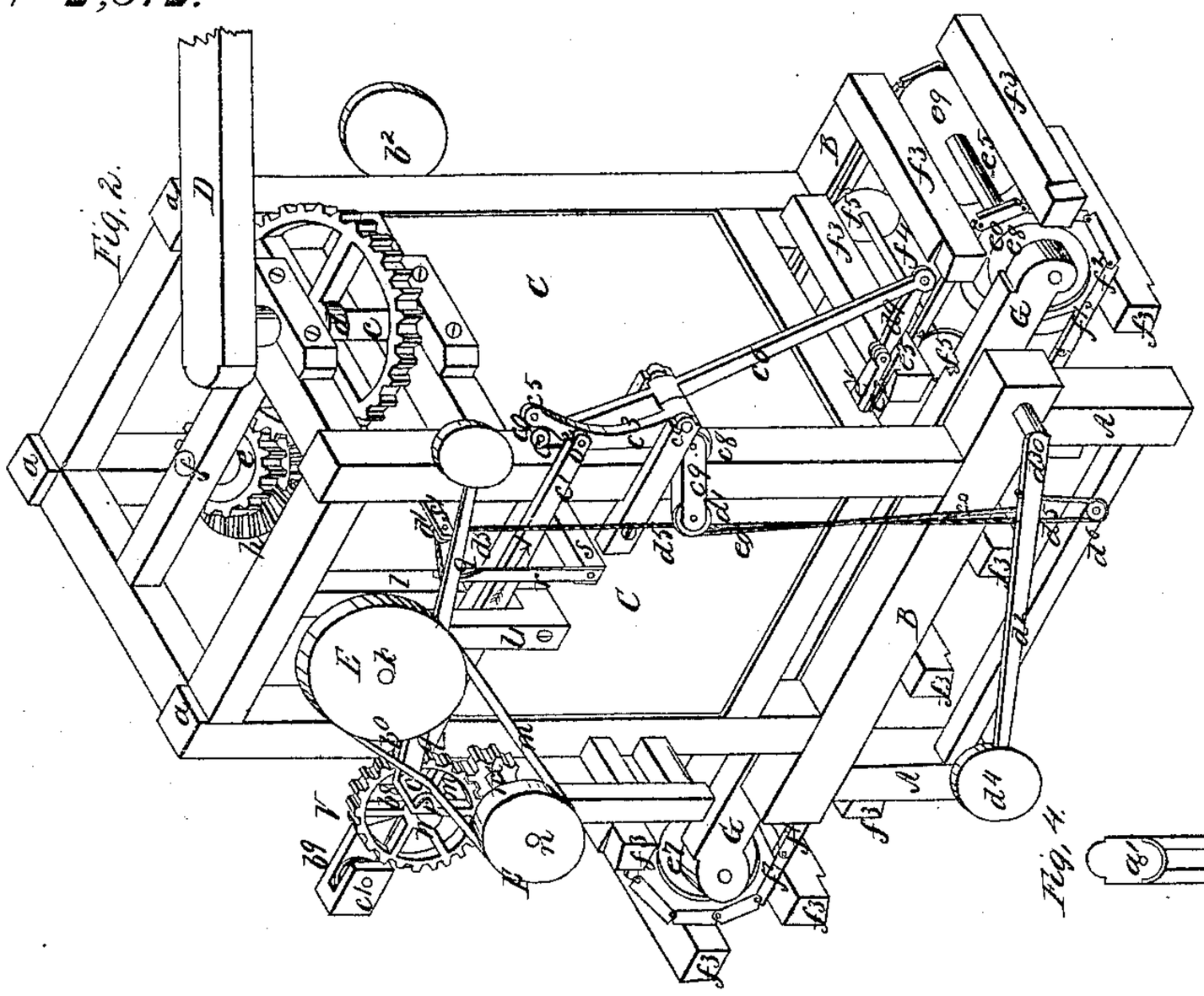


Fig. 4.

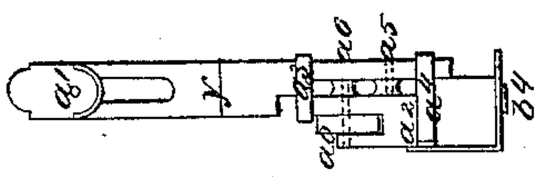


Fig. 3.

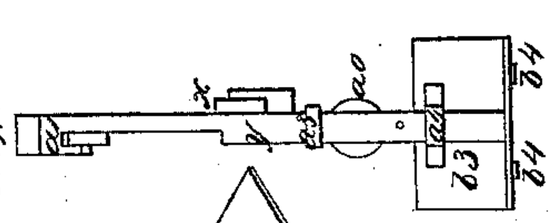


Fig. 5.

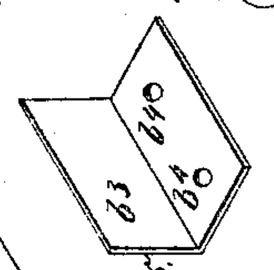


Fig. 6.

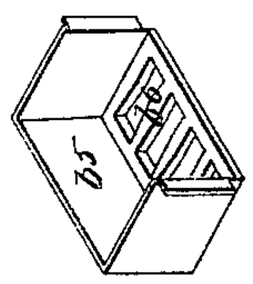


Fig. 7.

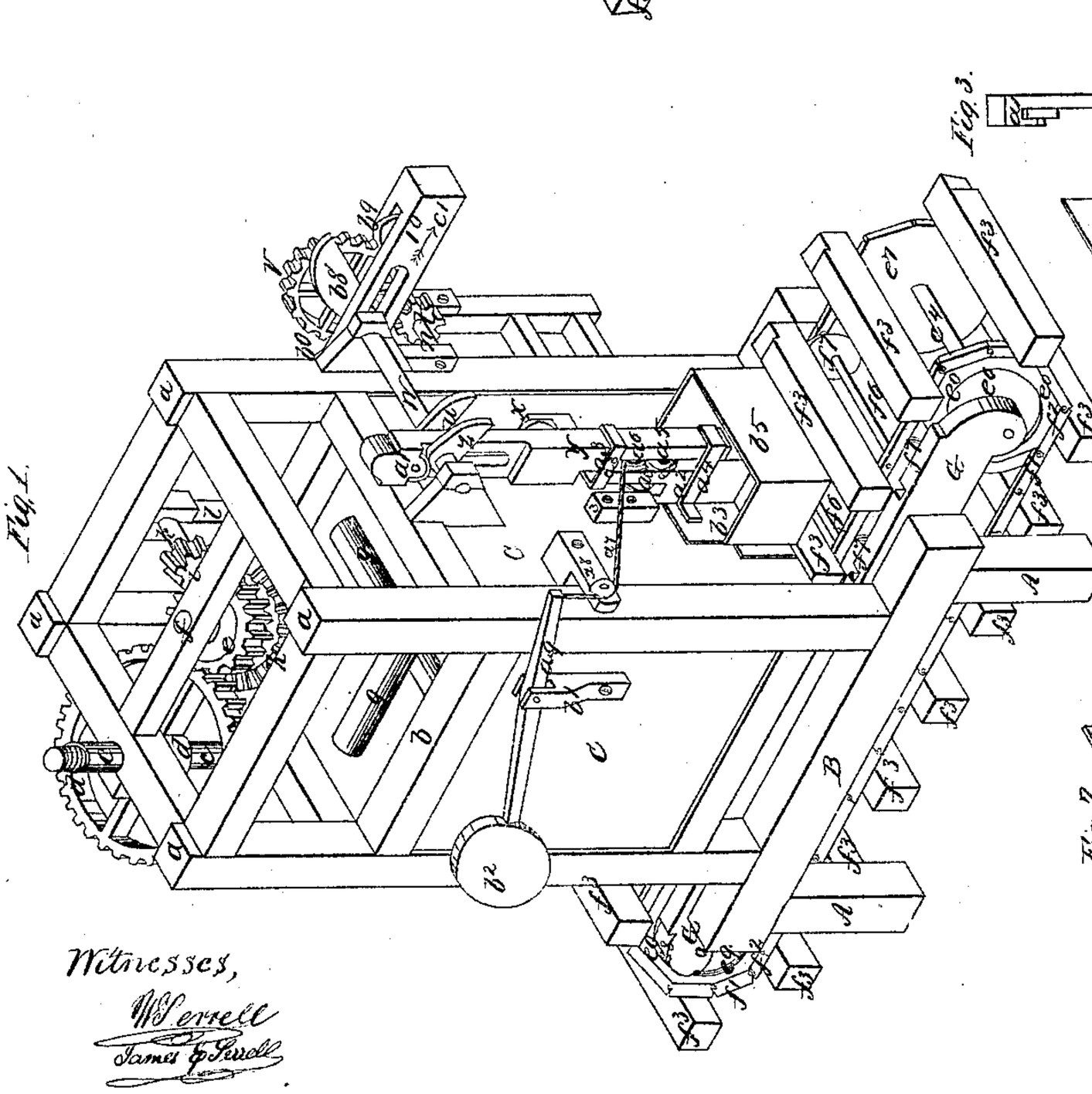
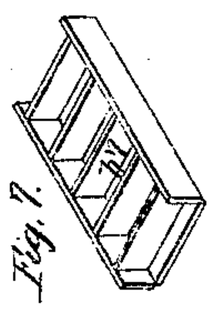


Fig. 1.



Witnesses,

W. Serrell

James G. Serrell

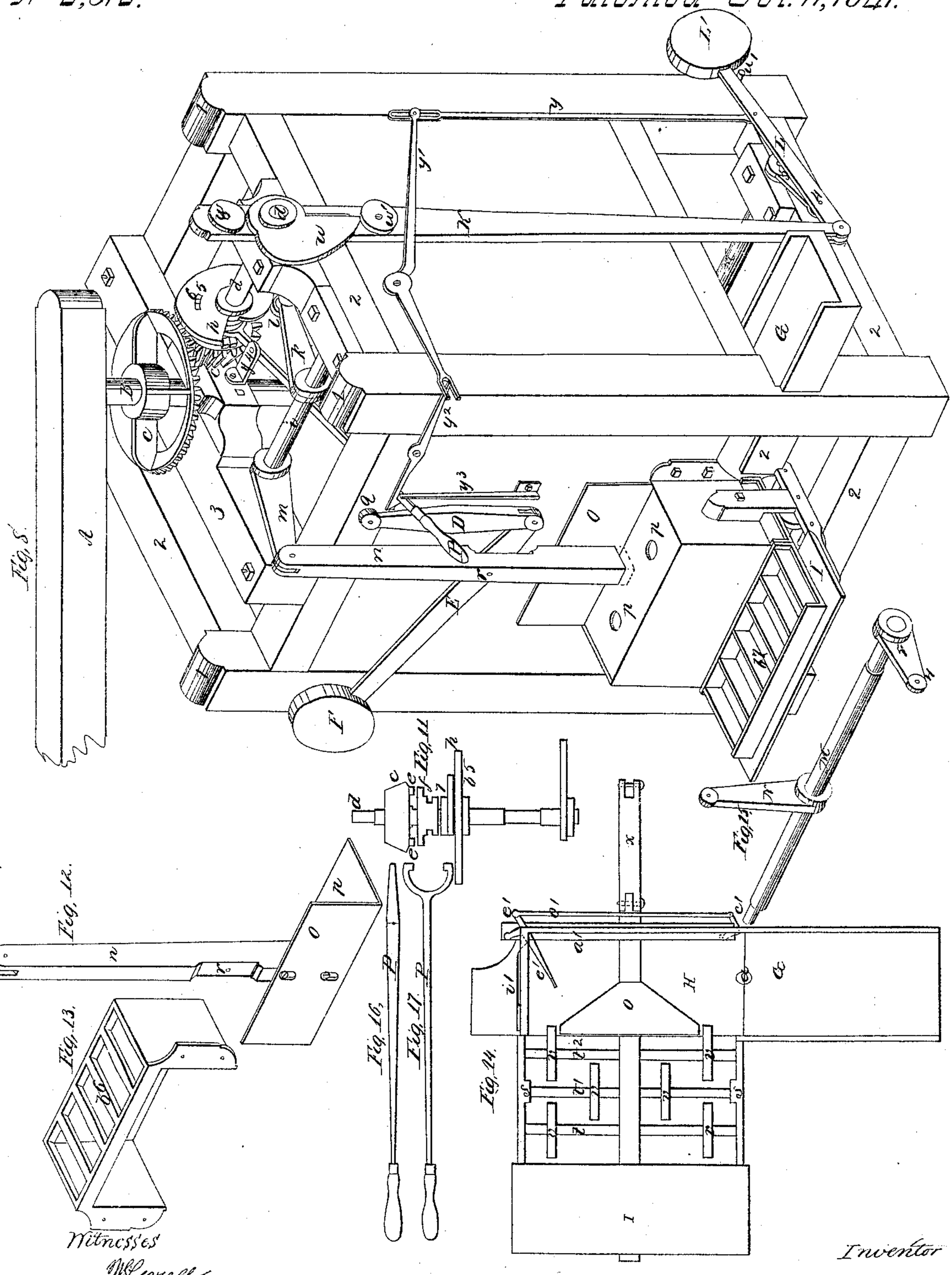
Inventor

Charles G. Brown

2 Sheets, Sheet 2.

C. G. Brown,
Brick Machine.

No. 2,312. Patented Oct. 11, 1841.



Witnesses
W. Burnell
James E. Fitch

Inventor
Chas. G. Brown

UNITED STATES PATENT OFFICE.

CHARLES G. BROWN, OF CALDWELLS, NEW YORK.

BRICK-MACHINE.

Specification of Letters Patent No. 2,312, dated October 11, 1841.

To all whom it may concern:

Be it known that I, CHARLES G. BROWN, of Caldwells, Rockland county, in the State of New York, brickmaker, have invented and made and applied to use certain new and useful Improvements in the arrangement of mechanical means for grinding, molding, and pressing clay into the form of bricks, for which improved means I seek Letters Patent of the United States, and that the mode of constructing and using the said improvements and the ends to be attained thereby, are fully and substantially set forth and shown, in the following description and in the drawings attached to and making a part of this specification, wherein—Figure 1, Sheet 1, is a perspective elevation of one form of the machinery, as I use the same, seen on one angle thereof. Fig. 2 is a similar perspective elevation of the same seen on the opposite angle to Fig. 1.

The figures in Sheets 2 and 3 and the other detached figures, added to show particular parts more clearly, are separately referred to, and the same letters and numbers as marks of reference apply to the same parts in all the several figures.

A, A, B, B, Figs. 1 and 2, Sheet 1, are the main parts of the fixed frame supporting the whole of the machine.

a, *a*, *a*, *a*, are four timber standards forming the angles of the square box C, which serves the purpose of the tub in the common pugging mill, as used by brickmakers, and the clay material is put into it in the common way, at the opening *b*, shown on the side of Fig. 1.

c is a vertical shaft on the top of which is the horse lever D, and below the top tie in the frame, on the shaft *c* is the horse wheel *d* gearing into the pinion *e* on the knife shaft *f*, which carries the knives *g*, with four forcing cams or wipers below. All these parts are represented as made and used in the common manner but below the pinion *e*, the bevel wheel *h*, on the shaft *f* communicates the power to a bevel pinion *i*, on a horizontal shaft *k*, supported in bearings *l*, l^1, inside and outside the frame of the box, C, and which carries on the outer end of the drum E, connected by a belt *m* to a drum F, on a shaft *n*. A tightening rigger *o*, is mounted in a carriage *p*, on this end of the levers *q* whose fulcrum is on the bearing l^1, the opposite end of the lever *q*, is kept up to tighten the belt by the spring latch *r*, on a small bracket *s*, but the rigger in certain cases is to be put out of use by means shown hereafter.

The shaft *n* carries within the drum, F, a small pinion *t*, gearing into a tooth wheel *v* on a shaft *w* the opposite end of this shaft *w* has an elliptic half cam *u*, which in its descent operates on a roller *x*, on this side of the vertical press arm *y*, and forces it downward, this arm *y* has a slot or mortise through which the shaft *w* passes, the lifting or return motion is given by the corresponding half cam *z*, operating on the roller a^1, these two cams cause the arm *y* to move up and down between them and it is steadied in its motion by the slot on the shaft *w*. This press arm *y* is made in two parts the upper and outer part *y*, is seen in front in Fig. 3, and is shown sidewise constructively in Fig. 4, where a^2 is a part sliding in a band a^3, on *y* while the lower end of the part *y* slides in a band a^4, on the part a^2. On *y* is a roller sheave a^5, on a strong pin, on a^2 is a roller sheave a^6 also on a strong pin, on a^2, above a^5, is a strong cord a^7, descending below a^5 and returning over a^6, passes off toward the side of the machine and under a roller sheave a^8, and turning up finishes by an attachment to this end of the lever a^9, with a fulcrum at b^1, and having a weight b^2 at the opposite end to keep the cord a^7, tight; at the back of a^2, a roller a^0 is mounted on the same pin with the roller a^6, and acts against a small lateral bracket 3 to prevent the arm *y* having any lateral sway. At the lower end of the arm a^2, the press driver b^3, shown separate in Fig. 5, is secured on and has in it two openings b^4 as shown in Fig. 5 beneath each of which a common clock valve is hung as shown in Figs. 4 and 5 to allow the entrance of air between the driver and the clay material when the driver rises.

The box b^5, receives the clay material from the pugging box through an opening for the purpose and the driver b^3 forces it downward through a set of metal grates b^6, shown separate in Fig. 6 into the molds b^7, shown separate in Fig. 7, these are brought successively under the chamber or box b^5, and grates b^6, by means which are now to be described.

The shaft *w* already named has on it, between the wheel *v* and the outer bearings on the side of the machine a nearly cylindrical formed cam b^8, set eccentrically on the shaft *w* and in its rotations operating alternately on a pair of roller sheaves b^9, b^0, this sheave

b^0, is partly hidden in the drawings by the tooth wheel v these two sheaves are mounted on the side of a sliding shackle bar c^1, which lies along the side of the machine and has a slot in it, at this end by which it works on the shaft w, the other end passing behind the spring latch r and above the lower bracket s is jointed by a pin c^2, to the vertical connecting arm c^3, whose lower end is mounted on a short shaft c^4, and on its upper end is a roller sheave c^5, the shaft c^4, carries also a vertical lever c^6, whose upper and shorter arm finishes with a pin carrying a roller sheave c^7, in the same way as the connecting arm c^3, is finished. From the upper end of the lever c^6, a strong cord c^0, passes under and over the sheave c^5, and over the sheave c^7, descending between the arms and through the shaft c^4, and passing under a sheave c^8, in this end of the angle bollard c^9, rises and passes over the sheave d^1, at the other end of the bollard and again descending the cord c^0, terminates by an attachment to the lever d^2, whose fulcrum is at d^3, and which tailing to the other end of the machine has a weight d^4, on its loose end. Between the cord c^0, and the fulcrum, d^3, a second cord d^5, leads from the lever d^2, under a sheave d^6, on the frame of the machine and ascending over a sheave d^7, on the bracket s^1, terminates by a fastening to an eye on the top of the spring latch r.

The lower end of the vertical lever c^6. is jointed by a link d^9, to the horizontal latch slide e^1, working in staple slides beneath the box c, and having on its under side a strong spring e^2, terminating near the link d^9, with a shoulder downward forming a latch catch e^3. Beneath these last parts a pair of strong longitudinal bearers G, G, within the main frame sustain at their ends a pair of shafts e^4; e^5. These carry each a pair of flanch wheels e, ^{6}, ^{7}, ^{8}, ^{9}, the outer faces of which are made with a rib e^0, whose outer edges are octagonal, to receive the inner edges of the metal link pieces f^1, which form a hinge jointed chain each alternate link being made with a boss f^2, through which a screw bolt secures a wood or metal cross piece f^3; these cross pieces form the cross wise connections between the two chains and also form the divisions into which the molds b^7, shown in Fig. 7, are to be laid for use. These parts collectively form an apron to carry the molds under the press and place each set by an intermittent motion, to receive the clay and give it the form required. One end of each cross piece f^3, is chamfered on the forward edge to allow of the latch spring e^2, sliding readily on and over it; and near the back end of the machine a shaft f^4, and pair of flanched rollers f^5, are mounted to support that end of the apron chain and a similar shaft f^6, and pair of flanch rollers f^7, lie under the apron chain near the back and front part of the press chamber b^5, so as to be directly under and sustain two of the cross pieces f^3, when in the proper position for the molds to be filled by the action of the press driver above.

When thus completed and adjusted the machine is to be used as follows: The molds are to be put successively in on the back end so as to keep all the spaces on the upper and straight part of the chain filled to the press chamber and the pugmill being charged and power applied in any convenient manner to turn it the motion of the knives and wipers will force out the clay into the press box b^5. The motion communicated through the shaft w and cam u and roller x, to the arm y will cause the driver b^3, to descend in successive alternations as each set of molds comes under it and force the clay through the grates b^6 into the molds and before the driver begins to rise the motion of the cam b^8, drives the bar c^1, in the direction of the arrow 1, and thus carrying the connecting arm c^3, and upper end of the lever c^6, with it the lower end of the lever c^6, goes in the opposite direction carrying with it the latch slide e^1, and latch spring e^2, this by its shoulder e^3 catches one of the cross pieces f^3, and carries the filled mold from under the chamber by moving that and the apron chain forward the width of one mold and cross piece, bringing an empty mold under the chamber, the driver which has risen during this last motion now descends and forces a new portion of material into the succeeding molds and the motions being maintained by the power applied, the pressing and molding goes on continuously with the pugging and forcing out of the material. Should a stone or other hard substance go through the mill and prevent the driver descending, the machinery is protected from breaking by the operation of the two part arm y and a^2 to the driver, as so soon as the pressure and resistance are equalized the arm piece a^2, will slide in the upper band a^3, and the lower end of the arm y will slide in the band a^4, and the rollers a^5, a^6, will separate as the cord a^7, will draw down this end of the lever a^9, and raise the weight b^2, at the opposite end, and this operation, by the effect of the weight on the lever a^9, regulates the amount of compression on any quantity of material in the box which compression may be increased or diminished by changing the position or size of the weight b^2, on the lever a^9. Should a stone or other hard substance go through the grates b^6, so as to stop the progress of the apron chain and molds the cord c^0, from the lever c^6, and connecting arm c^3, will allow the arms to separate and the cord will then rise the lever d^2 which by its reverse operation through

the cord d^5, will draw the spring latch r from under the lever q. This will fall by its weight and raise the tightening rigger o off the belt m thus preventing any breakage in this part of the machine.

In Sheet 3, Fig. 20, shows a variation in the mode of fitting the press driver see Fig. 1. The parts of the pressing follower are the same as are already described but the arm y is to be in one piece secured to the driver, and sliding in a guide staple 10 is connected by a pin 11, to the lever 12, which at one end carries a weight 13, and rests on a pin 14, on the frame of the machine the other end being jointed to the vertical bar 15 whose upper end is to be fitted with a slot to pass the shaft w and with the rollers x and a^1 to be operated on by the cams z and u in the same manner as the press bar y Fig. 1, the intent of this arrangement being to regulate the press by the amount of the weight 13 on the lever 12 and if any hard substance passes into the press and prevents the descent of the driver arm y the weight 13 will rise and thus prevent breakage.

Fig. 21, is a variation in the mode of fitting the shackle bar c^1, and lever c^6. These are shown as connected by jointing them to a crooked lever 16, with a weight 17, on the longer arm which rests on a bracket 18, on the underside of the shackle bar c^1, and the lever 16, is connected by the cord d^5 to the latch spring r. By this arrangement if any hard substance prevents the progress of the molds b^7, and chains f the lever 16 and weight 17, will rise and by the cord d^5 draw the spring latch r from under the tightening rigger lever q and release the band m, thereby preventing breakage in this part of the machine by disengaging the roller o from the operation of the driving belt m.

In Sheet 2 the principal Fig. 8 represents a variation in the general arrangement which includes a change in the mode of making and fitting the grinding knives and fitting the wipers and comprises my latest improvements in other parts and the change effects the intended objects with greater quickness and certainty. The letters of reference now used refer to the several parts to be next described.

1, 1, 1, 1, are the angle posts and 2, 2, the ties that collectively form the frame containing the pugmill, 3 is the shaft tie, A, is the horse lever on B, the principal vertical shaft shown as made round with the knives a. secured from turning on the shaft by pins through the hubs or eyes and shaft. When this mode of fitting is used it is my intention to have the pins so proportioned in size that they shall cut off between the shaft and hub, by the resistance of any obstacle which would otherwise be enough to break the knives or wipers but when this mode of fitting is not used it may be better to increase the strength of the shaft knives and wipers and to make the shaft B, square below the upper bearing to receive the eyes and hubs of the knives a and wipers b, the mode of forming these knives is shown detached in Figs. 9 and 10, Sheet 3, where the knives are represented as made three fold and instead of being in pairs or set singly in sockets on the shaft, these are set on so that each three knives stand at an angle of about sixty degrees with the three above or below them thereby materially increasing the quantity of work done when grinding and also rendering the material more homogenous, more fit to mold, and producing better bricks.

On the upper part of the shaft B, is the bevel wheel C, gearing into the bevel pinion c mounted on the cross shaft d which is elongated outside the machine for purposes stated hereafter. On the pinion c are the clutch blocks e taking into shoulders in the cam f which slides on the shaft d and is to be prevented turning by a slide key; this cam f is to be used as hereafter shown. Next this is the fixed cam 7 with a pin 6 working into a slot 5 in the pressing cam h, on the shaft d which is shown with the parts on it in the separate Fig. 11, Sheet 2. The cam h operates on a roller l, on the point of the crank arm k which is secured on the press shaft i this carries a second crank arm m whose outer end is jointed to the upper end of the vertical press arm n whose lower end is secured to the vertical part of the press driver o by screw bolts going through vertical slots as shown in the detached Fig. 12, Sheet 2, the follower p of the press driver is shown in Fig. 8 with two holes below which are two common clack valves as described in Figs. 3, 4, and 5, Sheet 1, and the valves are also shown in place in the detached Fig. 20, Sheet 3. The press driver p works above a set of press grates the same as shown in Fig. 6, Sheet 1, and in reverse in larger size in Fig. 13, Sheet 2. Above the press o is a descending link D, jointed to the frame at q and at the lower end to the press lever E, which is secured to the press arm n by a pin r and has a press weight F, at the outer end.

On the side of the Fig. 8 is the molding box slide G, this, and the parts that are connected with it, but which lie under the body of the machine, are shown detached in Fig. 14, where the mold slide G, terminates at the cross line (a) being there about one inch higher than the next part which is the receiving platform H; s, is a metal frame to carry the platform H, and delivering platform I, between these are three cross shafts t, t^1, t^2, carrying metal rollers v, v, over which the molding boxes b^7, Fig. 7, Sheet 1,

are to be passed by means now to be described.

On the outer end of the shaft *d*, the leading cam *u* is mounted and between this and the frame tie 2, is the vertical leading lever K, which works up and down and is held up in place by a long slot through which the shaft *d* passes. Two rollers *w*, w^1, one above and one below the cam *u*, enable the cam in its rotation to lift or depress the lever K, whose lower end is connected to the lever L, this is connected at 4 to the crank 5, and a pin u^1, on the frame carries the other end, and gives effect to the weight L^1, on the end beyond the pin u^1.

The crank 5 is attached to this end of the leading shaft M, which has on it under the machine the leading crank N, as shown detached in Fig. 15, this crank N, is to be attached to the leader link *x*, shown as connected to the mold driver O, in the detached Fig. 14. A rod *y* is jointed at the lower end to the lever L the upper end is slotted to connect this rod *y* to one end of the latch bar y^1, the other end of this is forked to receive the outer end of the latch y^2, the hook of which holds the outer end of the forked clutch lever P, shown detached in Figs. 16 and 17, whose fulcrum is in a bracket y^4, on the tie 3, the fork of the lever P, lies into a groove in the clutch cam *f;* a spring y^3 is attached in front of the machine with the upper end against the clutch lever P, and must be strong enough to force the lever in the opposite direction and detach the cam *f* from the clutch pins *e* on the pinion *c* when the latch hook is raised as hereafter referred to.

In Fig. 14 a metal gage bar a^1, works in a long slot in the back of the frame *s* and overlies the mold driver O, and is held by a small crank c^1, at one end and at the other by a lever crank e^1, the arm of which overlies the platform H, and is held there by the spring i^1, the two cranks move simultaneously by the connecting rod o^1, the upper side of the gage bar a^1 lying at the same level with the mold slide G. The machine thus fitted is to be used as follows: The molding boxes b^7, Fig. 7, Sheet 1, are to be pushed on by hand over the mold slide G, and will be guided in upon the metal gage bar a^1 which prevents the forward end of the mold from dropping until the end of the mold strikes the crank lever e^1, when the gage bar a^1, will be drawn back by the joint action of the cranks and allow the mold to drop into place ready to move forward and power being applied in any convenient manner to turn the machine the wipers *b* will force the clay into the press box, under the press driver or follower *p*. As the machine moves on the cam *h* raises the press driver *p* and on the point of the cam *h* passing the roller *l* the cam will roll forward by the balance of its own weight until stopped by the pin 6 in the fixed cam 7, and allow the press driver to fall quickly by the power of the weight F, on the lever E, and on the driver *p* touching the clay it will rest momentarily only as the momentum gained by the weight F, will force the press arms down and cause it to operate with a sudden pressure on the driver *p* and the material below which will thus be driven through the bars of the press grates b^6 and fill the mold beneath.

The mold driver O, being at this time drawn back by the motion of the machine the next mold b^7, is to be pushed in and will be adjusted into place by the operation of the gage a^1, as before described the motion of the machine continuing, the leading cam *u* operating by the roller *w*, w^1, will depress the leading bar K, and crank 5 moving the crank N, forward this sends on the mold driver O, and next mold b^7, the upward motion of the cam *u* now reverses the previous motion of the mold driver O, and leaves the space for another mold, this and the other motions being successively repeated as described.

In the arrangement of the machine any hard substance passing over the grate bars b^6, will only decrease the operation of the press driver *p* without deranging the operation of the other parts, as the molding is to be effected by the momentum of the arm *n*, press *p*, lever E, and weight F. But if any hard substances goes through the bars b^6, the leading lever K, will only depress that end of the horizontal lever L, without depressing the crank 5 and deranging the other parts, as the lever L will move on the fulcrum 4 and the opposite end and weight will rise; this lifts the rod *y* and depresses the other end of the latch bar y^1, the fork of which carries down that end of the latch y^2 and lifts the hook from the lever P. The spring y^3 will move the lever in the opposite direction and this disengages the clutch cam *f* from the pinion *c* and prevents any breakage and the same result will be produced if any one of the molds b^7 should not be pushed in so as to take the proper place for being sent on by the driver O. In the common mode of making the bars of the press grates b^6 parallel in width the clay material frequently comes down first in the middle and pushes off the sand in the molds by touching the bottom or sides before the motion is completed; this is mostly caused by quicksand in the clay and when it happens the clay sticks in the molds the corners are not filled, and the bricks come out not formed full and square at the ends and corners; these defaults are prevented by my mode of making the grate bars of an increased width between the ends; this increase must not be made in the middle of

the length but about one third from the back of the press chamber forward when applied to machines where the clay comes in sidewise.

In machines where the clay descends direct the increased width must be in the middle of the length in either case leaving the ends of equal size as shown in the detached Figs. 6, Sheet 1, and 13, Sheet 2, and the widest part in the openings of the grates must be an inch and a quarter less than the width of the bricks and an inch and a half less in the length the same as in any other grates for similar uses as in practice those differences are essential to filling the molds without disturbing the sand used to assist in clearing them.

In Sheet 3, the detached Figs. 18 and 19 represent a variation in the means of constructing the parts that work the mold driver O. The cam u on the outer end of the shaft d is shown as a continuous cam instead of the interrupted cam, shown in Fig. 8, and the lower roller w^1 on the leading lever K, is dispensed with as are also the lever L, weight L^1, and the apparatus connected with that and the clutch latch y^2, leaving the clutch lever P, and fork as described. In these Figs. 18 and 19 the bar K, is connected direct on the end of the crank 5 and the opposite end of the leading shaft M is fitted with a lever R, and weight S, so placed that as the cam u allows the bar K, to descend, the weight S, operates to depress the lever R, and move the leading crank N, forward to carry the empty mold under the press and move out the one filled, the downward motion of the bar K, being regulated, and the upward or return motion given, by the cam u, and roller w.

What I claim as new and of my own invention is—

1. The fitting the press driver b^3 with common clack valves beneath the openings b^4, as shown in Figs. 5 and 20, to admit air between the clay material and the under side of the driver as the driver rises, substantially as the same are described.

2. The mode described and shown in Sheet 1, of regulating the pressure given by the driver by means of the connection between the arm y and the sliding part a^2, which collectively form the driver arm or rod, in combination with the weighted lever a^9, which lever prevents the part a^2 from moving up until the resistance to its descent is sufficient to overcome the weight on the lever when it will rise and prevent the breakage that would otherwise occur, the whole being constructed and operating as set forth and including any variations substantially the same in principle and character.

3. The mode of moving the apron chain for conducting the molds beneath the pressing chamber by means of the latch catch e^3, attached to the horizontal latch slide e^1, in combination with the lever c^6, the lever c^3, sliding shackle bar c^1, and cam b^3, the whole being constructed and operating substantially as described.

4. The mode of preventing breakage by hard substances obstructing the apron chain through the connection of the levers c^3 and c^6, by the cord c, o, to the lever d^2, and the combination of these with the cord d^5, latch o and tightening rigger lever q, the whole constructed and operating substantially as herein set forth.

5. The mode of constructing the metal grates b^6 with openings narrower in or near the middle than at the ends for the purpose of pressing the clay through the same so that it shall fill the ends and corners of the mold beneath equally with the middle parts of the mold, thereby avoiding any partial removal of the molding sand, and preventing the clay from sticking in the mold; substantially as the same is described.

6. The mode described and shown in Fig. 8, and 12, Sheet 2, of pressing the tempered clay into the molds beneath by the momentum of the weight F operating through the lever E, arm w, and driver p, and the combination of these parts with the crank arm m, and k, and lifting cam h, substantially as the same are described.

7. The mode of adjusting the molds b^7, in place to be sent on under the pressing chamber to be filled by the gage bar a^1, crank c^1, lever crank e^1, spring i^1, and connecting rod o^1, see Fig. 14, Sheet 2, substantially as the same is described.

8. The mode of driving the molds under the press chamber by the driver O, crank arm N, and 5 in combination with the vertical connecting lever K, and cam u, see Figs. 8, 14, and 15, Sheet 2, substantially as such mode is herein shown and described.

9. The mode of preventing breakage from hard substances passing through the grates into the molds so as to obstruct the molds, as shown in Figs. 8, 11, 16 and 17, by the operation of the vertical lever K, lever L weight L^1, slotted bar y, and forked latch bar y^1, and the combination of these parts with the latch y^2, spring y^3, clutch lever P, clutch cam f, and pin e on the pinion c, substantially as the construction, combination and operation of these parts are herein shown and described.

In witness whereof I the said Charles G. Brown, have hereunto set my hand, in the presence of the witnesses whose names are hereto subscribed, on the twenty seventh day of September one thousand eight hundred and forty one.

CHARLES G. BROWN. [L. S.]

Witnesses:

Lewis Constant,

Cynemus F. Brill.