(No Model.)

9 Sheets—Sheet 1.

C. CHAMBERS, Jr.

BRICK MACHINE.

No. 362,204. Patented May 3, 1887.

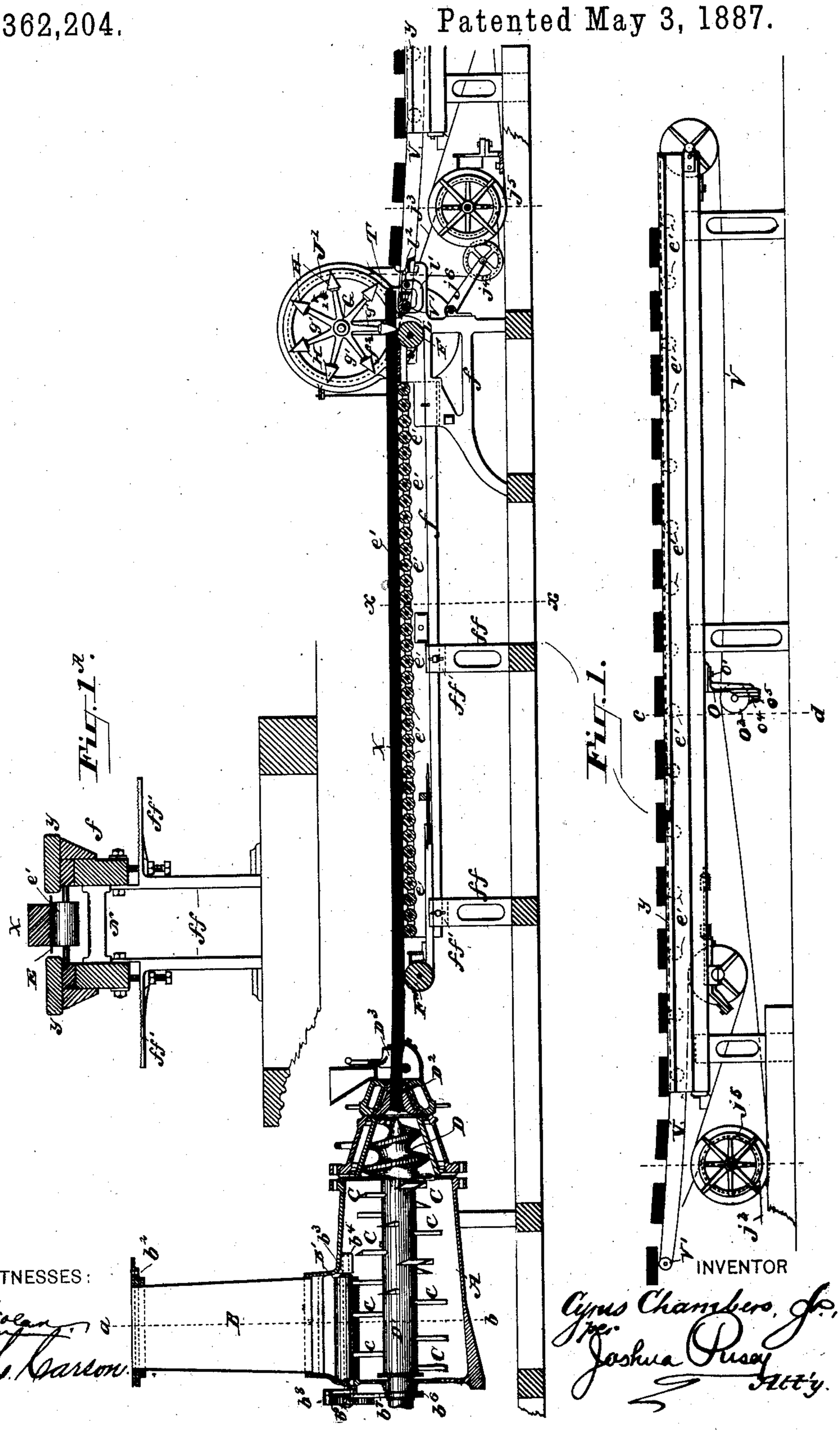

Fig. 1.

Fig. 2.

WITNESSES:

Thos. A. Logan.

Wm. R. Baron.

INVENTOR

Cyrus Chambers, Jr.

per Joshua Pusey

Atty.

(No Model.) 9 Sheets—Sheet 2.

C. CHAMBERS, Jr.

BRICK MACHINE.

No. 362,204. Patented May 3, 1887.

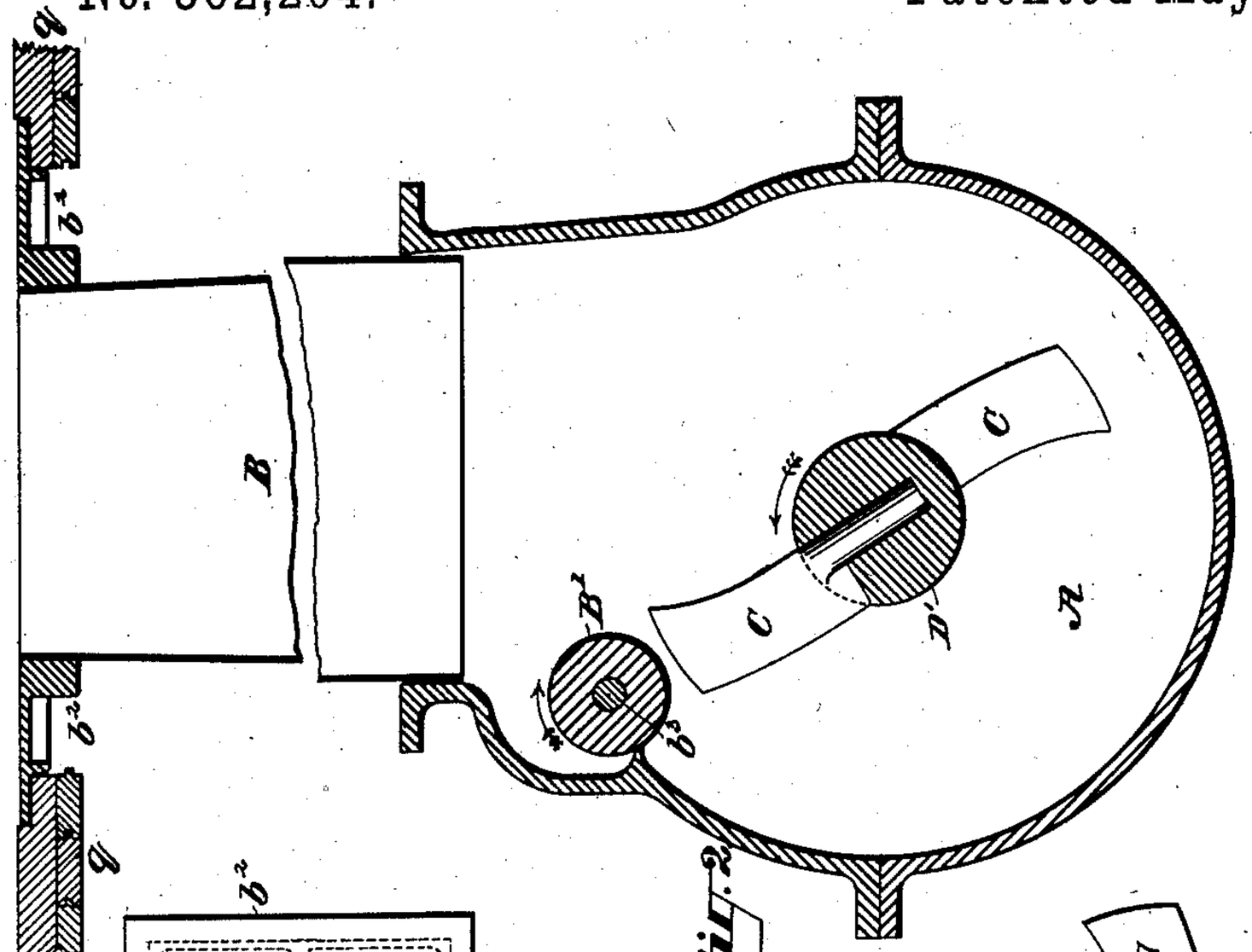

Fig. 2.

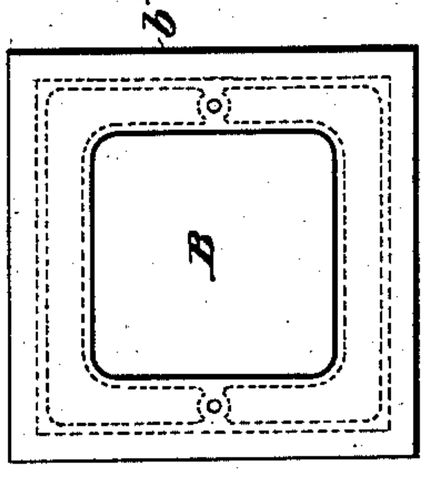

Fig. 4.

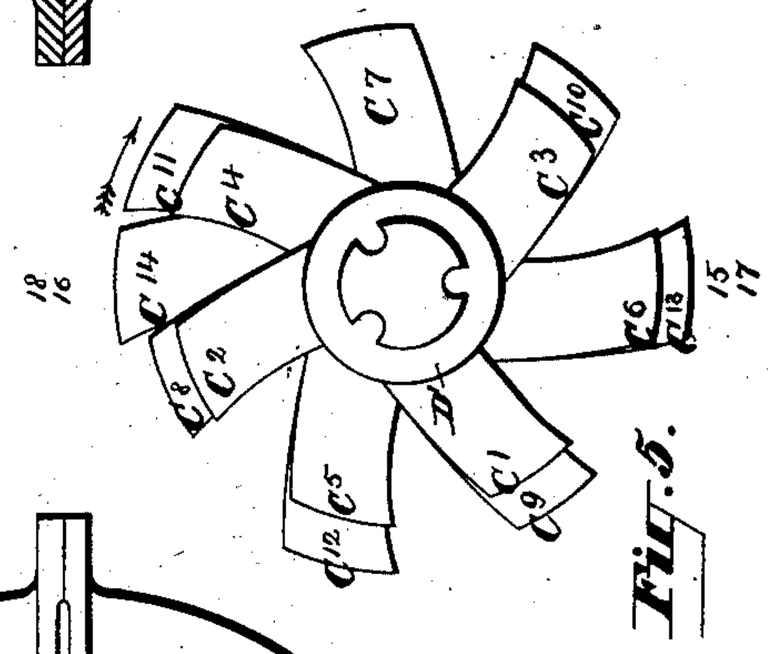

Fig. 5.

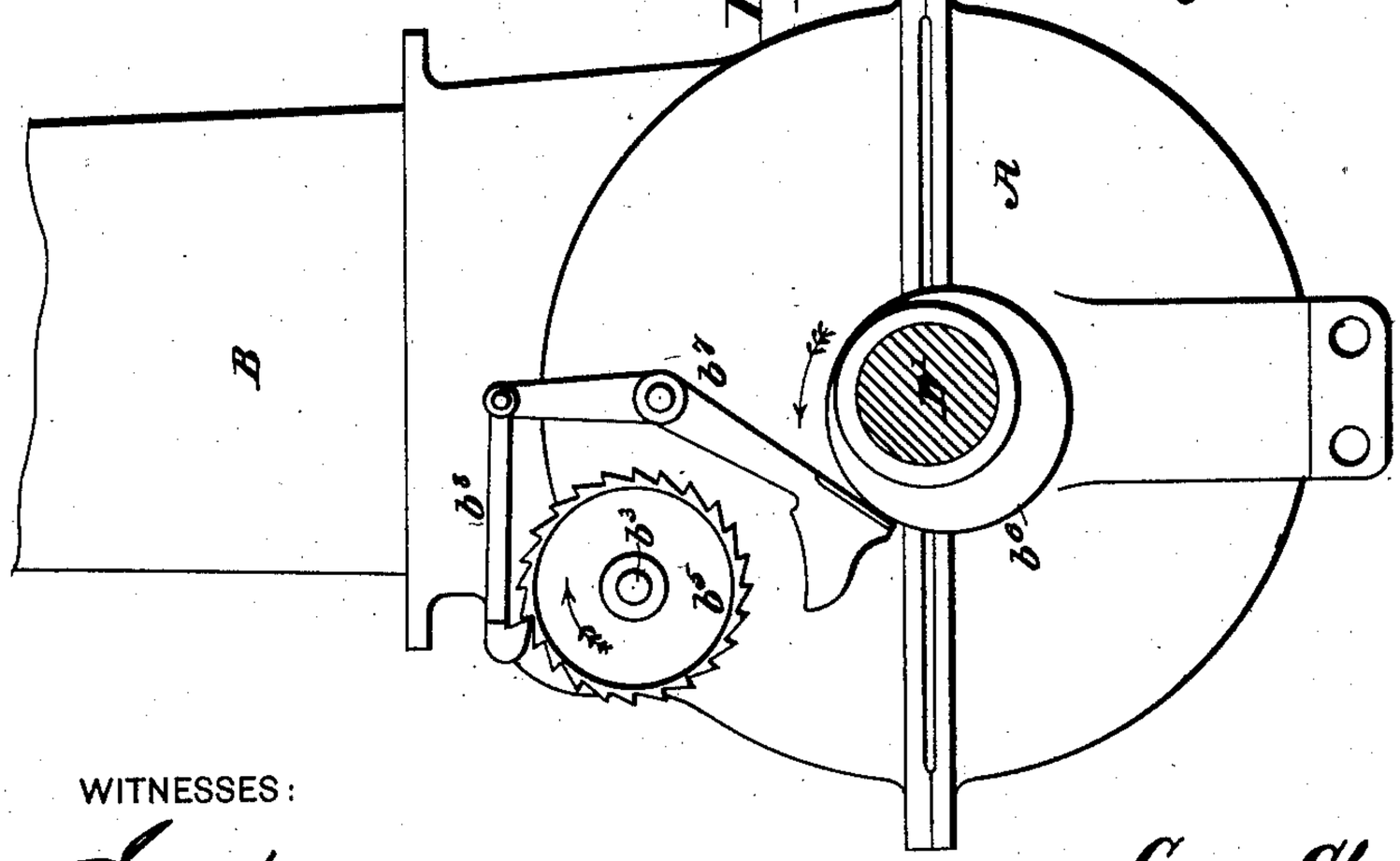

Fig. 3.

WITNESSES:

Geo. Gaeyn
Wm. H. Carson.

INVENTOR

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per Joshua Pusey
Atty.

(No Model.) 9 Sheets—Sheet 3.

C. CHAMBERS, Jr.

BRICK MACHINE.

No. 362,204. Patented May 3, 1887.

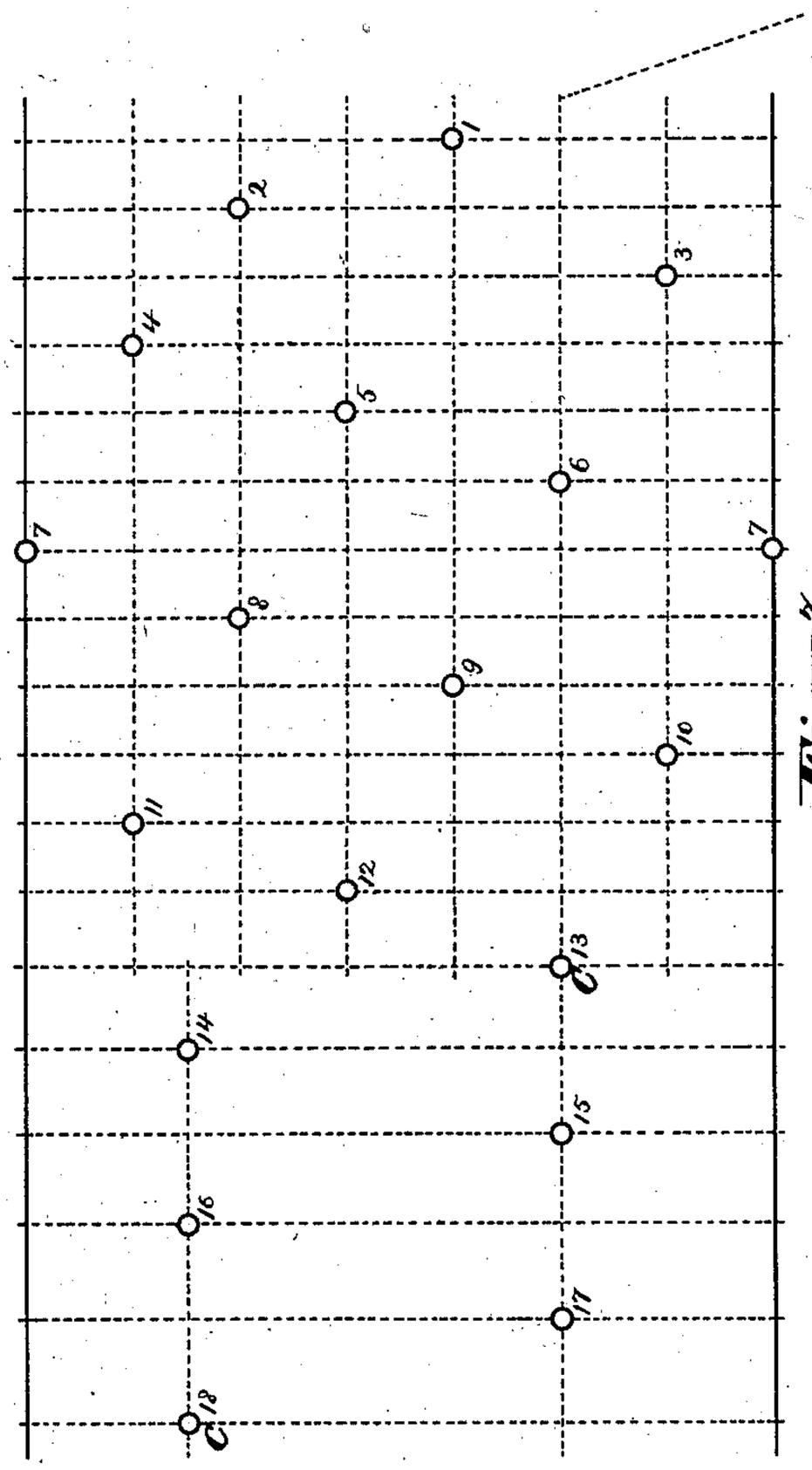


Fig. 7.

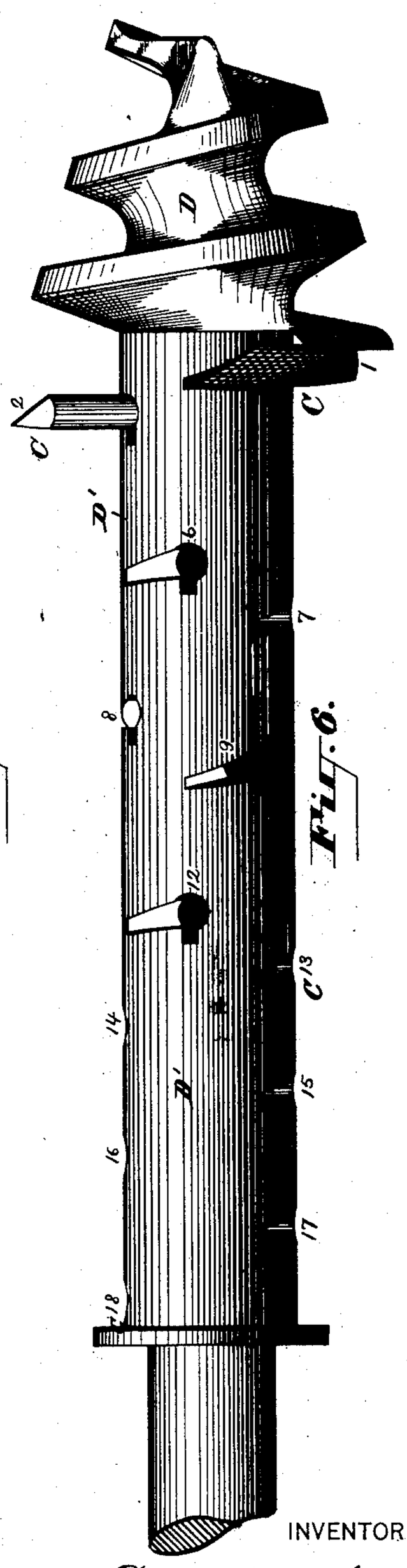


Fig. 8.

WITNESSES:

Leo. Stoeger.

Wm. R. Carson.

INVENTOR

Cyrus Chambers, Jr.,

per Joshua Pusey

Atty

(No Model.) 9 Sheets—Sheet 4.

C. CHAMBERS, Jr.

BRICK MACHINE.

No. 362,204. Patented May 3, 1887.

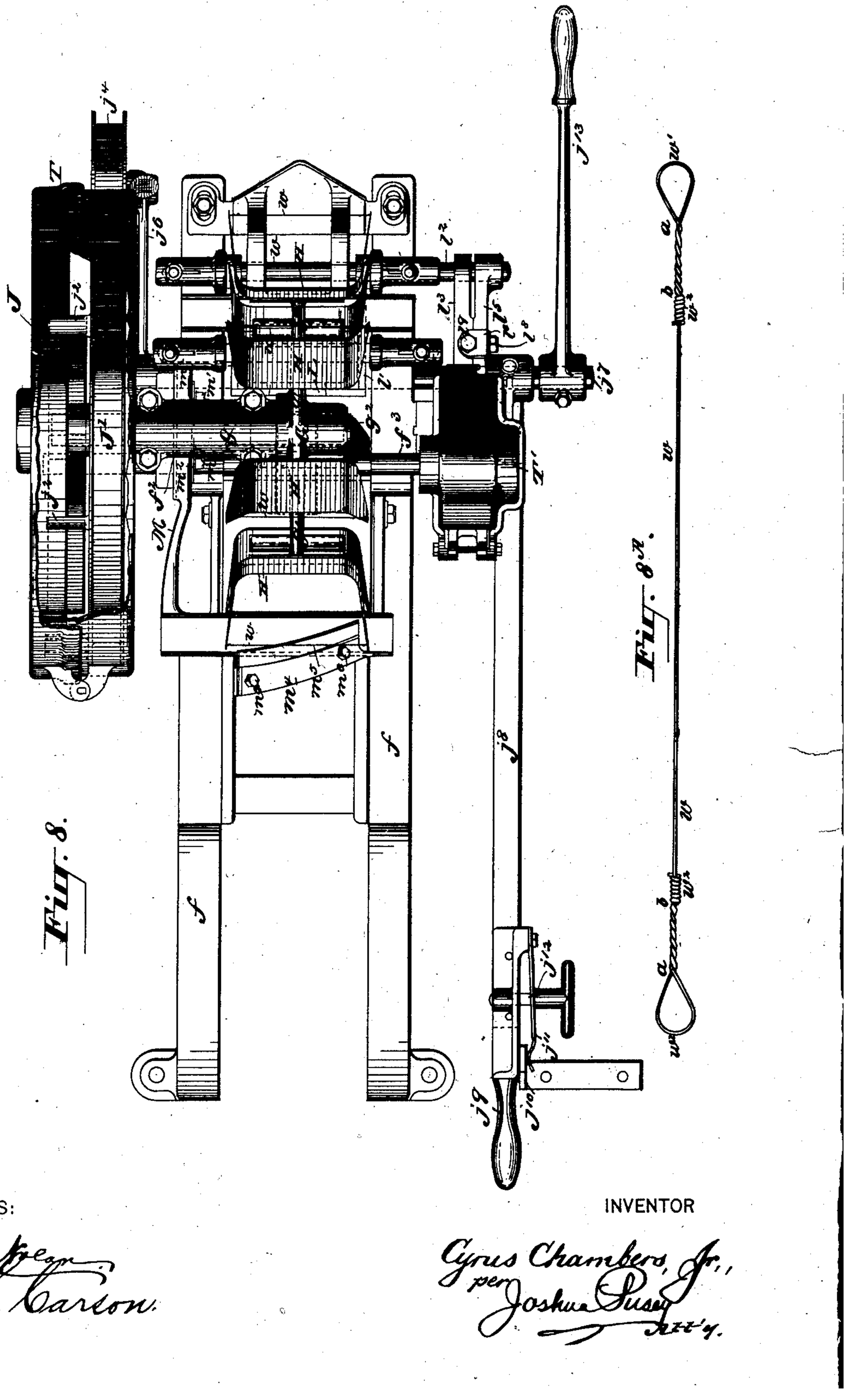


Fig. 8.

Fig. 8*a*.

WITNESSES:

Geo. Breck.
Wm. A. Carson.

INVENTOR

Cyrus Chambers, Jr.,
per Joshua Pusey
Att'y.

(No Model.)

9 Sheets—Sheet 5.

C. CHAMBERS, Jr.

BRICK MACHINE.

No. 362,204.

Patented May 3, 1887.

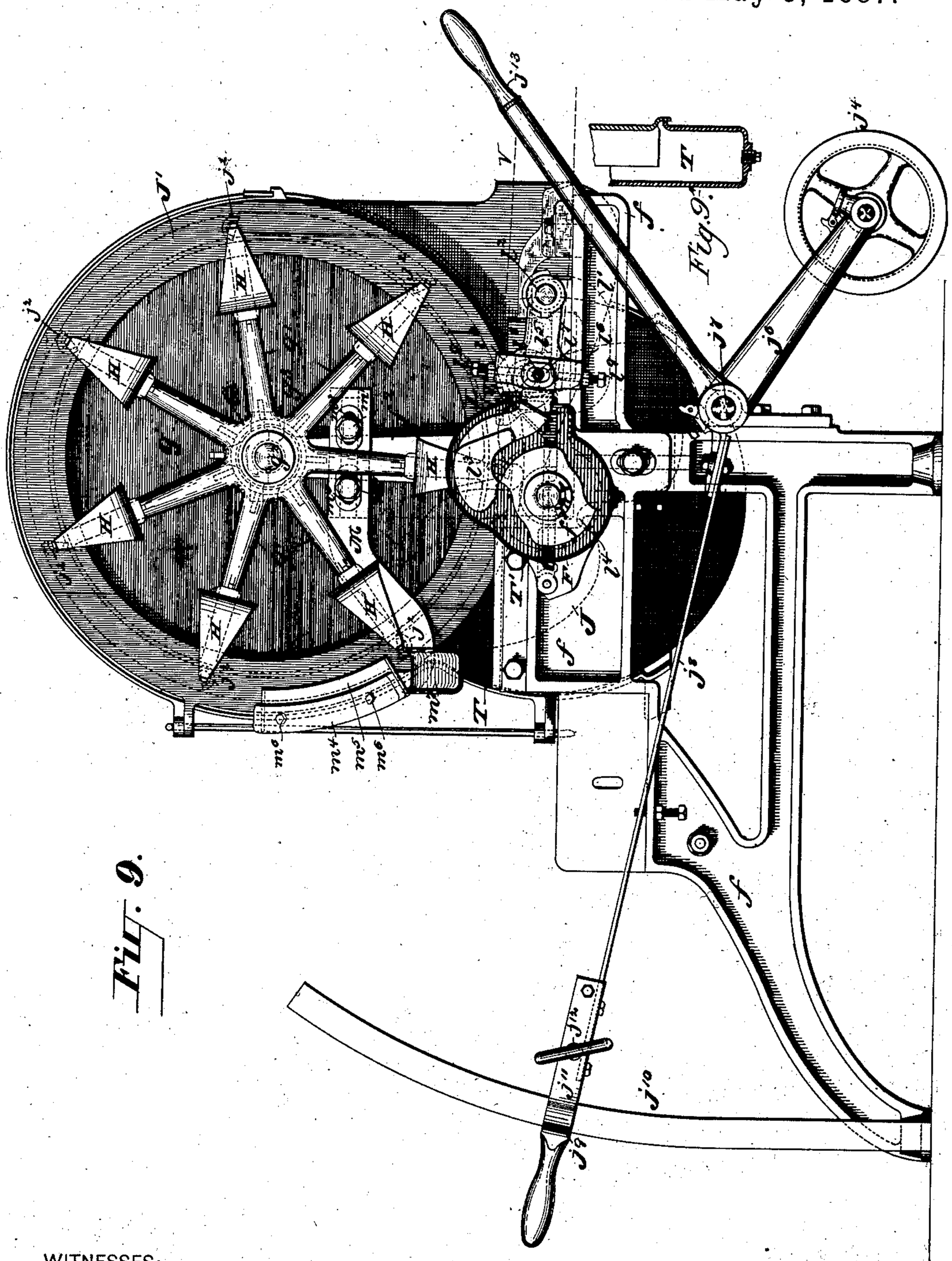


Fig. 9.

WITNESSES:

Geo. Logan

Wm. R. Carson.

INVENTOR

Cyrus Chambers, Jr.

per Joshua Pusey

Atty.

(No Model.)

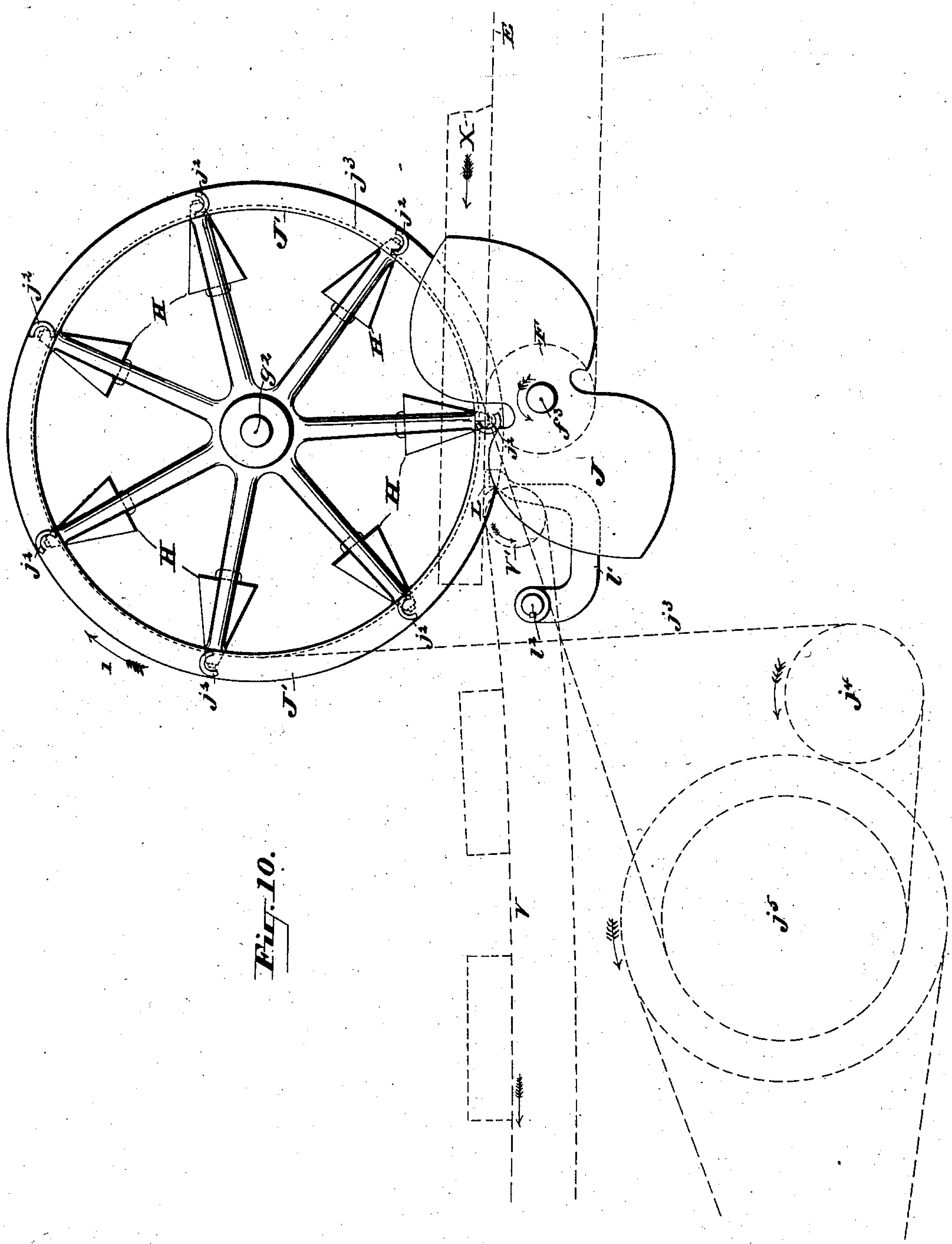
9 Sheets—Sheet 6.

C. CHAMBERS, Jr.

BRICK MACHINE.

No. 362,204.

Patented May 3, 1887.



WITNESSES:

Geo. Nolan

Wm. H. Carson.

INVENTOR

Cyrus Chambers, Jr.,

per

Joshua Pusey

Att'y.

(No Model.)

9 Sheets—Sheet 7.

C. CHAMBERS, Jr.

BRICK MACHINE.

No. 362,204. Patented May 3, 1887.

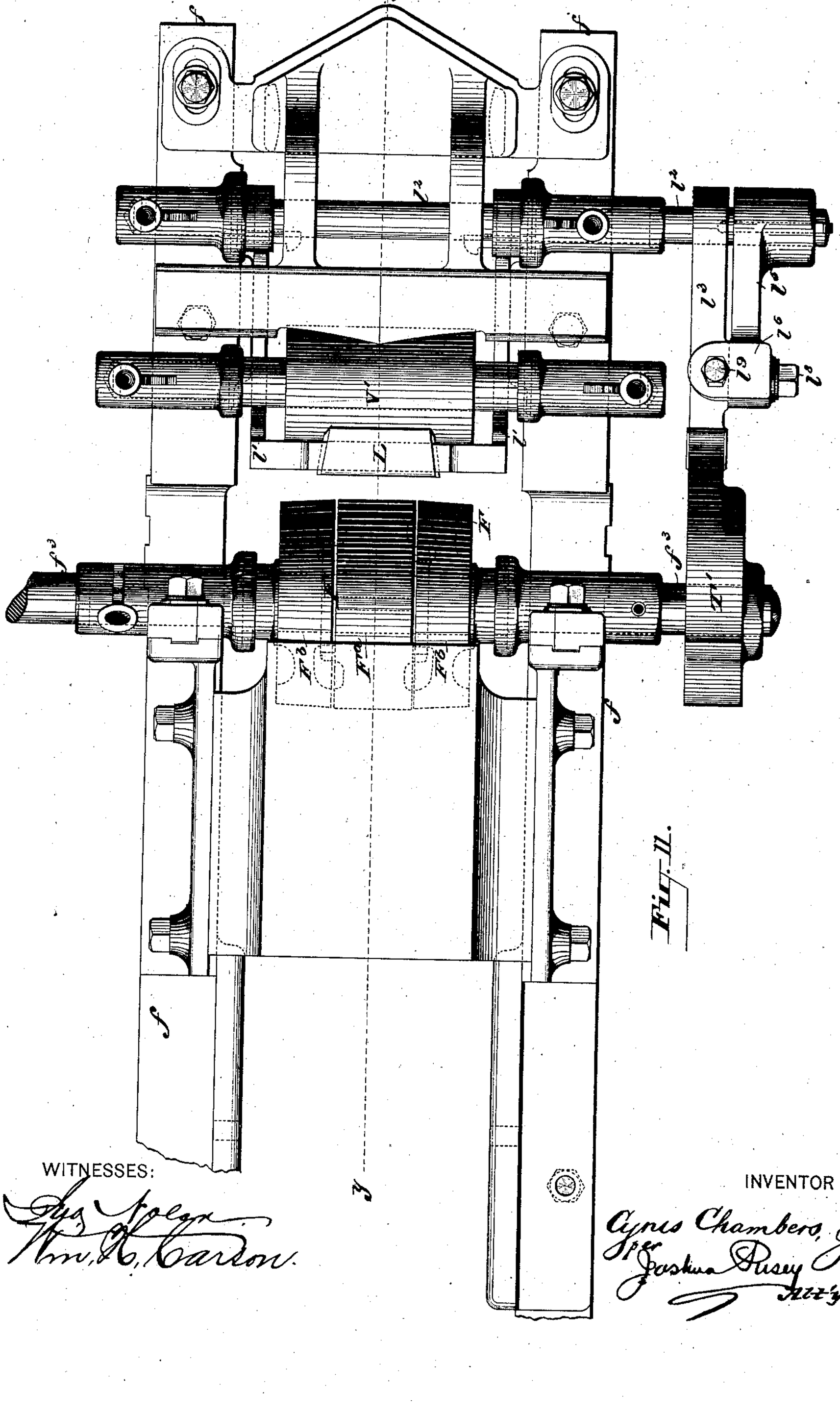


Fig. II.

WITNESSES:

Lys. Coleman
Wm. H. Carson.

INVENTOR

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per Joshua Pusey
Atty.

(No Model.)

9 Sheets—Sheet 8.

C. CHAMBERS, Jr.

BRICK MACHINE.

No. 362,204. Patented May 3, 1887.

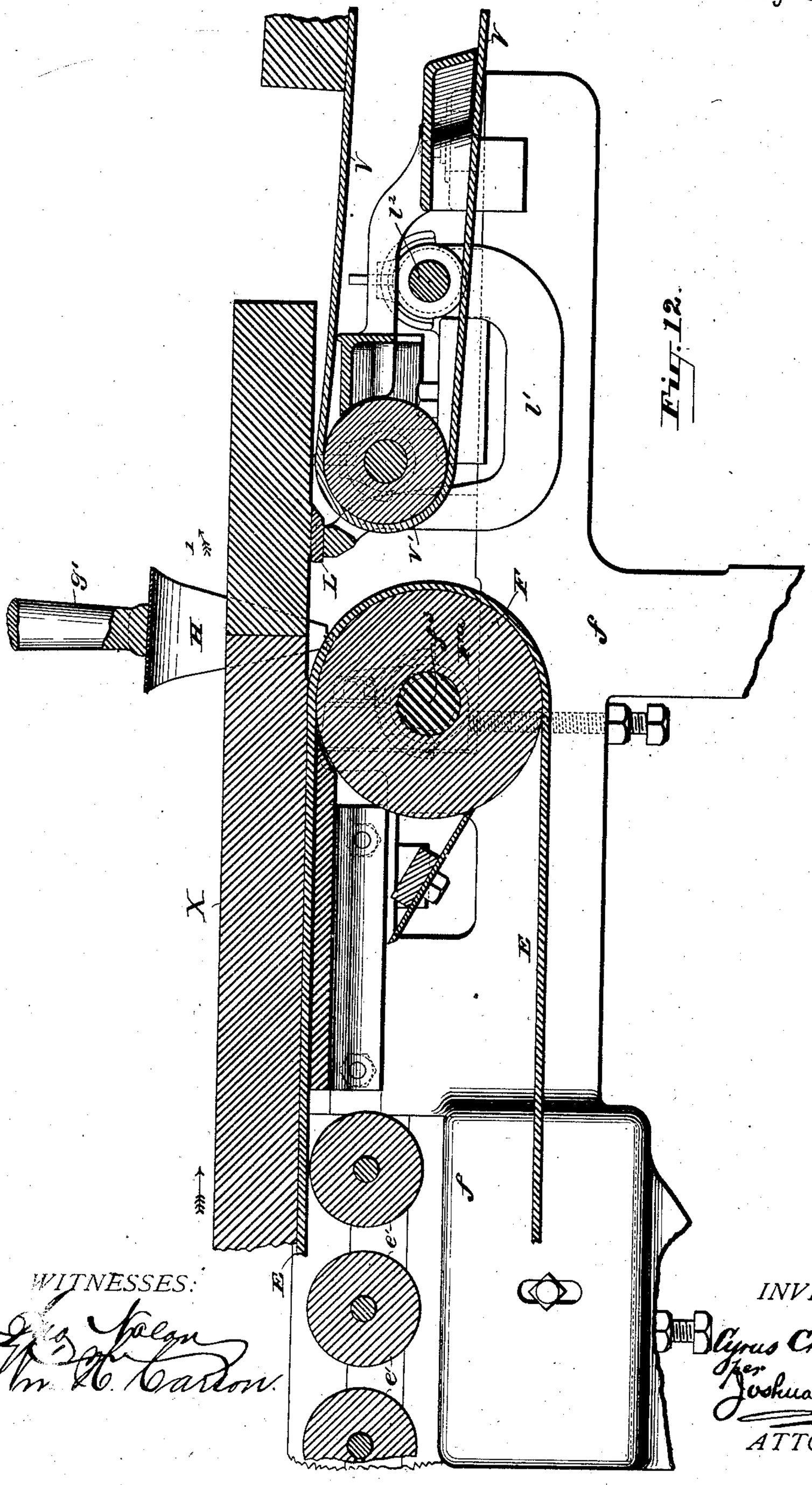

Fig. 12.

WITNESSES:

Geo. Soley

Wm. H. Carlon.

INVENTOR

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per Joshua Pusey

ATTORNEY

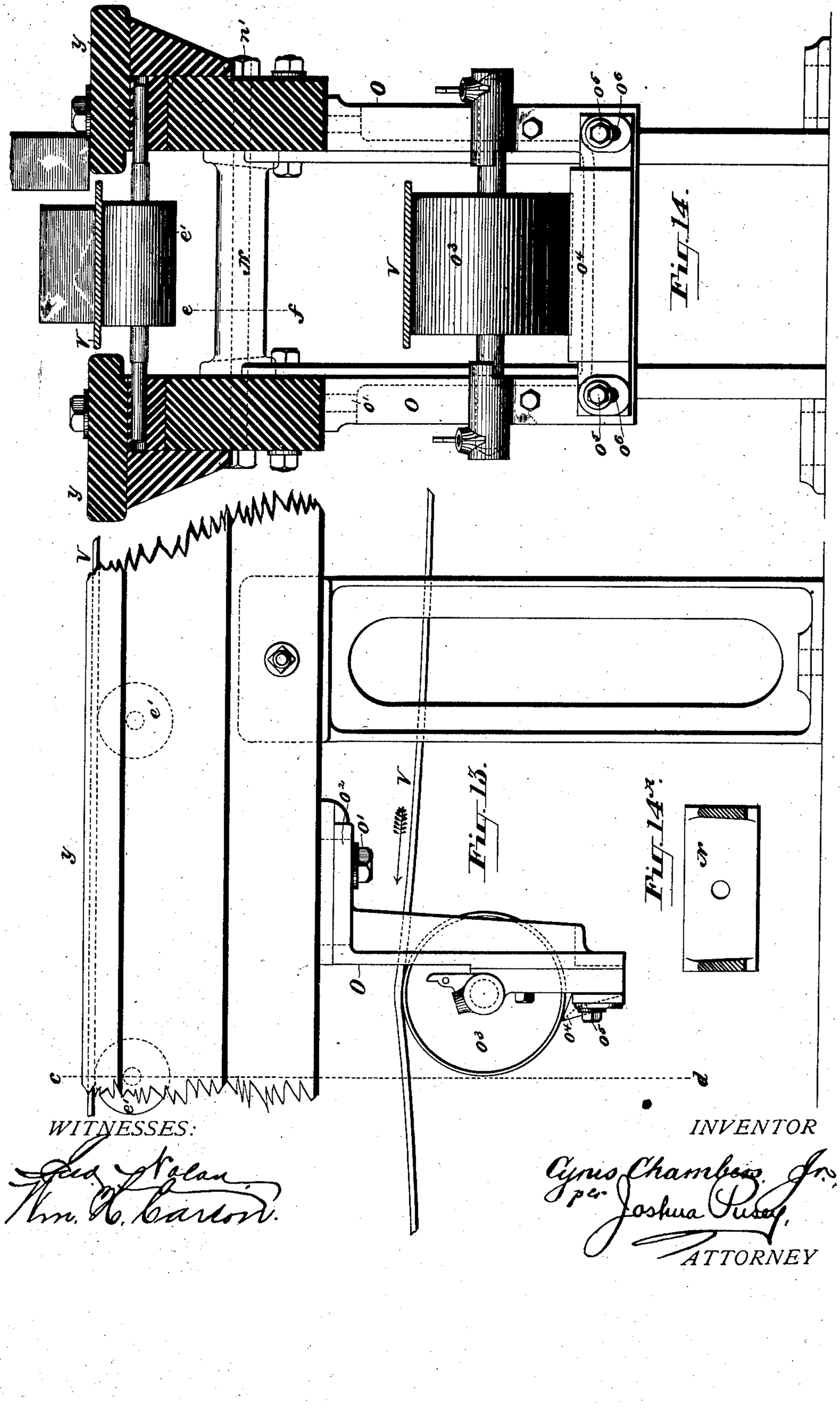
(No Model.)

9 Sheets—Sheet 9.

C. CHAMBERS, Jr.

BRICK MACHINE.

No. 362,204. Patented May 3, 1887.



WITNESSES:

Geo. H. Dalan

Wm. H. Carson.

INVENTOR

Cyrus Chambers, Jr.

per Joshua Pusey.

ATTORNEY

UNITED STATES PATENT OFFICE.

CYRUS CHAMPERS, JR., OF PHILADELPHIA, PENNSYLVANIA.

BRICK-MACHINE.

SPECIFICATION forming part of Letters Patent No. 362,204, dated May 3, 1887.

Application filed November 1, 1886. Serial No. 217,671. (No model.)

To all whom it may concern:

Be it known that I, CYRUS CHAMBERS, JR., a citizen of the United States, residing in the city and county of Philadelphia, and State of Pennsylvania, have invented certain new and useful Improvements in Brick-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, of which—

Figure 1, Sheet 1, is a sectional side elevation of the entire machine as it appears in operation. Fig. 1^A is a section on line *x*, Fig. 1. Fig. 2, Sheet 2, is a transverse section of the tempering-case, pugging-shaft, feed-roller, and hopper as on the line *a b*, Fig. 1. Fig. 3 is a rear end view of the tempering-case, the pugging-shaft being cut off. Fig. 4 is a plan of the hopper. Fig. 5 is a front or screw end view of the pugging-shaft and knives in position, the screw having been removed. Fig. 6, Sheet 3, is a plan view of the pugging-shaft detached, with the forcing-screw thereon, showing two of the tempering-knives in place, the others removed. Fig. 7 is a plane diagram illustrating the relative positions occupied by the tempering-knives on said shaft. Fig. 8, Sheet 4, is a plan view of the "cut-off" wheel and its adjuncts and connections, the box inclosing the tappet-wheel and other parts being broken away. Fig. 8^A represents one of the cut-off wires detached. Fig. 9, Sheet 5, is a side elevation, partly in section, of the cut-off wheel, wire-cleaner, cam and lever mechanism for operating the side plate, and the friction-belt tightener and adjuncts. Fig. 9^A is a section of part of the cam-casing. Fig. 10, Sheet 6, is a side outline of the tappet-wheel and cut-off wheel, the double cam, and side plate; also the friction-belt system, regulating-belt, and off-bearing belt in dotted lines, all as seen from the side opposite to that of Fig. 9, Sheet 6, and the casing of the cam, tappet-wheel, &c., removed. Fig. 11, Sheet 7, is a plan view of the measuring-pulley, slide-plate, and adjacent parts, all the mechanism above the line of the bar of clay having been removed. Fig. 12, Sheet 8, is a side sectional elevation, as on line *y y*, Fig. 11, of a portion of the cut-off wheel, the measuring-pulley, &c., showing the relative position of the parts at the instant the bar of clay is completely severed. Fig. 13, Sheet 9, is a side elevation of a section of the off-bearing frame enlarged from Fig. 1, and return-belt carrying pulley and bracket. Fig. 14 is a section of the off-bearing frame as on line *c d*, Figs. 1 and 13. Fig. 14^A is a section on line *e f*, Fig. 14, of one of the cross-stays of the off-bearing-belt frame.

This invention relates to that general class of brick-making machines in which the clay is tempered within a case and forced out therefrom through a die of suitable form in a continuous bar whose breadth and thickness are those of the bricks to be made, and said bar is severed into brick lengths by means of cut-off devices adapted to that end.

Machines of this class have long been known in the United States and elsewhere as "Chambers' Brick-Machines." These are shown and described in the following Letters Patent of the United States granted to me, to which reference may be had: No. 40,221, dated October 6, 1863, wherein a rotating-knife cut-off mechanism is shown; No. 207,343, dated August 27, 1878, and No. 275,467, dated April 10, 1883, wherein a spiral-blade cut-off mechanism is shown; Nos. 297,671 and 297,917, dated April 29, 1884, wherein the cut-off is a series of wires mounted on an endless moving belt inclined to and moving with the bar of clay. Various other improvements in the construction of this aforesaid general class of machines have been made and patented by me in the interval between the first and the last above-mentioned Letters Patent, with the view to the production of a brick-machine that should approximate in entirety and detail, as nearly as could be in the light of actual experience and observation, toward perfection.

The improvements I am now about to set forth are the result up to a recent time of keeping steadily in view the realization of this aim toward perfection. Said improvements relate more particularly to the wire cut-off mechanism described in my aforementioned Letters Patent, Nos. 297,671 and 297,917, although, as will appear, a number of improvements in other parts of the mechanism of the machine will be hereinafter described and particularly pointed out.

In describing the general construction and operation of the machine and the several features and combinations that will hereinafter form the subject of claims, I shall, for order

and perspicuity, commence with the rear part of the machine, wherein the clay is delivered in the tempering-case, and proceed, as nearly as conveniently may be, *seriatim*, to the forward part thereof, where the bricks are finally conveyed into position to be taken away by the "off-bearers" for hacking to be dried, preparatory to removal of the same to the kilns for burning.

Referring now to the annexed drawings, the clay is dumped from a suitable platform into the tempering-case A by way of the vertical hopper B, wherein it is tempered by the spirally-set knives C, and is forced out by said knives and the screw D on the end of the pugging-shaft D′, through a die, D^2, in a continuous bar, X, which passes through a sand-box, D^3, thence onto an endless belt, E, (supported by rollers e',) running over pulleys F F′, respectively journaled in the frame *f*. This belt is termed the "regulating-belt," and will be hereinafter referred to as such. The bar of clay advances beneath a wheel, G, having arms g', that carry at their free extremities elastic steel bows H, such as those described in said Patents Nos. 297,671 and 297,917. To each of these bows is attached a cut-off wire, *w*. By mechanism to be described, the wheel is rotated and the wires caused to be carried across the path of the bar of clay and thereby sever the same at right angles into bricks, which pass on to the off-bearing belt V.

I prefer to make the hopper B of the form shown—that is to say, gradually tapering upward, nearly square in cross-section, and with rounded corners. (See Figs. 1, 2, 3, and 4.) It is made square so as to give a large opening into the tempering-case and to correspond with the straight side or line required by the feeding-roller B′, (to be described,) and the corners are rounded in order to prevent the clay from lodging therein, and the tapering form is designed to prevent the clay, as a whole mass, from becoming lodged. To the contracted upper end of the hopper is secured a plate or flange, b^2, whose dimensions are sufficient to close the opening in the feeding floor or platform *q*, Fig. 2, through which the hopper passes.

The first of the present improvements to be set forth consists in placing what I term a "feeding-roller," B′, within the tempering-case at the side thereof immediately below the hopper, in position, however, to just clear the rear tempering-knives. The object and operation of this roller is to break or cut off the connection between the clay lining of the tempering-case beyond the reach of the knives, and thereby prevent the clay from packing onto said lining and forming an arch that finally, as it grows, closes the bottom of the hopper, and thus obstructing further feeding of the clay until the arch is broken. The tempering-knives in their rotation force the clay against the roller; but, as the latter is caused to turn by the action of the devices to be described, the knives, passing close to the under side of the roller, clear off any clay adhering thereto. One end of the shaft b^3 of this roller runs in a box-lug, b^4, within the case, and the other end extends outside the rear wall of the tempering-case, as seen in Figs. 1 and 3. Upon the outer end of the shaft, Figs. 1 and 3, is a ratchet-wheel, b^5, which is actuated by means of a cam, b^6, on the pugging-shaft D′, and a bell-crank lever, b^8, and pivoted pawl b^7. It will be obvious that as the pugging-shaft rotates the desired intermittent rotation of the roller B′ will take place.

The second improvement relates to a peculiar position or arrangement of certain of the tempering-knives on the pugging-shaft, and its object is to obviate a defect in the operation of the horizontal fast-running shaft in machines of this class, wherein the knives are arranged in regular spiral around the shaft, as shown in Letters Patent No. 297,675, dated April 29, 1884. I observed that one or more of the knives in that arrangement were always under the hopper, and there had a tendency to hold the clay up and prevent the free and uniform feeding thereof; also, that when the spiral made by the position of the knives (the direction of which spiral is the reverse of that of the screw on the end of the shaft) met at the screw, or within one or two knives from the same, as shown in said Patent No. 297,675, the knives adjacent to the screw forced or jammed the clay against the side of the outside thread of the screw, and thereby interfered with the proper feeding of the clay to the screw.

I now arrange the knives (C^{13} to C^{18}, both inclusive) at the rear or hopper end of the shaft in the same positions as heretofore relative to the longitudinal axis of the shaft; but instead of following circumferentially the regular spiral in regular order, I arrange said knives in two rows parallel to the axis of the shaft, as shown in Fig. 6, Sheet 3, and in the diagram, Fig. 7, same sheet which latter represents a plan of the periphery of the shaft, all the knife-sockets being consecutively numbered thereon, and so far as visible in Fig. 6. Fig. 5, Sheet 2, shows the knives as arranged on the shaft, looking at the end of the latter. Said two rows of knives, instead of being arranged parallel, as shown, may, however, be set on an oblique spiral, one knife slightly in advance of the other, and produce the same result, substantially, as if the rows were quite parallel. The described arrangement of the knives at the hopper end allows the whole volume of clay descending from the hopper to slide down to the shaft after the passage of the one row of knives and before the arrival of the succeeding row. This greatly facilitates the feeding of the clay, and with much greater uniformity than heretofore. The other peculiarity above alluded to in the position of the knives resides in the peculiar location of those knives near the screw end of the shaft relatively to each other and to the screw. It will be observed, referring to Figs. 5, 6, and 7, that the knife marked C′, next the screw, is

set just in front of the mouth of the screw, so as to deliver the clay directly therein; the second knife, C^2, just in front of the first in the spiral, so as to insure the latter knife, C^2, receiving its full complement of clay, while the third knife, C^3, Figs. 5 and 6, is located on the side of the shaft opposite to the second, in order to have room to move the clay over into the path made by knife C^2, yet far enough back or behind the latter so as not to bind the clay between the knives C' C^2 or against the side of the screw. The pitch or direction of the spiral of the knives is reversed, beginning with the fourth knife, C^4, instead of at the second, as heretofore, and as shown in said Patent No. 297,675. By this arrangement less power is required to run the machine, and greater uniformity is secured than has been the case with previous arrangements.

The third improvement pertains to the construction of the series of rollers e', Fig. 1^A, which support the regulating-belt E with relation to the latter. Heretofore, and as seen in my said Patent No. 297,917, the face of these rollers has been wider than the width of the belt. Consequently pieces of clay and stones sometimes dropping on the projecting ends of the rollers lodged between the same—the rollers being always comparatively close together—caused friction, and thereby retardation of the rollers, and sometimes bits of clay squeezed under the edge of the belt, thereby causing it to run irregularly and preventing the close adhesion of the clay bar to the belt, and so seriously affecting the "regulation." In order to remedy these defects, I now make the said rollers narrower on their face than the width of the regulating-belt, as clearly shown in Fig. 1^A. I have found a similar construction to be advantageous when applied to the off bearing belt V, also, whereby it permits the cap-boards *y* (see Fig. 14) to be brought close to the off-bearing belt, thereby facilitating the "edging-up" of the brick on the cap-boards by the "off-bearers," in position to be taken away for conveyance to the hacking-sheds.

The next and fourth improvement, which I remark is the most radical and important, relates to the devices for and pertaining to the severing of the bar of clay into brick lengths, and is specifically an improvement upon the cut-off devices shown in my aforesaid Letters Patent No. 297,671, dated April 29, 1884. As will appear by reference to that patent, the bar of clay was cut off by means of wires secured to elastic bows mounted equidistantly upon an inclined endless belt, which, being driven by the mechanism therein described, carried said wires successively in continuous rotation gradually through the bar of clay and severed the same at right angles into bricks. I found after some experience that this endless-belt cut-off device, although practically successful, was in certain respects imperfect in its operation and was otherwise objectionable, whereupon I was led to devise the construction which I shall now proceed to describe. This consists of a wheel or hub, G, Figs. 1, 8, 9, and 10, having equidistant radial arms g', to the expanded free ends of which are bolted elastic steel bows H, whose form and function are identical with those of the bows shown and described in my Patent No. 297,671—that is, their form is U-shaped with tapering sides and their function to hold with a yielding tension the cut-off wires *w*. This "cut-off" wheel, as I term it, is secured to a stud-shaft, g^2, journaled in a box, g^3, borne by a rigid standard, f^2, Figs. 1 and 9, that extends up from the frame *f* of the regulating-belt. The position, laterally and vertically, of said cut-off wheel with relation to the advancing bar of clay, X, (see Figs. 1, 10, and 12,) is such that as the wheel is rotated in the proper direction—that of the arrow 1—the wires *w*, carried by the bows H, will pass across the path of the clay bar, and also at one point or stage of their movement, a short distance below the latter.

As the motion of the bar of clay forced from the die in the end of the tempering-case is forward in a straight line, while that of the cut-off is rotary across the path of the clay bar, and as, also, owing to the varying consistency of the clay and other causes, the speed of the bar is not uniform, it is necessary, in the first place, to the production of perfectly rectangular bricks, that the rotary movement of the cut-off wheel shall be controlled or regulated so as to compel the cut off wires in traversing the bar of clay to pass through the same at right angles; and, in the second place, it is requisite, in order to secure accurate results, that the rate of rotation of the cut-off wheel shall correspond with the speed of the bar of clay as the same shall vary. The means for securing these requirements are as follows, premising that the distance apart of the cut-off wires is greater than the length of the longest brick the particular machine is designed to make, or, to state it more precisely, greater than the length of a diagonal from the upper corner of one end of the brick to the lower corner of the other end of the brick:

The exact length of the brick to be made is measured by the pulley F—which I term the "measuring-pulley"—at the forward end of the regulating-belt frame *f*, around which pulley, as previously stated, the said belt runs and propels the pulley with a velocity in unison, so to say, with the advancing bar of clay resting upon the belt, the circumference of this pulley being the length of a brick or a multiple of their length. In the present case it is equal to two brick lengths; hence this pulley makes half a revolution for each brick length. In calculating the proper diameter of said pulley I allow for the thickness of the belt and the kind of belt. A four-ply rubber belt in bending over a pulley retains its normal length at the center—that is to say, the half of the belt next the surface of the pulley upsets, while the outer half stretches—so that half the thickness of the belt is to be added to the radius of the

pulley F in calculating the circumference in order to secure exact length of bricks.

In order to secure the first of the two requirements above recited—that is, to insure a cut-off at right angles to the bar of clay—I provide on the end of the shaft f^3 of the measuring-pulley a double heart-shaped cam, J, and on the shaft g^2 of the cut-off wheel I place a wheel, J′, (which, for a purpose to be hereinafter mentioned, is also a belt-wheel,) with tappets j^2, corresponding in number and relation to the cut-off wires on the wheel G. As the shaft f^3 is turned by the bar of clay operating by its friction the regulating-belt, the edge of the cam engages these tappets, whereby the course of the cut-off wheel is controlled, the cam by its peculiar shape governing the rate and course of movement of the cut-off, so that the wires can pass through the bar of clay only at right angles thereto, providing, of course, that it is desired to make rectangular or straight-edge bricks. If the ends of the bricks are to be of other configuration—that is, "ogees," "rounds," or "hollows"—the shape of the cam must be varied accordingly. This cam, which runs within an oil-tight and dust-proof casing, T, is made quite heavy, so that it will serve both as a fly-wheel to maintain uniform motion and as an anvil to take up the blow of the somewhat irregular motion of the tappet-wheel and its adjuncts, and thus relieve the bar of clay from unequal strains and the impact jars of the tappets. It will be understood that the cam does not drive the tappet-wheel. It simply governs the necessary variability of its rotation. The tappet-wheel is driven in the direction of the arrow, Figs. 1 and 10, so as to always hold the tappet sufficiently in contact with the edge of the cam by a friction-belt, j^3, which passes around said wheel and around a tightener-pulley, j^4, and a grooved pulley, j^5, which latter is positively driven through suitable belt and gear connections (not shown in the drawings) intervening between it and the main source of power. The rate of motion thus imparted to the tappet-wheel tends to exceed relatively that of the bar of clay, so that the tappets always have a bearing against the cam; and as the friction of the bar of clay upon the regulating-belt E moves the latter and its pulley F, as also the cam J, and as the cam restrains and governs the course of the tappet, and consequently the cut-off wheel, the wires upon the latter must sever the bar of clay at right angles, whatever be the speed of the bar issuing from the die of the machine. As, owing to the difference in clays or the consistency of the clay, there frequently occurs a tendency of the friction-belt to drive the tappet-wheel with greater force than is really necessary, (owing to the fact that the positively-driven pulley j^5 rotates more rapidly relatively than the bar of clay advances,) I provide the frictional-belt device above alluded to, and also means for regulating the same. These are as follows, particular reference being had to Figs. 1, 9, 10, and 11:

As previously stated, the friction-belt J^3 passes around the tappet-wheel pulley J′, thence in contact with the tightener-pulley j^4, and around the driving-pulley j^5. The arm j^6 of the frame in which the shaft of the tightener-pulley is journaled is attached to a shaft, j^7, journaled transversely in the main frame. To a rearward projection of said arm is secured a spring-lever, j^8, terminating in a handle-piece, j^9, which bears against an upright segment, j^{10}, that is fastened to the foot of the frame. This piece has also attached thereto a spring-finger, j^{11}, the end of which bears against the inside of the segment, (see Fig. 8, Sheet 4,) and the latter is clamped between the piece j^9 and the said finger by means of a clamp-screw, j^{12}, and thus the spring-arm j^8 is retained in the required position. The function of this spring-arm is to allow for the small irregularities that may occur in the running of the belt—such, for instance, as those caused by a piece of clay or stone getting under the belt.

Other devices for retaining the spring-arm in any desired position may be substituted for those described.

The shaft of the tightener-frame also carries a hand-lever, j^{13}, which is intended to be used when it is necessary for the operator to temporarily increase or diminish the friction, which is done by raising or depressing said lever, and consequently the tightener-pulley. The elasticity of the arm j^8 permits this to be done without freeing the same from the segment.

I remark that the measuring-pulley, with a circumference being a multiple of the bricks to be made, may be used in connection with other cut-off devices than those above described and referred to.

The fifth improvement relates to the specific construction of what I have termed the "measuring-pulley" F. I have found that in order to insure uniformity in the speed of the regulating-belt, and consequently the greatest accuracy of cut-off, this pulley should be straight on its face, so that its speed relative to the movement of said belt shall be uniform. Such I discovered was not the case with a "crowning pulley;" yet in order to guide the belt a crowning pulley is desirable. It is also desirable—in fact, necessary—to a perfect cut-off by the wires that this belt shall be made to take a rounding form at the point where the wires finally pass through the bar of clay—beneath which point the periphery of the pulley F is located—so as to compensate for the spring of the wires. Therefore, in order to secure positive accuracy in the propulsion of the pulley, and also, at the same time, the belt-guiding function, I divide this pulley into independent sections, Fig. 11, each constituting, say, one-third of the width of the pulley, the middle section, F^a, being straight-faced and tight on the shaft f^3, and the outer sections, F^b, tapering or rounding, as shown, and running freely upon the shaft. Thus the straight tight section, which determines the

length of the bricks, takes an even positive motion from the regulating-belt, while the loose sections take whatever speed the belt may impart to them, and their rounding faces permit the cut-off wires to take a curve similar to that shown in Fig. 3 of my said Patent No. 297,671.

The sixth improvement relates to the "slide-plate" and mechanism for operating the same, which plate is placed just back of the measuring-pulley, between it and the pulley v' of the off-bearing belt V, as shown and described in a certain application for Letters Patent filed June 26, 1886, by Elizabeth S. Lasor, administratrix of Sanford W. Lasor, deceased, the serial number of which application is 206,291. My devices are simply an improvement upon those of said Lasor. Said plate supports the end of the bar of clay, which slides upon it, before and immediately after it is severed, and is caused to drop at the proper intervals in order to allow the passage of the cut-off wires, as I shall now describe.

Referring to Figs. 1, 8, 9, and 12, L is the slide-plate, whose upper surface is in line with the under side of the bar of clay. It is held by a tilting yoke, l', which is attached to a rock-shaft, l^2, journaled across the frame. To this shaft is connected a lever, l^3, whose free end is upwardly curved and extends over a small double cam, l^4, (see Fig. 9,) on the end of the shaft f^3 of the measuring-pulley. This cam l^4 runs in an oil-tight and dust-proof case, T'. The arrangement and the shape of the face of the cam are such as shown in Fig. 9—that is, it holds up the lever l^3, and consequently the yoke and slide-plate, while the brick is being cut off, and then, as it (the cam) continues in its rotation, allows the yoke and plate to drop by gravity and thereby move away from the path of the cut-off wires on the rotating wheel G. This cam is so timed that this drop of the plate does not occur until the center of gravity of the brick is in advance of a vertical line passing through the center of the off-bearing-belt pulley v', so that the brick will be carried smoothly forward upon the plate by the push of the unsevered end of the bar behind the brick.

As it sometimes is necessary to adjust the height of the slide-plate, I provide the following convenient means for accomplishing the same: On the shaft l^2, close to the lever l^3, I key an arm, l^5, having extensions or lugs l^6 above and below, and a vertical slot, l^7, through which passes a bolt, l^8, that is connected with the lever, and which, when tightened up, firmly clamps the lever and arm l^5 together. Through the extensions l^6 pass adjusting set-screws l^9, whose ends extend into slot l^7. Now, it is clear that when the bolt l^8 and the adjusting-screws l^9 are slackened, or one retracted and the other correspondingly advanced, the arm will be free to be moved independently of the lever l^3, and if it be raised or depressed it will rotate the shaft l^2, to which it and the slide-plate yoke are secured, and thereby raise or lower said plate, as may be desired; and when the desired adjustment is made by means of the set-screws, the arm and lever are again bolted together, and thus, while the extent or throw of the lever by the cam always remains the same, the limit of elevation of the slide-plate may be changed at will. This plate is used in lieu of the roller (I,) shown in my said Letters Patent No. 297,671, of April 29, 1884; but, as also stated in said Lasor application, No. 206,291, it performs an additional function in holding back by friction the bar of clay partially severed, so as to counteract the parting strain.

The seventh improvement relates to the construction of a device for cleaning the cut-off wires of dirt, roots, &c., which would otherwise collect thereon and prevent a clean cut-off of the clay. This cleaner is an improvement upon a device for a like purpose which constitutes the subject of an application for Letters Patent filed June 26, 1886, by Elizabeth S. Lasor, administratrix of Sanford W. Lasor, deceased, the serial number of which application is 206,291.

My improvement shown in Figs. 8 and 9 consists of a curved arm, M, that is attached by bolts m' to lugs m^2, projecting laterally from the standard f^2, which supports the shaft of the cut-off wheel. Longitudinal adjustment of the arm is secured by means of the bolts m', that pass through slots m^3. Said arm carries at its free extremity a curved, inclined, and twisted plate, m^4, to which a strip, m^5, of india-rubber or other suitable flexible material, which I term the "wiper," is secured by means of bolts m^6. The plate and the wiper are below the center of the cut-off wheel, and by reason of that fact and of the twist and inclination of said plate and wiper the latter always projects upward and presents its surface radial to the center of motion of the wires; hence any dirt lodging in the wiper is carried back and down away from the wires and slides down and is carried off by the dirt-spout, hereinafter referred to.

As the cut-off wheel rotates, (in the direction of the adjacent arrow,) each of the wires thereon, continuously in succession, comes into contact with the edge of the flexible wiper, striking the same first at the top, and by the time the wire has passed beyond the lower end of the edge of the strip the latter has, so to say, gradually traversed the length of the wire, and thereby the wire has, by the friction of the wiper, been entirely freed of the clinging roots, dirt, &c., that would otherwise interfere with the integrity of the cut-off. To the arm M is also attached an inclined dirt-spout, m^7, immediately below the wiper, which spout extends transversely beyond the line of the cut-off and the bar of clay. The spout, being below the wiper and projecting beyond the perpendicular of the same, catches the dirt, &c., as it is wiped off and falls from the wires, and delivers the same away from the possibility of contact with the bar of clay.

In the Lasor device, above referred to, the wiper is inclined, but not curved and twisted, nor is it located entirely below the center of the cut-off wheel, which constructions are necessary in connection with the dirt-spout, in order to carry off the droppings from the wires.

The eighth improvement relates to the pulley and frame for supporting the return part of the off-bearing belt V, Figs. 1, 13, and 14; and it consists of a bifurcated frame, O, secured to the under side of the longitudinal pieces of the off-bearing frame by means of bolts o', that pass through longitudinal slots o^2. (Indicated by the dotted lines in Fig. 13.) Between the limbs of this bracket is journaled the pulley o^3, which supports the return part of the off-bearing belt. To the cross-piece beneath the pulley, which connects the two limbs of the frame, is secured a scraper, o^4, whose edge bears against the periphery of the pulley. The scraper is adjustable by means of the fastening-bolts o^5, that pass through slots o^6. It will be seen that by the described construction the pulley may be adjusted to carry the return belt without throwing the journal-boxes of the pulley-shaft out of line with each other, and the scraper always retains its adjustment with the pulley.

Heretofore I have made the cross-stays round or arched, the bolt n' passing through or under the same. I found that this construction was objectionable, as particles of clay falling from the belt would stick and accumulate upon said stays until they would build up against and interfere with the running of the rollers that supported the belt. To obviate this I now make said stays N a vertically open frame, as shown by the vertical section, Fig. 14^A, Sheet 9, and thus the droppings of clay are allowed to fall through.

I prefer to connect the uprights *ff*, which support the stringers of the frame *f*, that sustains the regulating-belt, with side extensions or plates, *ff'*, (see Fig. 1^A,) projecting some distance beyond the frame, so as to form steps at intervals along the length of said frame, which afford ready means for the operator of the machine to pass over the said frame. Upon these steps pass vertical screws for adjusting the height of the longitudinal pieces of the roller-frame, and consequently the regulating-belt.

I now use cut-off wires of a somewhat different construction than heretofore. I learned by experience that when the eyes w' of these wires were made round, or nearly so, as seen in my aforesaid Letters Patent No. 297,671, the wire would cut off at the point where it was bent short at the eye and where the strain was greatest. In order to obviate this defect, I now make the eyes as represented in Fig. 8^A, Sheet 6—that is to say, I make them so that their straight converging sides form an acute angle, (the ends being rounded, as shown,) and so as to allow the contiguous parts of the wire to lie almost parallel with each other, so that when one is twisted around the other the bends or twists of the wire will be comparatively long or form a twist of comparatively great pitch. I also discovered that when the portions of wire were wound around each other only and subjected to a heavy strain they would untwist, the one sliding back on the other. To obviate this I first wind the wires around each other a certain distance, say from *a* to *b*, Fig. 8^A, and when near the short end I leave the long portion or body of the wire straight, and then wind the remainder w^2 of the short end close around the wire; and in order to secure still greater resistance I sometimes solder the ends of the wire. In this way I produce a very strong eye without any very short bends at or about the points that are subject to the heavy strains.

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

1. The combination, with the tempering-case, pugging-shaft, and knives, of the roller B', the ratchet-wheel, the cam, and pawl and lever, substantially as and for the purpose specified.

2. The combination, with the pugging-shaft, of the knives immediately beneath the delivery-opening into the tempering-case, arranged in two opposite lines, and the knives in advance thereof arranged spirally upon said shaft, substantially as and for the purpose specified.

3. In that class of brick-machines wherein the clay is tempered in and forced out from a tempering-case by means of a series of knives spirally set on the pugging-shaft and a screw on the end of said shaft, the first three knives arranged with relation to each other and to the screw, as specified, upon a spiral running in the same direction as that of the screw, and the succeeding knives arranged on a spiral whose direction is in the reverse of that of the screw, all as shown, and for the purpose specified.

4. The combination, with the regulating-belt, of the series of rollers *e'*, having their faces of less width than the width of said belt, substantially as and for the purpose specified.

5. The combination, with the off-bearing belt and its frame, having its cap-boards close to said belt, of the rollers *e'*, having their faces of less width than the width of said belt, substantially as and for the purposes specified.

6. In a brick-machine of the class recited, the combination, with the regulating-belt, the cut-off device, and the mechanism for driving the same, of the rotating cam for determining the movement of the cut-off wheel, together with the measuring-pulley F, having its circumference, plus that of the middle line of said belt, equal to the length of the bricks to be cut off from the bar of clay or a multiple thereof, substantially as and for the purpose set forth.

7. In a brick-machine of the class recited, the combination of the rotatable wheel journaled above the continuously-moving bar of clay, the series of transverse cut-off wires fixed to the periphery of said wheel, so as to succes-

sively cross the path of the clay bar as the wheel rotates, together with mechanism, substantially as shown, whereby said wheel is caused to rotate in the same direction as that of the movement of clay bar and in unison therewith, so as to sever the bar into brick lengths, substantially as and for the purpose set forth.

8. In a brick-machine of the class recited, the combination of the rotating wheel having transverse cut-off wires mounted thereon and arranged to move with and across the path of the moving bar of clay, the tappet-wheel, and the rotating cam engaging with the tappets for determining the movement of the cut-off wheel, and thereby the movement of the wires thereon through the bar of clay, substantially as and for the purpose set forth.

9. In a brick-machine of the class recited, the cut-off wheel having the radial arms and U-shaped elastic bows secured to and around the periphery thereof, to which the wires are adapted to be secured, substantially as and for the purposes set forth.

10. In a brick-machine of the class recited, the combination of the regulating-belt, the cam J, the wheel carrying the transverse cut-off wires arranged and adapted to move with and across the bar of clay, the tappet-wheel whose tappets engage with the said cam, together with the positively-driven friction-belt device for driving said tappet-wheel, all constructed and adapted to operate substantially as and for the purpose set forth.

11. The combination, with the regulating-belt, the cut-off wheel, the cam J, and the friction-belt, of the pivoted tightener and the spring-regulating arm, with devices for locking said arm in the required position, substantially as and for the purpose set forth.

12. The combination, with the regulating-belt, cut-off wheel, cam J, the friction-belt, the pivoted tightener, and the spring-regulating arm, of the lever j^{15}, substantially as and for the purpose described.

13. In a cut-off brick-machine, the combination, with the endless belt running over pulleys F F′ and regulated by the moving bar of clay thereon, the compound pulley F, composed of the middle straight-faced section fixed to its shaft, and rounding or tapering side sections loose upon said shaft, substantially as and for the purpose described.

14. In combination with the regulating-belt and the cut-off wheel, arranged with relation to each other substantially as shown and described, the compound pulley F, composed of a middle straight-faced section fixed to the shaft, and rounding or tapering side sections loose upon said shaft, substantially as and for the purpose set forth.

15. In a wire cut-off brick-machine of the class recited, the combination, with the cut-off wires and mechanism for moving the same with and across the path of the bar of clay, of the slide-plate, located with relation to the bar of clay as shown, the pivoted yoke to which said plate is attached, the lever l^3, and the rotating cam l^4, all constructed and adapted to operate substantially as and for the purpose set forth.

16. The combination of the slide-plate, relatively located as shown, the pivoted yoke, the lever l^3, the rotatable cam l^4, and the adjustable arm l^5, for regulating the elevation of said plate, substantially as and for the purpose specified.

17. In a brick-machine of the class recited, the combination, with the clay-bar-supporting belt E, the wire cut-off wheel, and the wiper, of the spout m^7, arranged as shown, so as to carry off the droppings from the wires beyond the line of said belt and its supports, substantially as and for the purpose specified.

18. In a brick-machine of the class recited, the combination, with the cut-off wheel, of the adjustable arm M, provided with the plate m^4, for holding a flexible wiper, and the spout m^7, whereby the said spout and the wiper may be adjusted together simultaneously, substantially as described.

19. The return-belt support consisting of the combination of the adjustable bifurcated bracket O, adapted to be secured to the frame upon which said belt is carried, and the pulley journaled in said bracket, together with the scraper secured thereto, substantially as and for the purpose specified.

In testimony whereof I have hereunto affixed my signature this 23d day of October, A. D. 1886.

CYRUS CHAMBERS, JR.

Witnesses:
J. H. CHAMBERS,
RICHARD W. YERKES.