(No Model.) 4 Sheets—Sheet 1.

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No. 548,935. Patented Oct. 29, 1895.

Fig. 1.

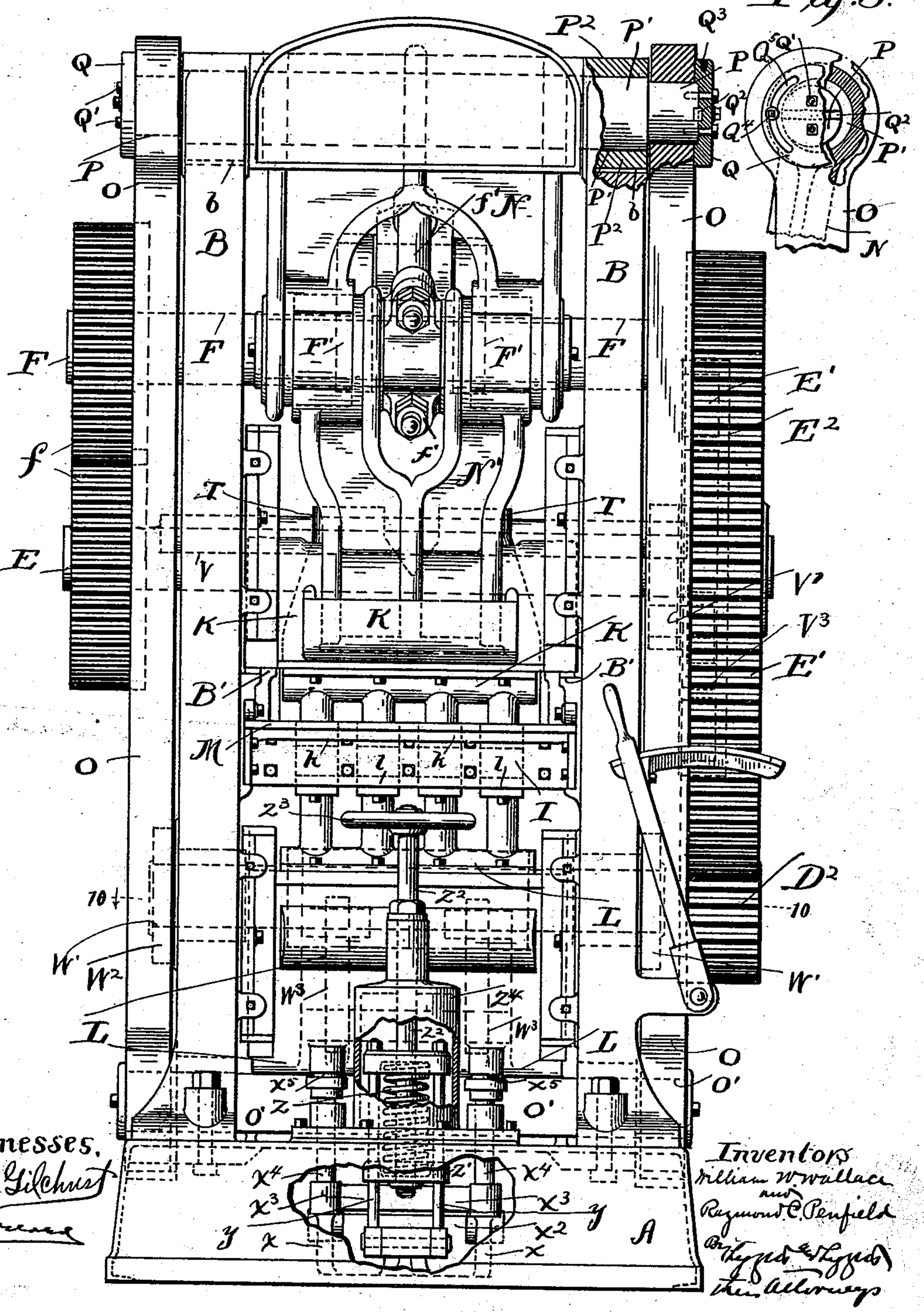

Fig. 3.

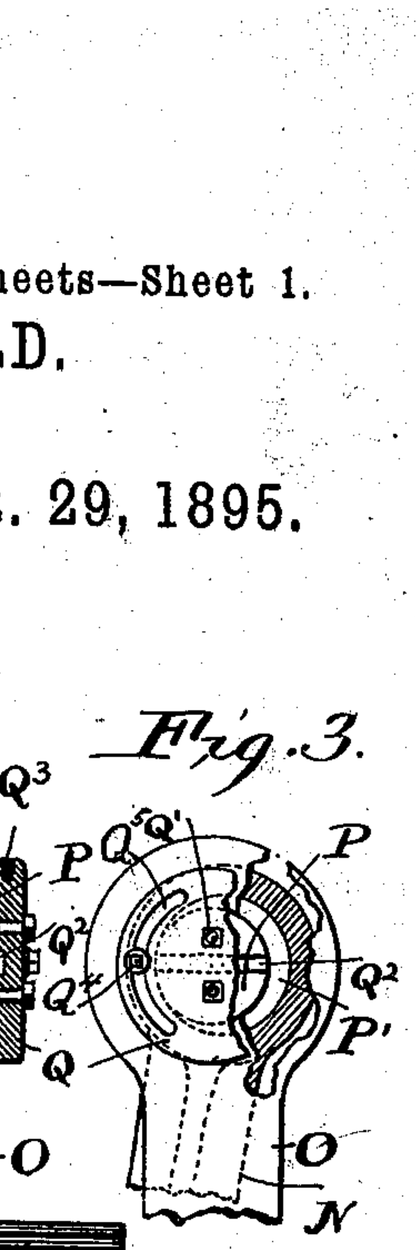

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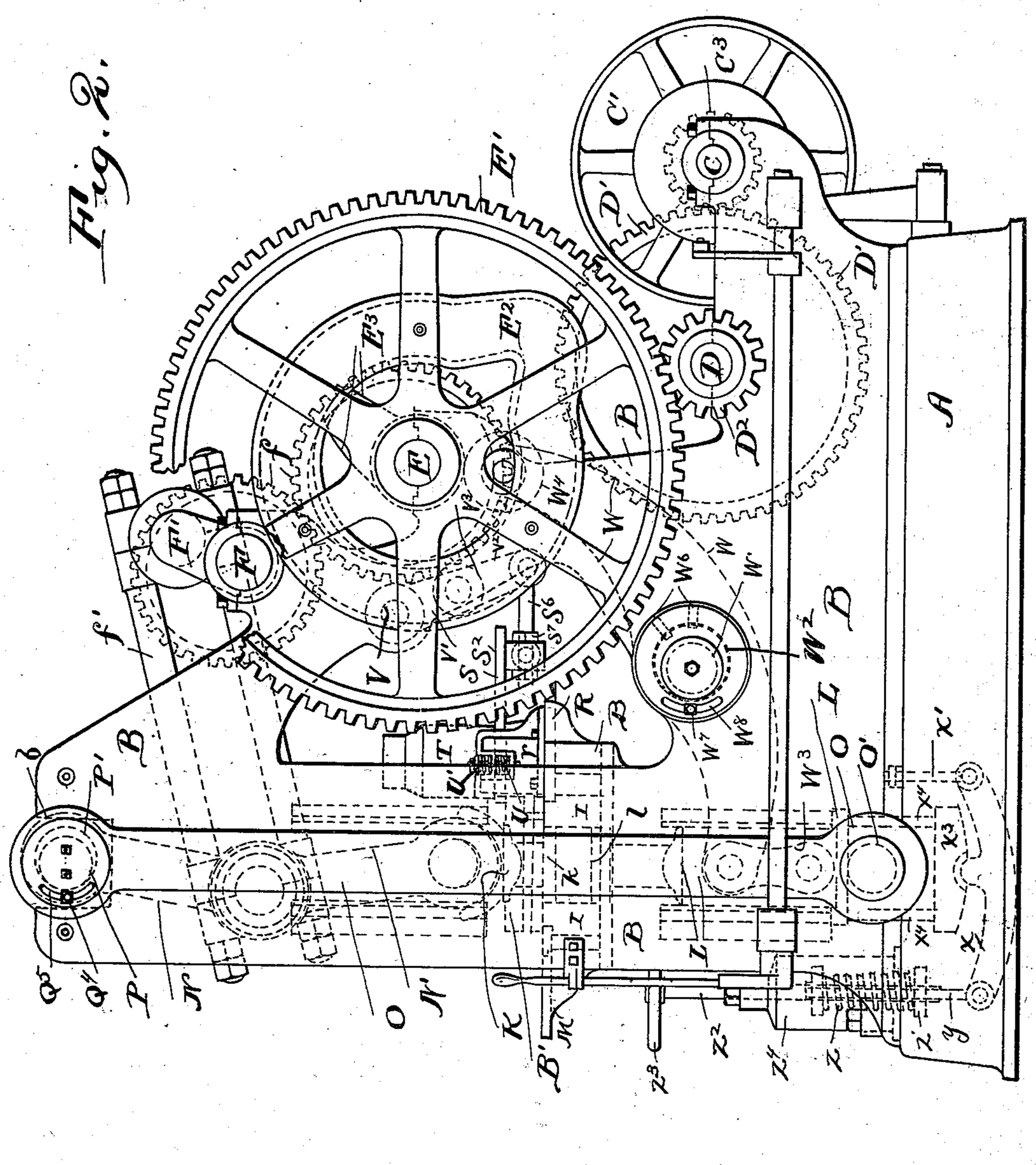
Fig. 2.



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(No Model.)

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Fig. 4.

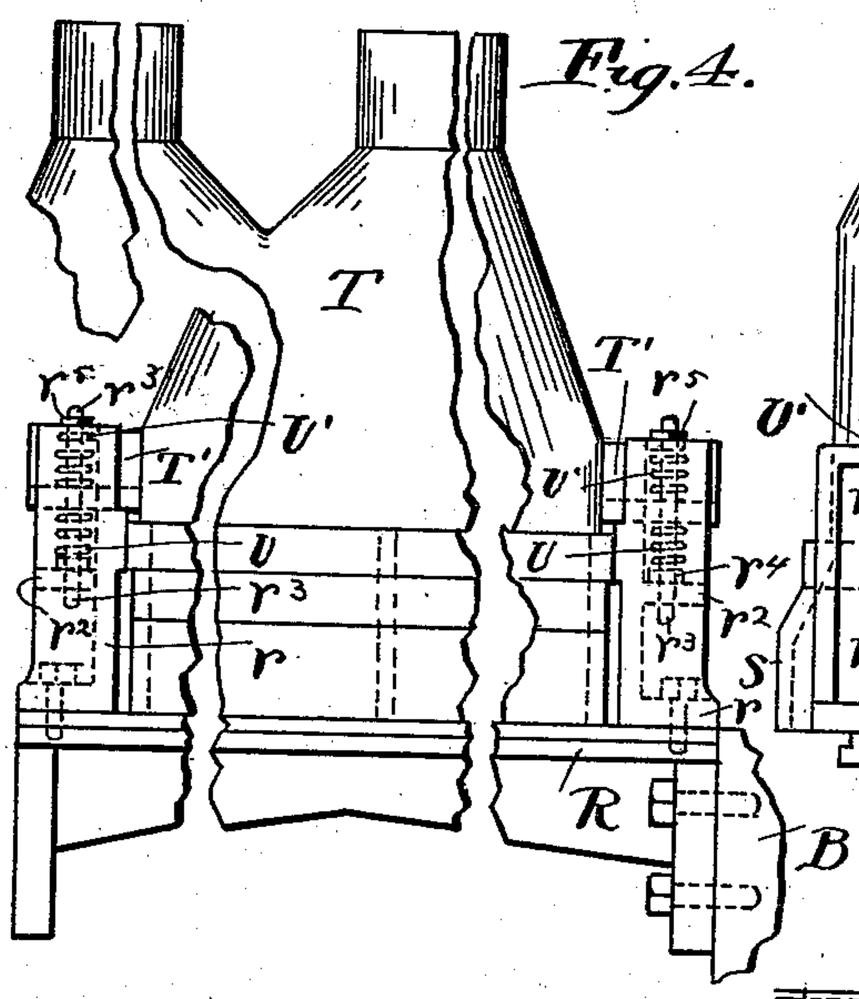


Fig. 5.

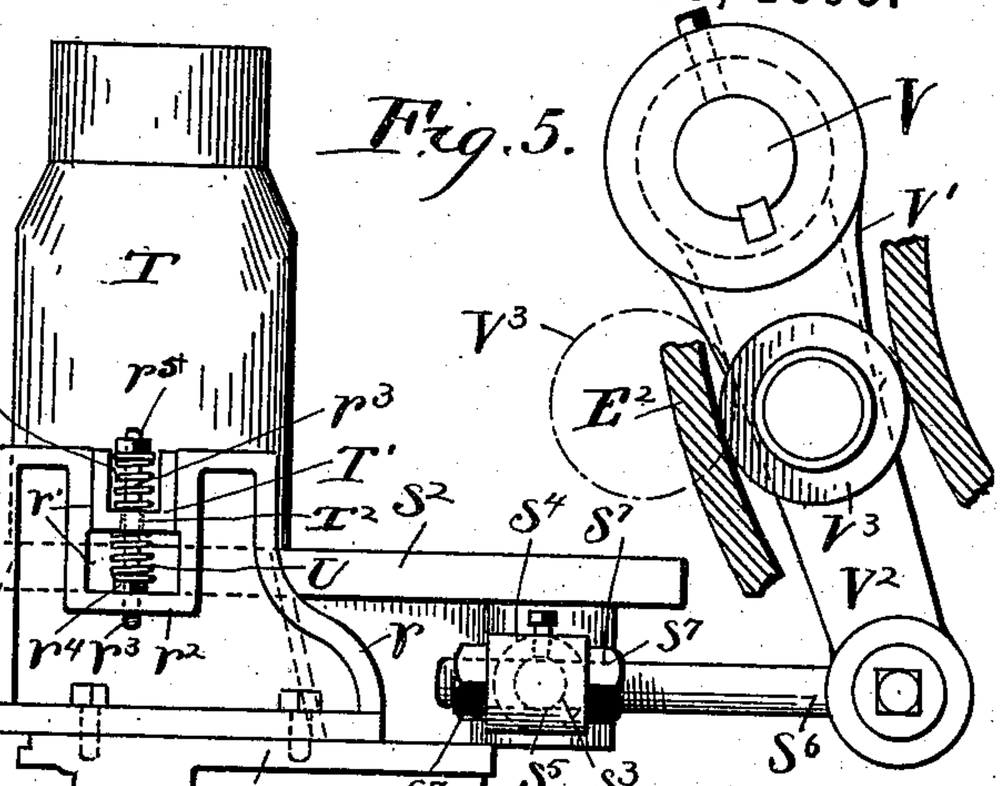
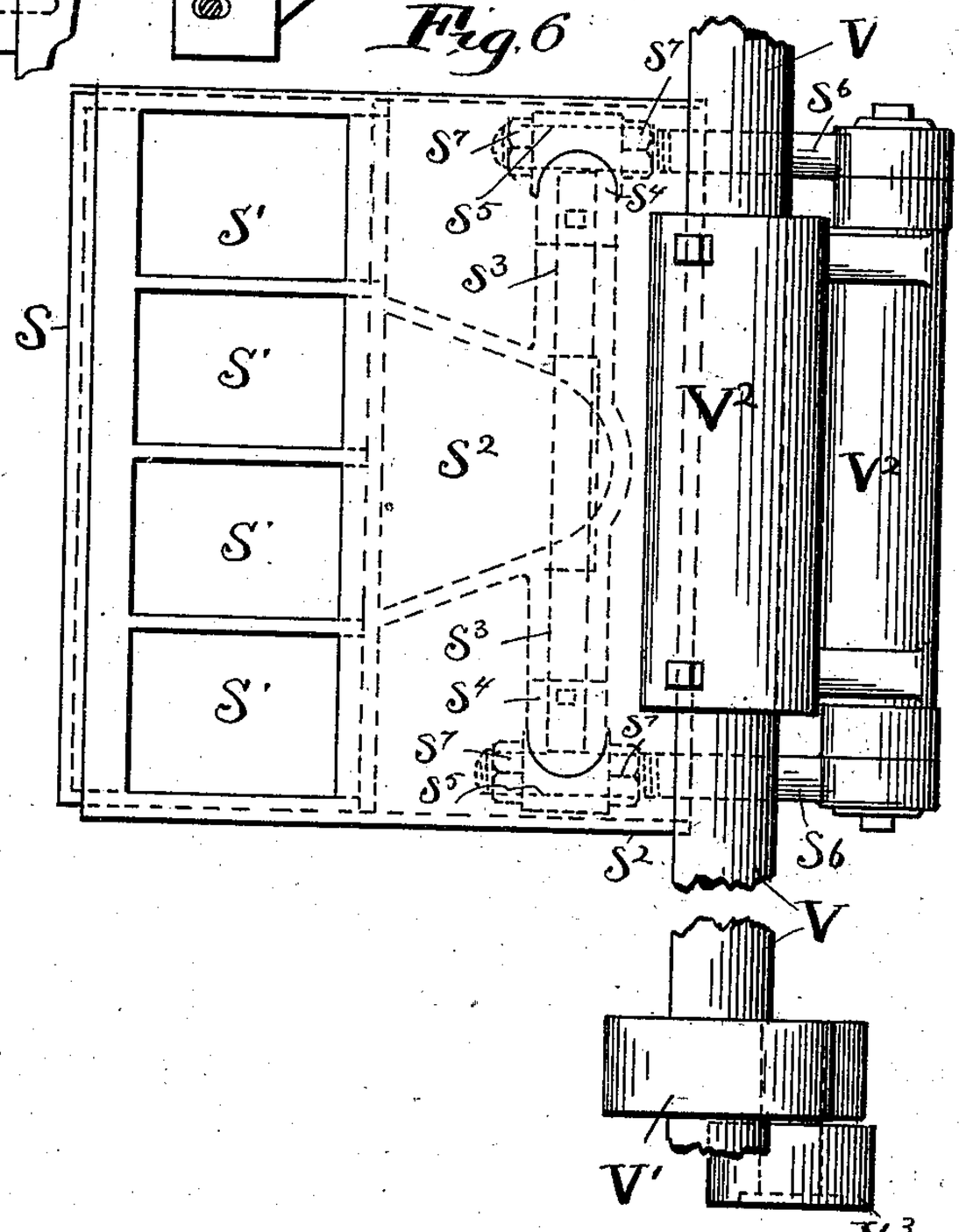


Fig. 6



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(No Model.)

4 Sheets—Sheet 4.

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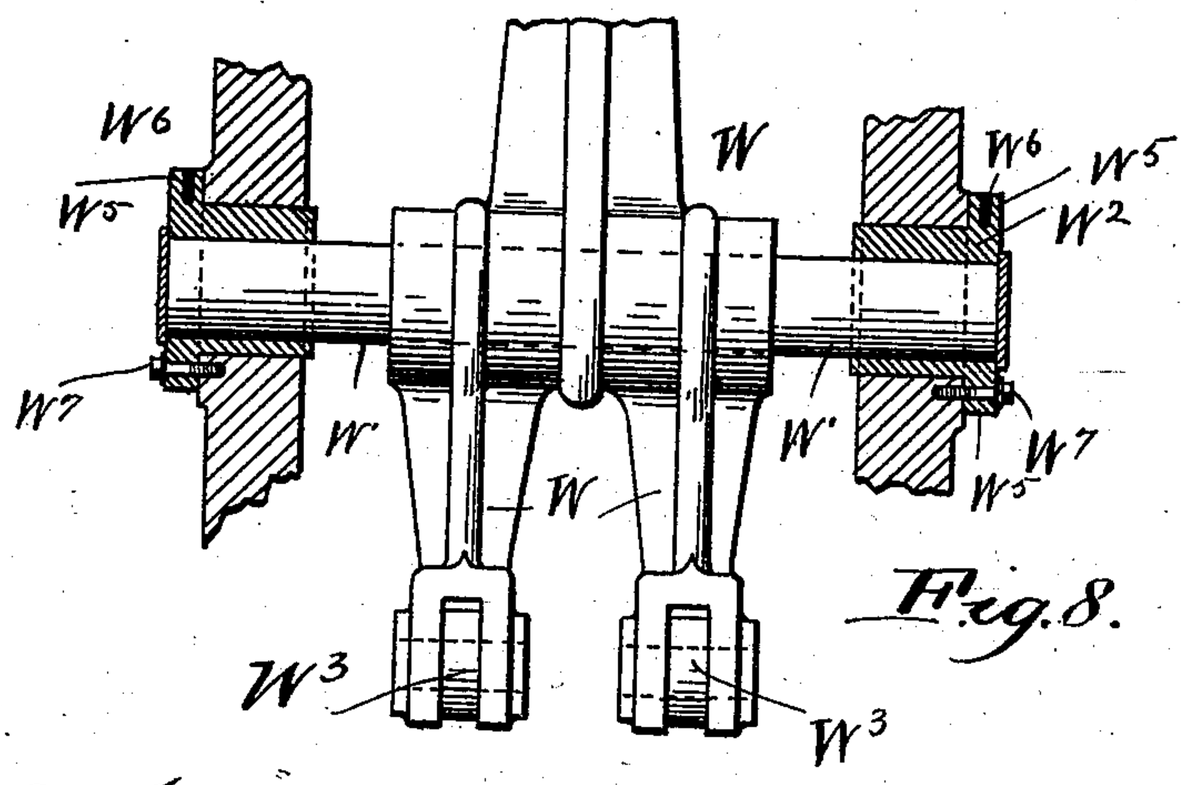

Fig. 8.

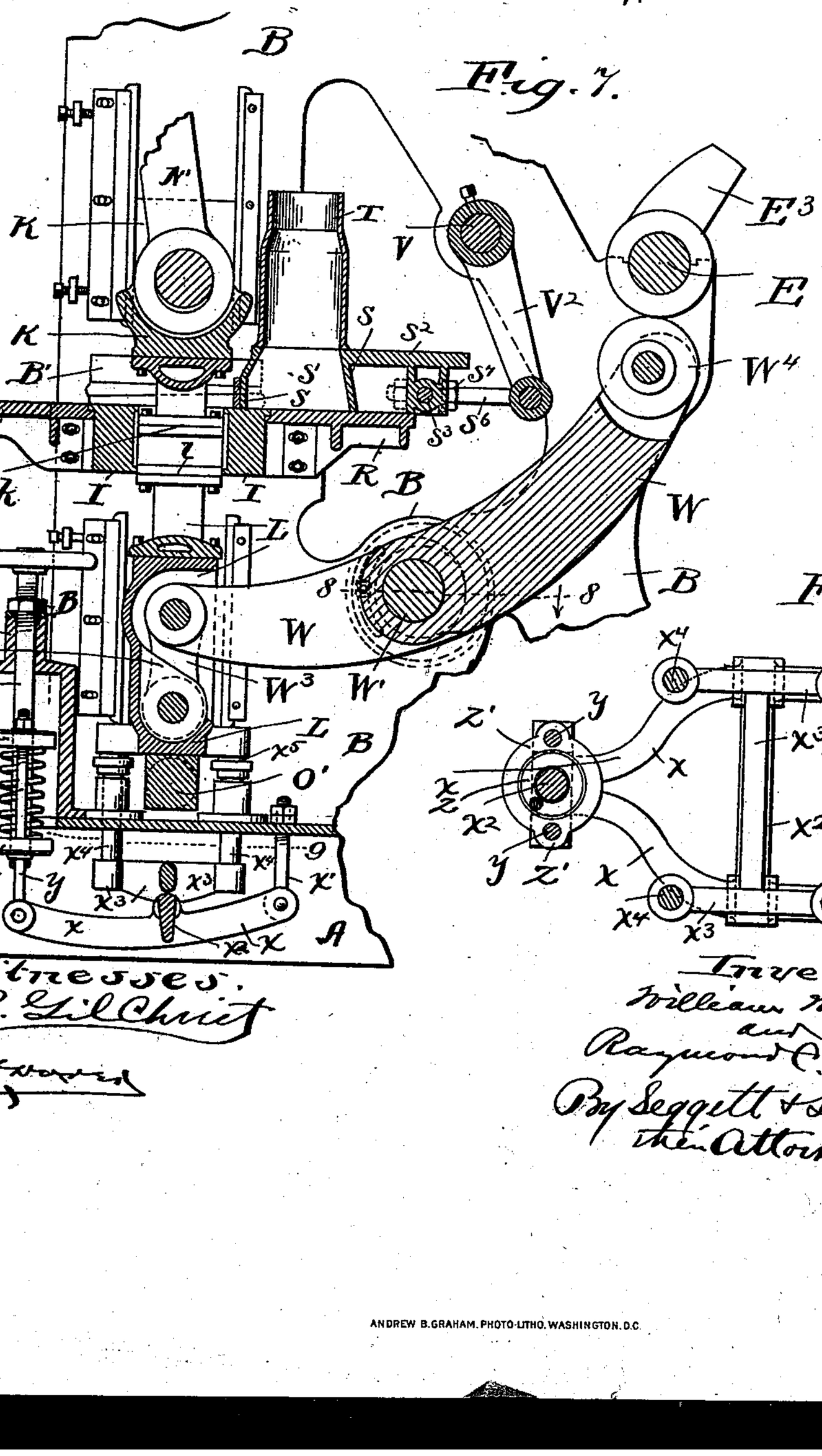

Fig. 7.

Fig. 9.

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UNITED STATES PATENT OFFICE.

WILLIAM W. WALLACE AND RAYMOND C. PENFIELD, OF WILLOUGHBY, OHIO, ASSIGNORS TO J. W. PENFIELD & SON, OF SAME PLACE.

BRICK-PRESS.

SPECIFICATION forming part of Letters Patent No. 548,935, dated October 29, 1895.

Application filed September 28, 1893. Serial No. 486,721. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM W. WALLACE and RAYMOND C. PENFIELD, of Willoughby, in the county of Lake and State of Ohio, have invented certain new and useful Improvements in Brick-Presses; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

Our invention relates to improvements in brick-presses, more especially what are known as "dry-brick" presses; and it consists in certain features of construction and in combination of parts hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a front side elevation of a brick-press embodying our invention, portions being broken away and in section to more clearly show the construction. Fig. 2 is a right-hand side elevation relative to Fig. 1, partly broken away to more clearly show certain features in the construction. Fig. 3 is an elevation in detail, partly in section, showing the means employed for adjusting the toggle-arms vertically and the means employed for securing the same in the desired adjustment. Fig. 4 is a front side elevation of the feed-box and feed-hopper, showing, also, the means employed for supporting said hopper; and Fig. 5 is a right-hand side elevation of the same, showing, also, and partly in section, the mechanism for reciprocating the feed-box in under the hopper, portions being broken away in Fig. 4 to reduce the size of the drawing. Fig. 6 is a top-plan of the feed-box and mechanism for actuating the same, portions being broken away to reduce the size of the drawing. Fig. 7 is a right-hand side elevation, mostly in vertical section, of a portion of the machine, showing, among other things, the mechanism for actuating the lower plunger and the mechanism for gaging the vertical position of the lower plunger, as will hereinafter more fully appear. Fig. 8 is a section in detail on line 8 8, Fig. 7. Fig. 9 is a top plan in section on line 9 9, Fig. 7.

The supporting structure of the machine comprises a base A and two heavy side frames B B, rigidly mounted upon the base. The side frames are provided with suitable boxes that afford bearing, respectively, for shafts C, D, E, and F.

C designates the driving-shaft, (see Fig. 2,) that is supported at the rear extremity of the supporting structure, said shaft being provided with a driving-pulley C′. On shaft C (see Fig. 2) is also operatively mounted a pinion C^3, that meshes with a gear D′ on shaft D. A pinion D^2 is also operatively mounted upon shaft D and meshes with a large gear E′, operatively mounted upon shaft E. Shaft D is located a suitable distance forward, but preferably in the same horizontal plane with the driving-shaft, and shaft E is, of course, supported a suitable distance above and somewhat forward of shaft D. A cam E^2 that operates the mechanism for reciprocating the feed-box hereinafter described is mounted upon or rigid with gear E′, and a cam E^3, that operates the mechanism for actuating the lower plunger hereinafter referred to, is also operatively mounted upon shaft E. Shaft F is located a suitable distance above and somewhat forward of shaft E, and shaft F is operatively connected with shaft E by means of a pair of elliptic gears *f*.

I represents the die or mold in which the material is compressed, said die or mold being suitably supported from and between the upright side frames of the supporting structure.

K and L represent the upper and lower plungers, respectively, the upper plunger K being adapted to compress the material into the die or mold from above, and lower plunger L being adapted to compress the material from below and elevate the pressed material or bricks from the die or mold flush with the top surfaces of the die or mold and table M, suitably supported in front of the die or mold. The plungers comprise, respectively, a series of heads *k l*, that are adapted to fit the respective compartments of the die or mold, which it is not considered necessary to illustrate in detail. The upper plunger K is actuated by toggle-arms N N′, suitably connected with each other and operatively connected by means of a link *f′* with the crank F′ of crank-shaft F. The lower end of the lower toggle-arm is suitably pivoted to the upper plunger, and the upper end of the upper toggle-arm is

pivotally connected with vertically-movable side bars O O by means of the cam or eccentric shaft or rod P, (see Figs. 1 and 3,) the upper toggle-arm suitably embracing the cam or eccentric portion P′ (see Fig. 3) of said shaft or rod. Said shaft or rod is journaled in vertically-sliding boxes P^2, adapted to move up and down in slots *b* in the side frames of the supporting structure. Cap-plates Q are secured to the ends of cam or eccentric shaft or rod P, preferably by means of one or more bolts or screws Q′, and are preferably keyed to the shaft or rod, as at Q^2, said keys engaging opposing slots in the respective end of the shaft or rod and cap-plate, as shown very clearly in Figs. 1 and 3.

By the construction just described, it will be observed that cap-plates Q and the eccentric or cam shaft or rod to which they are secured must turn together, and that by adjusting said shaft or rod circumferentially the toggle-arms are elevated or lowered as required in making the different sizes of brick. Caps Q are preferably provided with one or more holes Q^3 for receiving a wrench or lever (not shown) for turning the eccentric shaft or rod in adjusting the toggle-arms up or down. Cap-plates Q overlap the side bars O and are secured to the latter in the desired adjustment of the cam or eccentric shaft, preferably by means of a bolt or screw Q^4, the bolt-holes Q^5 in the cap-plates for receiving bolts or screws Q^4 being elongated concentric with the axis of the aforesaid shaft or rod to accommodate the aforesaid circumferential adjustment of the shaft or rod, that is held in the desired adjustment by tightening the bolts or screws Q^4.

If desired, suitable means (not shown) might also be employed for securing the lever (not shown) employed for turning said shaft or rod to the adjacent side bar O, and thereby assist the bolts or screws that secure the cap-plates to the side members in holding the cam or eccentric shaft or rod in the desired adjustment.

An important feature of our invention consists in the employment of elliptic gears to establish operative connection between crank-shaft F and shaft E, and such an arrangement of the parts that a very slow movement is given to the upper plunger during the compression of the material in the die or mold by said plunger, and that said plunger is caused to dwell or come to a short stand after the compression of the material by said plunger, and to move comparatively rapidly upon its return stroke. By this construction and arrangement of parts the machine possesses both great efficiency and capacity. Preferably there is a little lost motion left between the pin that pivotally secures the upper plunger to the lower toggle-arm and its seat.

The front table M, as already indicated, receives the pressed bricks as the latter are elevated from the die or mold, and from said table the bricks are supposed to be removed by hand. Another table R is suitably supported at the rear of the die or mold, the top surface of said rear table being flush with the top surfaces of the die or mold and forward table. On the rear table operates the reciprocating feed-box S, (see Figs. 4, 5, and 6,) and over this feed-box is suitably supported a feed-hopper T, that discharges into the feed-box.

The feed-hopper is preferably supported in the following manner: The rear table at opposite sides has rigidly secured thereto two upright brackets *r*, respectively, (see Figs. 4 and 5,) said brackets being slotted laterally, as at *r*′, with the slots open at their upper ends, the upper portion of said slots being engaged by laterally-projecting ears or flanges T′ on the feed-hopper. Brackets *r* are flanged laterally at the lower end of slots *r*′, as at r^2, and said flanges are provided with vertical screw-threaded perforations for the reception of screw-threaded rods or studs r^3, that extend upwardly through holes T^2 in the laterally-projecting members T′ of the feed-hopper, a spring U being confined upon each stud or rod r^3 between the lower side of the laterally-projecting member T′ of the feed-hopper and a nut r^4, mounted upon the stud or rod a suitable distance below member T′, and a spring U′ is confined upon each rod or stud r^3 between the upper side of said laterally-projecting member and a nut s^5, mounted upon the stud or rod a suitable distance above said projecting member of the feed-hopper.

By the construction just described, it will be observed that the lower set of springs U sustain the weight of the hopper, and that the upper set of springs U′ permit the hopper to rise in case of any hard substance or obstruction finding ingress between the feed-box and lower edge of the hopper, and thereby relieve the hopper without doing any damage.

The feed-box has a series of compartments S′, corresponding with the compartments of the die or mold. The feed-box rests upon the rear table and is adapted to be reciprocated upon said table, in under the feed-hopper, preferably by the following mechanism: V (see Figs. 2, 5, and 6) represents a rock-shaft suitably supported from the side frames of the supporting structure a suitable distance forward of shaft E. Said rock-shaft bears a rock-arm V′ and a double rock-arm or rocking frame V^2. The free end of arm V′ carries a roller V^3, adapted to be engaged by cam E^2, and the free end of double rock-arm or frame V^2 is operatively connected with the feed-box, preferably as shown in Figs. 5 and 6, wherein the feed-box has a cut-off plate S^2, flush with the top surface of the box and extending a suitable distance rearwardly of the box proper, the function of said cut-off being to retain the material in the hopper during the time that the feed-box moves from under the hopper in supplying the die or mold. The cut-off of the feed-box carries a shaft S^3, and a collar S^4 is rigidly mounted upon each end of said shaft, said collars extending beyond

the ends of the shaft, and the parts of the collars thus extending beyond the shaft ends are perforated laterally, as at S^5, for the reception of links or rods S^6, operatively connected with rock-arms or rocking frame V^2. Links S^6, at the end connected with collars S^4, are screw-threaded, and nuts S^7 are mounted upon said screw-threaded portion of the links at either side of the collars, whereby said links are adjustable endwise.

The depth of the feed-box is such that it will hold ample material for the bricks to be pressed at each operation of the machine. If there is more material in the feed-box than is needed, the surplus is carried back with the feed-box in under the hopper. The feed-box having received the discharge from the hopper, is thrust forward over the die or mold, where the material discharges into the die or mold by gravity, and as the feed-box is thrust forward to deliver the material into the die or mold it pushes forward the bricks already pressed onto the table M, where they are supposed to be removed by hand or otherwise, the pressed bricks being elevated from the die or mold by the lower plunger.

The lower plunger, as already indicated, is adapted to elevate the bricks flush with the top surface of the mold, subject to the action of the front side of the feed-box, that pushes the bricks onto the front table. The mechanism employed for actuating the lower plunger is preferably as shown in Figs. 2, 7, and 8, and comprises a lever W, that near its longitudinal center has axial trunnions W′, journaled in eccentric-boxes W^2, suitably supported by the upright side frames of the supporting structure. Lever W is operatively connected with the lower plunger by means of a link or pitman W^3, and at its opposite end is provided with a roller W^4, that at the proper time is engaged by cam E^3, that actuates the lever to lift the lower plunger, resulting in the elevation of the bricks from the die or mold. Upon the disengagement of said cam and lever, the latter reverses by gravity of the lower plunger. It will, of course, be understood that the axial trunnions of the lower plunger must be adjusted with accuracy, so that the plunger, when elevated, shall always be brought flush with the top surface of the die or mold; hence the employment of eccentric-boxes W^2 for the trunnions of lever W aforesaid. Said boxes are cylindrical blocks of metal journaled in suitable holes in the side frames of the supporting structure, and these blocks are bored eccentric with their axes to receive the trunnions of the aforesaid lever. By turning these eccentric-boxes the axis of the lever is raised or lowered to adjust the upward movement of the lower plunger. Said boxes have flanges W^5, that overlap the side frames of the supporting structure, and said flanges have holes W^6 in which a bar of metal or lever (not shown) can be inserted for turning them. A screw or bolt W^7 secures the boxes, respectively, to the supporting-frame and holds the respective box in the desired adjustment, the hole W^8 in the flange W^5 of the box for the passage of said screw or bolt being elongated concentrically with the axis of the box to accommodate the circumferential adjustment of the box.

Side bars O are connected below with a heavy bar O′, that is arranged transversely of the machine. The parts are so arranged and timed that while the upper plunger is being thrust downwardly by the action of the toggle-arms, the lower plunger engages the top side of transverse bar O′. The descent of the upper plunger in compressing the material in the die or mold is limited by stops B′, formed upon the inner side of the upright side frames of the supporting structure, and the arrangement of parts is such that the upper plunger, during its descent, shall engage the aforesaid stops before the toggle-arms are entirely straightened, or so that the further movement of the toggle-arms in the direction to straighten shall, through the medium of the aforesaid side bars O, with which the upper toggle-arm is operatively connected, as hereinbefore described, lift the aforesaid transversely-arranged bar O′, and thereby elevate the lower plunger, so that the bricks shall be pressed partly from below as well as partly from above, by means of which two pressures the compression of the bricks throughout will be more uniform, the parts being preferably so arranged and timed that the compression by the lower plunger immediately follows the compression by the upper plunger, whereupon the lower plunger lifts the pressed bricks from the die or mold subject to the action of the feed-box, that is thereupon actuated to remove or push the pressed bricks onto table M and to re-supply the die or mold.

x (see Figs. 7 and 9) designates a lever having a forked rear end where it is fulcrumed to eyebolts *x*′, that connect with the supporting-base. This lever *x* has a transverse member x^2, and upon the lever at the ends of member x^2 is seated a frame x^3, that is provided with four upright pins or members x^4, suitably cushioned at their upper ends, as at x^5, and the lower plunger is adapted to descend upon the elastic upper extremities of the aforesaid upright pins or members. To the forward end of lever *x* are pivoted bolts Y, and these extend up loosely through holes in a plate Y′ and are provided with nuts Y^2, engaging said bolts above the plate. Bearing upward against plate Y′ is a spring Z, that is carried by a lower plate Z′. This lower plate has a centrally-located screw-threaded hole engaged by a screw Z^2, that is provided with a hand-wheel Z^3 for turning the same. By turning screw Z^2 in one direction or the other the lower plunger will be raised or lowered, as desired, to gage the amount of material fed into the mold. Of course as soon as the pressure of the toggle-arms is applied spring Z is compressed and the lower plunger is forced down on member

O'. Screw Z^2 is supported by a hollow bracket Z^4, the rod of course having a suitable shoulder or equivalent to rest on the bracket. The cavity in this bracket forms a suitable case for spring Z. This spring mechanism just described is merely to gage the vertical position of the lower plunger while the material is being fed in. In compressing bricks from dry material the pressure must be applied somewhat slowly to give the air a chance to escape; otherwise the brick would burst or crack when the pressure was removed. Hence this class of machines is necessarily limited to comparatively slow movements.

By means of the elliptic gears hereinbefore described a very slow movement is given to the plungers while the heavier part of the pressure is being applied, and the plungers are allowed to dwell for a little while after compression; but during the time that the pressure is not being applied the movement of the parts is comparatively fast.

The advantage accruing from the use of elliptic gears in the place indicated is a large increase in the efficiency and capacity of the machine.

What we claim is—

1. In a brick-press, the combination with the supporting-structure comprising a base and two upright side-frames mounted a suitable interval apart upon the base, a die or mold suitably supported from and between the side-frames, upper and lower plungers for compressing the material in the die or mold and elevating the pressed bricks therefrom, respectively, of suitable mechanism for elevating and lowering the upper plunger, a tilting roller-bearing lever suitably supported between the aforesaid side-frames and operatively connected with the lower plunger, a rotating shaft suitably supported by said side-frames and a cam on the shaft adapted to engage the roller of said roller-bearing lever and thereby actuate the lever to cause the lower plunger to be elevated, said lever having axial trunnions, said trunnions being journaled in boxes supported in the aforesaid side-frames, whereby the axis of the lever is elevated or lowered according as the journal-boxes are turned in the one direction or the other, said journal-boxes having flanges overlapping the side-frames and screws or bolts extending through said flanges into the supporting-frames, the screw or bolt-holes in the flanges being elongated to accommodate the circumferential adjustment of the journal-boxes, substantially as set forth.

2. In a brick-machine, the combination of the supporting-structure comprising a supporting-base and two upright side-frames located a suitable distance apart, a die or mold suitably supported from and between the side-frames, upper and lower plungers for compressing the material within the die or mold, the lower plunger being adapted to elevate the bricks or compressed material from the die or mold, toggle-arms for actuating the upper plunger, two rotating shafts, E and F, a pair of elliptic gears establishing operative connection between said shafts, suitable means for driving shaft E, suitable mechanism operatively connecting the toggle-arms with shaft F, suitable mechanism for actuating the lower plunger, a vertically-movable horizontal bar or beam located below the lower plunger, links or bars operatively connected with the upper toggle-arms and operatively connected with the aforesaid horizontal beam or bar, a stop for limiting the downward movement of the upper plunger before the straightening of the toggle-arms, and the arrangement of parts being substantially as shown, for the purpose specified.

In testimony whereof we sign this specification, in the presence of two witnesses, this 2d day of September, 1893.

WILLIAM W. WALLACE.
RAYMOND C. PENFIELD.

Witnesses:
C. H. DORER,
WARD HOOVER.