

(No Model.)

5 Sheets—Sheet 1.

S. B. LANE.
ROTARY BUTTON PRESS.

No. 574,154.

Patented Dec. 29, 1896.

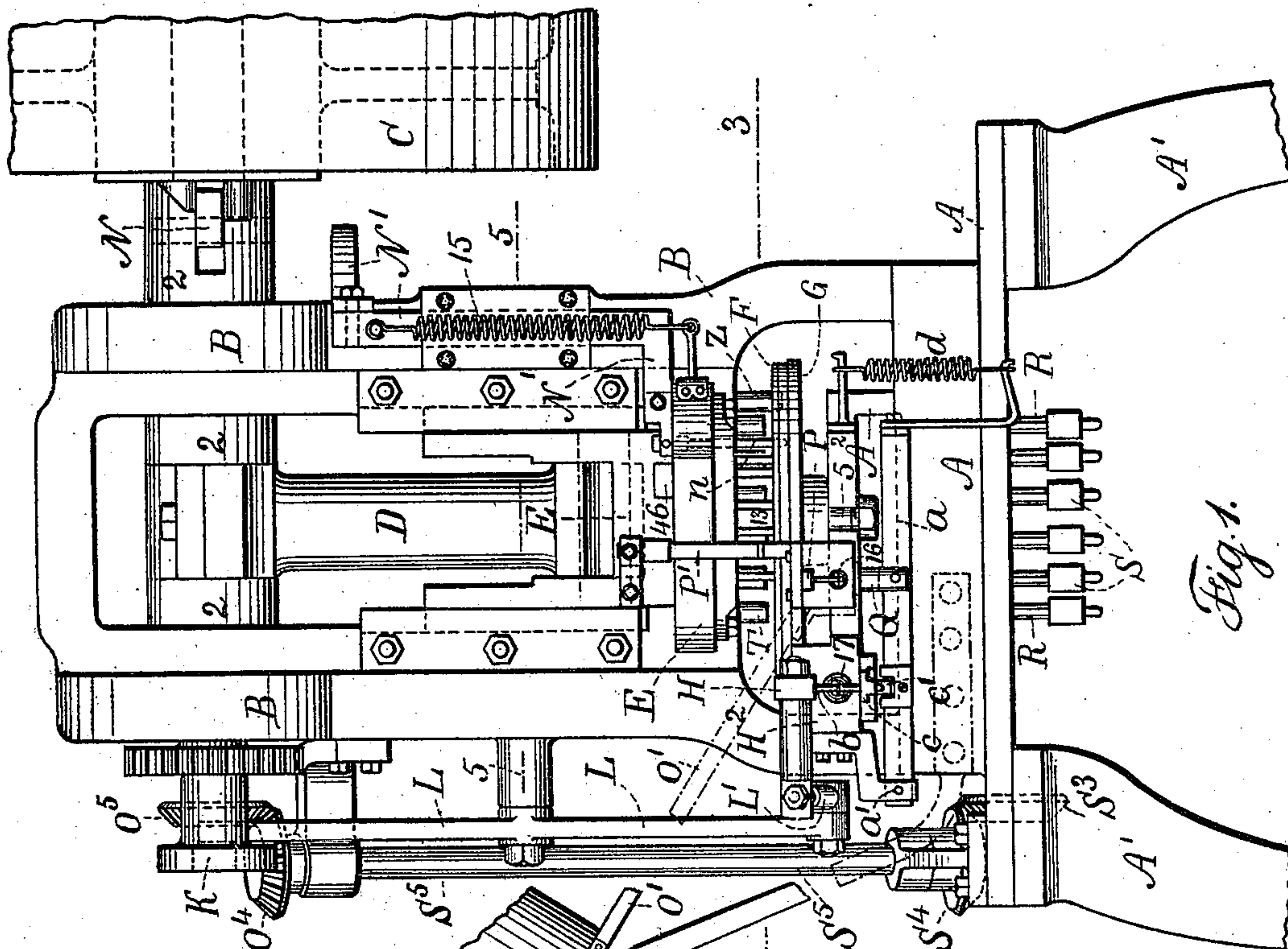


Fig. 1.

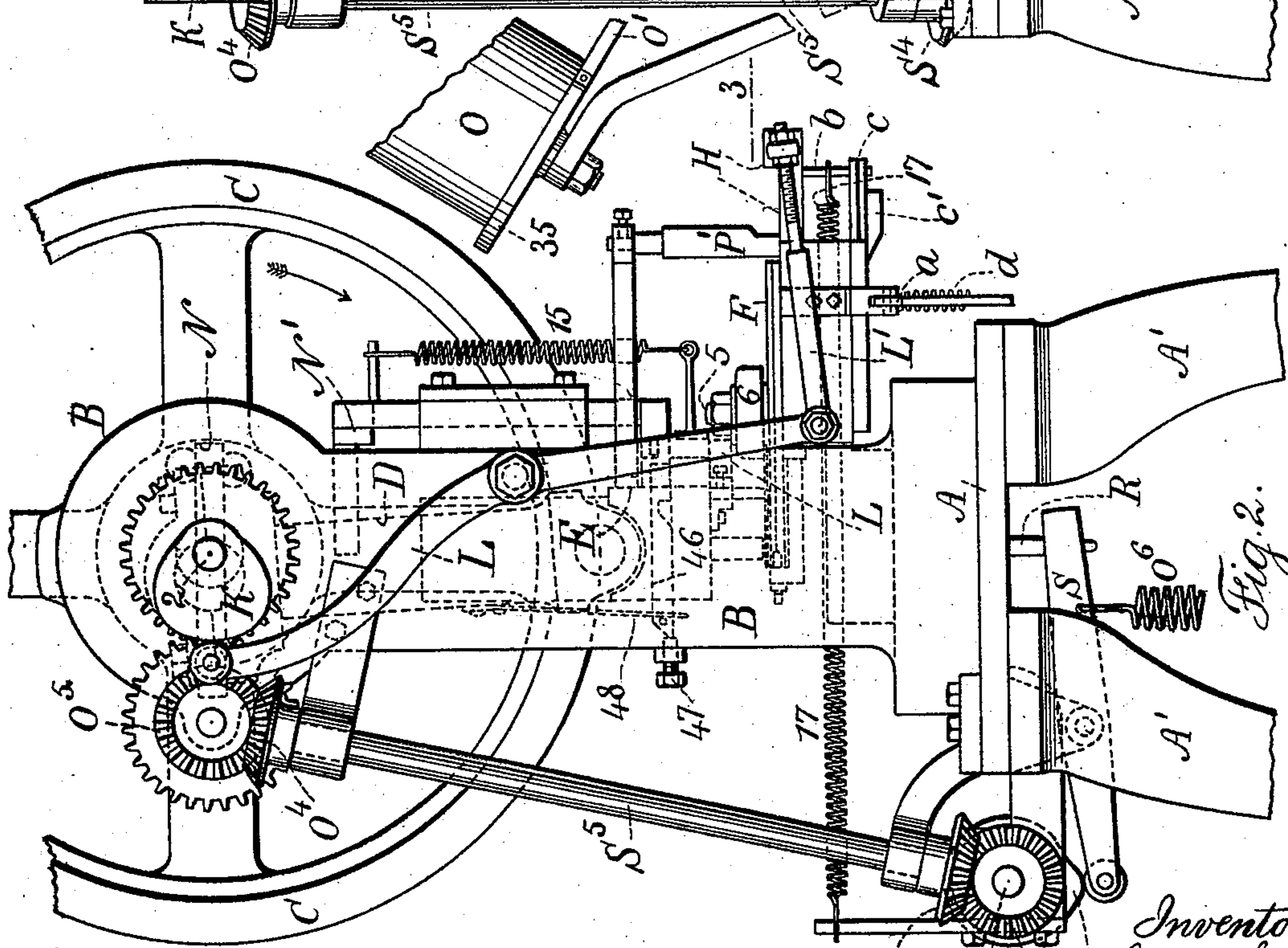


Fig. 2.

Witnesses:
J. Stair
J. Chas. Smith

Inventor:
S. B. Lane
by J. P. Terrell & Son
attys

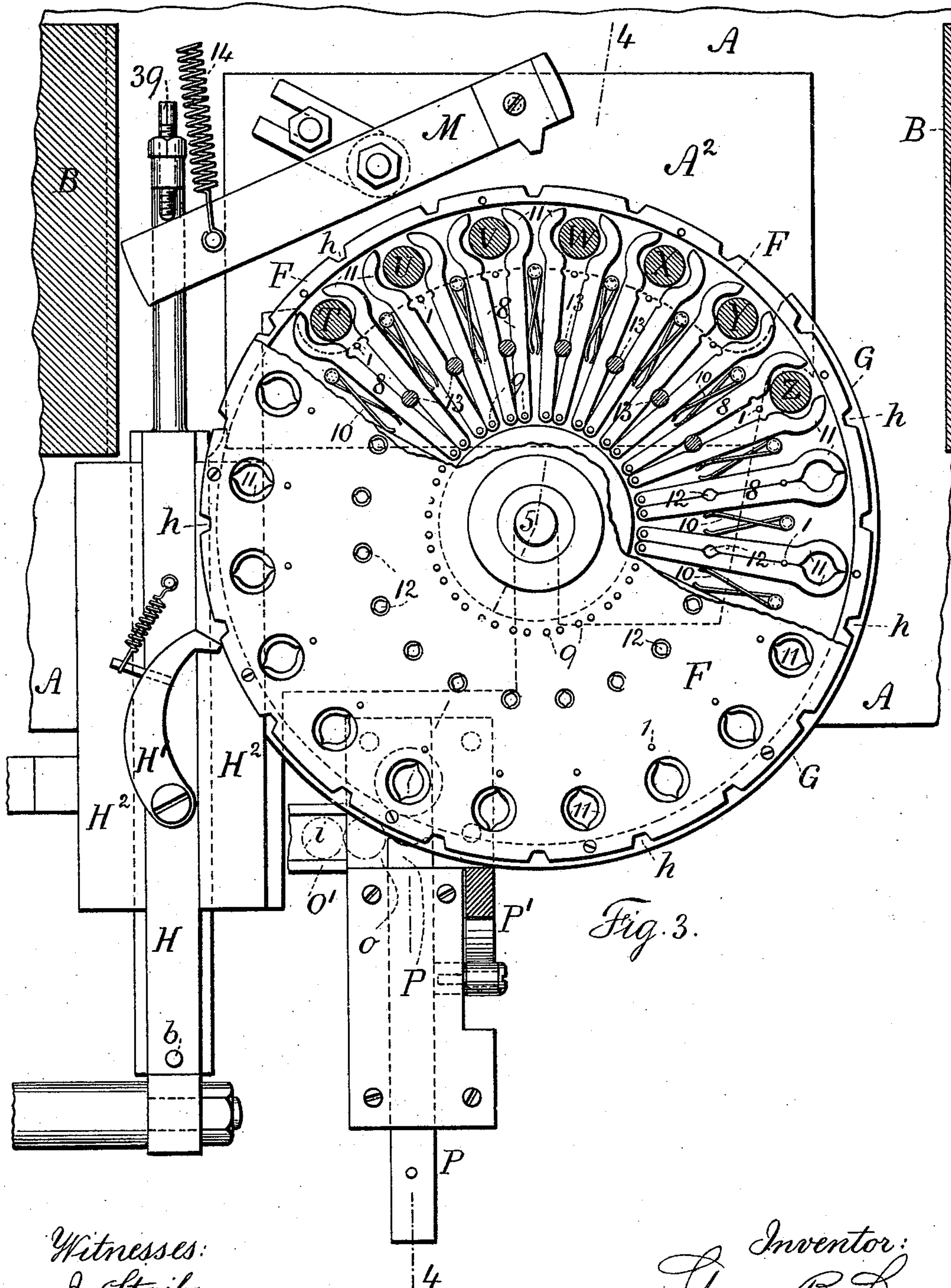
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Witnesses:
J. Staib
Chas. & Smith

Inventor:
Spencer B. Lane
by L. W. Ferrell & Co.
attys

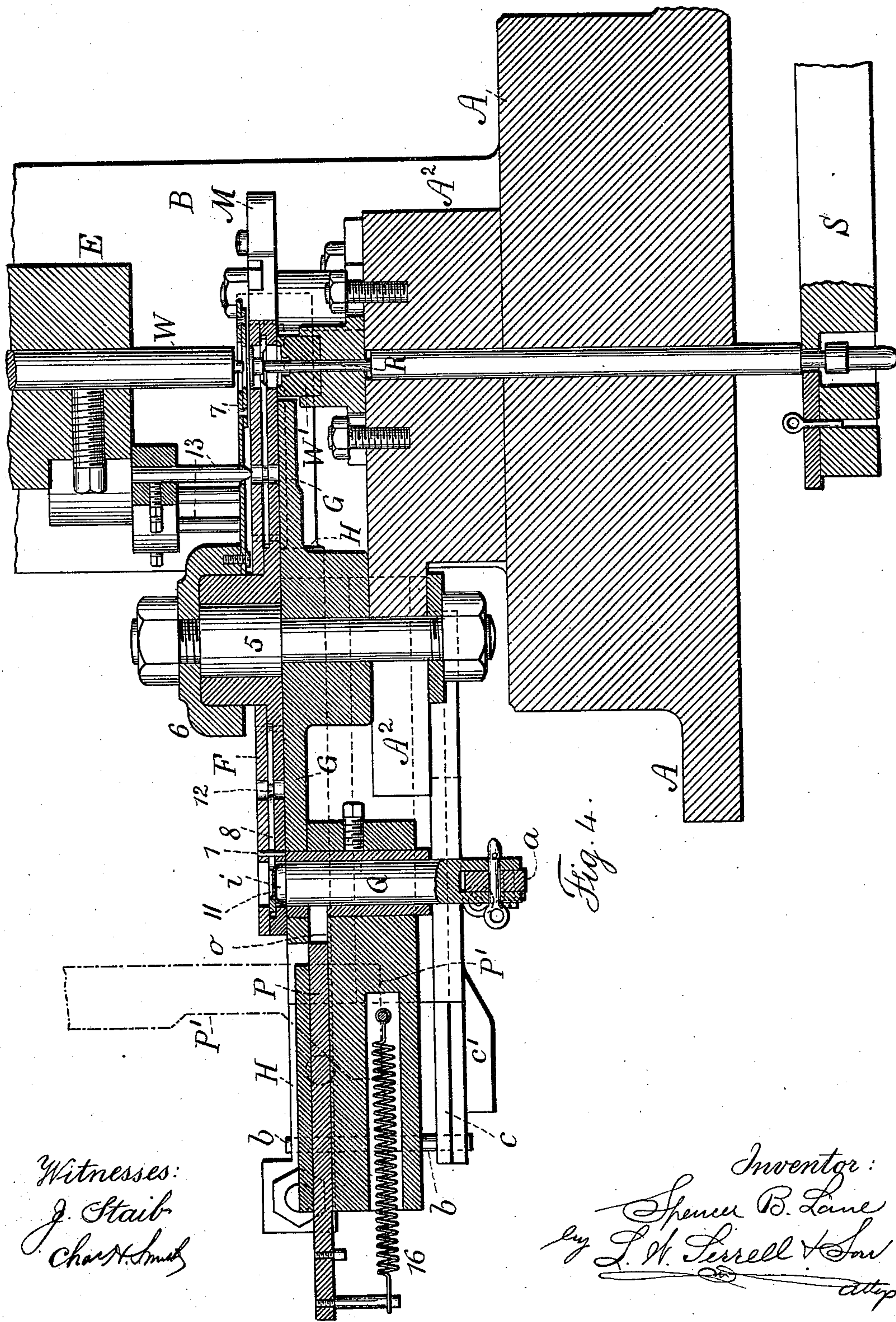
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Fig. 5.

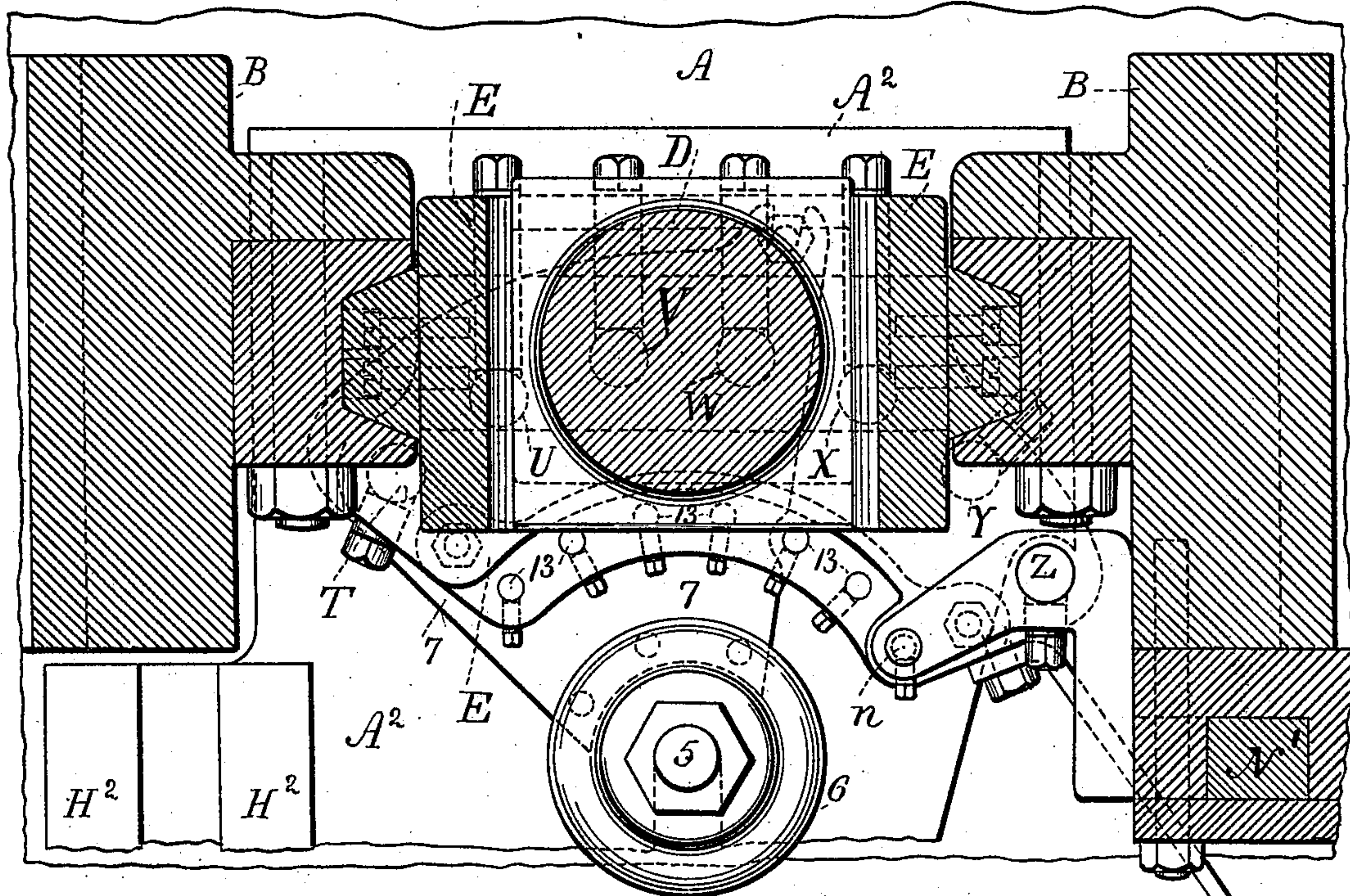
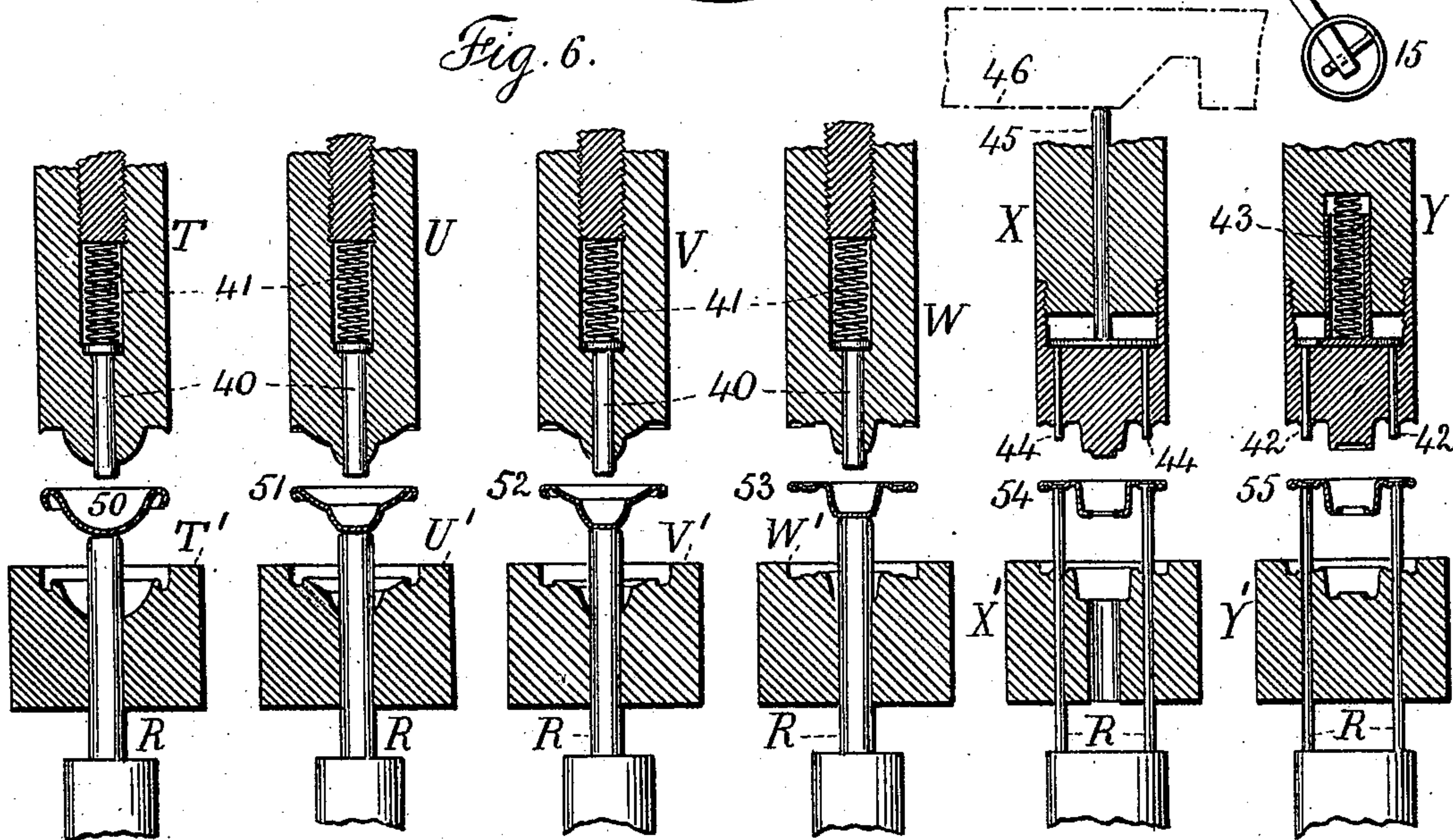


Fig. 6.



Witnesses:
J. Stair
J. H. Smith

Inventor:
S. B. Lane
By L. W. Ferrell & Son
attys

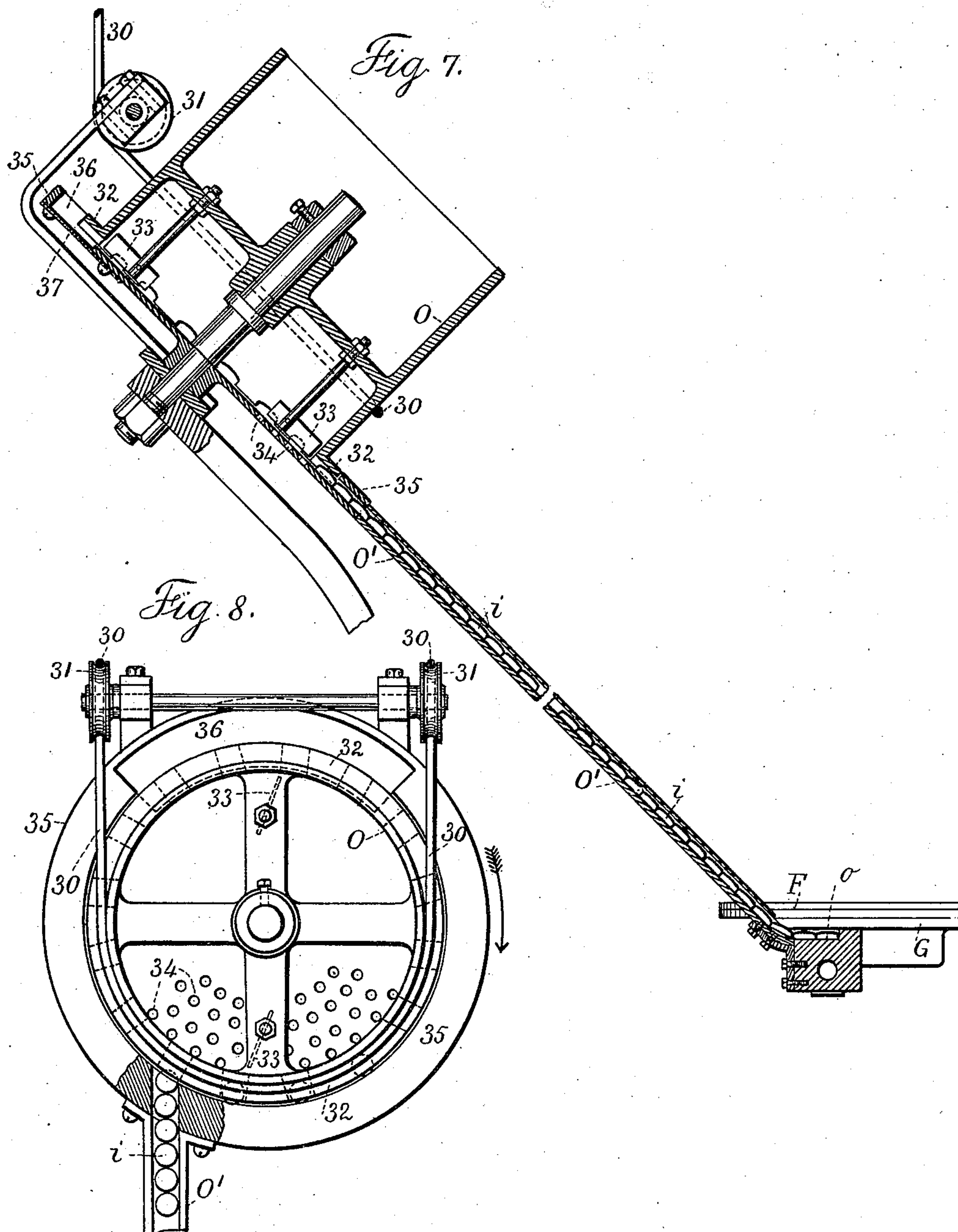
(No Model.)

5 Sheets—Sheet 5.

S. B. LANE.
ROTARY BUTTON PRESS.

No. 574,154.

Patented Dec. 29, 1896.



Witnesses:
J. Staib
Chas. H. Smith

Inventor:
Spencer B. Lane
by L. W. Serrell & Son

UNITED STATES PATENT OFFICE.

SPENCER B. LANE, OF WATERBURY, CONNECTICUT, ASSIGNOR TO THE
AMERICAN RING COMPANY, OF SAME PLACE.

ROTARY BUTTON-PRESS.

SPECIFICATION forming part of Letters Patent No. 574,154, dated December 29, 1896.

Application filed August 27, 1896. Serial No. 604,075. (No model.)

To all whom it may concern:

Be it known that I, SPENCER B. LANE, a citizen of the United States, residing at Waterbury, in the county of New Haven and State of Connecticut, have invented an Improvement in Rotary Button - Presses, of which the following is a specification.

The object of the present invention is to facilitate the manufacture of sheet-metal buttons and to prevent the button-blank becoming misplaced as the same is conveyed from one operation to the next between the respective dies and punches.

In this press the cup-shaped metal blanks are fed into the machine with the open ends downward, and they are lifted successively and grasped by fingers in a rotary carrier, and these fingers present the blanks in succession to the action of the dies, and the pairs of fingers are opened to liberate the blanks as such blanks are taken by the dies, so that the blanks are not only accurately presented to the dies, but they are liberated from the holding devices just before the dies grasp and act upon the blanks, and the fingers are open when the dies separate from the blanks, so as to close automatically by the action of springs to grasp the blanks and convey them around from one operation to the next until the button is finally completed and delivered from the machine.

In the drawings, Figure 1 is a front elevation. Fig. 2 is an elevation at the left-hand side of the machine and without the feeding-slide. Fig. 3 is a plan view partially in section and representing generally the parts below the line 3 3 of Fig. 1, the same being in larger size. Fig. 4 is a section near the line 4 4 of Fig. 3. Fig. 5 is a section in larger size at the line 5 5, Fig. 1, showing the stripper-plate and adjacent parts; and Fig. 6 represents the successive dies and punches in a range for illustrating the successive operations. Fig. 7 is a section, and Fig. 8 a perpendicular view, of the feeding devices.

The bed A of the machine is supported on suitable legs A', and above this a frame B is secured that carries the operating part, and there is a fly-wheel C, which may also be used as a belt-pulley upon the crank-shaft 2, that is supported in the frame B, and from the

crank on the shaft a connecting-rod D passes to a head E for reciprocating the same, and this head gives motion to the punches and other moving devices hereinafter described. 55

The stud 5 is supported upon a bracket from the bed A and receives upon it the rotary carrier F, that is provided with fingers, as hereinafter described, for conveying the blank from one operation to the next, and this rotary carrier rests upon a table G, which is stationary and supported by a bracket on the bed-plate A² and held firmly in position by the shank of the stud 5 and by the other operative parts hereinafter described that pass through openings in this table. 60 65

The slide H is supported within guides H² upon the bed A, and pivoted to this slide is a pawl H', which engages notches *h* in the edge of the rotary carrier, and there is a cam K on the crank-shaft 2, which gives motion to a lever L, pivoted upon the frame B and having a link L' to the slide H, so as to give motion at the proper time to the slide and to the pawl for rotating the carrier F with a step-by-step motion. 70 75

The holding-dog M is pivoted upon the bed-plate A² and provided with a spring 14 to press the tooth toward the periphery of the rotary carrier, and the sides of the tooth and of the notches *h* are inclined, so that when the proper power is applied to the slide H and pawl H' the rotary carrier will be turned the extent of one notch, and this movement is given for carrying the blank button from one pair of dies to the next, so that the operations are performed successively. The screw 39 at the end of the slide H draws the dog M out of the notch before the pawl H' turns the rotary carrier. 80 85 90

Upon the crank-shaft 2 is a clutch N, with which a projection upon the fly-wheel pulley C engages, and there is a slide N' with a projecting arm at its upper end, and if, in the rotation of the carrier F, there is an obstruction, so that such carrier is not forced properly around to position, the finger *n* will rest upon the rotary carrier F instead of going through one of the holes in the rotary carrier, and the slide N will engage the disconnecting-clutch and swing it out of contact with the projection on the fly-wheel pulley, 95 100

allowing such fly-wheel pulley to continue its movement, but the machine to stop instantly.

I remark that the spring 17 gives motion to the slide H and its pawl and tends to press the upper end of the lever L against the cam upon the crank-shaft. Hence the cam will carry the slide and pawl to a definite position upon the back movement ready for the spring to move the slide H and turn the rotary carrier, but if there is an obstruction to the movement of the rotary carrier greater than the power of the spring 17 the parts will stop and the machine will be stopped, as aforesaid, so as to prevent injury to the parts.

The rotary carrier F is made of two disks connected so that they revolve together, there being a flat annular space between the two disks, and between these disks the fingers 8 are pivoted at 9, such fingers being arranged in pairs, as seen in Fig. 3, and there are springs 10 between one pair of fingers and the next, which, acting on the outer edges of the fingers, tend to press the fingers of the respective pairs toward each other, and at the outer ends of the fingers there are jaws 11, made semicircular or nearly so, as illustrated in Fig. 3, and these are of a size adapted to receive and hold the button-blank in proper position, and there are also in the inner faces of the fingers notches at 12 for the reception of openers 13, that are attached to the head or punch carrier E, and these openers 13 have tapering ends, so that they readily pass at the notches 12 between the fingers of each pair to open such fingers, and there are preferably pins 1 in the rotary carrier and between the fingers in each pair, so that the fingers closing by the springs against these pins are stopped in the proper positions when they are not holding the button-blank, and it is to be understood that there are upon the head E as many openers 13 passing down as there are punches that are brought into action in making the button, the object being that the openers 13 shall draw out from between the pairs of fingers to allow the fingers to close by the springs and hold the button as it is lifted from the dies and carry such button-blank from one set of dies to the next, and then the head E, again descending, will bring the openers again into action upon the next pair of fingers to open such fingers before the dies reach the button-blanks to act upon the same, and these operations will be performed successively from the time the blank for the button is received into the rotary carrier until the completed button is delivered.

There are to be as many pairs of dies and punches as there are operations to be performed in making the button. In Fig. 6 there are represented six pairs of dies in performing the respective operations upon the button-blank, such dies and punches being marked, respectively, T T' U U' V V' W W' X X' Y Y', the punches being connected to the head E and the dies being supported upon the portion A² of the bed, and their upper

surfaces are level or nearly so with the top of the table G, and the punches may pass through the stripper-plate 7.

In the manufacture of buttons the blank is liable to become wedged in the lower die, and to raise the blanks to the proper position to be taken by the fingers 8 the lifters R are employed. Each lifter is made in the form of a rod, passing centrally through the die, or if more convenient the upper end of the lifter may be in the form of two rods or a fork to act under the flange of the button. These lifters liberate the buttons from the respective dies, and in order to actuate such lifters the levers S are made use of, there being cams S' upon the shaft S², and it is to be understood that there are as many cams and lifters as there are dies upon the bed of the machine, and the shapes of the cams S' are to be such as to act upon the levers S and lifters at the proper time, and the shaft S² is driven by an intermediate shaft S⁵ with pairs of bevel-gears S³ S⁴, the same receiving motion from gear-wheels O⁴ O⁵, the latter being upon the crank-shaft 2, and there are springs O⁶ to pull down the lifters and to keep the levers S to their respective cams.

The blank buttons are advantageously cut out with dies and stamped up into the shape of shallow cups i, and this is done in a separate machine, and the cup-blanks are put into a cylinder O and the blanks allowed to pass from such cylinder down a feed-slide O'. This cylinder O may be of any desired character, and it is so constructed as to allow the blanks to pass in succession and slide down the slide O' to a table o, which is beneath the edge of the rotary carrier F.

I have shown the cylinder O as upon an inclined axis perpendicular to the feed-slide O', and this cylinder is rotated by any suitable means. I have shown a cord 30, passing below pulleys 31 and around the cylinder O, so as to rotate the same, and this cord may pass to any suitable pulley, and upon the lower edge of the cylinder is an outward-projecting flange 32, with openings in it corresponding in size and shape to the cup-shaped blank i, and the mass of cup-shaped blanks being placed in this cylinder and the cylinder revolved such blanks are constantly agitated, and they slide out down the incline O' as the line of blanks passes down the incline and into the machine, and I find it advantageous to place a notched ring 35 around the flange 32, so that cup-shaped blanks that may be in the notches at the lower edge of the cylinder cannot drop out or become obstructed, and this ring 35 is notched at the upper part, as seen at 36, so as to give access to the outer edge of the flange 32 for removing anything that may become wedged into the notches of the cylinder, and by placing a removable plate 37 below the notched portion 36 access can be given to the bottom edge of the feed-cylinder O to avoid removing the same from its axis.

The lifter Q passes through the table at the lower end of the feed-slide O', and the upper end of this lifter Q is flat to receive the blank and carry the same up to the fingers 8 of the pair of fingers in the rotary carrier that are above such lifter at the time a motion is given to the lifter, and the flat upper end of the lifter Q is normally level with the surface of the table G or slightly below it.

The lifter Q is connected at its lower end to a lever *a*, (see Figs. 1 and 4,) which lever is pivoted at *a'*, and the spring *d* acts to raise the lifter and the blank when the lever *a* is not otherwise acted on, and from the slide H a pin *b* passes down to a slide-bar *c*, which is above a roller or projection on the lever *a*, and this slide-bar *c* has upon it a cam-incline *c'*, which acts upon the lever *a* at the proper time to depress the same in order that a cup-blank *i* may pass above the lifter, and as the slide H is drawn back the cam-incline *c'* is withdrawn from the lever *a* and such lever acts upon the lifter Q to raise the shell into position for the fingers and rotary carrier to move the same into position for being acted upon by the first pair of dies. A pusher P is made use of to move the blank over the lifter Q. This pusher is in the form of a horizontal bar acted upon in one direction by a spring 16, and at one side of the pusher a pin projects, that is acted upon by the cam-bar P', (shown by dotted lines in Fig. 4,) such cam-bar being fastened to the head E and raised and lowered with the same, and the shape of the cam-bar is such and the parts are so timed that when the head E is raised and the cam-bar P' lifted the pusher P is forced back and a cup-blank passes from the slide O' upon the table *o* and in front of the pusher P, and after the lifter Q has descended, as aforesaid, the cam-bar P', descending with the head, allows the pusher P to carry the cup-blank over the lifter Q, the top end of such lifter Q at this time being level with the surface of the table *o* or slightly below it.

The various operations will be fully understood by reference to Fig. 6, in which the respective dies and punches are represented. The punches T, U, V, and W are provided with pushers 40, actuated by springs 41, and these pushers yield during the punching operation, but the springs, acting on the pushers, discharge the blank from the ends of the punches as they rise, and the liberators before described act to lift the button-blank from each of the dies T' U' V' W' X' Y'. It, however, is advantageous with the dies X' and Y' to make the liberators in the form of two rods acting upon the under side of the button-blank near the edges thereof, because in these dies a central hole is formed in the button, and the punches X and Y are also advantageously made with double pushers, so as to come opposite the pushers in the dies, and the double pushers 42 in the punch Y are advantageously acted upon by a spring 43, and the pushers 44 in the punch X are ad-

vantageously acted upon by a rod 45 and cam-bar 46, which is in the head E and receives an end movement in one direction by the screw 47, that is stationary upon the frame, and the spring 48, that acts against a pin upon the cam-bar 46, as seen in Fig. 2, the object of this device being to insure the separation of the blank from the punch after the punch has perforated the central hole in the button-blank, because at this time there is the greatest liability for the button-blank to adhere to the punch as such punch rises.

The cup-shaped blank *i* is represented by the devices before described with the hollow or concave side downward, and it is carried between the die T' and punch T, and in the movement of the head the punch T presses the convex side of the cup-blank downward, concaving the same, and the edges of the cup-blank are partially turned under, as seen in Fig. 6, and this blank 50 is lifted from the die T' and separated from the punch T, and it is carried by the rotary carrier and its fingers in between the dies U U', which give to the same the shape indicated at 51, and the blank 51 is lifted and separated from the dies and carried between the dies V V', which give to the same the shape represented at 52, and this blank is separated from the dies and carried by the rotary carrier and fingers between the dies W W', which still further shape the blank, as indicated at 53, and leave it in a condition for the final shaping of the cavity and the perforation of the central hole by the punch X and die X', as shown at 54, and it is separated from the punch and die, as before described, and carried to the final finishing operation between the punch Y and the die Y', which bend the metal around the central hole upward, so as to completely finish the button, as shown at 55, and this is conveyed by the rotary carrier and fingers to the discharger Z, that insures the delivery of the button through a hole in the table G into a suitable receptacle.

It will now be more fully appreciated that the spring-fingers simply grasp or hold the blanks and carry them from one die and punch to the next, and the openers 13, acting between the spring-fingers, press them back and open them sufficiently for the dies and punches to act upon the blanks, the fingers not only being out of the way of the punches, but in consequence of entirely loosening their hold upon the blanks the blanks are free to accommodate themselves to the dies and punches as they come together.

This machine has been described with reference to the manufacture of buttons with central openings adapted to the reception of attaching-eyelets. I do not limit myself to the use of this machine for the manufacture of any particular kind of button, as the improvement is available with buttons and similar articles.

I claim as my invention—

1. The combination in a press for buttons,

of a range of dies and punches adapted to receive and act upon the sheet-metal blanks, a rotary carrier and means for moving the same between the dies and punches, such carrier
 5 having openings through it, fingers upon such carrier, springs for closing the fingers, and openers acting on the fingers and receiving their movements from the head carrying the punches, substantially as set forth.

10 2. The combination in a press for buttons, of a range of dies and punches adapted to receive and act upon the sheet-metal blanks, a rotary carrier and means for moving the same between the dies and punches, such carrier
 15 having openings through it, fingers upon such carrier, springs for closing the fingers, openers acting on the fingers and receiving their movements from the head carrying the punches, and lifters for raising the blanks from the
 20 lower die into the carrier and between the spring-fingers, whereby they are carried from one pair of dies to the next, substantially as set forth.

3. The rotary carrier formed of two plates
 25 connected together, fingers in pairs between the plates pivoted at their inner ends, and having jaws at the outer ends, springs between the fingers for acting upon the same, tapering openers acting between the pairs of
 30 fingers, substantially as set forth.

4. The carrier having a plate with openings

through it, in combination with fingers in pairs pivoted at their inner ends and having jaws at the outer ends, springs acting upon the fingers for closing them, and tapering
 35 openers acting between the fingers and mechanism for moving the same and for revolving the carrier, substantially as set forth.

5. The combination in a rotary button-press, of a slide down which the cup-shaped
 40 blanks pass, a lifter upon the upper end of which the blank is received, a rotary carrier having spring-fingers in pairs, means for actuating the lifter and raising the blank between the spring-fingers, dies and punches
 45 for acting upon the blanks in succession and lifters for raising the blanks and passing them in between the spring-fingers of the rotary carrier, substantially as set forth.

6. A rotary carrier and its supporting-shaft
 50 and means for revolving the same progressively, such carrier having a circular range of openings through it, in combination with fingers in pairs pivoted at their inner ends, stop
 55 pins and springs between the pairs of fingers and tapering openers for opening such fingers, substantially as set forth.

Signed by me this 14th day of August, 1896.
 SPENCER B. LANE.

Witnesses:

SAMUEL JOHN MARSH,
 CHAS. W. GILLETTE.