

(No Model.)

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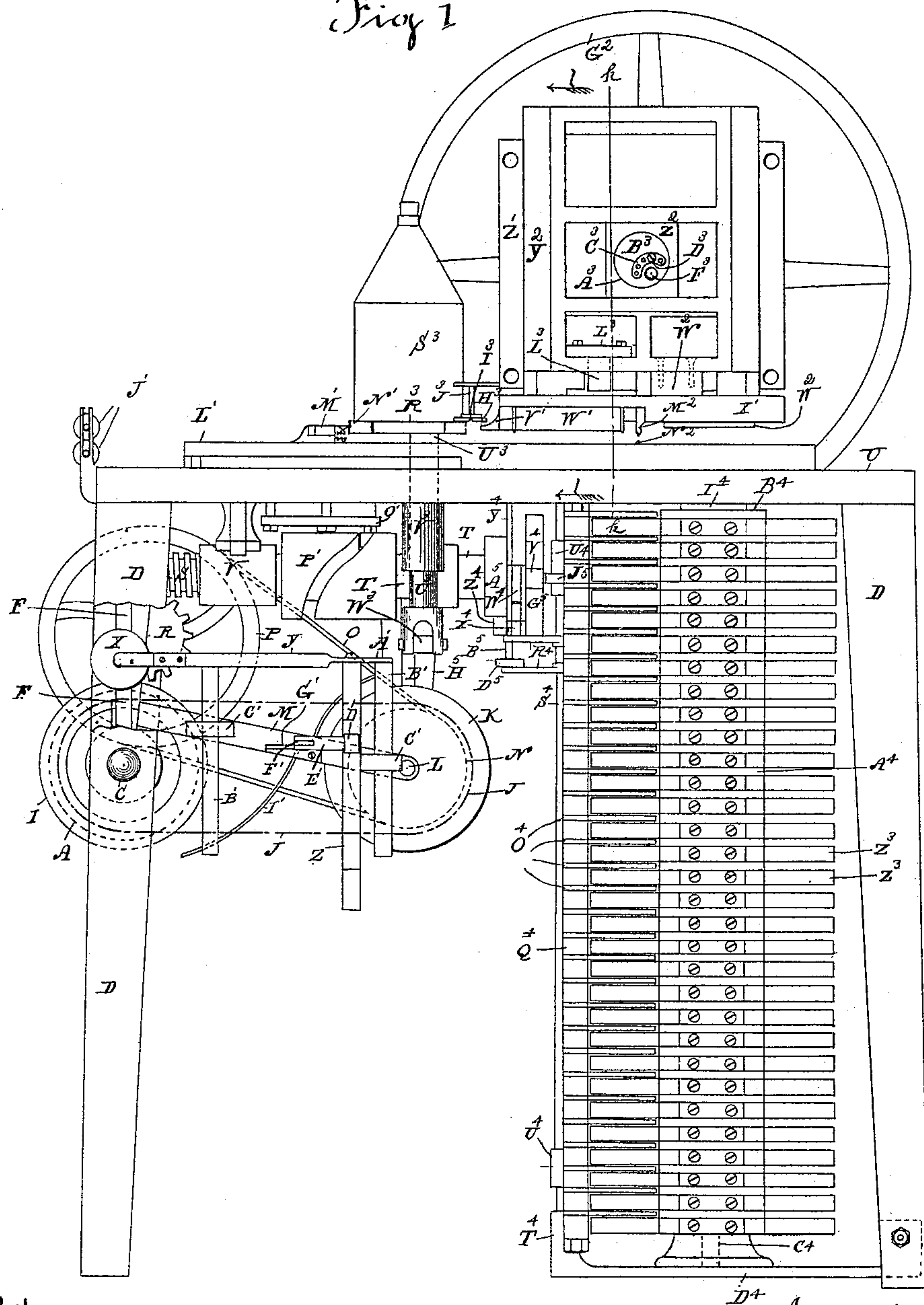
A. L. PICKETT.

MACHINE FOR MAKING PAPER BOXES.

No. 389,407.

Patented Sept. 11, 1888.

Fig 1



Witnesses:  
Chas. B. Shumway  
Harry Hall

Inventor  
Alva L. Pickett  
By Geo. W. Seymour,  
Atty

(No Model.)

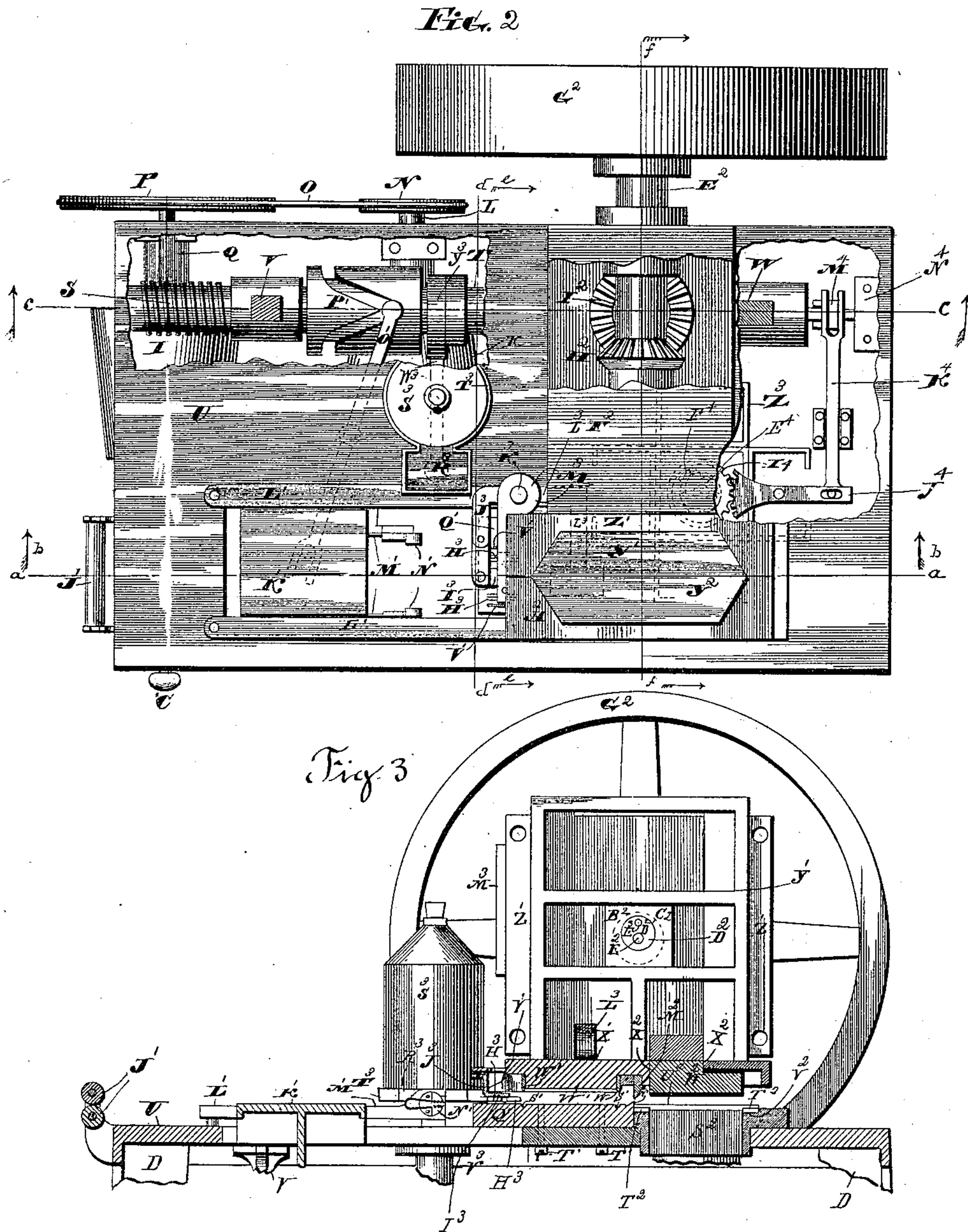
9 Sheets—Sheet 2.

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Witnesses:  
Chas B. Shumway  
Harry Hall

Inventor  
Alva L. Pickett  
By Geo. Seymour  
Atty



(No Model.)

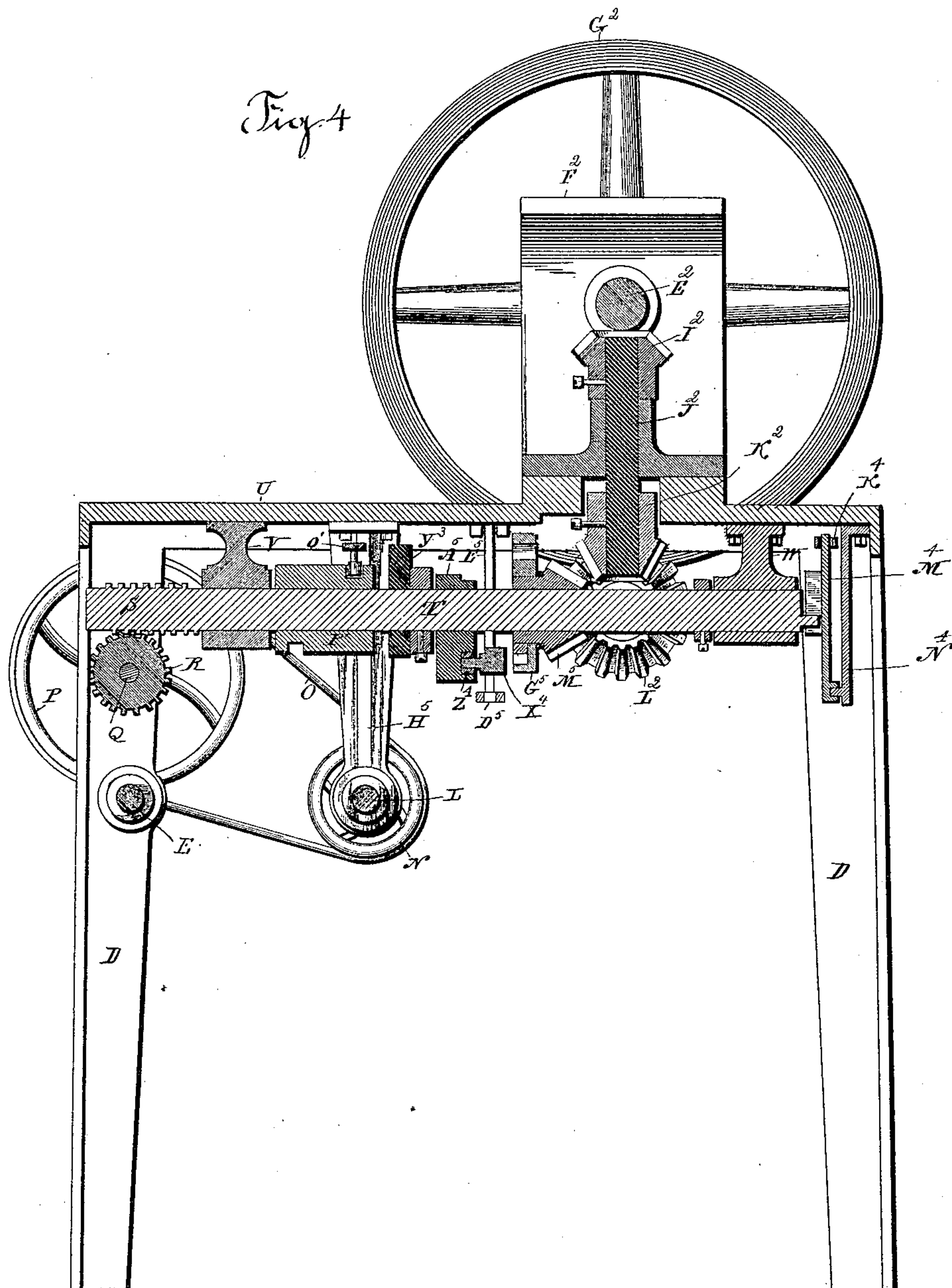
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A. L. PICKETT.

MACHINE FOR MAKING PAPER BOXES.

No. 389,407.

Patented Sept. 11, 1888.



Witnesses:  
Chas. D. Hummer  
Harry Hall

Inventor  
Alva L. Pickett  
By Geo. O. Seymour.  
Atty

(No Model.)

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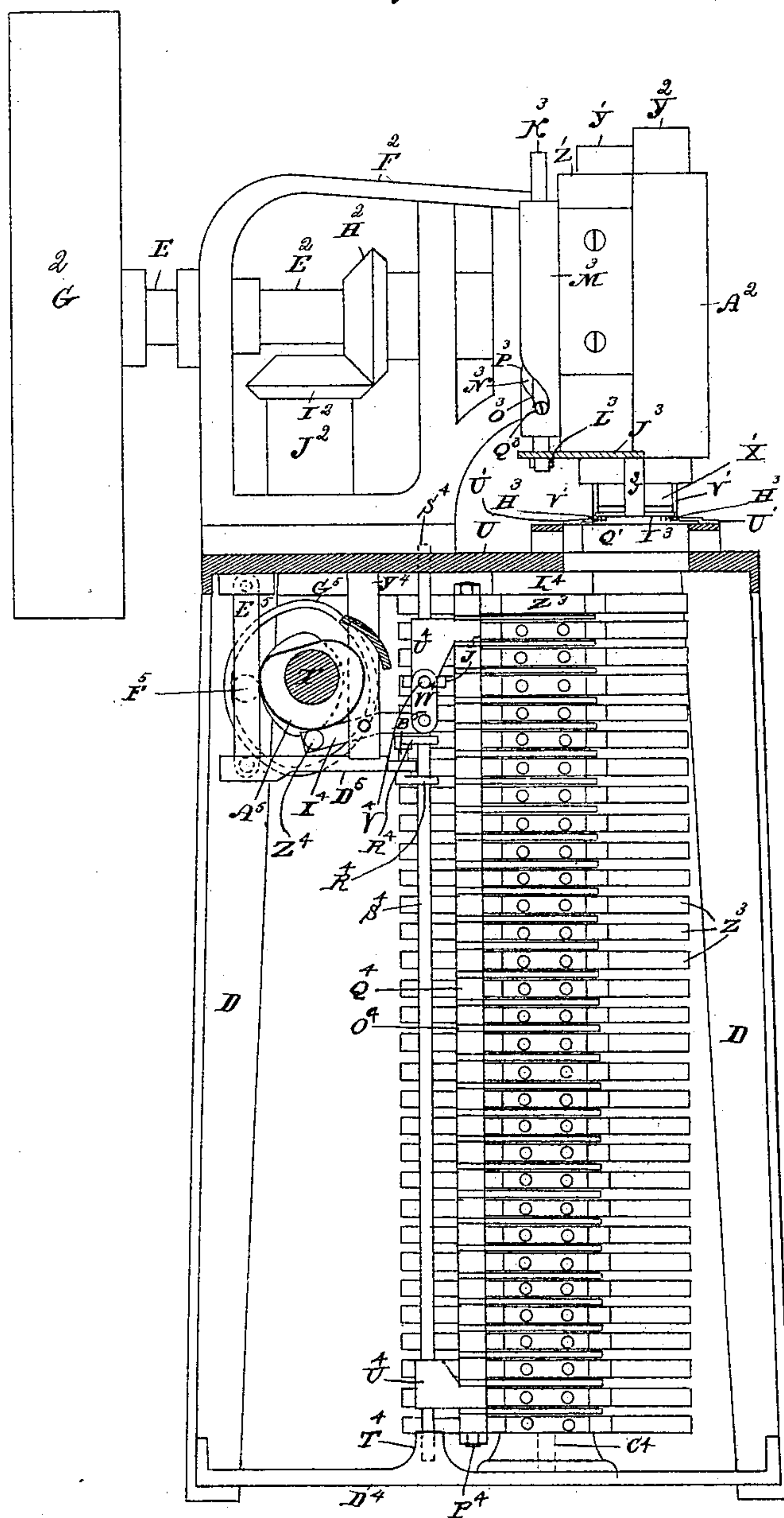
A. L. PICKETT.

# MACHINE FOR MAKING PAPER BOXES.

No. 389,407.

Patented Sept. 11, 1888.

Fig. 5



Witnesses:

Chas. B. Shumway

Harry Hall

Inventor

Oliver L. Pickett

By *G. O. Seymour.*  
Atty



(No Model.)

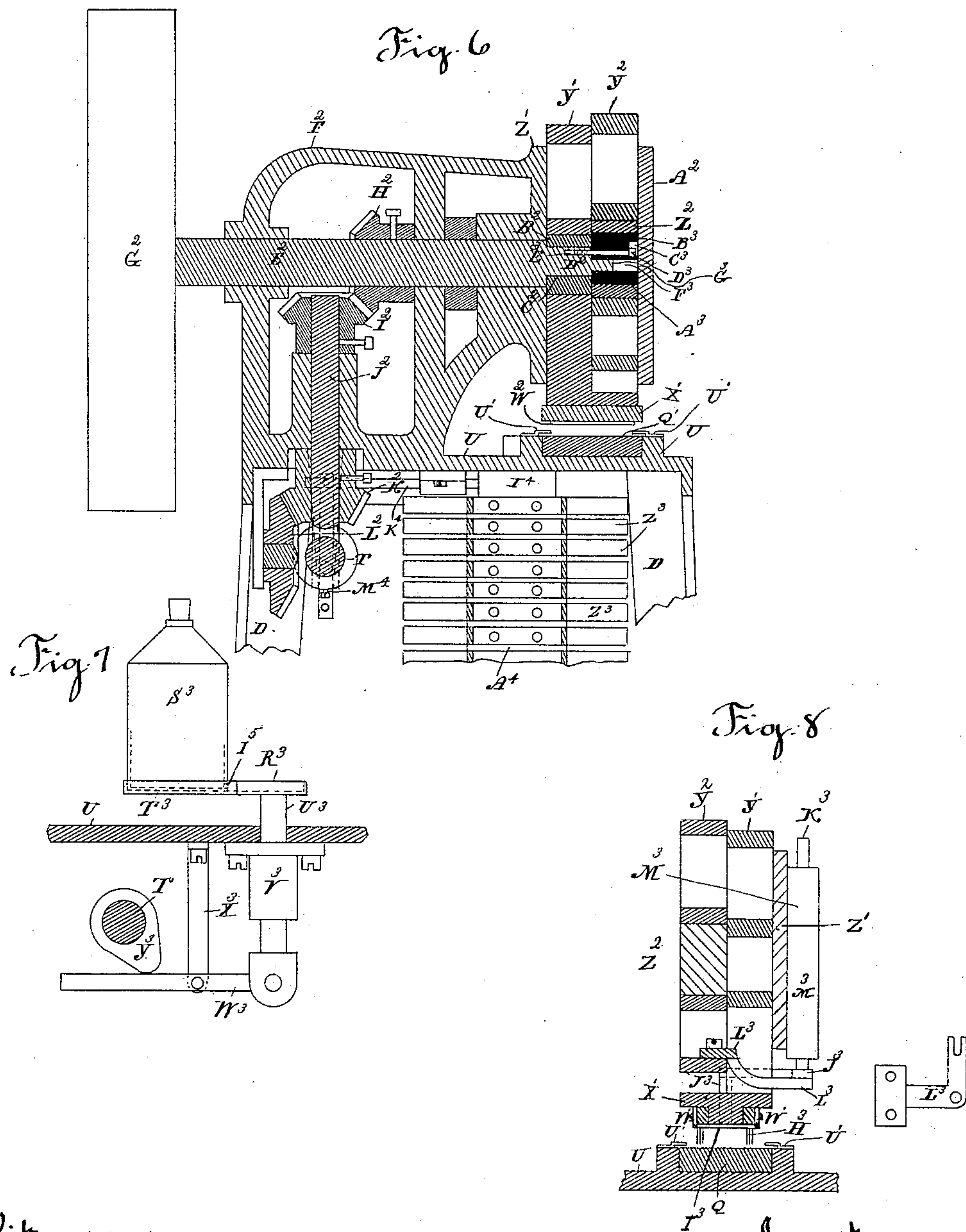
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A. L. PICKETT.

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(No Model.)

9 Sheets—Sheet 6.

A. L. PICKETT.

# MACHINE FOR MAKING PAPER BOXES.

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Fig 9

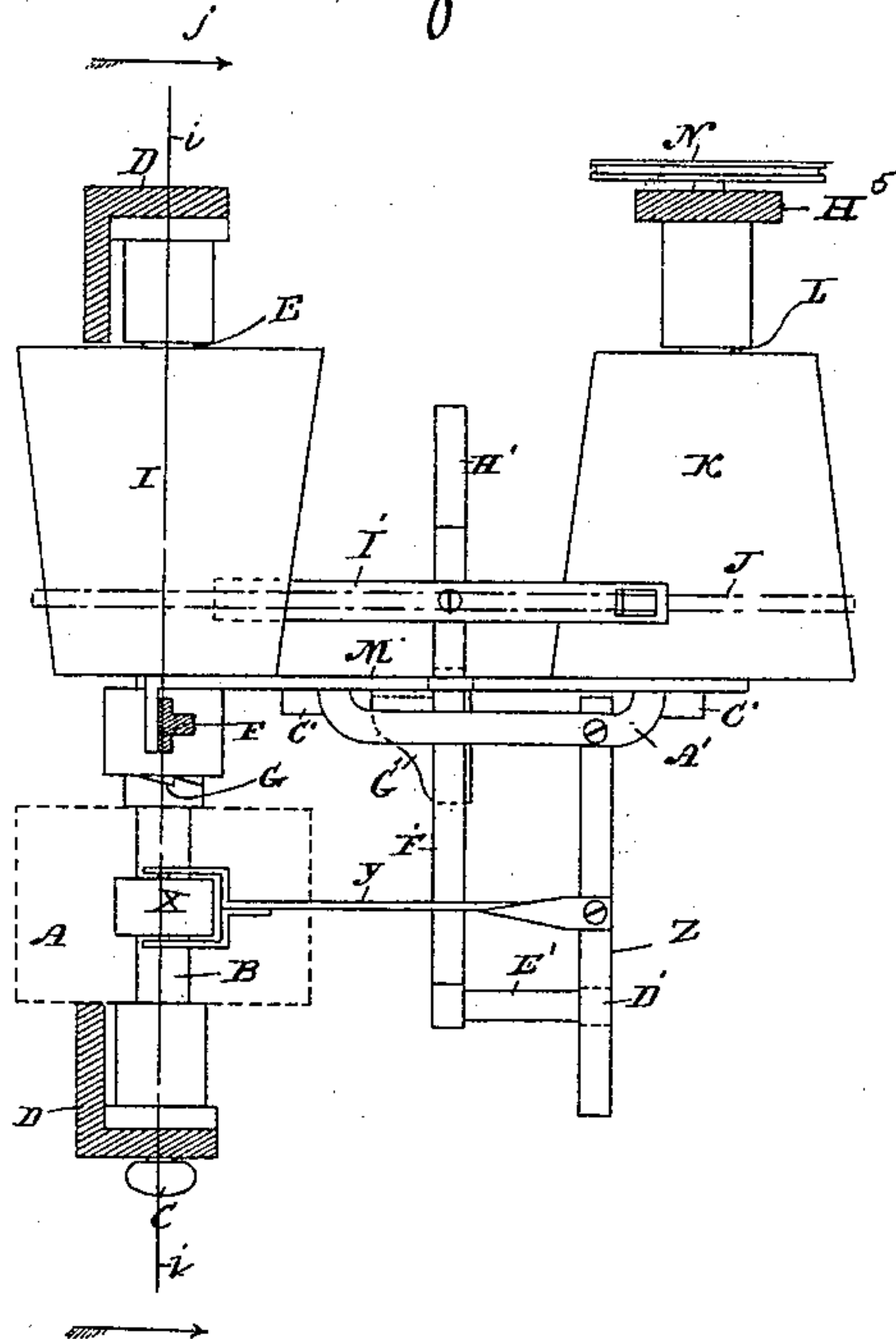
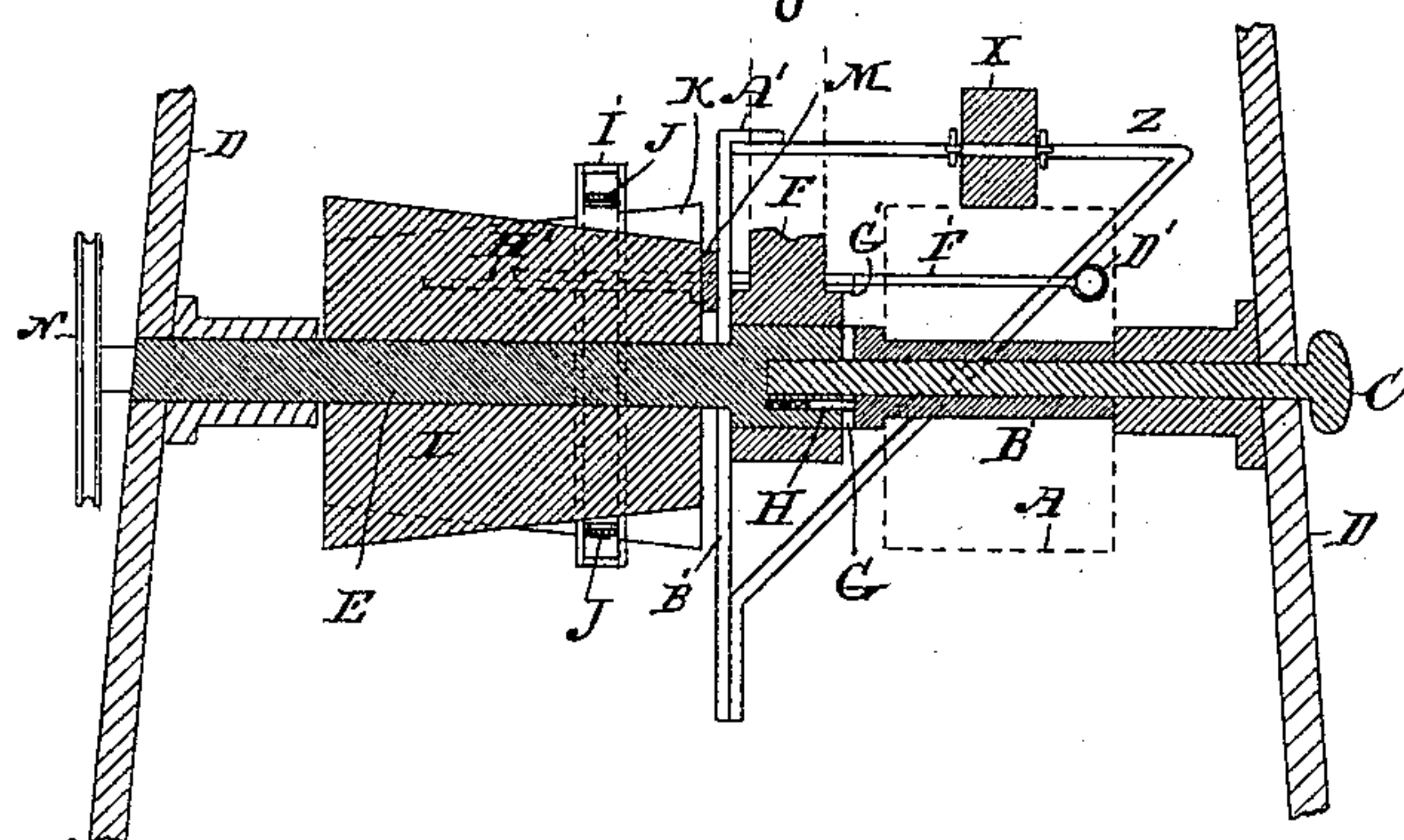


Fig. 10



Witnesses:

Chas. B. Shumway

Harry Hall

Inventor

Alva L. Pickett

By Geo. W. Seymour.  
Atty

Atty

A. L. PICKETT.

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FIG 11

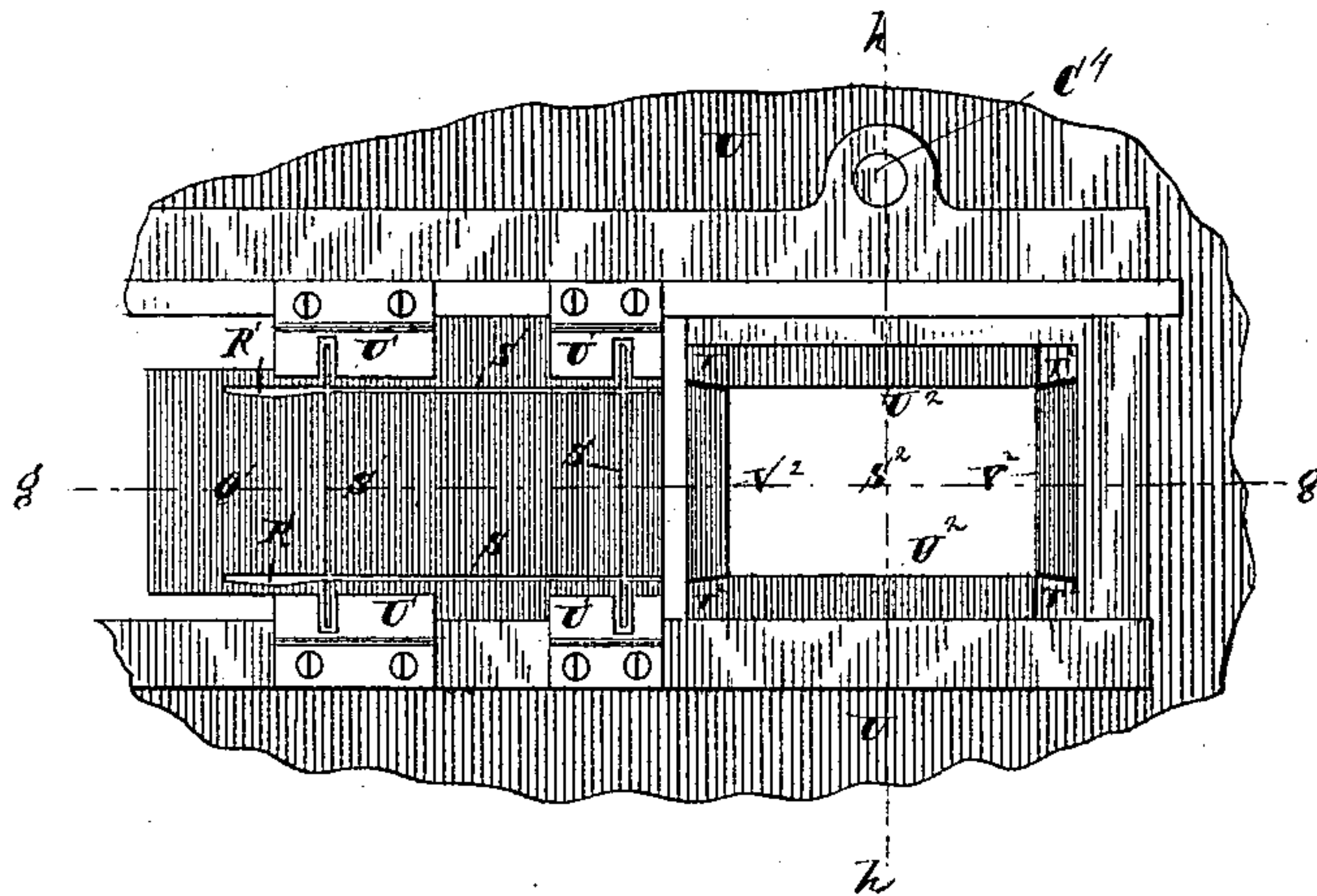


FIG 12

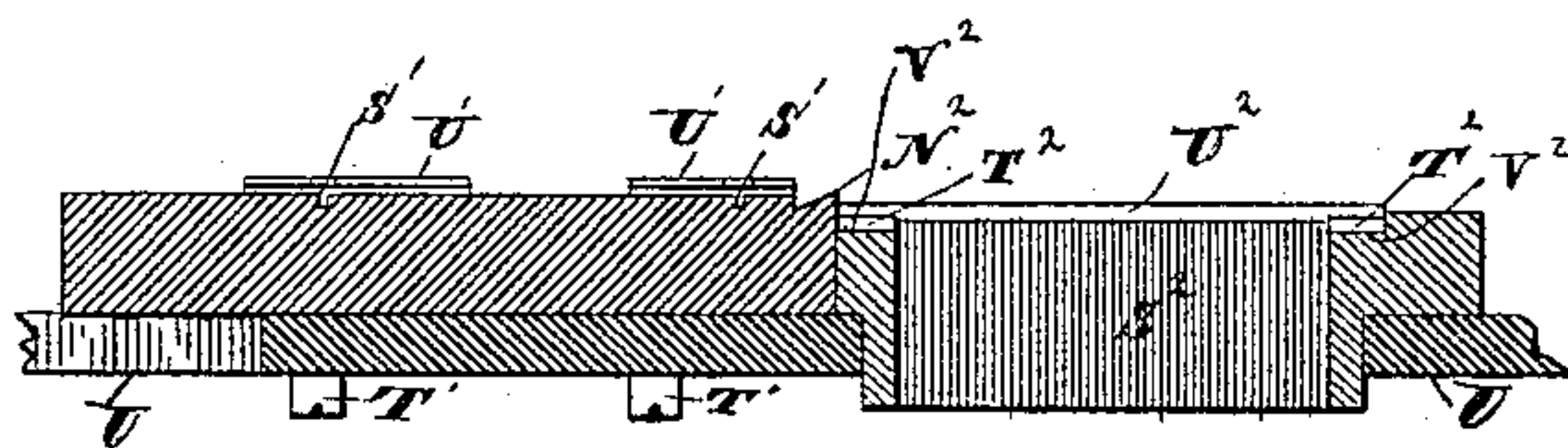
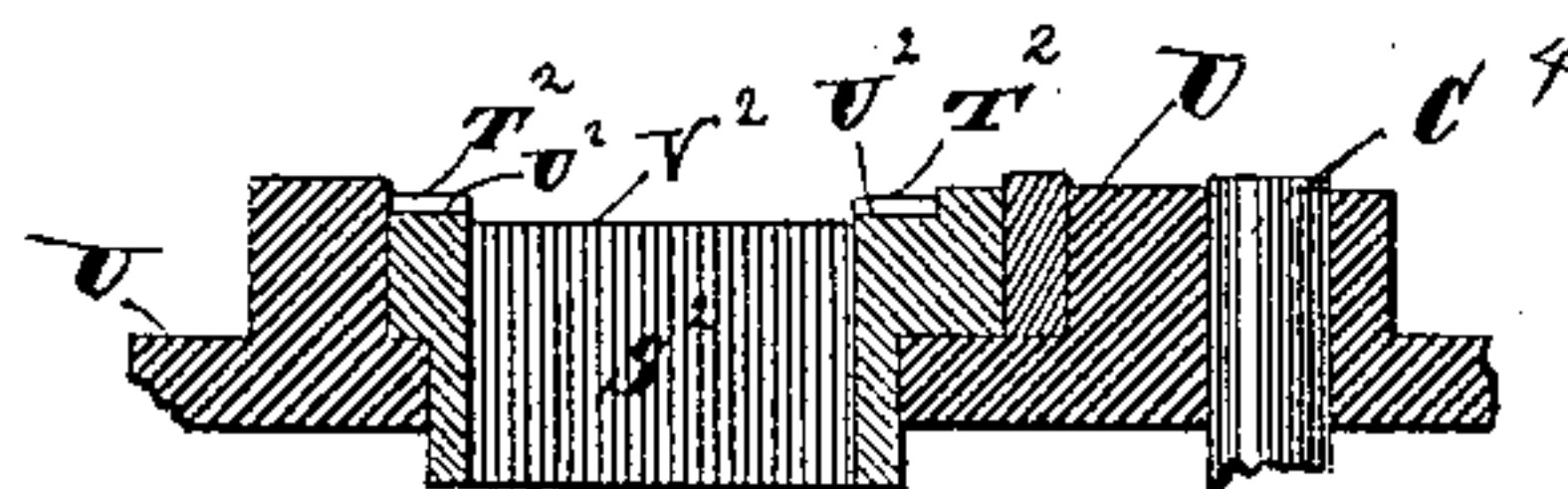


FIG 13



WITNESSES:

Chas B. Shumway  
Chas L. Brown Jr.

INVENTOR

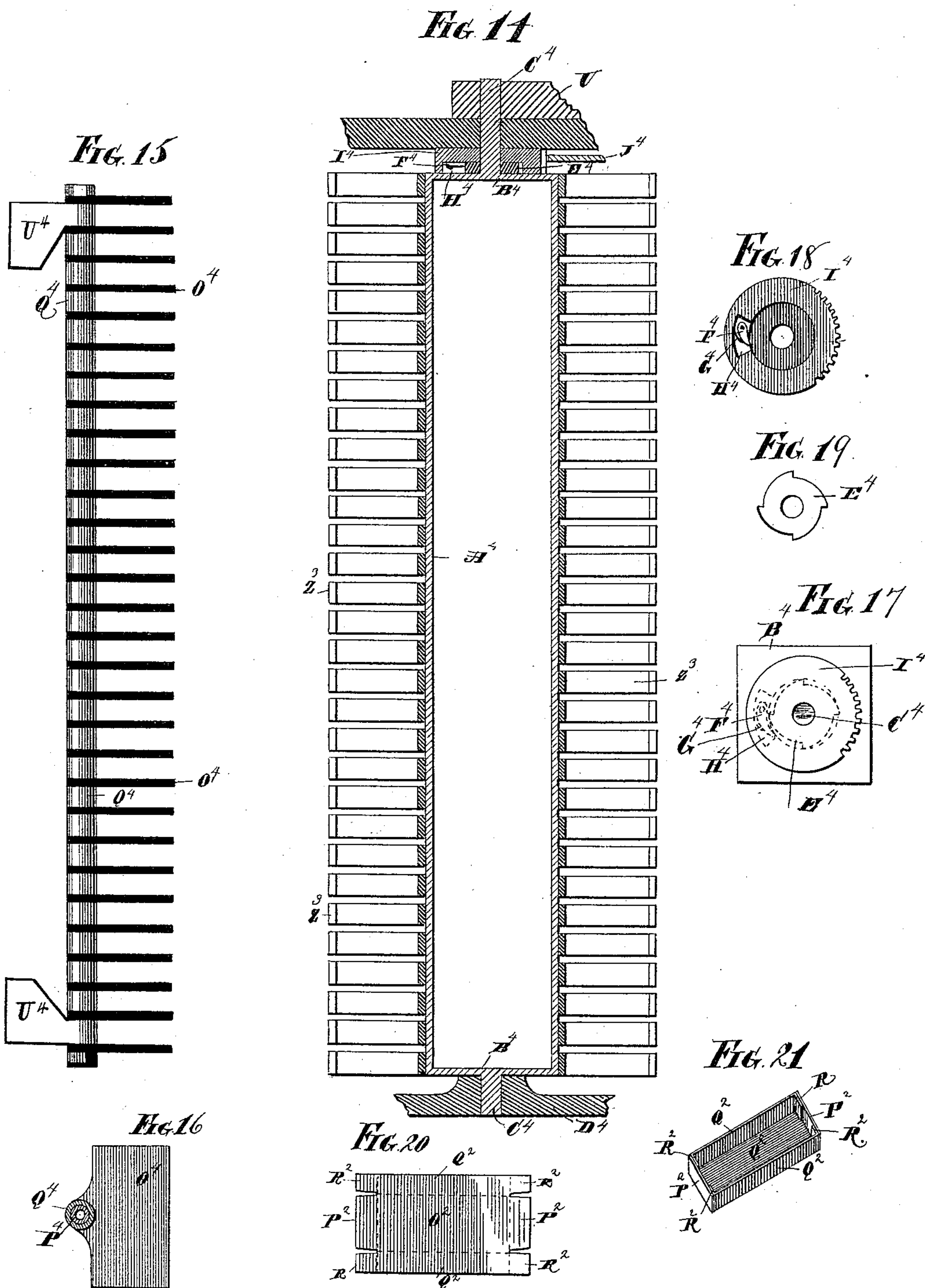
Alva L. Pickett.  
By Geo. W. Seymour.  
Atty.



A. L. PICKETT.  
MACHINE FOR MAKING PAPER BOXES.

No. 389,407.

Patented Sept. 11, 1888.



WITNESSES:

Chas B. Shumway  
Chas L. Sman Jr.

INVENTOR

Alva L. Pickett.  
By Geo. W. Seymour. atty.



(No Model.)

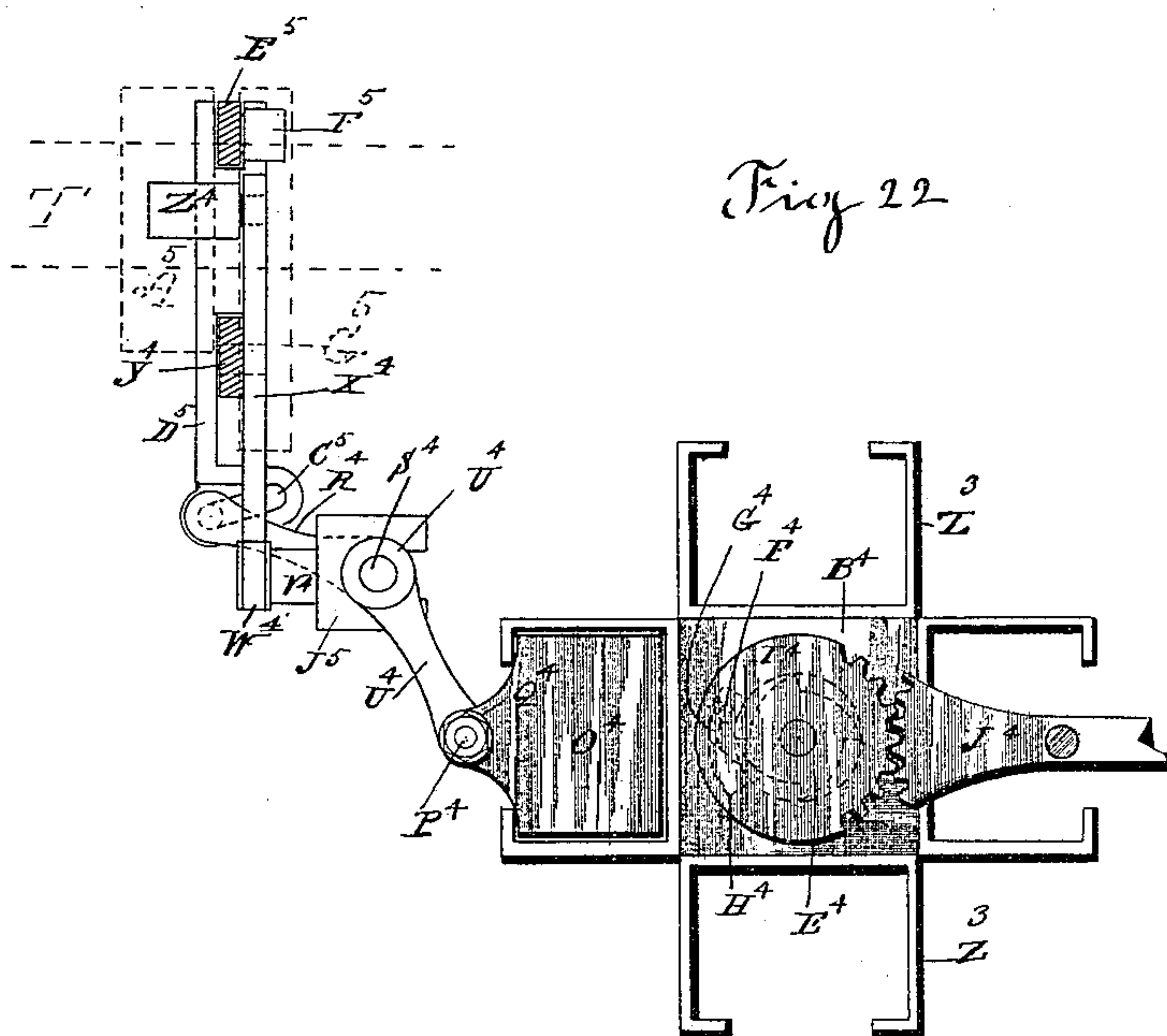
9 Sheets—Sheet 9.

A. L. PICKETT.

MACHINE FOR MAKING PAPER BOXES.

No. 389,407.

Patented Sept. 11, 1888.



Witnesses:  
Chas B Shumway  
Harry Hall

Inventor  
Alva L. Pickett  
By *Gosley*  
Atty

# UNITED STATES PATENT OFFICE.

ALVA L. PICKETT, OF NEW HAVEN, CONNECTICUT, ASSIGNOR TO THE  
DIAMOND MATCH COMPANY, OF SAME PLACE.

## MACHINE FOR MAKING PAPER BOXES.

SPECIFICATION forming part of Letters Patent No. 389,407, dated September 11, 1888.

Application filed August 11, 1886. Serial No. 210,600. (No model.)

*To all whom it may concern:*

Be it known that I, ALVA L. PICKETT, residing at New Haven, in the county of New Haven and State of Connecticut, have invented  
5 certain new and useful Improvements in Machines for Making Paper Boxes; and I do declare the following to be a full, clear, and exact description of the same, reference being  
10 had to the accompanying drawings, which form a part of this specification.

My invention relates to an improvement in machines for making paper boxes, the object  
being to produce a machine which shall be compact, efficient, and have a large capacity  
15 for work and for drying boxes.

With these ends in view my invention consists in a machine having certain details of construction and combinations of parts, as will  
20 be hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in front elevation of a machine embodying my invention with the front of the casing inclosing the reciprocating heads removed.  
25 Fig. 2 is a plan view of the machine with portions broken away to show its operating-connections. Fig. 3 is a broken sectional view of the machine on the line *a a* of the preceding figure, looking in the direction of the arrows  
30 *b b*. Fig. 4 is a sectional view on the line *c c* of the same figure and looking in the same direction. Fig. 5 is a similar view on the line *d d* of the same figure and looking in the direction of the arrows *c c*, the gum-fount being  
35 removed. Fig. 6 is a similar view on the line *f f* of the same figure and looking in the direction of the arrows last mentioned. Fig. 7 is a detached view, partly in section and partly in elevation, and showing the gum-fount and its  
40 operating-connections. Fig. 8 is a similar view showing the gummers and their operating-connections, and taken on the line *k k* of Fig. 1, and looking rearward toward the gummers in the direction of the arrows *l l* of that  
45 figure. Fig. 9 is a detached plan view of the feed-regulator. Fig. 10 is a similar view thereof in vertical section on the line *i i* of Fig. 9, and looking in the direction of the arrows *j j* on such figure. Fig. 11 is a broken plan view  
50 showing the scoring and cutting table and the

folding-die. Fig. 12 is a view in vertical longitudinal section on the line *g g* of the preceding figure. Fig. 13 is a view in vertical transverse section on the line *h h* of the same figure. Fig. 14 is a view in vertical central section of  
55 the drying-cage. Fig. 15 is a detached view, in elevation, of the tier of followers co-operating with such cage. Fig. 16 is a detached view showing one of the followers in elevation and one of the collars and the shaft in section. Fig. 17 is a plan view showing the upper head  
60 of the cage and the gear with the ratchet and spring-actuated pawl in broken lines. Fig. 18 is a reverse plan view of the gear. Fig. 19 is a detached plan view of the ratchet. Fig. 20 is a plan view of a blank. Fig. 21 is a perspective view of a box as made by the machine, and Fig. 22 is a detached enlarged plan view  
65 of the cage and the operating-connections of the shaft carrying the followers.

The stock, A, from which the boxes are made is prepared in a long strip of suitable width and wound in a coil upon a sleeve, B, mounted upon a movable spindle, C, having one end supported in the frame D of the machine and  
75 the other end in a shaft, E, of which one end is supported in a hanger, F, and the other end in the frame of the machine, that end of the sleeve adjacent to the shaft being provided with face ratchet-teeth G, which are engaged  
80 by a spring-actuated dog, H, located in the adjacent end of the shaft, (see Fig. 10,) whereby the sleeve is coupled with the shaft, so as to be rotated thereby. A cone-pulley, I, mounted upon the said shaft with its smaller end forward,  
85 is connected by a belt, J, with a similar pulley, K, reversed in position and carried upon a shaft, L, supported at its forward end in a horizontal arm, M, attached to the hanger F, and at its rear end in a hanger, H<sup>5</sup>, beyond  
90 which it projects to receive the pulley N, connected by a belt, O, with a pulley, P, secured to a short shaft, Q, mounted in the frame of the machine, and provided at its forward end with a pinion, R, meshing with a worm, S, located upon the shaft T, extending the length  
95 of the machine and supported under the bed-plate U thereof in bearings V and W, as shown in Fig. 2 of the drawings.

The uniform feeding of the stock is regu- 100



lated and controlled by the coil itself through a roller, X, resting upon it and descending by gravity as it is reduced in diameter, and mounted in an arm, Y, the opposite end of which is secured to a triangular frame, Z, supported and guided in vertical reciprocation by a frame, A', the legs B' B' of which have bearing in blocks C' C', secured to the horizontal arm M, before mentioned. The outer face of the longer and inclined side of the said triangular frame engages with an anti-friction roller, D', mounted at the outer end of an arm, E', offsetting from a horizontal slide, F', passing through the arm M, supported by a frame, G', and an arm, H', respectively secured to the front and rear faces of the said arm M, and connected at its inner end with a shipper, I', controlling the position of the belt J upon the cones I and K. As the coil of stock is gradually unwound and reduced in diameter, the roller X and the angular frame Z descend, the latter through its inclined side drawing the slide forward and bringing the belt toward the smaller end of the driven cone I and toward the larger end of the driving-cone K, whereby the rate of rotation is increased in the former, the parts being constructed and arranged so that the contraction of the coil will always be exactly met by a proportional increase in the rapidity of its rotation, wherefore the stock is at all times fed uniformly to the machine. From the coil the strip passes upward and between two guide-rolls, J' J', and from thence to a reciprocating table, K', located between guides L' L', secured to the bed-plate U, and provided at its forward end and upon its opposite edges with frames M' M', each carrying upon their inner faces a pair of spring-actuated jaws, N' N', having the forward ends of their adjacent edges provided with teeth cut on a forward slant, pivoted to the rear of their longitudinal centers, and having a spring interposed between their respective rear ends or tails, whereby they are adapted to seize the strip as the table is advanced and to slip over it as the same is retracted, the table being reciprocated by a lever, O', fulcrumed to the under face of the bed-plate U and actuated by the cam P' upon the shaft T, before mentioned. The jaws N' N', seizing the strip, carry it forward to the table Q', provided upon its upper face with two parallel knife-incisions, R' R', tapering at each end, and with four intersecting scoring-incisions, S' S', located in advance of the knife-incisions. Screws T' T', mounted in the bed-plate U and located under the table, are provided for vertically adjusting it as the thickness of the paper or other conditions may demand. Four guides, U', arranged in pairs, respectively, extending over the opposite edges of the table, serve to guide the strip and keep it in place thereupon.

Two tapering cutting-knives, V' V', corresponding in shape to the incisions R' R', and hence adapted to cut a double-V-shaped piece out of the strip near each edge, and four scorers, W', arranged to correspond to the

scoring-incisions S' S', are secured to the lower face of a plate, X', located upon the lower end of a skeleton head, Y', mounted in a casing, Z', having a removable front, A', and vertically reciprocated in such casing through a block, B', mounted for horizontal reciprocation in the head and provided with a central aperture, C', receiving an eccentric, D', formed upon the forward end of the main driving-shaft E', which latter is mounted in the frame F' and provided with a driving-pulley, G', and connected through gears H' and I', shaft J', and gears K', L', and M', with the shaft T, which it drives.

The cutting-off knife M' is also secured to the plate X' and at a point in advance of the scorers, and operates in conjunction with a cutting-edge, N', formed at a corresponding point in the table Q', already described, to cut the strip into blanks like that shown by Fig. 20 of the drawings, each blank being virtually divided by the removal of the V-shaped pieces and the scoring-lines into the bottom portion, O', the end portions, P' P', the side portions, Q' Q', and the corners R' R' R' R', all as shown. The blanks, it will be noted, are cut on a line exactly dividing the double-V-shaped openings formed by the knives V' V' before the end of the strip reaches the cutting-off knife. The folding-die S' is located in advance of and with one end set against such cutting-edge N', and is provided with elevated corners T' T' T' T', with elevated sides U' U', and with depressed ends V' V', being also adapted in depth to contain three boxes at one time. The folding-punch W', co-operating with said die, is secured through an opening, X', in the plate X' to the lower end of a head, Y', located in front of the head Y' and in the same casing, and vertically reciprocated through a block, Z', mounted in it for horizontal reciprocation, and provided with a central circular aperture, A', receiving an eccentric, B', having a segmental series of holes, C', receiving a screw, D', securing it to the eccentric D', and entering a screw-hole, E', therein, and a hole, F', receiving a pin, G', projecting from the eccentric D' and relieving the screw D' from strain, the said eccentrics being proportioned so that the head Y' will have about twice the throw of the head Y' as it has to enter the die and rise above it to give clearance to the incoming strip, and the segmental series of holes being provided for shifting the screw, and hence the relations of the two eccentrics, as may be required in timing the machine.

Simultaneously with the cutting and scoring of the strip the end portions of two adjacent and still undivided blanks are gummed by gummers H', operating between the knives V' V' and upon the table Q', and arranged in two groups of three gummers each at the opposite ends of an arm, I', secured to the lower and free end of an angular frame, J', having its upper end rigidly secured to the lower end of an upright spindle, K', connected at such end with a bent arm, L', (see Fig. 8,) extending rear-



wardly through the head  $Y'$  and attached to the head  $Y^2$ , which raises and lowers it, and with it the spindle, which is mounted in a box,  $M^3$ , secured to the casing  $Z'$ , and provided with a cam-slot,  $N^3$ , composed of a straight lower portion,  $O^3$ , and a curved upper portion,  $P^3$ , and receiving a stud,  $Q^3$ , projecting from the spindle and operating through such stud to rotate the spindle as the same is raised and lowered by the head  $Y^2$ , whereby the gummers are swung forward, and then let down in a straight line or vertically between the knives  $V' V'$  and onto the strip, and then lifted above the knives and swung back into a position of retirement.

The gummers are charged for each gumming of the strip from a shallow gum-distributor,  $R^3$ , supplied from a gum-fount,  $S^3$ , supported upon a standard,  $T^3$ , the said standard and distributor being formed integral and located upon the upper end of a short upright shaft,  $U^3$ , mounted in a bearing,  $V^3$ , hung from the bed-plate  $U$ , and connected at its lower end with a lever,  $W^3$ , fulcrumed in a hanger,  $X^3$ , and actuated by a cam,  $Y^3$ , mounted upon the shaft  $T$  and timed to lift the shaft  $U^3$ , and hence the distributor, and so immerse the gummers in the same, the gummers being located, when retired, directly over such distributor. A small discharge-opening,  $I^3$ , formed in the extreme lower edge of the fount, discharges gum into the distributor, and so long as this opening is open the mucilage will flow out from the fount into the distributor. As soon, however, as the gum in the distributor rises above the level of the top of the said discharge-opening, the gum will stop flowing from the fount, and the column of gum therein will be held back by the pressure of the atmosphere upon the gum in the distributor; but when the gum in the distributor is lowered in charging the gummers below the level of the discharge-opening in the fount the gum will begin to run out into the distributor and be discharged thereinto until the opening is again closed, as described. The gum is therefore automatically supplied to the distributor and exactly according to the demand upon the same, and the gumming apparatus, so far as the fount and distributor are concerned, needs no other attention than the refilling of the font.

The boxes, folded and gummed, are delivered from the folding-die into a vertical rotary skeleton drying-cage composed, as herein shown, of four vertical series or tiers of box-holding frames,  $Z^3$ , secured with a space between each to the respective sides of a hollow square body,  $A^4$ , provided at its upper and lower ends with heads  $B^4$ , furnished with short shafts  $C^4$ , the shaft of the lower head being mounted in the part  $D^4$  of the frame of the machine and that of the upper head in the bed-plate  $U$  of the machine. A ratchet,  $E^4$ , having four teeth, is rigidly secured to the shaft of the upper head, upon which it rests, and is engaged by a pawl,  $F^4$ , actuated by a spring,  $G^4$ , and located in a recess,  $H^4$ , formed

in the under face of a gear,  $I^4$ , adapted to fit over and inclose the ratchet, and provided upon its periphery with teeth engaged by a toothed rocking lever,  $J^4$ , fulcrumed to the under face of the bed-plate  $U$ , and having its opposite end connected with a slide,  $K^4$ , connected with the upper end of an arm,  $M^4$ , (see Fig. 4,) having eccentric connection with the shaft  $T$ , and pivoted at its lower end to a hanger,  $N^4$ , as shown. Under these connections the cage is rotated a quarter-turn for each rotation of the shaft  $T$ .

The boxes are pushed downward from frame to frame through the respective tiers of frames and finally discharged from the cage by means of a vertical series or tier of followers,  $O^4$ , corresponding in number to the whole number of frames in any one tier of frames and mounted upon a shaft,  $P^4$ , upon which they are separated each from the other by collars  $Q^4$ , of sufficient width to bring the followers into alignment with the spaces between the frames. Horizontal arms  $U^4 U^4$ , respectively located at the upper and lower ends of the said tier of followers, are rigidly secured to the shaft  $P^4$  thereof and to a shaft,  $S^4$ , adapted to be rotated and vertically reciprocated, the upper end of the said shaft  $S^4$  having bearing in the bed of the machine and its lower end in the step  $T^4$  of the machine. A collar or plate,  $J^5$ , arranged to turn freely on the said shaft  $S^4$ , is located directly under the upper arm  $U^4$ , against which it lifts. This plate is provided with a horizontal stud,  $V^4$ , forming the upper pivotal point of a link,  $W^4$ , the lower end of which is connected with a lever,  $X^4$ , fulcrumed to a hanger,  $Y^4$ , and provided at its rear end with a roller,  $Z^4$ , engaged by a cam,  $A^5$ , mounted upon the shaft  $T$  and operating to lift the shaft  $S^4$ , and hence the tier of followers, through a space measured by the distance between two adjacent box-holding frames. The said shaft  $S^4$  is rotated to swing the followers into and away from the cage through a pin,  $B^5$ , located between and secured to two arms,  $R^4 R^4$ , rigidly secured to the shaft  $S^4$  below the lower end of the link  $W^4$  and playing in an elongated slot,  $C^5$ , formed in the forward end of a slotted slide,  $D^5$ , movably secured to the lower end of the hanger  $Y^4$ , and pivotally attached at its rear end to the swinging lever  $E^5$ , hung from the bed-plate  $U$ , and carrying a roller,  $F^5$ , engaged by a cam,  $G^5$ , mounted on the shaft  $T$ , and operating to advance and retract the slide  $D^5$ , which rotates the shaft  $S^4$  so as to swing the tier of followers into and away from the cage.

Having described my improved machine in detail, I will now set forth the method of its operation.

Let it be assumed that the machine is properly timed and that a box has just been produced, leaving the end of the strip cut, scored, and gummed upon the table  $Q'$ . The reciprocating table  $K'$  now advances and through the jaws  $N' N'$  moves the strip forward and its cut, gummed, and scored portion over the fold-



ng-die and under the folding-punch. The knives  $V' V'$ , the scorers  $W'$ , and the gummers  $H^3$  now descend to cut, score, and gum that portion of the die newly brought under them, and at the same time the cutting-off knife  $M^2$  descends and cuts off the end of the strip already cut, scored, and gummed on a line intersecting the double-V-shaped incisions made by the knives  $V' V'$  on their last preceding downstroke. The folding-punch  $W^2$  now descends and forces the detached blank into the die  $S^2$ , the corners  $T^2$  of which first lift the corner portions,  $R^2$ , of the blank, after which the sides  $U^2$  of the die lift up the sides  $Q^2$  of the blank, while the depressed ends  $V^2$  of the die act last in lifting the gummed ends  $P^2$  of the blank, such portions being folded against the corner portions,  $R^2$ , of the blank, as shown by Fig. 21 of the drawings. The knives, scorers, gummers, the cutting-off knife, and the punch now retire and give clearance to the strip, which is again advanced and the operations detailed above are repeated. When three boxes have accumulated in the die and when the fourth box is formed, the lower box will be discharged into the uppermost box-holding frame of that tier of frames in the cage which is below the die at the time. The cage is then rotated to bring the next tier under the die, and when the upper frame of that tier has received a box the cage is again rotated, and so on. At every rotation of the cage the followers are swung into the tier adjacent to them, with the respective followers above the boxes in the frames to which they correspond. The followers are now depressed, moving the boxes each down one frame, when they swing out and permit the cage to turn again. It will thus be seen that for every revolution of the cage the boxes carried in the frames of its respective tiers are moved downward each to the frame below until they reach the bottom frame of the tier, from which they are discharged perfectly dry, and hence retaining their shape.

I would have it understood that I do not limit myself to the exact construction herein shown and described, but hold myself at liberty to make such changes and alterations as fairly fall within the spirit and scope of my invention.

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

55 1. In a machine for making paper boxes, the combination, with a reciprocating table, of a pair of horizontal gripping jaws mounted upon frames respectively secured to the opposite edges of such table, pivoted to the rear of

their longitudinal centers, and having forwardly-inclined teeth constantly pressed against the stock-strip on the opposite sides of the edges thereof, and a spring located between the rear ends of each pair of jaws and pressing them, as described, against the strip, substantially as set forth.

2. In a machine for making paper boxes, the combination, with a cutting and scoring table and a folding-die placed end to end, of a gummer located to apply gum to the strip while on the table, substantially as set forth.

3. In a machine for making paper boxes, the combination, with a folding die, of a swinging gummer located near such die and gumming the paper just before it enters the same, and a gum-supply to gum the gummer when it is swung back or retired, substantially as set forth.

4. In a machine for making paper boxes, the combination, with feeding mechanisms, of two heads reciprocated by two eccentrics located on the same shaft, scorers and knives carried by one head and a folding-punch by the other, the head carrying the punch having the greater throw, substantially as set forth.

5. In a machine for making paper boxes, a folding-die having elevated corners and sides and depressed ends, substantially as set forth.

6. In a machine for making paper boxes, a skeleton cage having a series of box-holding frames separated each from the other, and a series of followers, including a follower for each frame, for advancing the boxes through the cage, substantially as set forth.

7. In a machine for making paper boxes, a rotary skeleton cage having one or more tiers of box-holding frames, a vertical tier of followers, and means, substantially as described, for reciprocating and rotating the followers, substantially as set forth.

8. In a machine for making paper boxes, the combination, with a rotary skeleton cage having a square body and four vertical tiers of box-holding frames secured with a space between each frame to the respective sides of the said body, of a vertical tier of followers having as many followers as there are frames in one tier of frames, such tier of followers being vertically reciprocated within the frames and rotated to escape the same, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

ALVA L. PICKETT.

Witnesses:

EARL D. STEBBINS,  
CHAS. B. SHUMWAY.