

(No Model.)

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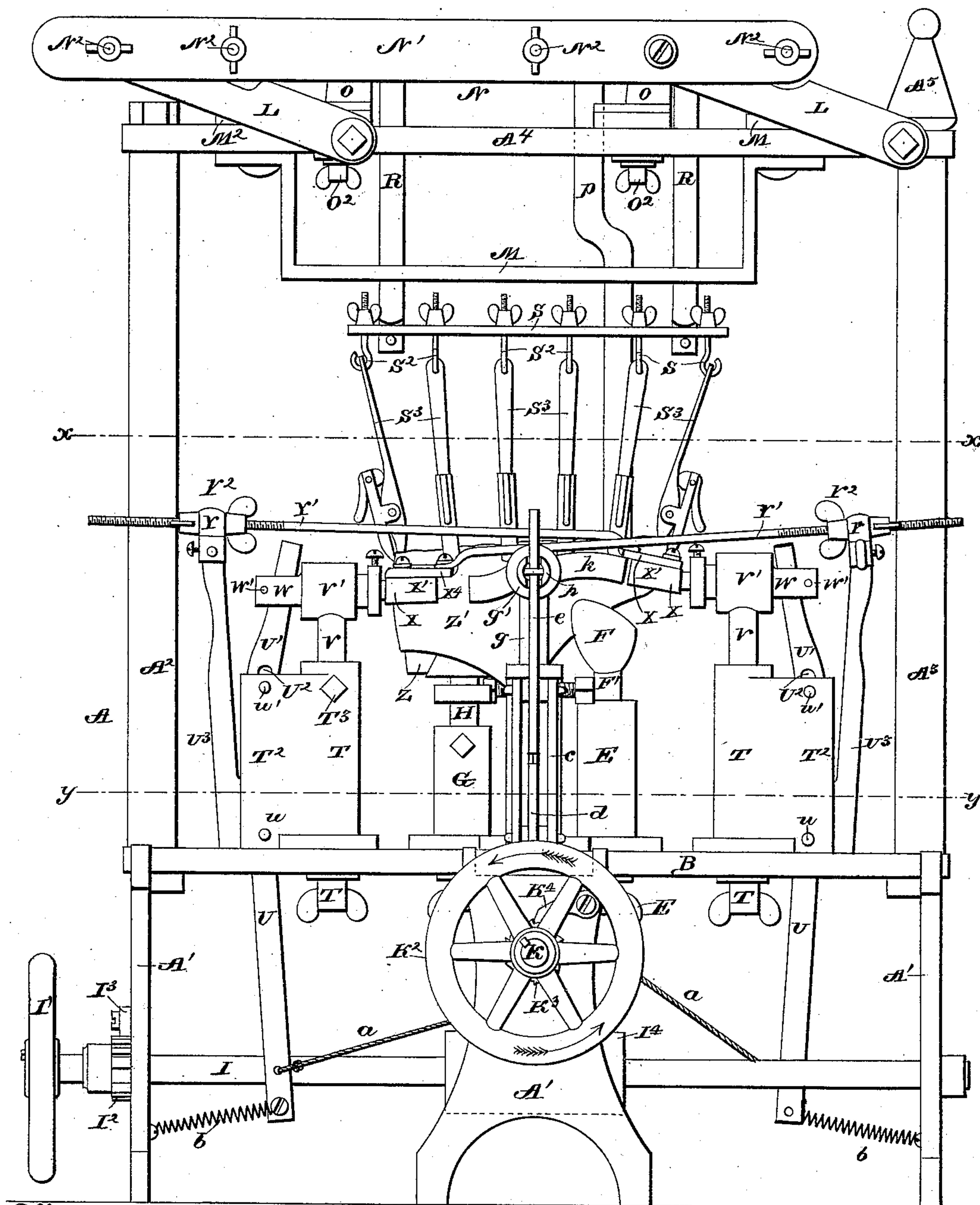
S. B. ELLITHORP.

LASTING MACHINE.

No. 362,370.

Patented May 3, 1887.

Fig. 1.



Witnesses

Inventor,

Rayl. Bowen.
J. W. Garner

Solomon B. Ellithorp;
By his Attorneys
C. A. Howard & Co.

(No Model.)

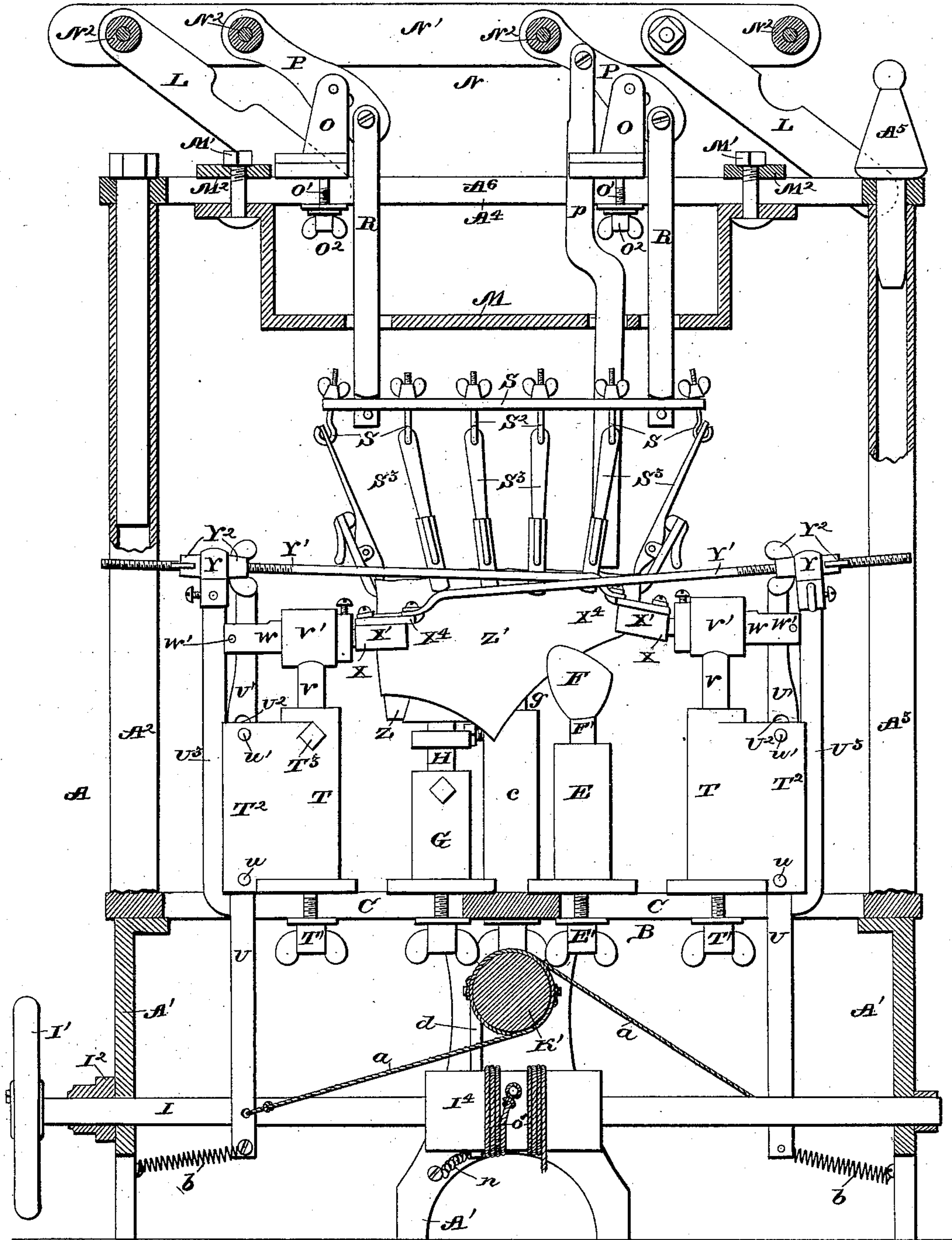
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Witnesses

Fig. 2.

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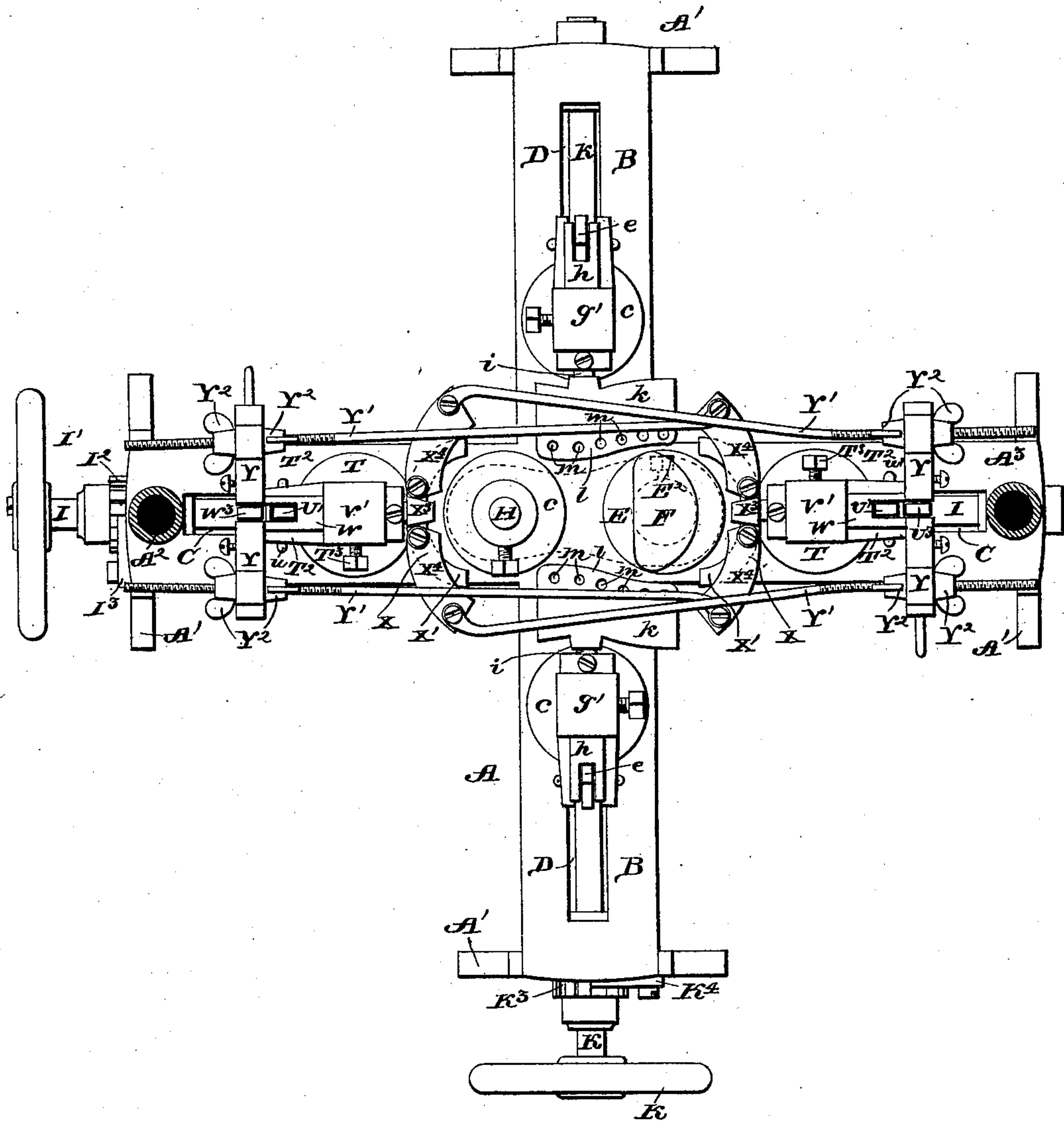
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Fig. 3.



Witnesses

Percy C. Bowen
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(No Model.)

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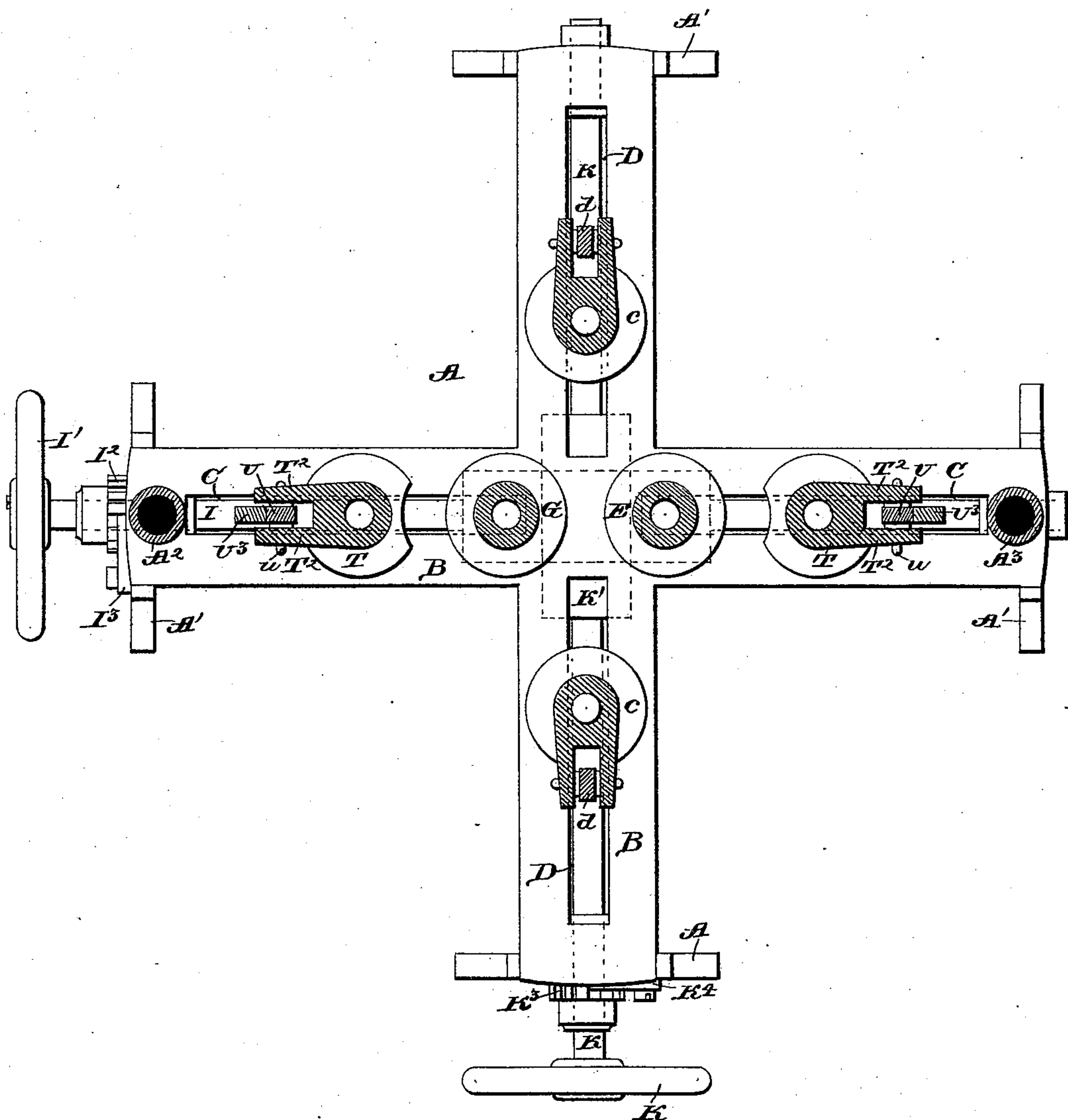
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Fig. 4.



Witnesses

Percy C. Bowen
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(No Model.)

5 Sheets—Sheet 5.

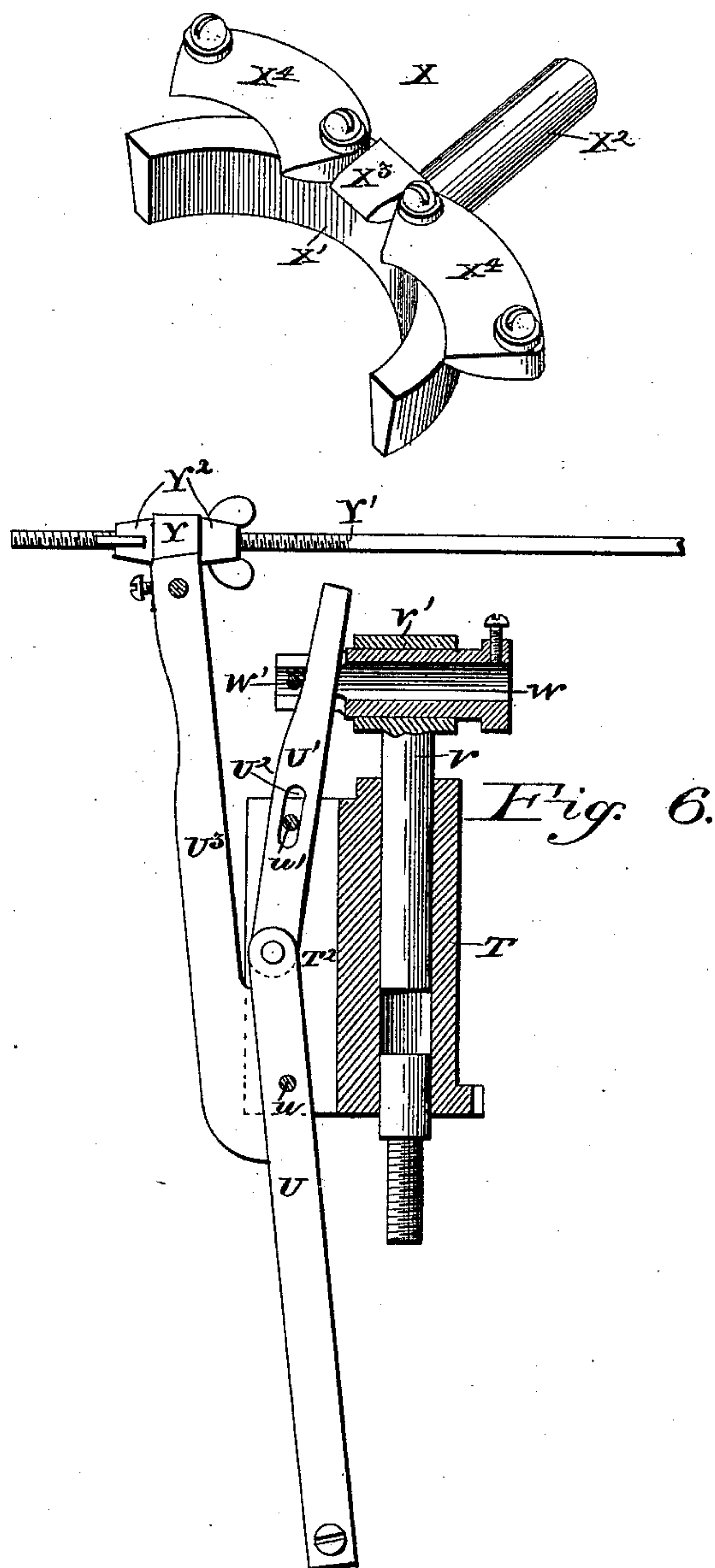
S. B. ELLITHORP.

LASTING MACHINE.

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Fig. 5.



Witnesses

Percy C. Bowen.
J. W. Garner

Inventor,

By his Attorneys *Solomon B. Ellithorp,*

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UNITED STATES PATENT OFFICE.

SOLOMON B. ELLITHORP, OF BUFFALO, NEW YORK.

LASTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 362,370, dated May 3, 1887.

Application filed July 24, 1886. Serial No. 209,036. (No model.)

To all whom it may concern:

Be it known that I, SOLOMON B. ELLITHORP, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented a new and useful Improvement in Lasting-Machines, of which the following is a specification.

My invention relates to an improvement in lasting-machines; and it consists in the peculiar construction and combination of devices, that will be more fully set forth hereinafter, and particularly pointed out in the claims.

My invention further consists in the method of lasting a boot or shoe, consisting in stretching the upper on the last and then forcing the edges of the upper over the spring of the last while the leather is stretched, whereby the upper will be smoothly drawn and secured on the last.

The object of my invention is to provide a machine whereby boots and shoes may be lasted very expeditiously and in a very thorough manner, thus effecting an economy in the manufacture of boots and shoes. This object I attain by the construction hereinafter described, and illustrated in the accompanying drawings, in which--

Figure 1 is a side elevation of a lasting-machine embodying my improvements. Fig. 2 is a vertical longitudinal sectional view of the same. Fig. 3 is a horizontal section taken on the line *x x* of Fig. 1. Fig. 4 is a similar view taken on the line *y y* of Fig. 1. Fig. 5 is a detail perspective view of one of the gatherers. Fig. 6 is a detail sectional view.

A represents the frame, which is made of any suitable material, and is designed to be fastened on a bench or table, or may be provided with supporting-legs and thereby adapted to rest upon the floor. The horizontal portion B of the frame is provided at opposite ends with longitudinal slots C, and in the sides of the frame, at the central portion thereof, are made transverse slots D, which correspond with the slot C.

E represents the last block or seat, which is provided with a depending threaded shank, that extends through one of the slots C, and on the lower end of the said threaded shank is screwed a clamping thumb-nut, E', by means

of which the last-block may be secured to the frame at any desired adjustment from the center thereof. The upper end of the said standard is provided with a vertical central recess to receive the spindle F' of the toe rest or block F, and the said standard is also provided with a set-screw, E², adapted to clamp the spindle of the toe rest or block, so as to secure the same at any desired vertical adjustment in the standard.

G represents a similar standard, which is secured near the inner end of the remaining slot C, and is adjustable longitudinally in the said slot, and in the said standard G is secured the vertically-adjustable pin or rod H, which is adapted to enter an opening made in the last, as shown, so as to support the heel or rear portion of the last. Legs A' depend from the ends of the frame A.

I represents a shaft, which is journaled longitudinally in the legs of the frame, under the slots C, and is provided at one end with a wheel or crank, I'. The said shaft is also provided with a ratchet-wheel, I², with which engages a gravity-pawl, I³, the function of which is to prevent retrograde rotation of the shaft. To the center of the shaft I, immediately under the center of the frame, is attached a drum, I⁴.

K represents the shaft which is journaled in the supporting-legs of the frame and extends at right angles to the shaft I, the said shaft K being directly under the slots D. The center of the said shaft K, directly under the center of the frame, is provided with a drum, K', and one end of the said shaft has a hand wheel or crank, K², and a ratchet-wheel, K³, with which engages a gravity pawl or detent, K⁴.

From one end of the frame rises a vertical standard, A², and from the opposite end thereof rises a similar standard, A³.

A⁴ represents a cross-bar or top plate, which has one end journaled or pivoted on the upper end of the standard A² and the opposite end resting upon the upper end of the standard A³, and is secured thereto by a removable pin or bolt, A⁵. By this means it will be readily understood that the top plate may be disconnected from the standard A³, and thereby adapted to be swung outwardly from the stand-

ard A^2 . Through the center of the frame A^4 , and extending from one standard to the other, is a longitudinal vertical slot, A^6 .

From the under side of the plate A^4 depends a guiding-yoke, M , which is provided with vertical arms that are attached to the plate by means of bolts which extend through lugs that project horizontally from the upper ends of the said vertical arms and are passed through the slot A^6 . On the upper ends of the bolts are clamping-nuts M' and clamping-plates M^2 , by means of which the guiding-yoke may be firmly secured to the top plate at any desired longitudinal adjustment.

N represents a lever-frame, which comprises a pair of longitudinal bars, N' , connected together by means of cross bars or rods N^2 . Two of the said cross-bars connect the side bars, N' , at their extremities, and the remaining cross-bars connect the side bars at suitable distances from the center of the lever-frame. Links or arms L connect the lever-frame with the top plate, the said links or arms having their upper ends pivoted to the lever-frame and their lower ends pivoted to the top frame. By this construction it will be readily understood that the lever-frame may be raised or lowered from the top plate and always maintained in a horizontal position.

On the upper side of the top plate are vertical lugs or standards, O , which are provided with transverse bases that rest upon the top plate, and from the lower ends of the said standards or lugs depend threaded spindles O' , which extend downwardly through the slot A^6 . Clamping thumb-nuts O^2 and washers are secured on the lower end of the spindles O' , and bear against the under side of the top plate, and thus secure the lugs or standards firmly thereto, and also adapt the said lugs or standards to be adjusted longitudinally on the top plate. To the upper ends of the said lugs or standards are fulcrumed levers P . The upper ends of the said levers are pivoted upon the intermediate cross-bars of the lever-frame N , and the lower shorter ends of the said levers are pivoted to vertically-depending rods R , which extend down through the slot A^6 , and also through rectangular openings which are made in the guide-yoke M . To the lower ends of the vertical rods R , below the guide-yoke M , is attached a templet, S , which is of the general shape of the bottom of the last Z , and is provided with slots around its edge for the engagement of hooks S^2 , from which are suspended clamps S^3 . The said templet, hooks, and clamps are of the same construction as described in the Letters Patent of the United States Nos. 236,218 and 247,625, granted to me January 4, 1881, and September 27, 1881, respectively.

T represents a pair of vertical standards, which are secured on the frame A , and are provided with depending threaded spindles which pass through the slots C . Clamping-nuts T' are screwed onto the lower ends of the said spindles, and serve to clamp the standards

T to the frame at any desired adjustment. The said standards are provided with outwardly-projecting flanges T^2 , which extend parallel with the slots C .

U and U' represent two pairs of toggle-jointed levers which extend through the grooves or openings in the outer sides of the standards T , between the flanges T^2 . The levers U are fulcrumed upon pins u , that extend through the lower sides of the said flanges, and the upper levers, U' , are fulcrumed upon pins u' , which pass through the upper sides of the flanges. The said upper levers, U' , are provided with slots U^2 , through which the said fulcrum-pins u' pass, thereby permitting the levers to work freely on the said fulcrum-pins. From the upper end of each lever U , on the rear side thereof, extends an arm, U^3 . The lower ends of the levers U pass downwardly through the slots C .

Each of the standards T is provided with a vertical recess, in which is socketed a vertical spindle, V , having a horizontal head, V' . Set-screws T^3 are provided for the standards T , and are adapted to clamp the spindles V , so as to secure the same in the standards at any desired vertical adjustment. Through the heads V' extend horizontal sleeves W , which are hollowed and are adapted to move back and forth in the heads. The rear ends of these sleeves are bifurcated and receive the upper end of the levers U' . Cross pins W' extend through the rear bifurcated ends of the sleeves in rear of the said levers U' , and thus secure the upper ends thereof in the bifurcated rear ends of the sleeves, and thus adapt the sleeves to be moved forwardly and rearwardly by the lever.

X represents gatherers, a pair of which is provided for each machine, one gatherer being intended for the toe and one for the heel of the last. These gatherers are provided with heads X' , which are adapted to the contour of the heel or toe of the last, so as to fit the same exactly, and from the central portion of the heads, on the rear sides thereof, project horizontal spindles X^2 , which enter the bores of the sleeves W , and are secured therein by means of set-screws with which the outer ends of the said sleeves are provided. On the upper side of the head of each gatherer, at the center thereof, is rigidly secured an inwardly-projecting plate, X^3 , forming a tongue or flange, and on each side of the said plate are pivoted jaws X^4 , which are curved and adapted to the contour of the head. The inner edges of the said curved jaws project beyond the inner side of the head, thereby forming inwardly-projecting flanges, which, together with the tongue X^2 , extend over the bottom or sole of the last at the heel and toe thereof.

To the upper end of each arm U^3 of the levers U is pivoted a transverse cross-head, Y . Y' represents rods, which have their front ends pivoted to the outer ends of the jaws X^4 . The outer ends of the said rods are screw-threaded and extend through transverse openings which are made in the cross-heads, and are provided

with thumb-nuts Y^2 , which bear against opposite sides of the cross-head and are screwed onto the threaded ends of the rod, and are thus adapted to adjust the latter forwardly and rearwardly in the cross-head.

a represents a pair of cords, which have their inner ends attached to the drum K' and coiled thereon in the same direction. The outer ends of the said cords are attached to the lower ends of the levers U .

b represents springs, which are attached to the frame, and are also connected to the lower end of the levers U , and the function of the said springs is to draw the said lower ends of the levers outwardly toward the ends of the frame. By rotating the shaft K in the direction indicated by the arrow in Fig. 1 the cords will be caused to wind upon the drum, and thereby draw the lower ends of the levers U toward each other. As the upper end of the said levers are toggle-jointed to the lower end of the levers U' , it follows that the upper ends of the latter levers will be moved inwardly toward each other, and thus force the heads of the gatherers against the toe and heel of the last. The upwardly-extending arms U^3 , which are rigidly attached to the upper sides of the levers U , will be moved outwardly from each other, and thus cause the rods Y' to draw upon the free outer ends of the pivoted jaws X^4 of the gatherers, and thus cause the said jaws to be clamped firmly against the toe and heel of the last. The detent or pawl K^4 , by engaging with the ratchet-wheel K^3 , prevents the shaft K normally from rotating in the reverse direction, and thus locks the said shaft, so as to keep the gatherers pressed firmly against the toe and heel of the last. As soon as the detent is released from the ratchet-wheel the springs b move the lower ends of the levers U outwardly from each other, and thus release the gatherers from the last, and at the same time the inward movement of the upper ends of the arms U^3 causes the rods Y' to open the pivoted jaws X^4 from the last, as will be readily understood.

c represents vertical standards, which are identical in construction with the standards T , and are secured to the frame, and are laterally adjustable to the slots D . The said standards are provided with toggle-jointed levers d and e , which are precisely like the levers U and U' .

g represents spindles, which are vertically adjustable in the standards c , and have heads g' , corresponding to the spindles and heads V and V' .

h represents hollow sleeves which fit in the said head g' , and are connected to the upper ends of the levers e , and in the said heads are secured the spindles i of plungers k . The said plungers are curved to fit the spring of the last on the ball and shank, between the toe and heel thereof, and are provided on their upper inner edges with laterally-projecting flanges l , which are adapted to extend over the sole or bottom of the last when the plungers

are forced against the same. In the said flanges are made slots or openings m , the function of which will be explained hereinafter.

o' represents cords, which are attached to the drum I^4 of the shaft I and have their outer extremities attached to the lower ends of the levers d . Coiled retractile springs n are attached to the depending legs at the sides of the frame A , and have their inner ends connected to the lower ends of the levers d , so as to move the latter outwardly when the pawl I^3 is released from the ratchet-wheel I^2 , and thus withdraw the plungers K from the sides of the last.

p represents a holding-rod, the upper end of which is pivoted to one of the levers P . The said holding-rod passes down through the slot A^6 of the top plate, A^4 , and also through the guide-yoke M and through the templet, and bears upon the last when the lever-frame N is lowered, so as to hold the last firmly upon the rest F .

The operation of my invention is as follows: In order to last a boot or shoe on this machine, I first take an insole and tack it on the bottom of the last. I then take the upper-leather Z' for the boot or shoe that has been prepared for lasting, and turn it bottom up and insert the last Z therein. The top plate, A^4 , is then released from the standard A^3 by withdrawing the pin or bolt A^5 , and is swung around so as to uncover the gatherers and plungers, the said gatherers and plungers having been previously distended or moved outwardly from each other. The last is then secured in an inverted position upon the pin or rod H and the rest F , and the top plate is then swung back to its original position and the pin A^5 reinserted, so as to secure the free end of the top plate to the standard A^3 . The lever-frame N is then raised, thereby causing the holding-rod to be raised, and the templet to be lowered simultaneously. The clamps S^3 are then caused to grasp the upper-leather Z' all around the edge thereof, which projects above the sole of the last, first grasping at the center of the heel, then at the center of the toe, and then at proper distances apart all around the said leather or upper Z' . The lever-frame N is then lowered, causing the clamps to be drawn upwardly by the templet, thereby causing the clamps to pull the leather Z' closely to the last, at every point alike, and at the same time the holding bar or rod is lowered upon the last thus preventing the same from being raised with the leather Z' , and thus causing the latter to be effectually stretched and fitted on the last. The shafts I and K are then turned simultaneously, causing the cords to draw inwardly upon the lower toggle-jointed levers, so as to force the gatherers and the plungers against the toe and heel of the last and against the sides thereof simultaneously and while the leather is stretched, thereby pressing the upper-leather Z' to the shape of the last all around the bottom thereof and over the insole which has been tacked thereon. The leather

is thus drawn smoothly and firmly over the last without wrinkling, and the edges which are bent over the bottom of the insole are temporarily secured thereto by driving pegs or nails through the slots or openings *m* of the plungers *k*. As soon as the leather has been set to the last, the plungers and gatherers are caused to move outwardly from the last, the clamps are disengaged from the leather, the holding rod or bar is released from the last, and the top plate, *A*⁴, is swung around out of the way, when the last may be very readily removed, and the operation is then repeated, as before.

By making the standards *T* and *c* adjustable on the frame, and by making the plungers and gatherers vertically adjustable on the said standard, and also by providing means for vertically adjusting the last, the machine is adapted to be used for lasting shoes or boots of any size.

Having thus described my invention, I claim—

1. The combination, in a lasting-machine, of the top plate, *A*⁴, having the levers *P*, the lever-frame connected to the said levers, the rods depending from the levers *P*, and the templet suspended by the said rods and carrying the stretching devices, whereby both ends of the templet will be raised or lowered simultaneously, and the templet thus maintained always in a horizontal position, and means, substantially as described, for holding the last down, substantially as described.

2. The combination, in a lasting-machine having the lugs or standards *O* on its upper side, of the levers *P*, fulcrumed to the said lugs or standards, the lever-frame connecting the upper free ends of the levers, the templet suspended from the outer ends of the levers and carrying the stretching devices, and the holding rod or bar connected to the inner end of one of the levers, whereby the said templet and holding-rod will be moved in opposite directions simultaneously, substantially as described.

3. The combination, in a lasting-machine, of the top plate, *A*⁴, the lugs or standards *O*, longitudinally adjustable thereon, the levers fulcrumed to the said lugs or standards, and the templet suspended from the said levers and carrying the stretching devices, substantially as described.

4. The combination of the top plate, *A*⁴, having the lugs or standards *O*, the guide-yoke *M* on the under side of the top plate, the levers *P*, fulcrumed in the lugs or standards, the rods *R*, attached to the said levers and extending downwardly through the top plate, and the guide-yoke and the templet attached to the lower ends of the said rods and having the gripping devices, substantially as described.

5. The combination of the top plate having the lugs or standards *O*, the lever-frame *N*, the links or arms connecting the said lever-frame to the top plate, whereby the lever-frame may

be raised or lowered and maintained at all times in a horizontal position, the levers *P*, fulcrumed to the lugs or standards *O* and connected with the lever-frame, and the templet suspended from the said levers and having the gripping devices, substantially as described.

6. The lasting-machine having the toggle-jointed levers *U* and *U'*, and the plungers and gatherers attached to the said toggle-jointed levers and adapted to be forced thereby against the last, substantially as described.

7. The combination, in a lasting-machine, of the toggle-jointed levers *U* and *U'*, the vertically-adjustable heads *V'*, and the gatherers secured to the said heads and longitudinally movable therein and connected to the levers *U'*, substantially as described.

8. The combination of the levers *U*³, adapted to move in opposite directions simultaneously by means substantially as described, the levers *U'*, adapted to move in opposite directions from the levers *U*³ at the same time, the gatherers attached to the levers *U'* and movable therewith, and the jaws *X*⁴, pivoted to the said gatherers and connected to the levers *U*³, for the purpose set forth, substantially as described.

9. The combination, in a lasting-machine, of the vertically-adjustable heads *V'*, the horizontally-movable sleeves *W'*, secured in the said heads, the levers for moving the sleeves, and the gatherers or plungers having the spindles entering the said sleeves, substantially as described.

10. The combination, in a lasting-machine, of the heads *V'*, the sleeves *W*, secured therein and movable longitudinally in the heads, the gatherers or plungers having the spindles entering the sleeves, and the set-screws for clamping the said spindle to the sleeves, whereby the gatherers or plungers may be adjusted independently of the sleeves, substantially as described.

11. The gatherers having the curved heads *X'*, the central inwardly-projecting rigid tongues or plates, *X*³, and the pivoted swinging jaws *X*⁴, in combination with the levers connected to the said jaws, for the purpose set forth, substantially as described.

12. The combination, in a lasting-machine, of the movable gatherers having the pivoted jaws *X*³ and the projecting tongues or plates *X*², the toggle-jointed levers *U* and *U'*, for moving the gatherers, the said levers *U* having arms *U*³ connected to the jaws *X*³, for the purpose set forth, substantially as described.

13. The combination, in a lasting-machine, of the movable gatherers, the toggle-jointed levers *U* and *U'*, for operating the gatherers, the lever-arms *U*³, extending from the levers *U* and having the cross-heads, and the rods *Y'*, connecting the said cross-heads with the gatherers, substantially as described.

14. The combination, in a lasting-machine, of the movable gatherers having the pivoted jaws *X*⁴, the levers to move the gatherers, the levers *U*³, and the rods *Y'*, connecting the jaws

X⁴ with the levers U³, the said rods being adjustable longitudinally, for the purpose set forth, substantially as described.

15. The combination, in a lasting-machine, 5 of the movable gatherers having the pivoted jaws X⁴, the lever-arms U³, having the cross-heads, the rods Y', attached to the jaws X⁴, and having the threaded outer ends extending through the cross-heads, and the clamping-nuts on the said threaded rods for adjusting 10 the same on the cross-heads, for the purpose set forth, substantially as described.

16. In a lasting-machine, the combination 15 of the standards, the gatherers carried by the standards, the jointed levers for operating the gatherers, and the adjustable rods connecting the levers to the gatherers, as set forth.

17. The combination, in a lasting-machine, 20 of the movable standards T, carrying the movable gatherers and the levers for operating the same, the movable standards c, arranged at right angles to the gatherers and carrying the movable plungers and the levers for operating the same, and the shafts I and K, ar- 25 ranged at right angles to each other, and means connecting the said shafts with the operating-levers of the gatherers and plungers, substantially as described.

18. The combination of the standards hav- 30 ing the vertically-adjustable heads for the plungers or gatherers, with the toggle-jointed

levers U and U', fulcrumed to the said standards, and the levers U' having the slots U² working on their fulcrum-pins, substantially as described.

19. The combination, in a lasting-machine, 35 of the frame having the radial slots C and D, arranged at right angles to each other, with the standards carrying the movable gatherers and plungers and the levers for operating the same, the said standards having the depend- 40 ing shanks extending through the slots C and D, and the clamping-nuts on the said shanks to secure the standards to the frame at any desired adjustment, substantially as described. 45

20. The combination, in a lasting-machine, 50 of the frame having the support at its center for the last, the slots C and D, radiating from the center of the frame and arranged at right angles to each other, and the standards se- 55 cured in the said slots and adjustable therein and carrying the movable gatherers and plungers and the levers for operating the same, substantially as described.

In testimony that I claim the foregoing as 55 my own I have hereto affixed my signature in presence of two witnesses.

SOLOMON B. ELLITHORP.

Witnesses:

JOHN H. SIGGERS,
WM. N. MOORE.