

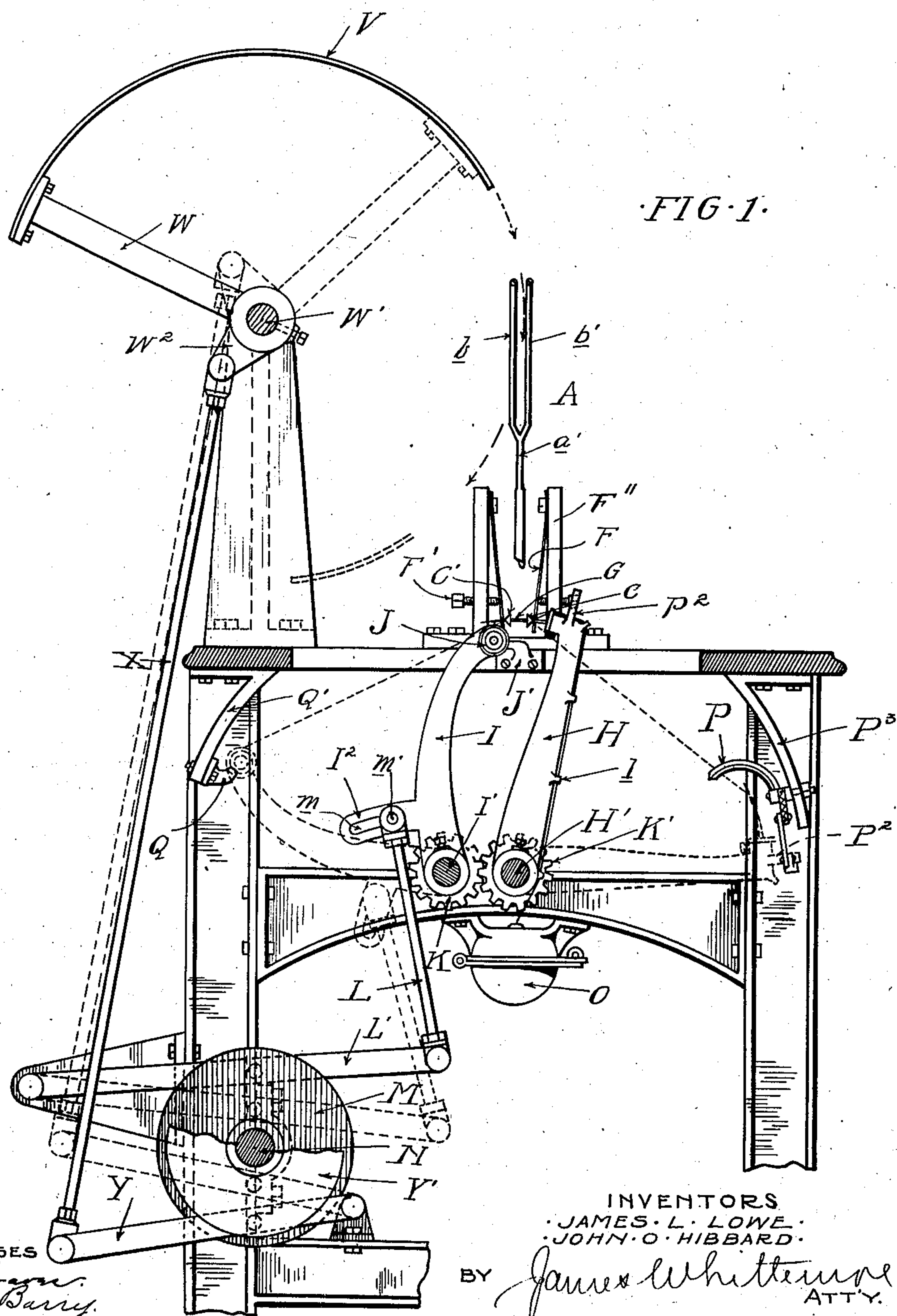
No. 815,606.

PATENTED MAR. 20, 1906.

J. L. LOWE & J. O. HIBBARD.
MACHINE FOR STRINGING BAGS.

APPLICATION FILED MAY 26, 1904.

4 SHEETS—SHEET 1.



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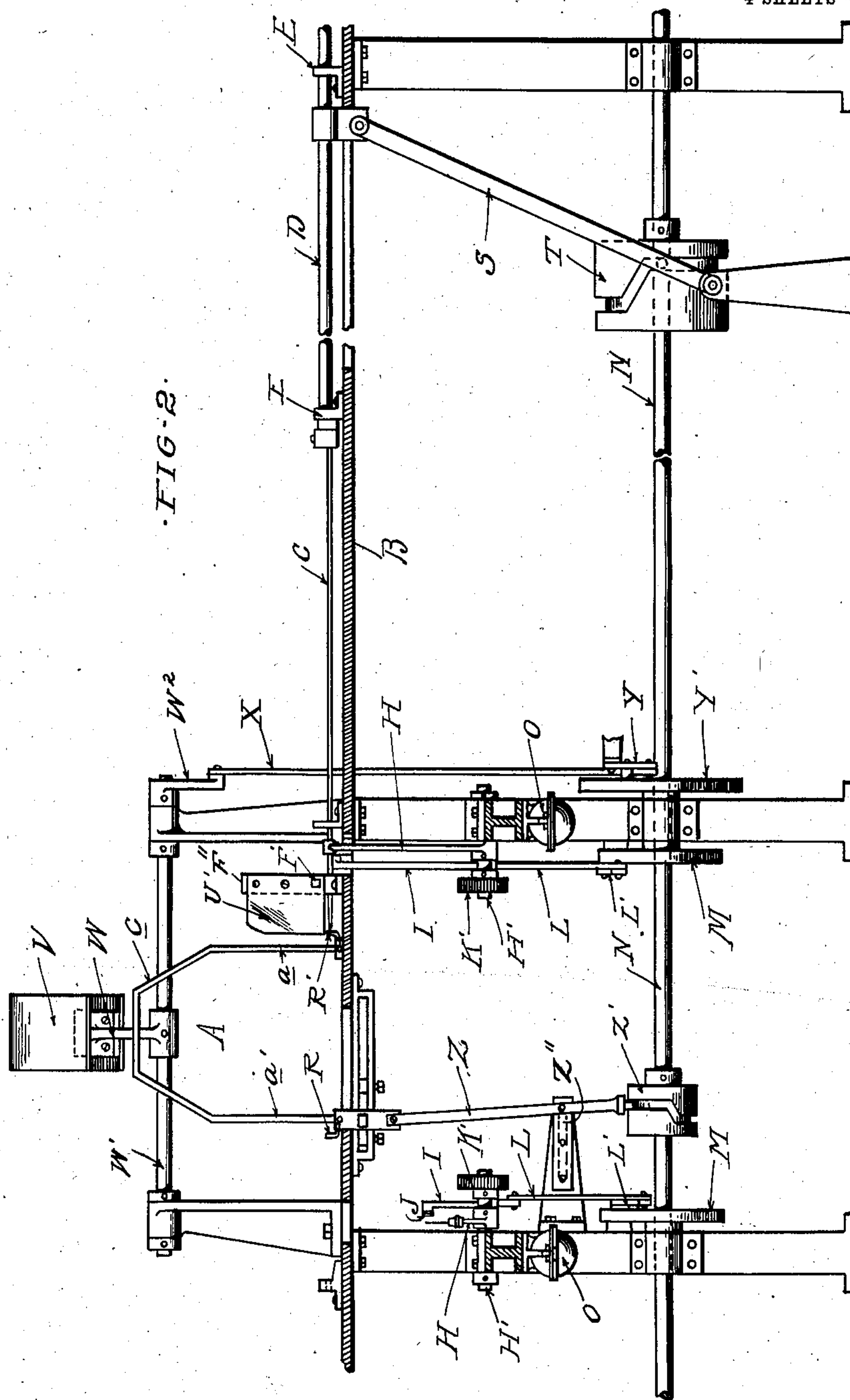
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4 SHEETS—SHEET 2.



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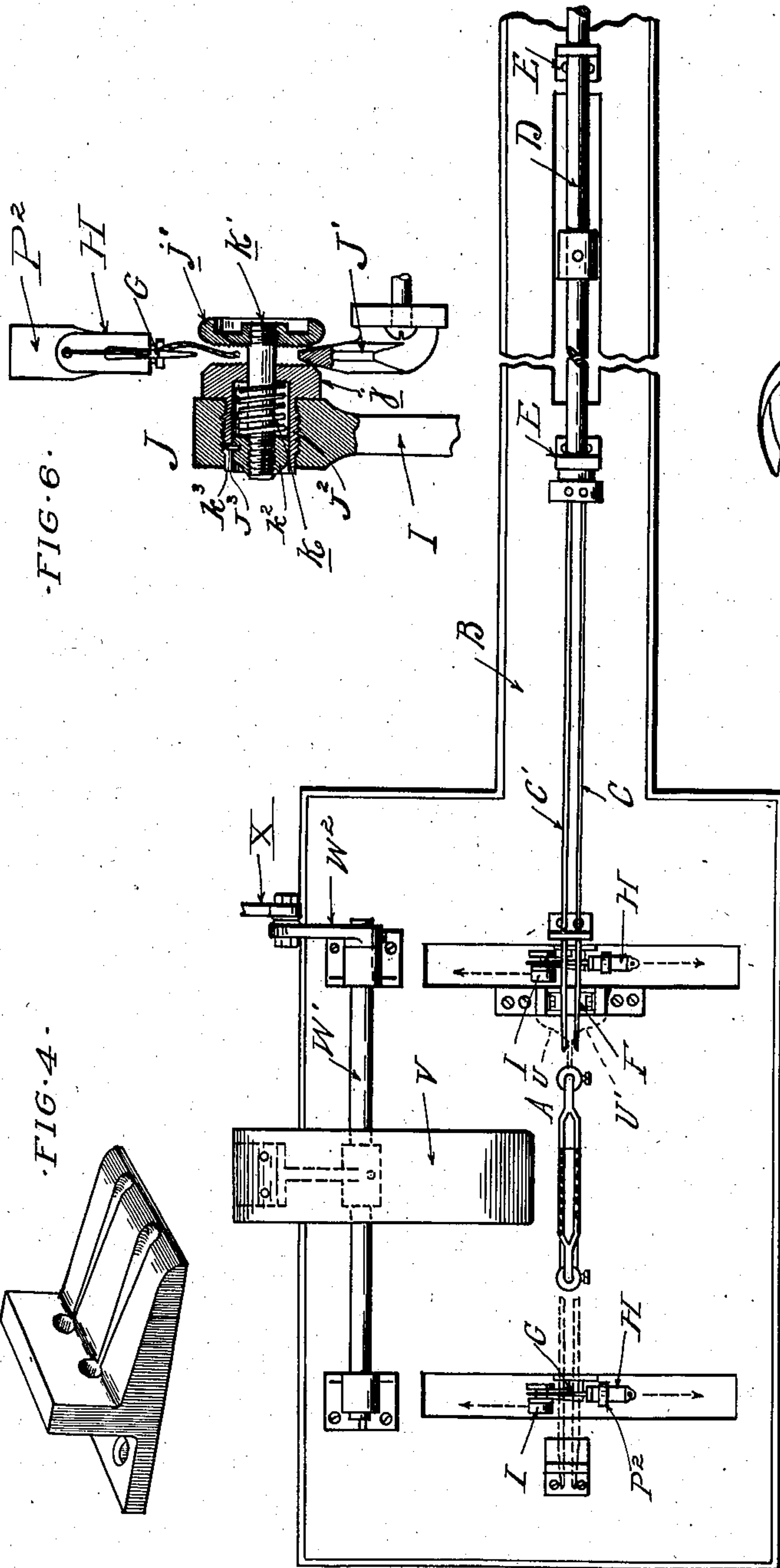


FIG. 3.

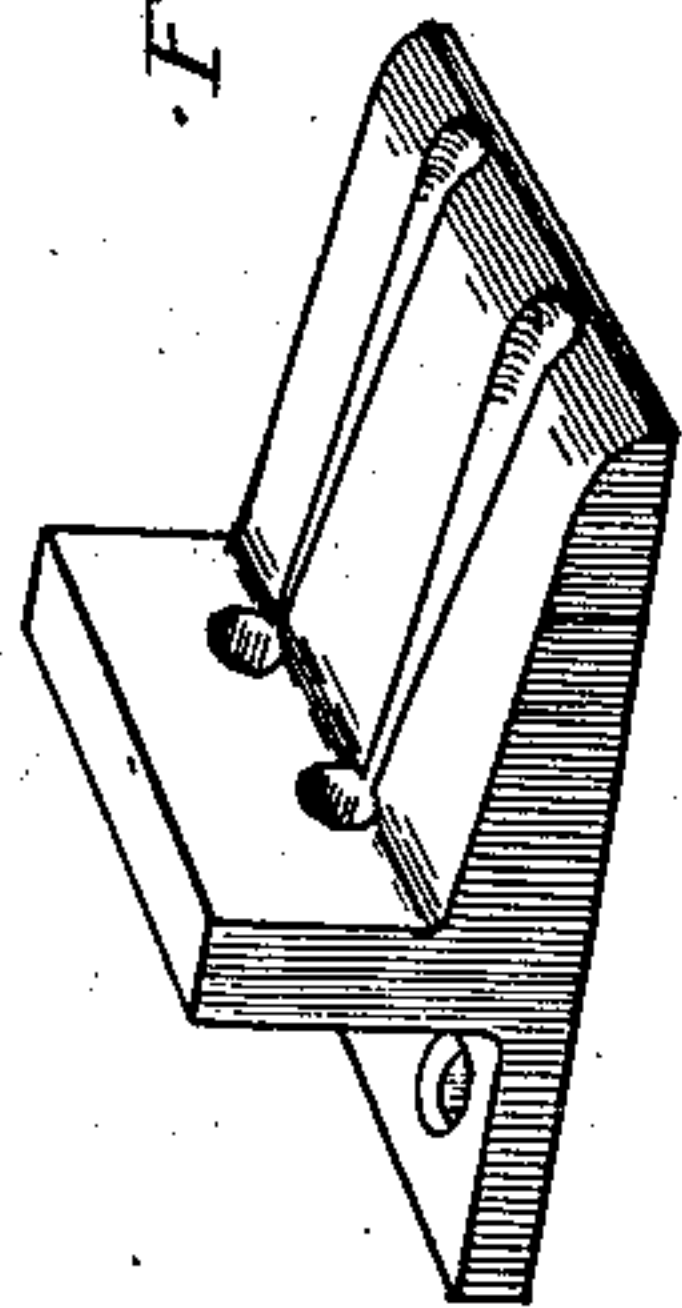


FIG. 4.

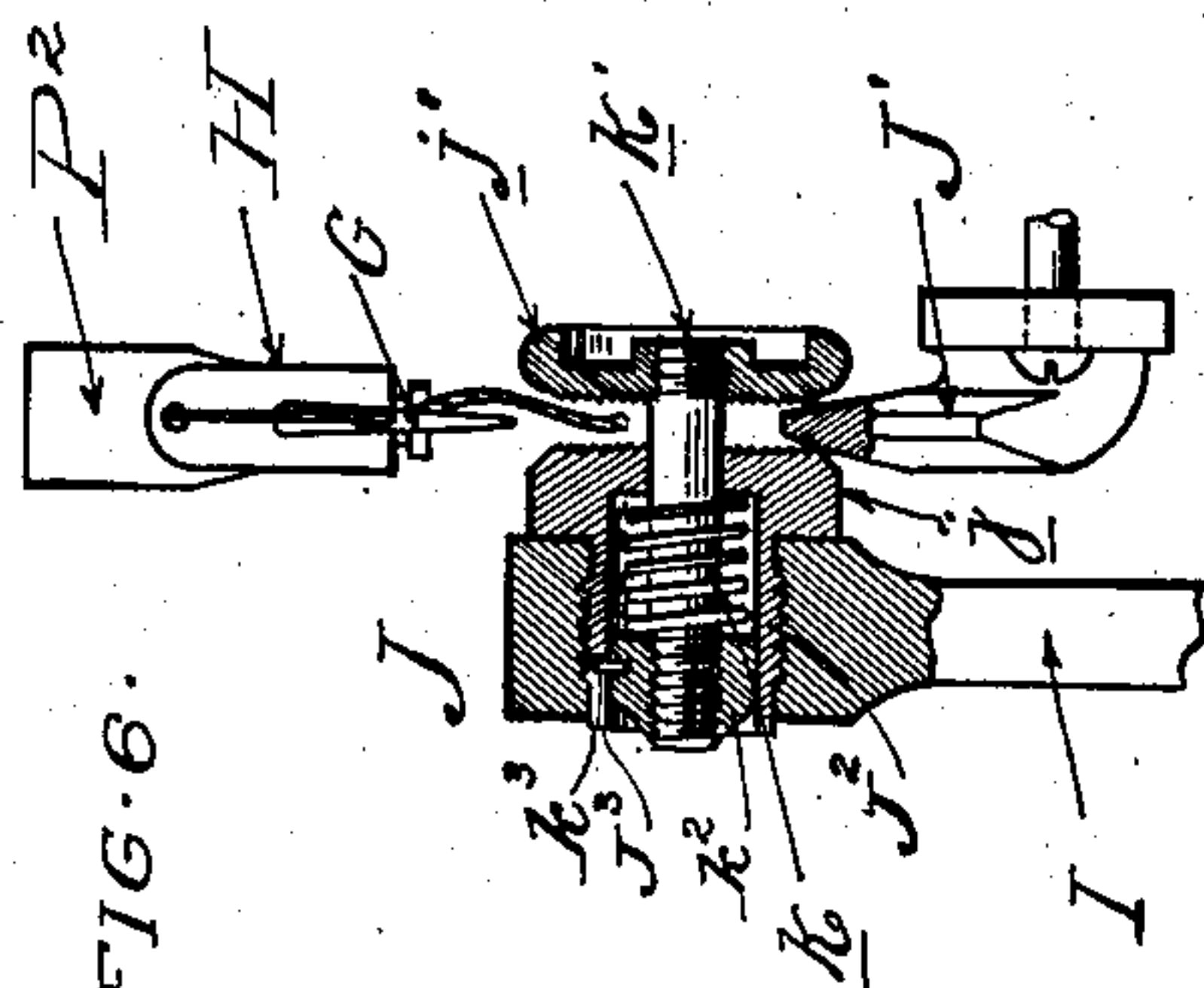


FIG. 6.

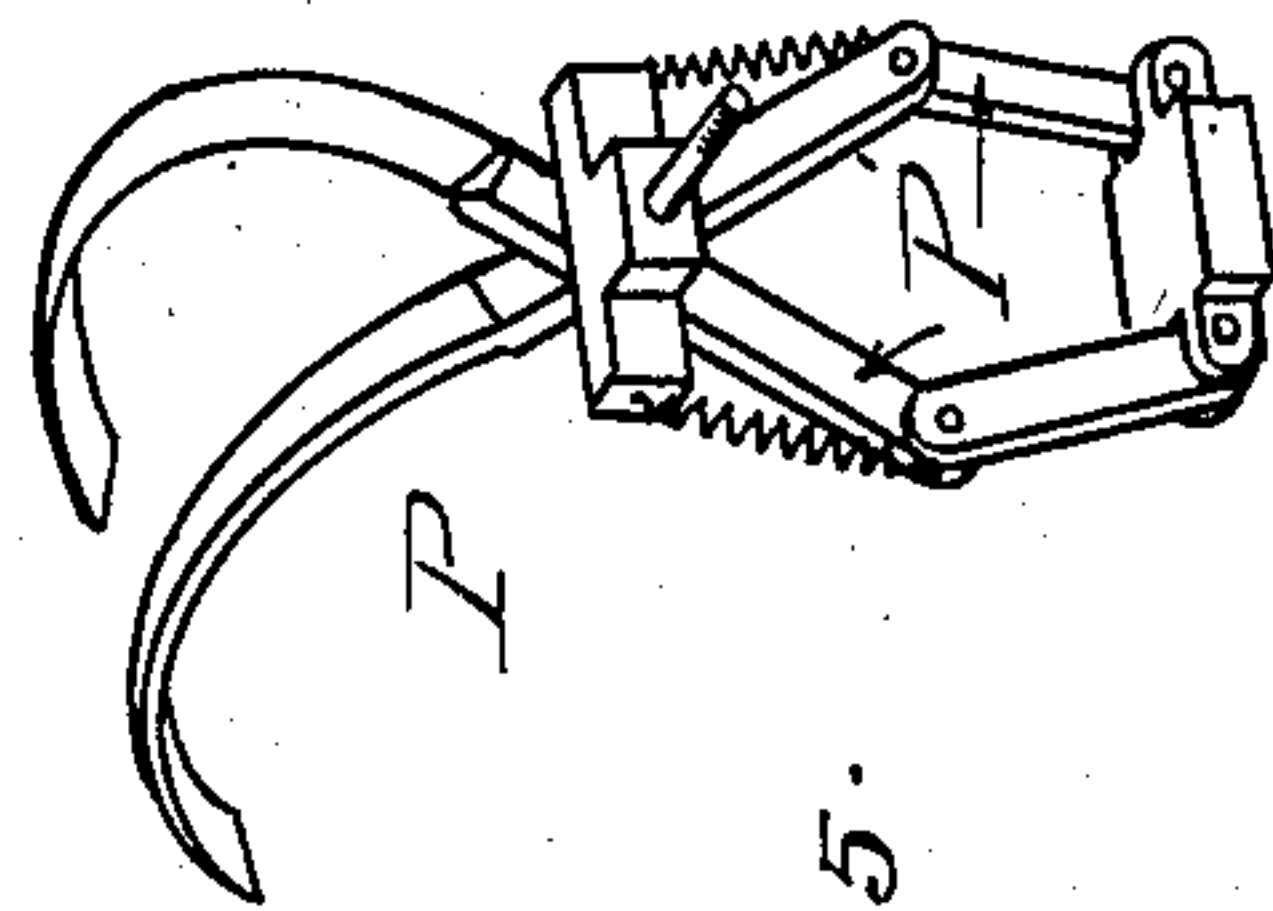


FIG. 5.

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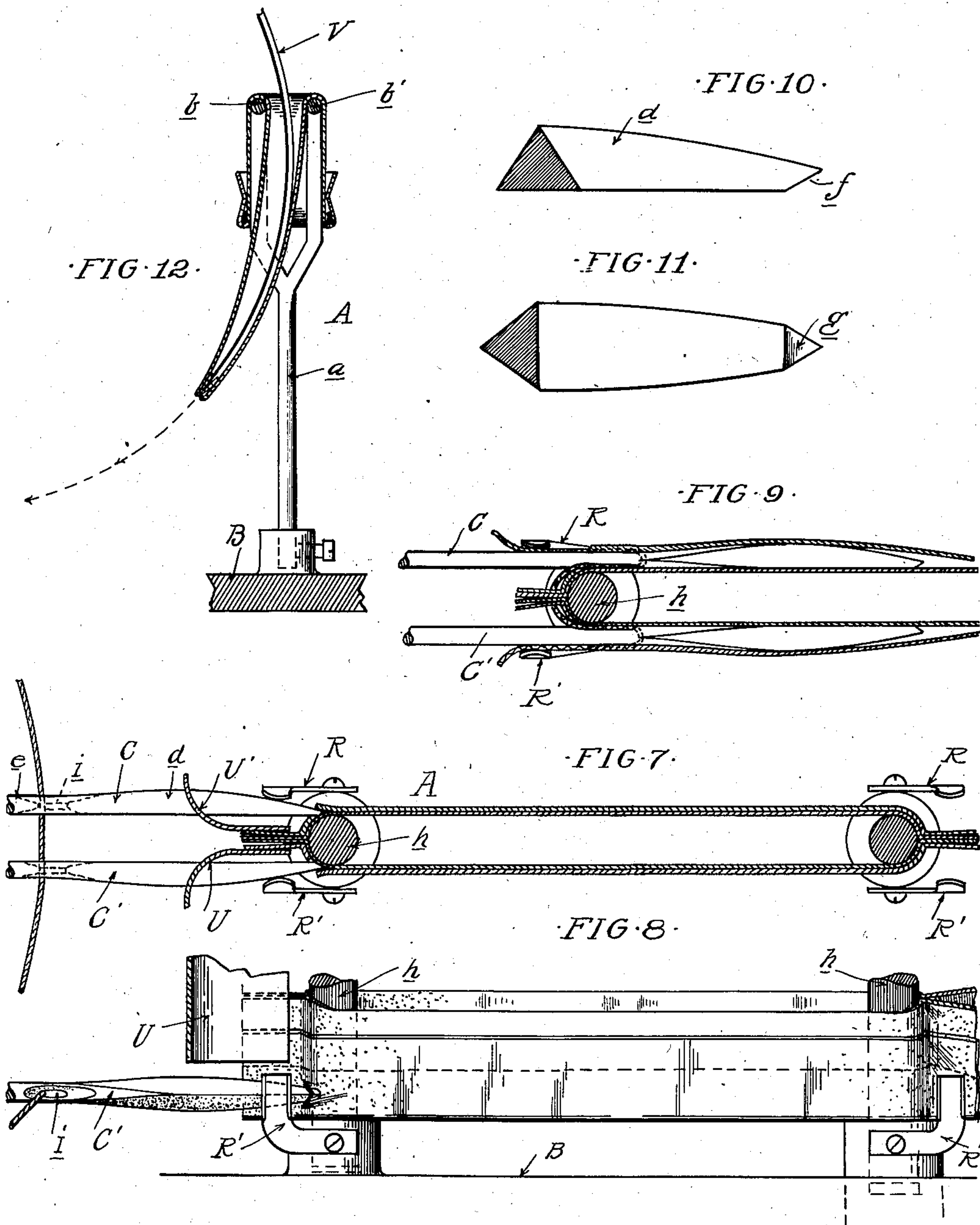
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4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

JAMES L. LOWE AND JOHN O. HIBBARD, OF DETROIT, MICHIGAN.

MACHINE FOR STRINGING BAGS.

No. 815,606.

Specification of Letters Patent.

Patented March 20, 1906.

Application filed May 26, 1904. Serial No. 209,971.

To all whom it may concern:

Be it known that we, JAMES L. LOWE and JOHN O. HIBBARD, citizens of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Machines for Stringing Bags, of which the following is a specification, reference being had therein to the accompanying drawings.

- 10 The invention relates to machines for stringing bags, and has for its object the attaining of a stringing-machine in which the work is accomplished automatically and expeditiously.
- 15 The invention consists in the means employed for supplying the strings to the stringing needles; further, in the construction by which the length of strings supplied may be adjusted according to the requirements of the
- 20 work; further, in the peculiar construction of the string-needle and its cooperating parts; further, in the construction by which the bags are strung while reversed or in the condition in which they are received from the
- 25 bag-forming machine and subsequently to the stringing are automatically reversed; further, in the peculiar construction of the bag-turning mechanism by which the bags are reversed, and, further, in the peculiar
- 30 construction, arrangement, and combination of parts, as hereinafter set forth.

- In the drawings, Figure 1 is a sectional end elevation of the machine. Fig. 2 is a longitudinal section therethrough. Fig. 3 is a
- 35 plan view. Figs. 4 and 5 are perspective views, respectively, of the needle-guide and string-cutter. Fig. 6 is a section illustrating the string-grabbing device. Fig. 7 is a horizontal section through the bag-holder, illustrating the string-needles in position for
- 40 piercing the outer ply of the bag. Fig. 8 is an elevation thereof. Fig. 9 is a section similar to Fig. 7, illustrating the needles after insertion between plies. Fig. 10 is an enlarged
- 45 plan of the point of the needle. Fig. 11 is a side elevation thereof; and Fig. 12 is a vertical section through the bag-holder, illustrating the bag-turning mechanism.

- The bags upon which the machine is designed to operate may be formed of any suitable material and are of any construction in which a hem or loop is provided at the mouth of the bag between the plies of which the string may be inserted. The bags are pref-
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erably strung in the condition received from the bag-forming machine—that is, before reversing and while the seams are on the outside.

The machine comprises a suitable holder A, upon which the bags to be strung are successively placed. This preferably comprises a spring formed of substantially inverted-U shape, one arm *a* thereof being rigidly secured to the bed or table B of the machine and the other arm *a'* being laterally adjustable. The upper portion of the frame is preferably bifurcated, the furcations *b* and *b'* thereof being slightly separated from each other and having oblique corner portions *c*, this construction being for a purpose that will be hereinafter set forth.

C and C' are the stringing-needles, which are arranged parallel to each other and on opposite sides of the plane of the holder A. These needles are preferably secured to the common carrier D, which, as shown, consists in a reciprocatory bar slidingly secured in bearings E upon the table B. Each of the needles C and C' is of a construction adapted to cooperate with the holder A, so that in operation the needles will pierce the outer ply only of the bag and will then separate the two plies apart to prevent the piercing of the same by the point of the needle until the opposite end of the bag is reached. This construction consists, essentially, in a tapering needle-point having a beveled inner face the angularity of which is such that the point will enter and pierce the outer ply of the bag and before piercing the inner ply will be deflected by said angular face, so as to separate the plies.

As shown, the forward end of the needles are formed of triangular cross-sections, which in the largest portion *d* are larger than the shank *e* and taper to the point *f*. The inner side of the triangle is arranged in a vertical plane and extends substantially straight from the shank to near the point. *g* is a beveled face extending from the forward end of said inner face to the point *f*. The holder A has a vertical rod *h* thereof, preferably of rounded cross-section, so that the bag when in engagement with said holder is drawn around said rounded bar. The needles C and C' are so adjusted in relation to the rounded bar *h* that the points *f* will readily pierce the outer ply of the portion of the bag drawn

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around said bar. Inasmuch, however, as the needles are traveling obliquely in relation to the surface at the point of piercing before the outer ply is penetrated by the point, the movement of the needle around the rounded bar will cause the inner ply to bear against the oblique face *g* of the needle and hold the point *f* from piercing it. In the further forward movement of the needle said oblique face *g* will cause the point to be deflected laterally, thereby carrying the outer ply away from the inner ply and also separating the point *f* from both outer and inner plies. As a result the needles are formed to travel the entire length of the holder without danger of the points piercing the cloth until the rounded opposite edge is reached, where the outer ply is again pierced by the point of the needle.

From the description above given it will be understood that the needles automatically pierce and separate the plies without the necessity of any auxiliary piercing or ply-separating device such as has heretofore been used in machines of this character. Where the needles are accurately adjusted in position, the operation will be positive and uniform, and to provide for this accurate adjustment we preferably employ in the path of the needles oppositely-disposed spring-guides *F*, mounted upon suitable supports *F'*, the free ends of the springs being adjustable through the medium of adjusting-screws *F''*, passing through said supports and loosely engaging said free ends, by means of which the needles *C* and *C'* may be adjusted in relation to the bar *h* of the frame.

In rear of the triangular portion *d* of the needle is arranged an eye *i*, through which the string must be inserted. This being a closed eye, all danger of catching in the cloth of the bag is prevented; but the construction necessitates a string-supplying mechanism which is capable of threading the string through the eyes of the needle at each operation. For this purpose we have provided an automatic threader, preferably of the following construction: *G* is a threading-needle which is capable of insertion through the needles *C* or *C'*. This needle *G* is itself provided with an eye through which the string is passed and by which it is carried through the eyes *i* of the needles *C* and *C'*. The needle *G* is carried by reciprocatory arm *H*, which, as shown, is mounted on a rock-shaft *H'*. *I* is a corresponding reciprocatory arm, which is mounted upon the parallel rock-shaft *I'* and carries at its free end a grabbing or string-clamping device *J*, the latter preferably comprising the serrated disks *j* and *j'*. The disk *j* has a shank *j²* threaded into a socketed portion of the arm *I*, the shank being hollow, as shown, and having a slotted portion *j³*. The disk *j'* is

provided with a shank *k'*, loosely passing through an aperture in the disk *j*, and has at its rear end a nut *k²*, slidable within the hollow shank *j²*, the inward movement thereof being limited by a pin *k³* engaging the slot *j³*. Mounted within the hollow shank *j²* is a spring *k*, the opposite ends of which bear, respectively, against the disk *j* and said nut *k²*, whereby the two disks are normally held together. These disks are carried by the arm *I*, so that when swung upward into a position adjacent to the needle *C'* they will be in proximity to the end of the string projecting from the threading-needle *G*. To separate the disks *j* and *j'*, a wedge-shaped stop *J'* is arranged in the path of the grabber *J* adjacent the limit of the upward movement of the arm *I*, so positioned that when the grabber *J* contacts therewith the stop will be inserted between said disks. This will move outward the disk *j'* against the tension-spring *k* and permit the end of the string projecting from the threading-needle *G* to pass between the disks and upon the reverse movement of the arm *I* to be clamped between said disks. The arms *H* and *I* are arranged to be simultaneously swung into opposite directions, preferably by providing intermeshing gear-wheels *K* and *K'* on the rock-shafts *H'* and *I'*. *L* is a rod connected to the arm *I* and actuated from the cam *M* through the medium of the lever *L'*. The cam *M* is upon a rotary shaft *N* and is so fashioned that once in each rotation of said shaft the lever *L* and rod *L'* will be reciprocated, thereby causing the rocking movement of the arm *I* and through the intermeshing gear-wheels *K* and *K'* an opposite movement of the arm *H*. The string threaded in the needle *G* is carried by the arm *H*, passing through a guide thereon, which is adjacent to the axis of movement of said arm and drawn from a supply located at any convenient point, such as in the holder *O*. Thus in the movement of the arm *H* to insert the needle *G* through the eyes of the needles *C* and *C'* there will be no tension upon the string; but as soon as the end of the string is seized by the clamp *J* and is carried by the swing of the arm *I* the string will be drawn through the eye of the needle *G* and through the guide *l* on the arm *H* until the outward movement of the arms *I* and *H* is completed. The movement of the arms *H* and *I* is sufficient to draw a length of string between the grabber *J* and the needle *G* which is suitable for the draw-string of the bag, and this string extends substantially equal distances upon opposite sides of the needle *C* and *C'*. At the termination of the outward movement of the arms *H* and *I* a cut-off *P* is operated to sever the string a short distance from the needle *G*. As shown, this cutter comprises a pair of shears with

actuating toggle-levers P' , which are engaged by a lug P^2 on the arm H during its final outward movement and are actuated to sever the string.

5 As the length of string for different sizes of bags varies, provision is preferably made for adjusting the operation of the swinging arms H and I so as to increase or diminish the amplitude of their movement. As shown, 10 the arm I is provided with an actuating extension I^2 , having a segment-slot m thereon, through which the pivot-pins m' for connecting the rod L pass. This pin is clamped to the arm I^2 and may be adjusted to different 15 positions in the slot m to vary its distance from the axis of the rock-shaft I and correspondingly vary the swing of the arm I .

The string is released from the grabber J at the termination of the outward movement of 20 the arm I by means of a lug Q , similar to the lug J' , which is arranged adjacent the limit of the outward movement of the arm I , in the path of the grabber, so as to separate the disks j and j' and release the end of the string there- 25 from. This releasing-lug Q , as well as the severing-shears P , must be adjusted in position to correspond to the movement of the arms H and I , and in the construction shown provision is made for this by adjustably se- 30 curing the lug Q upon the segmental bracket Q' and mounting the shears P upon the segmental bracket P^3 . These segments being respectively concentric with the axes of the arms H and I , it is obvious that in each posi- 35 tion of adjustment of the lug Q and shears P their relation to the path of the arms H and I will remain the same.

After the operation of the parts above de- 40 scribed to supply the string to the needles C and C' and sever the length from the threading-needle G said needles C and C' are moved forward to carry the string through the hem or loop at the mouth of the bag. In this movement the outer ply of the cloth is 45 pierced and the needle passes between plies in the manner already described, finally piercing the outer ply at the opposite end of the bag and passing out. During the travel of the needles the string is continually drawn 50 through the eyes i , and before the needles complete their movement the opposite ends of the string are drawn out through said eyes, thus disengaging from the needles. To prevent danger of the string drawing out 55 faster from one of the needles than from the other, oppositely-disposed spring-clamps R and R' are preferably mounted upon the holder A in any suitable manner at the opposite sides of the bar h and arranged to bear 60 against the string and the shank-needles, so as to put a uniform tension thereon.

At the end of the forward movement of the needles C and C' they are held stationary for

an interval, during which the needles are again supplied with string by a second 65 threading mechanism similar in construction to the one already described and operating upon the needles in the position described. As soon as this operation is complete and a 70 length of string severed the needles C and C' are returned, thereby drawing the second string through the hem or loop at the mouth of the bag, with the ends of the string ex- 75 tending oppositely from those of the string first engaged. The movement of the needles C and C' is effected by the reciprocation of the holder D , and the latter may be actuated by any suitable means, such as the lever S , oper- 80 ated by a cam T on the shaft N . In engaging the bag with the holder A it is drawn down over the spring-frame, and the project- 85 ing edges of the raw edges are preferably engaged between guides U and U' , mounted upon the support F'' in any suitable manner above the spring-clamps R R' and inter- 85 mediate the needles, so as to hold said edges out of the path of the needles C and C' .

After the completion of the stringing operation the bag is automatically removed 90 from the holder and at the same time is turned by the following mechanism: V is a thin blade adapted to be inserted between the furcations b and b' of the holder A . This blade, as shown, is of segmental form and is 95 carried by a rock-arm W on the rock-shaft W' , said shaft being intermittently actuated by the rock-arm W^2 and the rod X connected thereto, which at its opposite end is connected to the lever Y , actuated by the 100 cam Y' on the shaft N . The timing of the cam Y' is such that movement is imparted to the rock-shaft W' after the completion of the stringing operation, and this will cause the arm W to carry the blade V , so that its forward end will be inserted between the 105 furcations b and b' of the holder A , pressing the bottom of the bag downward. This movement will continue until the entire bag is drawn through between the furcations b and b' , being by this operation reversed and 110 finally disengaged from the holder. To permit the ready disengagement of the bag from the holder, the tension on the spring-frame is relieved, preferably by connecting the movable arm a' of said frame with the lever Z , 115 pivoted intermediate its ends to a suitable bracket Z'' , the lever being actuated by a cam Z' on the shaft N' . This cam-groove is adapted to operate at the proper time to swing the lever Z on its pivot and move the 120 arm a' outward, the arm a thereby contracting the frame A , so that the bag may freely slide thereon.

On account of the shape of the bifurcated portion of the frame A , and particularly by 125 reason of the beveled portion c thereof, the

corners of the bag will not be completely turned, but will remain tucked. Thus in the operation of the blade V the threefold result is obtained of removing the bag from the holder, reversing it, and tucking the corners.

What we claim as our invention is—

1. In a bag-stringing machine, the combination with a reciprocatory stringing-needle of a threading-needle adapted to be inserted through the eye of said stringing-needle, means for engaging the end of the string threaded through said eye and for drawing a suitable length thereof, and means for withdrawing the threading-needle and severing the length of string therefrom.

2. In a bag-stringing machine, the combination with a reciprocatory stringing-needle of a threading-needle carrying the end of a supply of string and adapted to be inserted through the eye of said stringing-needle, means for seizing the end of the string passed through said eye and drawing a suitable length thereof through said eye, and means for simultaneously withdrawing said threading-needle and retracting the same to draw therefrom a suitable length of string on the opposite side of said stringing-needle, and means for severing the drawn length of string so as to leave the end of the supply in engagement with said threading-needle.

3. In a bag-stringing machine, the combination with a pair of parallel reciprocatory stringing-needles of a threading-needle engaging with the end of a supply of string adapted to be inserted through the eyes of both of said stringing-needles, means for engaging the end of the string inserted through said eyes and for drawing a suitable length thereof, and means for withdrawing said threading-needle and for severing a length of string therefrom leaving the supply still in engagement therewith.

4. In a bag-stringing machine the combination with a reciprocatory stringing-needle of a threading-needle having engaged therewith the end of a supply of string and adapted for insertion through the eye of said stringing-needle a grabber comprising a spring-clamp, a reciprocatory arm therefor, operating means for the arm, means for opening said clamp when adjacent to said stringing-needle to receive the end of the string carried by said threading-needle and for closing the clamp upon the initial movement of said reciprocatory arm whereby a suitable length of string is drawn through the eye of said stringing-needle, and means for again opening said clamp at the end of the outward movement of said grabber to release said drawn string.

5. In a bag-stringing machine, the combination with a reciprocatory stringing-needle of a threading-needle engaged with the end of a supply of string and adapted for insertion through the eye of said stringing-needle,

a grabber comprising a reciprocatory member carrying the disks j and j' and a spring for drawing said disks together, the lugs J' and Q at opposite ends of the movement of said grabber whereby the clamp is opened to receive the string from said threading-needle and to disengage therefrom after the drawing of a length thereof.

6. In a bag-stringing machine, the combination with a reciprocatory stringing-needle of the swinging arms H and I on opposite sides of said stringing-needle, the threading-needle G, carried by the arm H, the string-seizing clamp carried by the arm I, means for reciprocating said arms H and I oppositely to first thread the string through the eye of said stringing-needle and then draw a length of string through said eye and from said threading-needle, and means for severing the drawn length.

7. In a bag-stringing machine, the combination with a reciprocatory stringing-needle of a pair of oppositely-moving members arranged to travel in a path transverse to the plane of movement of said stringing-needle, a threading-needle carried by one of said members and adapted for insertion through the eye of said stringing-needle, a grabber carried by the other member adapted to seize and draw a length of string from the threading-needle, and means for adjusting the amplitude of movement of said members to vary the length of string drawn.

8. In a bag-stringing machine the combination with a reciprocatory stringing-needle of a periodically-swinging arm moving in a plane transverse to the plane of movement of said stringing-needle, a threading-needle carried by said arm adapted for insertion through the eye of said stringing-needle and a guide through which a string is passed to said threading-needle located near the axis of said swinging arm, whereby the said arm may be moved without disengaging the string from said needle.

9. In a bag-stringing-machine, the combination with a reciprocatory stringing-needle of a threading-needle adapted for insertion through the eye of said stringing-needle, and means for drawing variable lengths of string from said threading-needle.

10. In a bag-stringing machine the combination with a reciprocatory stringing-needle of a guide over which two plies of cloth are drawn arranged in relation to the path of said needle, so that the point thereof will pierce the outer ply, said needle having associated means cooperating with the guide to deflect the inserted point and thereby separate the two plies.

11. In a bag-stringing machine, the combination of a reciprocatory stringing-needle, and means whereby the needle will pierce the outer of two plies of cloth at an angle and

will travel tangentially over the inner ply without piercing the same, including a curved guide over which the two plies of cloth are drawn.

12. The combination with a reciprocatory stringing-needle of a frame over which the bag is drawn having a rounded guide-bar at one edge, said bar being in such relation to the path of said needle and the needle being so formed as to permit the latter to angularly pierce the outer ply and pass tangentially over the inner ply, and adjustable means for guiding the point of said needle in piercing.

13. The combination with a frame over which the bag is drawn of a reciprocatory stringing-needle having a beveled point adapted to pierce the outer ply of said bag, the angle of said bevel being such as to cause the said point to pass tangentially over the inner ply and to be laterally deflected by said frame to separate said plies.

14. In a bag-stringing machine, a reciprocatory stringing-needle having its forward portion of triangular cross-section and tapering, one side thereof having the bevel to form the point *f*, in combination with a rounded guide over which two plies of the bag are drawn arranged in relation to the path of said needle so that the outer ply will be pierced and said beveled face will pass tangentially over the inner ply and deflect the point of the needle laterally.

15. The combination with a bag-stringing needle and a frame for holding the bag during the stringing operation of means for automatically removing said bag from said holder, simultaneously reversing the same.

16. The combination with a stringing-needle of a U-shaped frame over which the bag is drawn during the stringing operation, the end of said frame being bifurcated and a blade adapted to be inserted between the furcations of said frame to simultaneously withdraw the bag therefrom and reverse it.

17. In a bag-stringing machine, the combination with a reciprocatory stringing-needle, of a threading-needle adapted to thread said stringing-needle, means for engaging the end of the string after insertion through the needle-eye, and means for severing the string from the threaded needle.

18. In a bag-stringing machine, the combination with a reciprocatory stringing-needle, of a threading-needle carrying the end of a supply of string, and adapted to be inserted through the eye of said stringing-needle, means for seizing the end of the string passed through said eye and drawing a suitable length thereof through said eye, and means for simultaneously withdrawing said threading-needle and retracting the same to draw therefrom a suitable length of string on the opposite side of said stringing-needle.

19. In a bag-stringing machine, the combi-

nation with a pair of parallel reciprocatory stringing-needles, of a threading-needle engaging with the end of a supply of string adapted to be inserted through the eyes of both of said stringing-needles.

20. In a bag-stringing machine, the combination with a reciprocatory stringing-needle, of a threading-needle having engaged therewith the end of a supply of string and adapted to thread said stringing-needle, and a grabber adapted to engage the thread and withdraw a suitable length, comprising a spring-clamp a reciprocatory arm therefor.

21. In a bag-stringing machine, the combination with a reciprocatory stringing-needle, of a threading-needle having engaged therewith the end of a supply of string and adapted to thread said stringing-needle, a grabber adapted to engage the thread and withdraw a suitable length, comprising a spring-clamp and a reciprocatory arm therefor, and means for opening and closing the clamp.

22. The combination of a bag-holding frame, of a bag-stringing machine, having a bifurcated portion upon which the bottom of the bag is drawn, means for stringing the bag, and a blade adapted to be passed between the furcations of said frame to disengage the bag therefrom and simultaneously turn the bag, after said stringing operation.

23. The combination of a substantially U-shaped frame having a bifurcated end portion, said frame being adapted to receive the bag, means for stringing the bag, and a member adapted for insertion between the furcations of said frame to draw the bag therefrom and simultaneously reverse it, after said stringing operation.

24. The combination of a U-shaped frame having a bifurcated end portion, and adapted to have the reversed bag drawn thereon, means for stringing the bag while held by said frame, a rock-arm, and a segmental blade carried by said rock-arm adapted in its movement to pass between the furcations of said frame to simultaneously draw off said bag and reverse the same after said stringing operation.

25. The combination with a U-shaped frame adapted to support the bag-blank, and means operatively associated with said support for stringing the bag, said support having a bifurcated end portion with beveled corners, and a blade adapted to pass between the furcations of said frame between the beveled portions thereof to draw off and reverse the bag, leaving the corners tucked, said blade being operable after said stringing operation.

26. The combination with a bag-holder comprising a U-shaped frame adapted to support a bag, means associated with said support for stringing the bag, said frame having a bifurcated end portion, and a blade adapted to pass between the furcations of said frame

to remove and turn the bag, and means for springing the sides of said frame toward each other during the movement of said blade to permit the ready disengagement of said bag, 5 said blade being operable after said stringing operation.

27. In a bag-machine, the combination with a reciprocatory stringing-needle, means for threading the needle and for clamping

the threaded string, said means including oppositely-disposed intergear swinging arms.

In testimony whereof we affix our signatures in presence of two witnesses.

JAMES L. LOWE.

JOHN O. HIBBARD.

Witnesses:

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H. C. SMITH.