

J. A. SAFFORD.
Leather Splitting-Machines.

No. 156,652.

Patented Nov. 10, 1874.

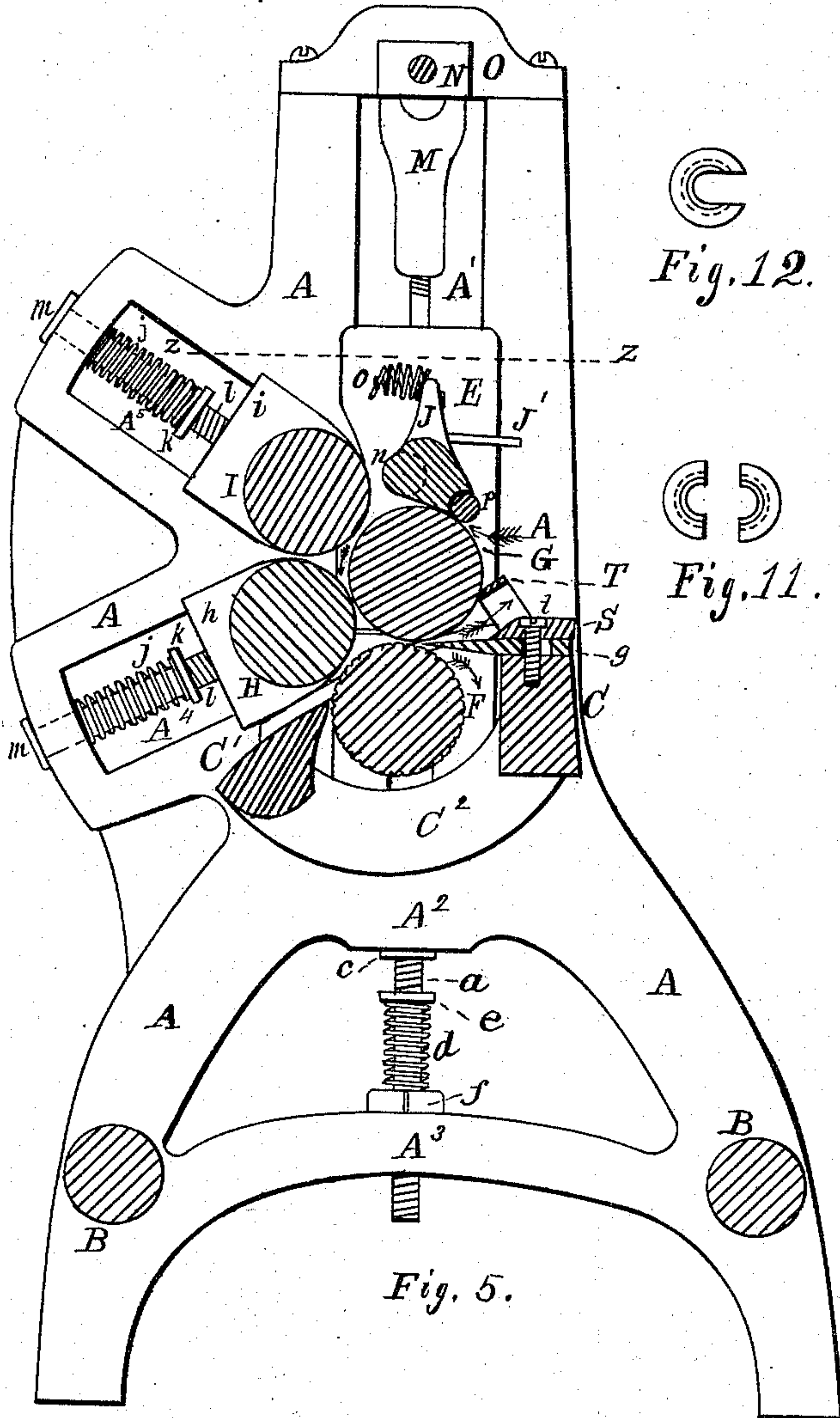



Fig. 12.


Fig. 11.

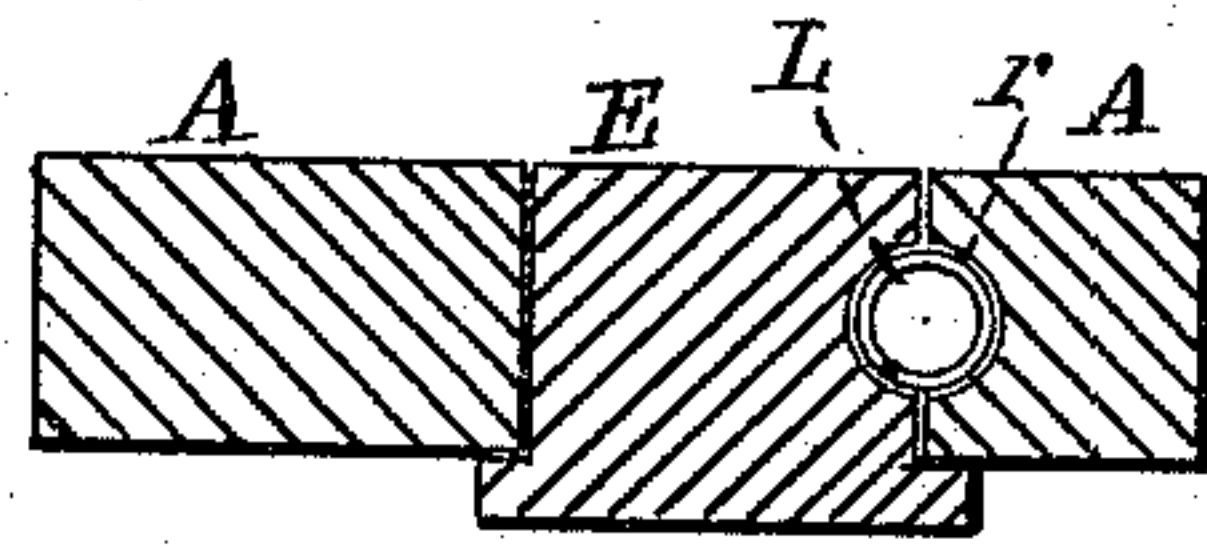


Fig. 7.

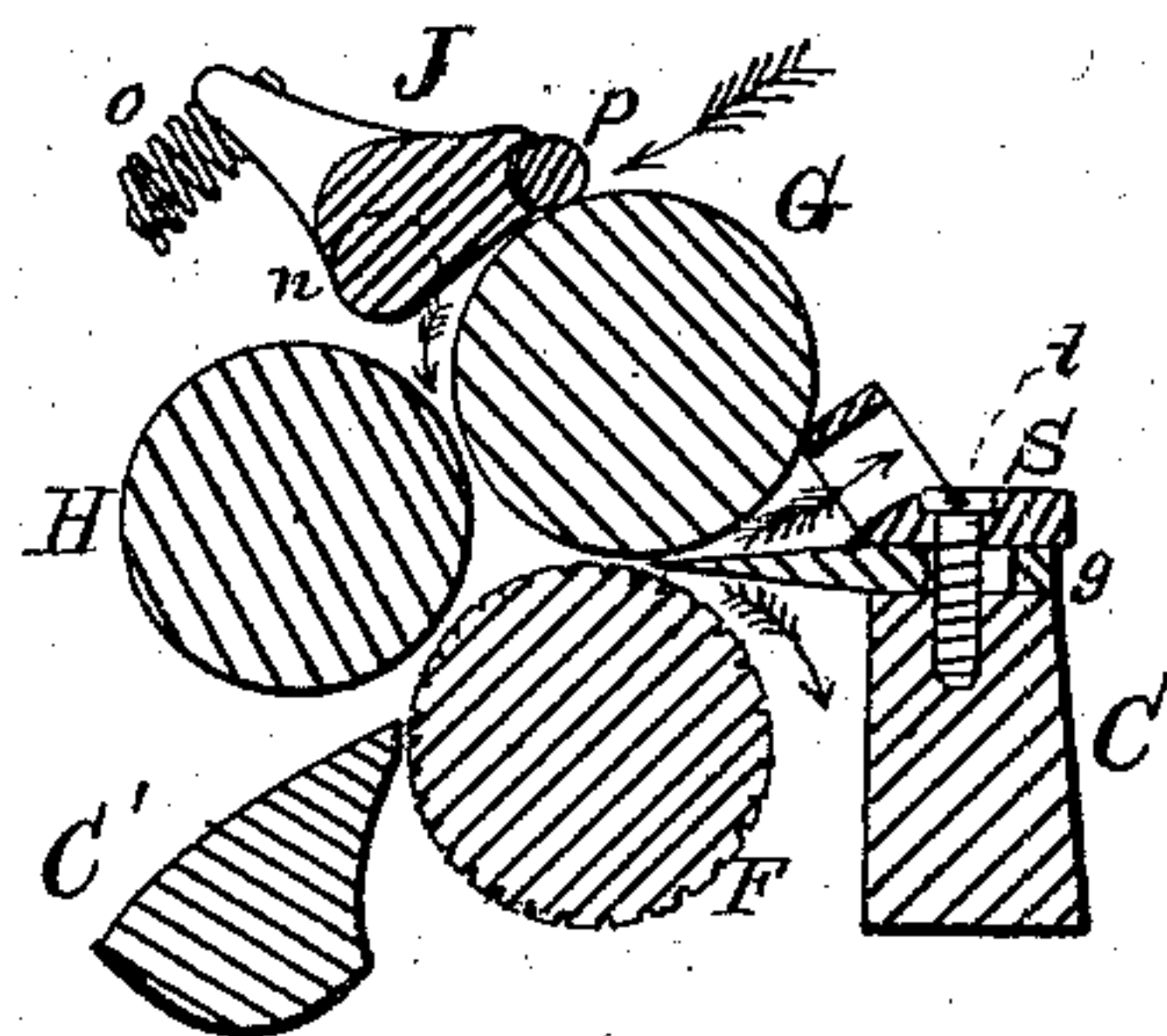


Fig. 8.

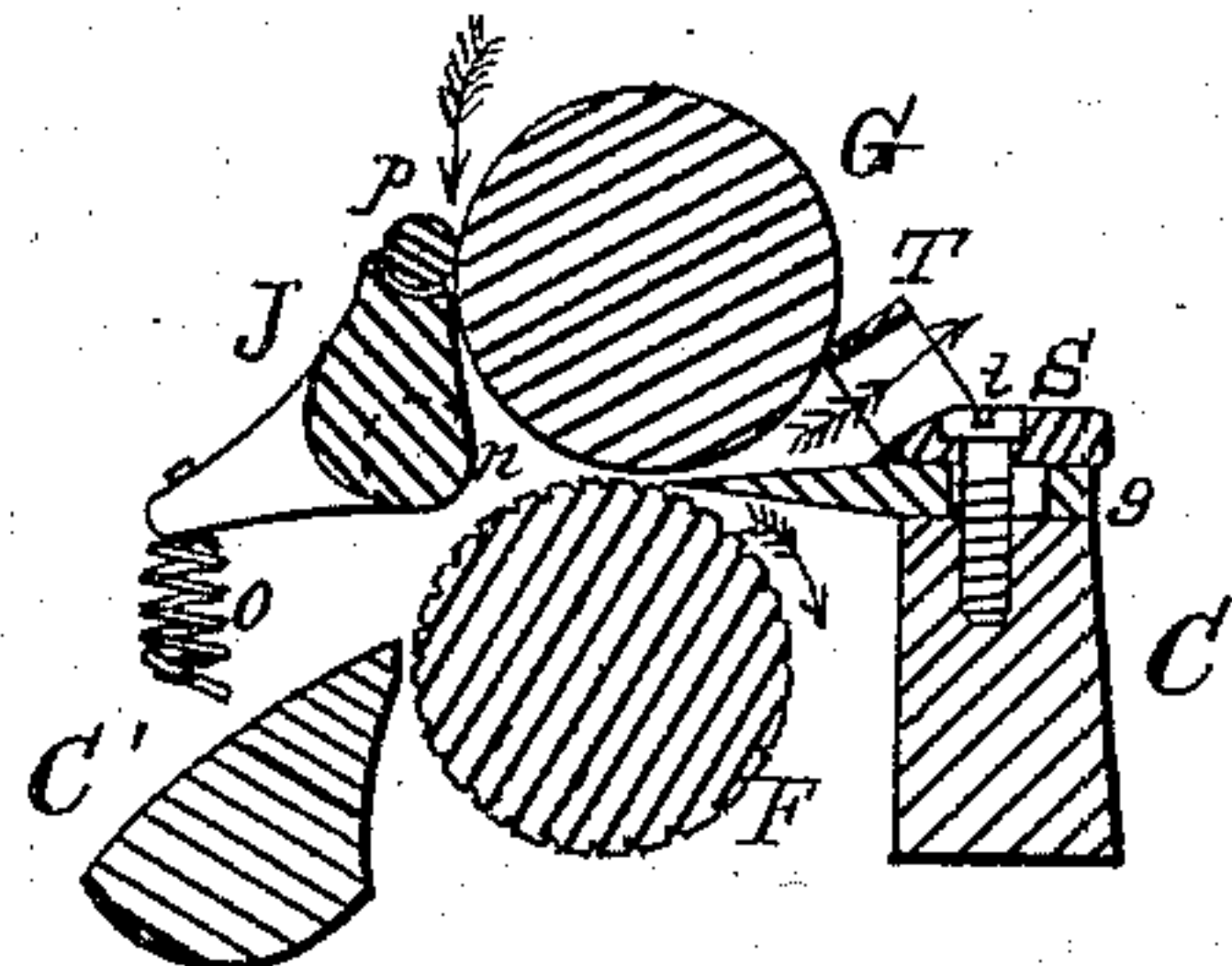


Fig. 10.

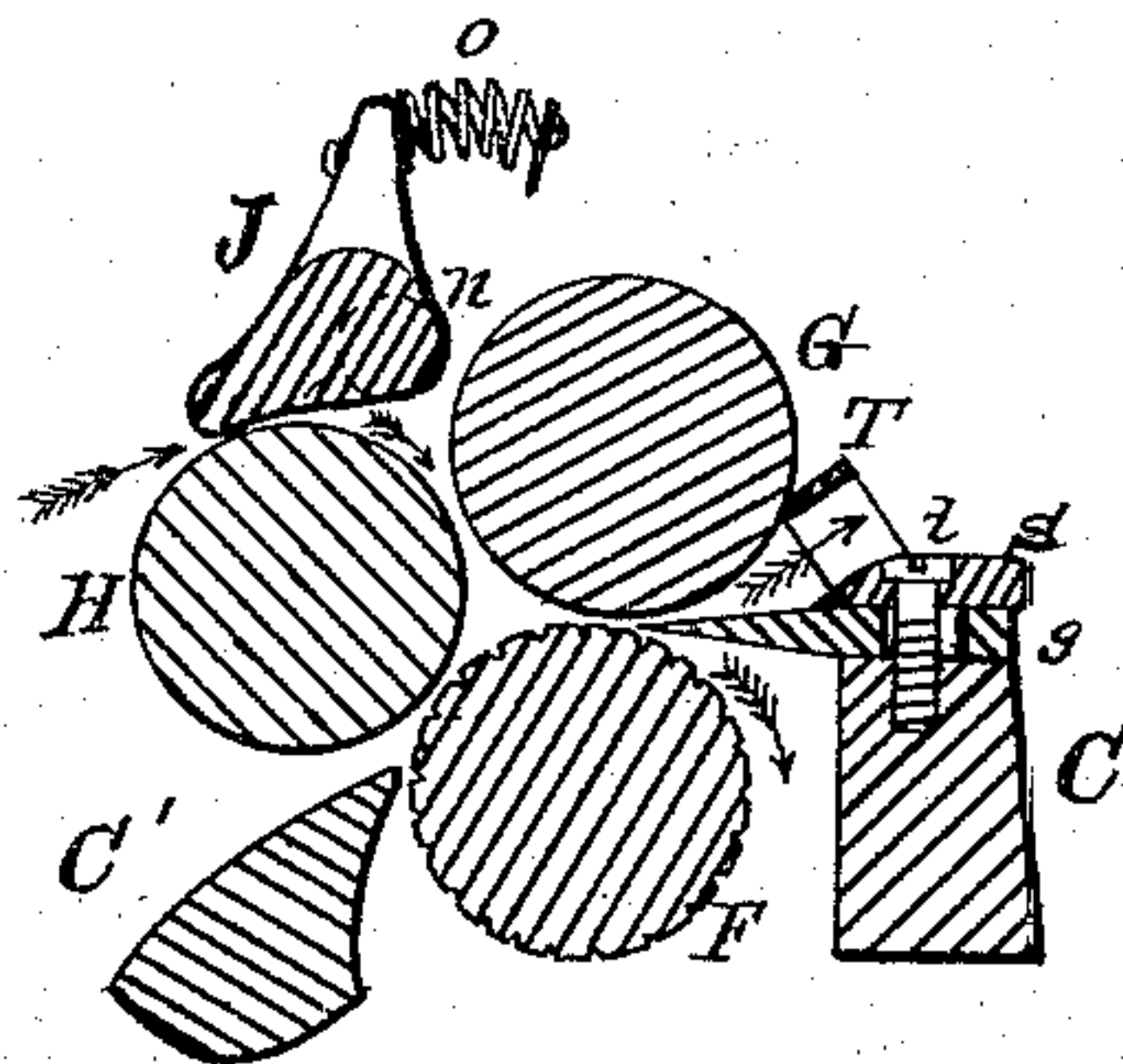


Fig. 9.

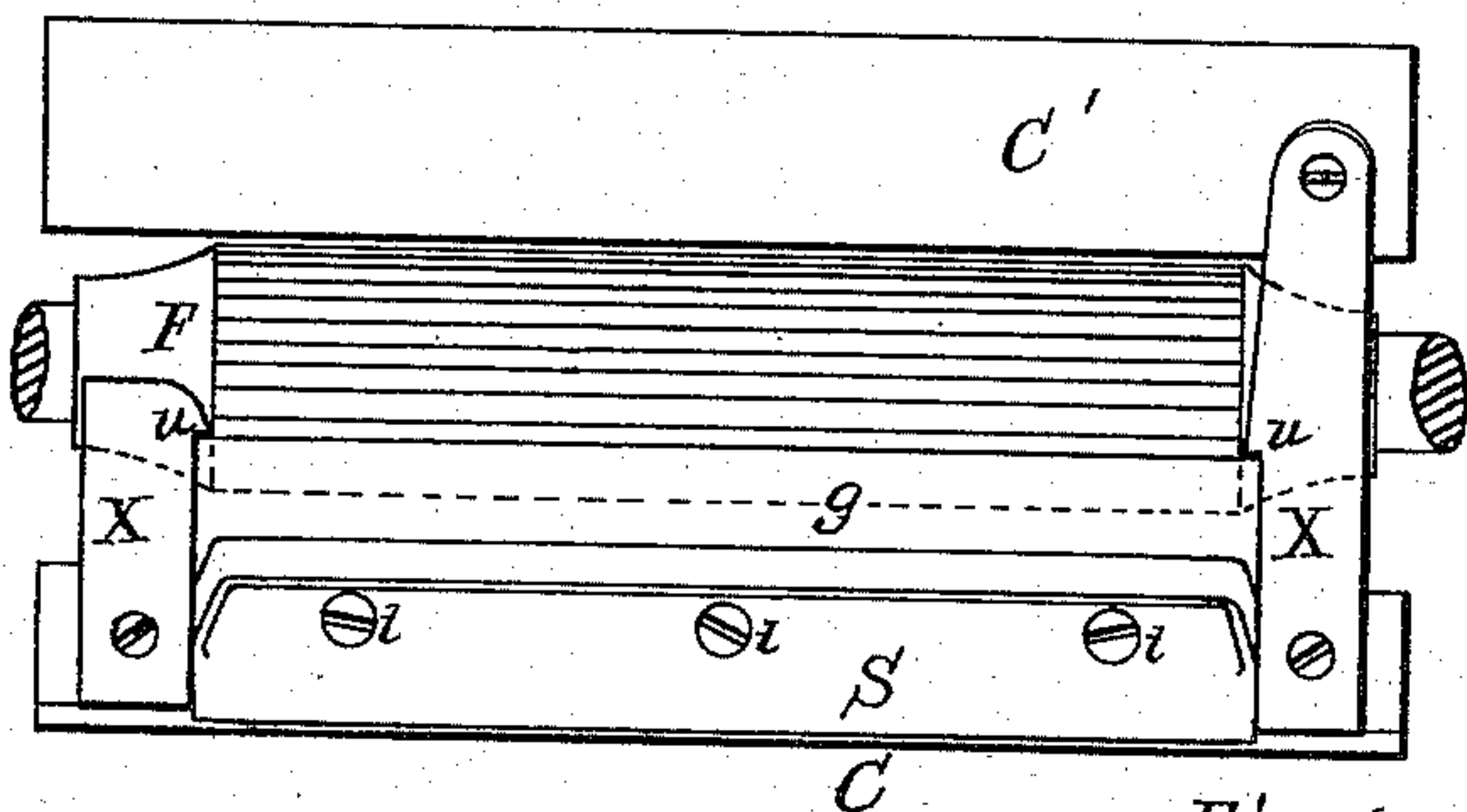


Fig. 6

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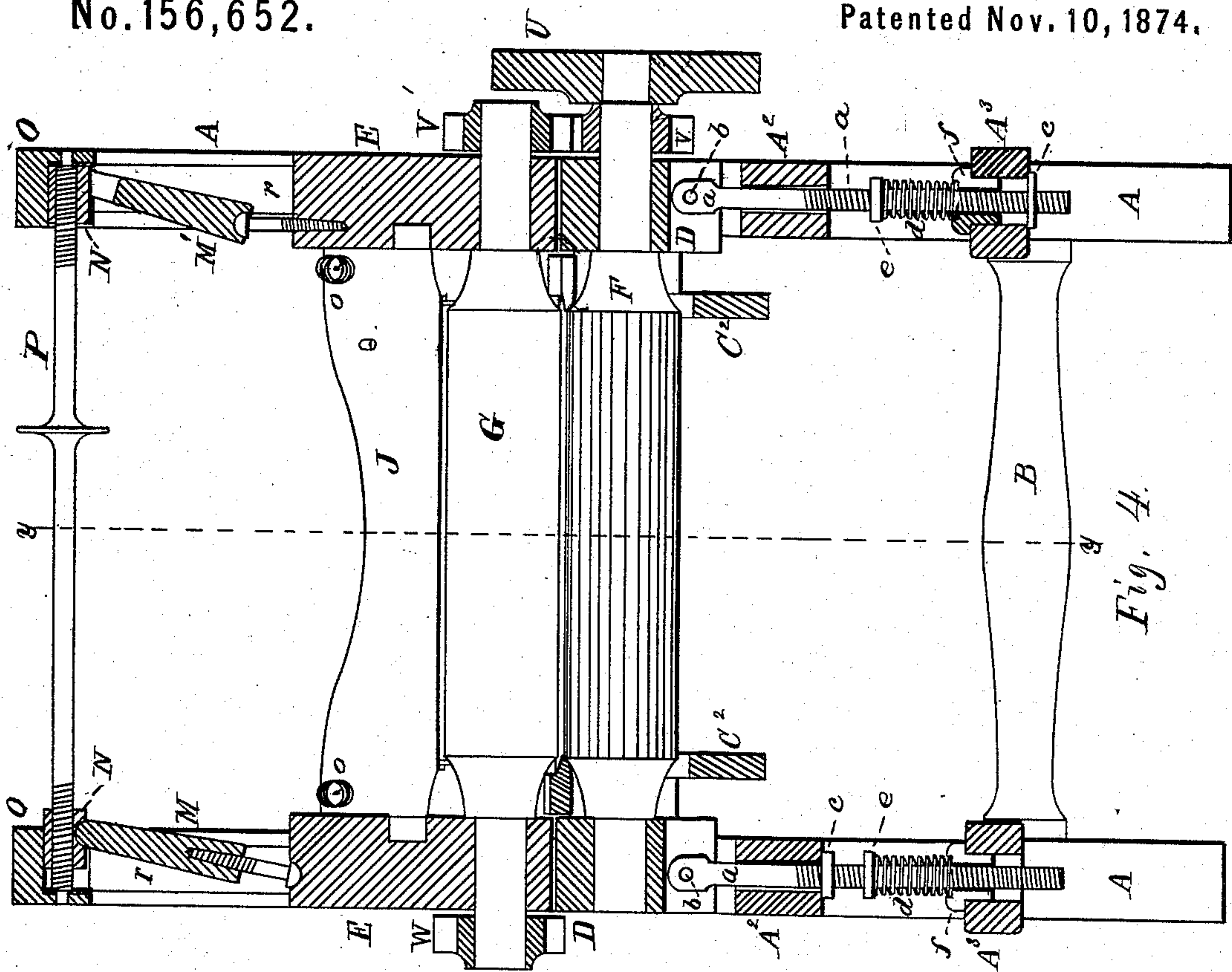


Fig. 4.

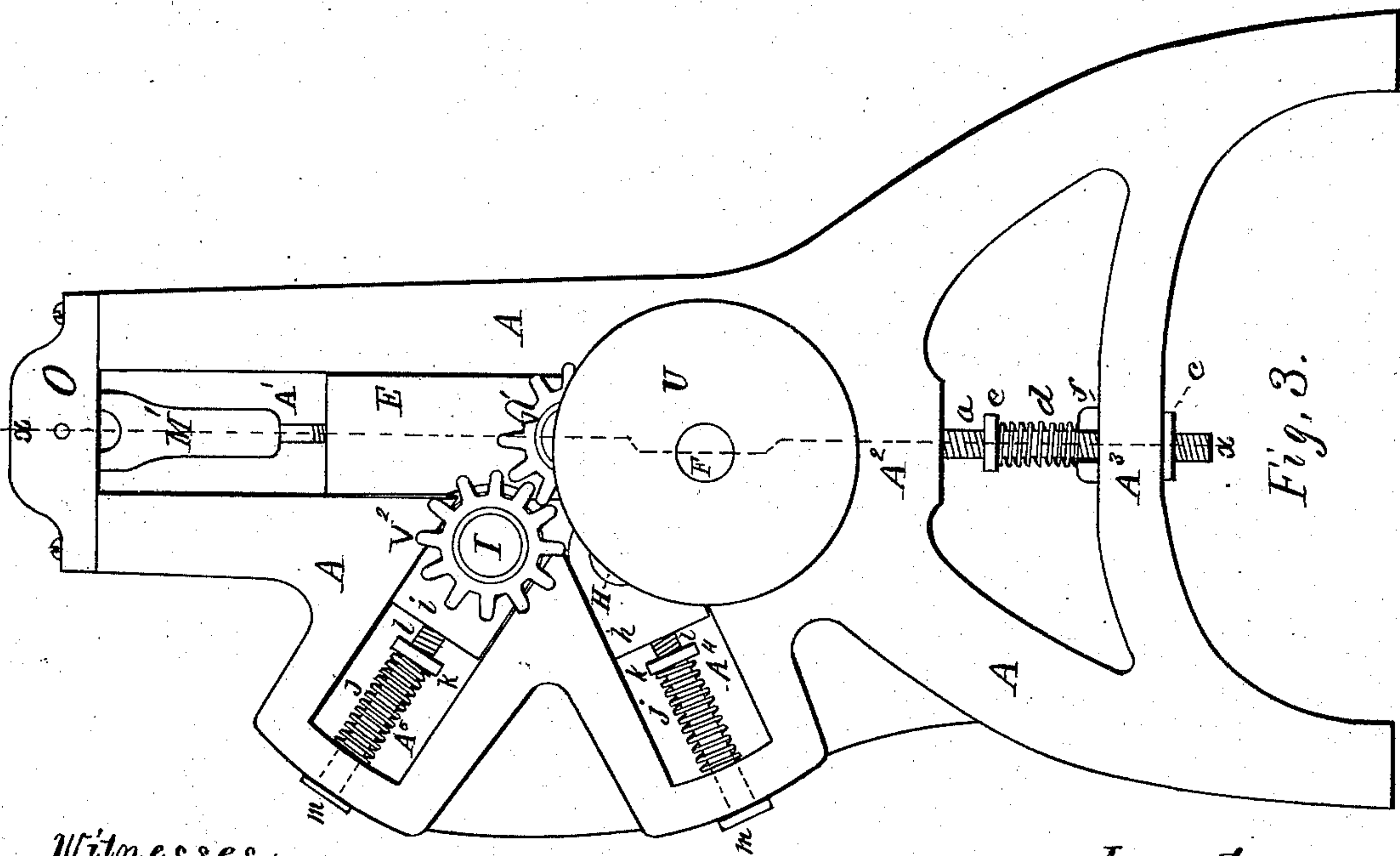


Fig. 3.

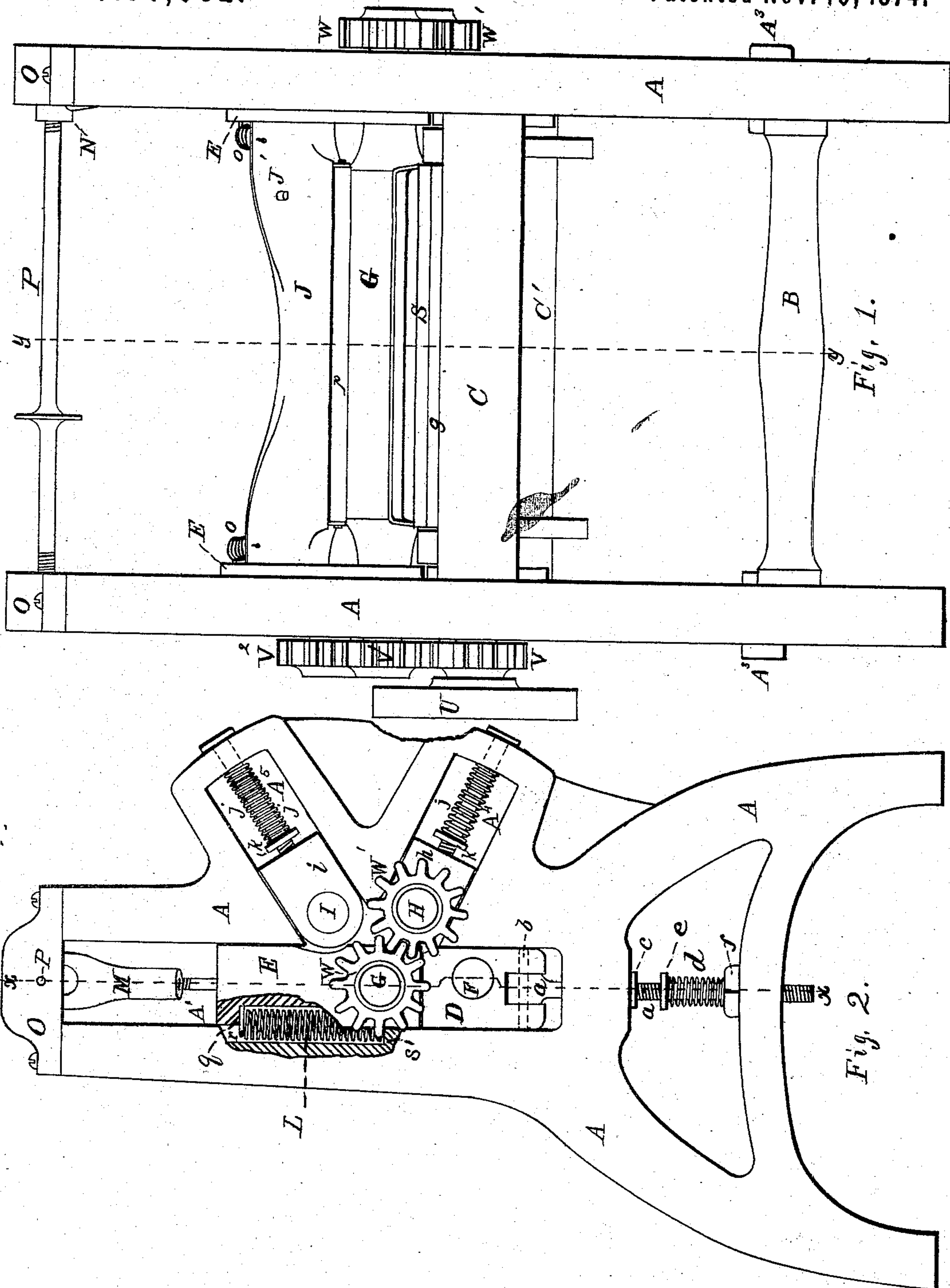
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UNITED STATES PATENT OFFICE.

JOSEPH A. SAFFORD, OF WINCHESTER, MASSACHUSETTS.

IMPROVEMENT IN LEATHER-SPLITTING MACHINES.

Specification forming part of Letters Patent No. **156,652**, dated November 10, 1874; application filed March 25, 1874.

To all whom it may concern:

Be it known that I, JOSEPH A. SAFFORD, of Winchester, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Leather-Splitting Machines, of which the following, taken in connection with the accompanying drawings, is a specification:

The first part of my invention relates to the arrangement of the feed and gage rollers, and the construction and relative position of the knife thereto; and it consists, first, in the use of a knife having a double-beveled edge, in combination with a gage-roll and a feed-roll arranged to move toward or away from the cutting-edge of said knife in different but parallel planes.

The second part of my invention relates to the means employed to keep the leather being fed to the knife smooth and extended upon the gage-roll; and it consists in the use of one or more pressure-rolls, in combination with gage and feed rolls, when said pressure-rolls are mounted in bearings arranged to yield in directions radial to the axis of the gage-roll, and have a positive rotary motion imparted thereto by suitable gearing. This part of my invention further consists in the use, in combination with gage and feed rolls, of a pivoted yielding pressure-bar arranged to bear upon the gage-roll, with or without a revolving roll mounted in the bearing end thereof.

The third part of my invention relates to the means employed for adjusting the gage and feed rolls and the manner of supporting the latter, and to the location and manner of applying the springs for that purpose; and it consists, first, in the use, as a means of adjusting the gage-roll, of a pair of struts, one at either end of said roll, the lower ends of which rest upon the boxes in which said roll is hung, and their upper ends fitted to suitable sockets or bearings formed in or upon the under sides of two threaded nuts fitted to slide horizontally in bearings formed in the upper part of the frame, in combination with a horizontal shaft mounted in fixed bearings in said frame, and provided at either end with a screw-thread to fit said nuts, the whole so arranged that a revolution of said shaft will move said nuts in

a horizontal direction, carrying with them the top ends of said struts, moving them toward or from a perpendicular position, according to the direction which said shaft is revolved. It consists, in the second place, in constructing the strut in two parts, one of which screws into the other, for the purpose of adjusting the length of said struts between its bearing-points as a means of leveling the gage-roll; and it further consists, as a modification of the above, of a box for hanging the gage roll, having an adjustable seat or step to receive the lower end of the inclined strut for adjusting said roll. It consists, in the third place, in the use of a threaded bolt or rod pivoted to the lower edge of the sliding box in which the feed-roll is mounted, and extending downward therefrom through the two ties of said frame below said box, and provided with a stop-nut and a tension-nut for regulating the tension of a spiral spring surrounding said rod, the lower end of which rests upon a seat-collar set in the opening in the lower tie, which opening is made large enough to allow of the passage of said spring through the same, said seat-collar being made in two parts, or with an open side, so that by raising the spring the seat-collar, after being raised out of its bearing in the frame, may be removed from the bolt, and the spring may be drawn off from said bolt and another put on in its place without disturbing the rolls.

The fourth part of my invention relates to the manner of securing the knife to the bed-girt, and the means employed to insure a proper delivery of the split leather from the machine; and it consists, first, in the use of one or more clamp plates or bars, in combination with the holding-bolts for securing the knife to the bed-girt, as will be more fully described. It further consists in the use, in combination with the gage-roll, of a stripper-bar to prevent the leather from adhering to said roll and being carried around again thereby. It further consists in constructing the stripper-bar in one piece, with or without securing it to the knife-clamp bar, as will be described. It further consists in the use of two gages, one at either end of the knife and secured to the knife-bed, said gages being provided with shoulders upon their inner edges, against which the front edge of

the knife is placed to determine its proper position with relation to the point of contact of the gage and feed rolls.

In the drawings, Figure 1 is a front elevation of a machine embodying my improvements. Fig. 2 is an end elevation, with a portion of the frame broken away to show the spring for raising the gage-roll. Fig. 3 is an elevation of the opposite end. Fig. 4 is a longitudinal section on line *x x* on Figs. 2 and 3. Fig. 5 is a transverse section on line *y y* on Figs. 1 and 4. Fig. 6 is a plan of the knife, knife-gages, knife-clamp, stripper-bar, and knife bed-girt. Fig. 7 is a transverse section of one of the frames on line *z z* on Fig. 5, showing the arrangement of the spring for raising the gage-roll. Figs. 8, 9, and 10 show modifications of the arrangement of the feed-gage and pressure-rolls and pressure-bar. Figs. 11 and 12 represent two modes of constructing the spring seat-collar, as seen in plan.

A A are the end frames of the machine, connected together by the tie-girts B B and bed-girts C and C'. The frames A A have formed in their upper parts the vertical slots A¹ A¹, into which are fitted, so as to slide therein, the boxes D and E. In the boxes D is mounted the feed-roll F, having a creased or fluted surface. To the lower side of the boxes D are pivoted the threaded bolts *a a* by means of the pins *b b*, as shown in Figs. 2 and 4. These bolts *a a* extend downward from said boxes through the cross-ties A² and A³ of the frames A, and are provided with the adjustable stop-nuts *c*, which serve to limit the upward movement of the feed-roll F, and the spiral springs *d*, surrounding said bolts, for raising the feed-roll, and the nuts *e*, for regulating the tension of said springs. The lower ends of the springs *d* rest upon the seat-collars *f*, made in two pieces, as seen in plan in Fig. 11, or in one piece with one open side, as shown in Fig. 12, the lower portion of said collars being made to fit the opening through the tie A³ of the frame, while the upper portion is made somewhat larger, so as to form a shoulder to rest upon the upper surface of said tie, as seen in Fig. 4. The opening through the tie A³ is sufficiently large to allow of a free passage of the springs *d* through the same when the collars *f* are removed, which is easily done by running the tension-nuts *e* up the bolt as far as they will go, and then lifting the collars till their lower ends are above the top of the tie A³, when they may be withdrawn sidewise from under the springs, and the springs may then be drawn off from the ends of the bolts in an obvious manner. The location of the springs *d* below the tie A² of the frame, and out of the way of the gearing, is a great advantage, as it makes it much more convenient to adjust the feed-roll, and the provision made for the removal of the springs, and the application of others in case of repairs, is another great advantage, as it enables the springs to be re-

placed without disturbing the rolls. G is the gage-roll, mounted in bearings in the boxes E in such a position that its axis shall be parallel to the axis of the feed-roll F, but about one-fourth of an inch, more or less, nearer to the knife *g* than the roll F, so that when the rolls F and G are moved up and down in the slot A¹, their axes will move in planes parallel to each other, but about one-fourth of an inch, more or less, apart. H and I are two yielding pressure-rolls mounted, respectively, in the boxes *h* and *i*, fitted to slide in the slots A⁴ and A⁵, formed in the frames A, and radiating from the axis of the gage-roll G, as shown. The rolls H I are forced against the gage-roll G by the tension of the spiral springs *j j*, one end of which rests against the frame and the other against the adjustable nut or collar *k* on the rod *l*. The rod *l* is provided with a fixed collar or head, *m*, and has a screw-thread formed upon its inner end, and is screwed into the outer end of the box *h* or *i* to a greater or less depth, according to the desired adjustment of the head *m*, which limits the movement of the rolls H I toward the gage-roll G. J is a pressure-bar, pivoted upon trunnions or centers at *n*, and arranged to bear upon the gage-roll G or one of the pressure-rolls H I at its opposite edge, as shown, the pressure being supplied by the springs *o o*. This pressure-bar may be a plain bar, as shown in Fig. 9, or it may have mounted in suitable bearings in its movable edge an idle-roll, *p*, as shown in Figs. 5, 8, and 10, and has its pivotal bearings in the sliding boxes E, in which the gage-roll G is hung when it is arranged to work in contact with the gage-roll, as seen in Figs. 5, 8, and 10; but when arranged to press upon one of the pressure-rolls, as seen in Fig. 9, it would be pivoted to the boxes in which said roll is mounted. The arrows indicate the direction in which the skin of leather enters and leaves the machine in the various modifications of the rolls and pressure-bar, as seen in Figs. 5, 8, 9, and 10. Each of the boxes E, in which the gage-roll G has its bearings, has formed in one of its edges, contiguous to the frame A, in which it slides, a vertical groove or recess, extending from its lower end nearly to its upper end, where it is closed by the shoulder *q*. The contiguous surface of the frame A has formed therein a corresponding groove or recess, *r*, extending from the upper end of the slot A¹ downward to a point near the lower end of the box E, where it terminates in the abutment *s*. L is a spiral spring placed in said recesses, with its lower end resting on the abutment *s* and its upper end bearing against the shoulder *q*, the tension of the springs tending to raise the gage-roll. M M' are two struts, the lower ends of which rest upon suitable bearing-surfaces on the upper ends of the boxes E, while their upper ends are suitably connected to the nut-blocks N N, arranged to slide horizontally in bearings formed for the purpose in the caps O O, se-

cured to the tops of the frames A. The struts M and M' are placed in an inclined position, parallel or otherwise, and when moved toward an upright or perpendicular position the boxes E and the gage-roll G are moved downward in an obvious manner. The nut-blocks N N are both moved in a horizontal direction by the horizontal shaft P, which is mounted in fixed bearings in the caps O O, and provided with a screw-thread upon each end thereof to fit the thread in the nut-blocks N N, as shown in Fig. 4, the threads upon said shaft being inclined in the same or a reverse direction, as may be desired. The struts for adjusting the gage-roll may be made in two parts, one of which is screwed into the other as a means of adjusting the length of the strut for the purpose of leveling the gage-roll, as shown at M on the left of Fig. 4; or the same end may be attained by making the seat for the lower end of the strut adjustable upon the box E, as seen at M' on the right of Fig. 4. The knife *g* has a double-beveled edge, and is secured to the knife-bed C in a horizontal position, with its cutting-edge about one-eighth of an inch from a vertical line drawn through the axis of the gage-roll, and nearly in contact with the surface of the feed-roll. S is a clamp-bar resting upon the top of the knife, and having a bite thereon considerably nearer the edge of the knife than the holding-bolts, the upper surface of said clamp being made beveling toward the cutting-edge of the knife, and thick enough at the point where the holding-bolts *t t* pass through that the bolt-heads may be sunk into the surface of the clamp, so as to not project above said surface. The clamp S may be made in one piece of the full length of the knife, or it may be in two or more pieces, as may be desired, as a matter of convenience. T is a stripper-bar, one edge of which rests against the surface of the gage-roll in an inclined position, for the purpose of stripping the leather from the surface of said roll if it is inclined to hug to the roll. In the case shown the bar T is attached to and forms a part of the knife-clamp S; but it is obvious that said bar may be made independently of the clamp, and be attached to the frame of the machine. The knife bed-girt C and the bed-girt C¹ are cast in one piece, being connected by the ties C², as shown. The pressure-bar J is raised to introduce the leather to the action of the rolls by means of the handle J'. U is the driving-pulley mounted on the end of the feed-roll shaft. V, V¹, and V² are gears through which motion is imparted to the gage-roll G and the pressure-roll I. Upon the opposite end of the gage-roll shaft is secured the gear W, which meshes into the gear W', secured to the shaft of the pressure-roll H, and by which said roll is made to revolve. Two knife-gages, X X, are secured to the knife-bed at either end, each provided with the shoulder *u u*, against which the edge of the knife is set.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. The combination of the knife *g*, provided with a double-beveled cutting-edge, the gage-roll G, and the feed-roll F, when said rolls are arranged, relatively to each other and to the knife, as set forth, and to be adjusted or yield in planes parallel to each other, but at different distances from the cutting-edge of the knife, substantially as described.

2. In combination with the feed-roll F and gage-roll G, arranged to be adjusted toward and from each other and the cutting-edge of a knife, one or more pressure-rolls arranged to be adjusted and yield in a direction radial to the axis of the gage-roll, when said pressure-rolls have a positive rotary motion imparted thereto by suitable gearing, substantially as described.

3. In combination with feed and gage rolls and a splitting-knife, the vibrating pressure-bar J, with or without the idle-roll *p*, arranged to operate substantially as described.

4. The combination of the sliding nut-blocks N N, the screw-shaft P, the struts M and M', the boxes E, and the springs L, all co-operating to control the position of the gage-roll by the movement of the top ends of said struts toward or from a perpendicular position, substantially as described.

5. The strut M, made in two parts, screwed together for the purpose of adjusting its length, in combination with the box E and the sliding nut-block N, all arranged to operate substantially as described.

6. The box E, provided with an adjustable step or seat for the lower end of the strut M' to rest upon, substantially as described.

7. The threaded rod or bolt *a*, pivoted to the lower side of the box D, and provided with the adjustable stop-nut *c* and tension-nut *e*, in combination with the spring *d*, all arranged as and for the purpose described.

8. In combination with the bolt or rod *a* and the spring *d*, the spring seat-collar *f*, fitted to the frame as set forth, whether said collar is made in two pieces, or in one piece with an open side, substantially as described.

9. A clamp plate or bar for binding the knife, and at the same time guiding the leather above the heads of the holding-bolts, substantially as described.

10. The stripper-bar T, in combination with the gage-roll of a leather-splitting machine, arranged to operate substantially as described.

11. The stripper T and the clamp S, made in one piece, substantially as described.

12. The knife-gages X X, provided with the shoulders *u u*, and arranged substantially as described, for the purpose specified.

Executed at Boston this 20th day of March, 1874.

JOSEPH A. SAFFORD.

Witnesses:

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S. A. WOOD.