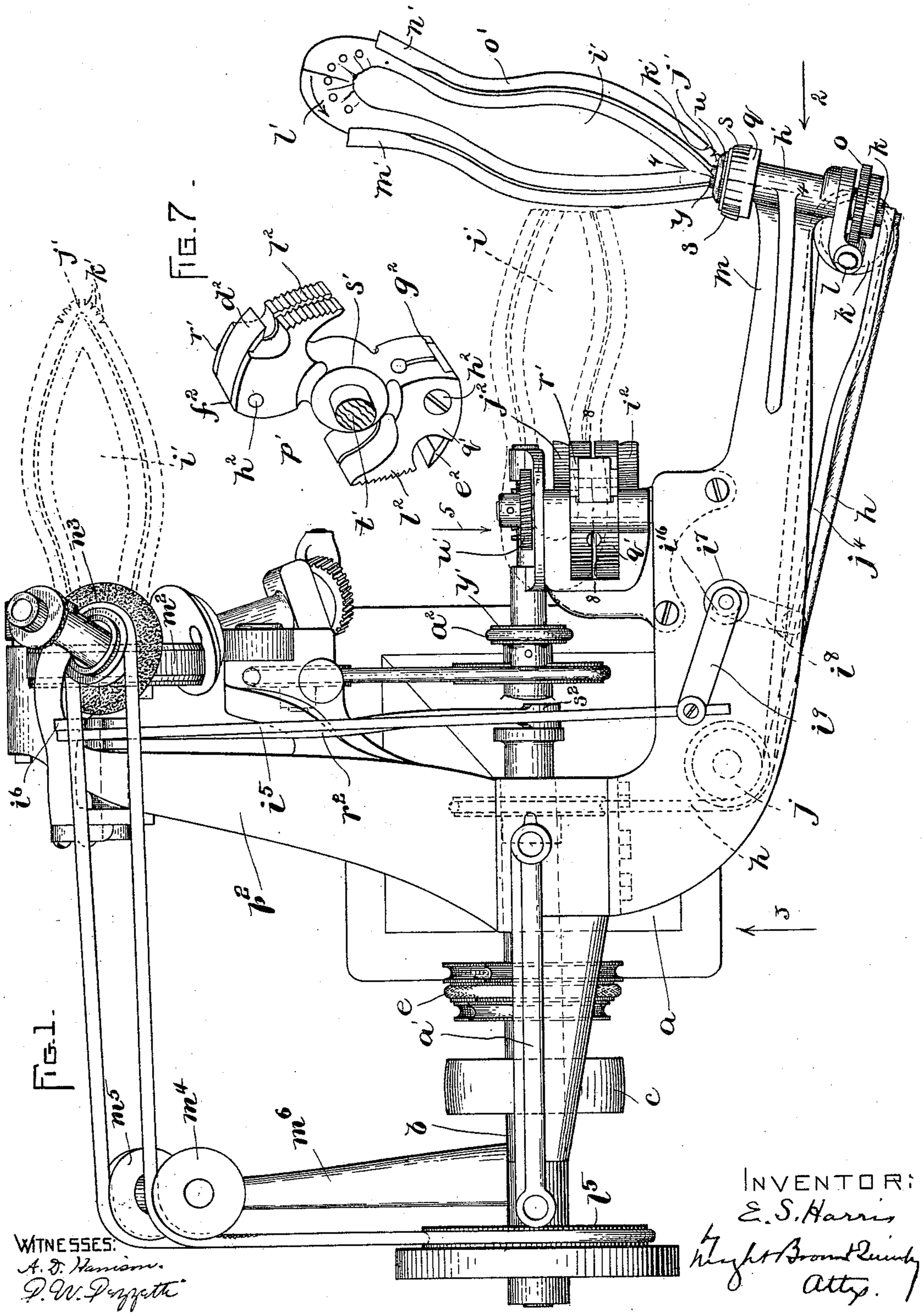
(No Model.) 4 Sheets—Sheet 1.

# E. S. HARRIS.

## INSEAM TRIMMING MACHINE.

No. 579,751. Patented Mar. 30, 1897.

FIG. 1.

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(No Model.) 4 Sheets—Sheet 2.

# E. S. HARRIS.

## INSEAM TRIMMING MACHINE.

No. 579,751. Patented Mar. 30, 1897.

FIG. 2.

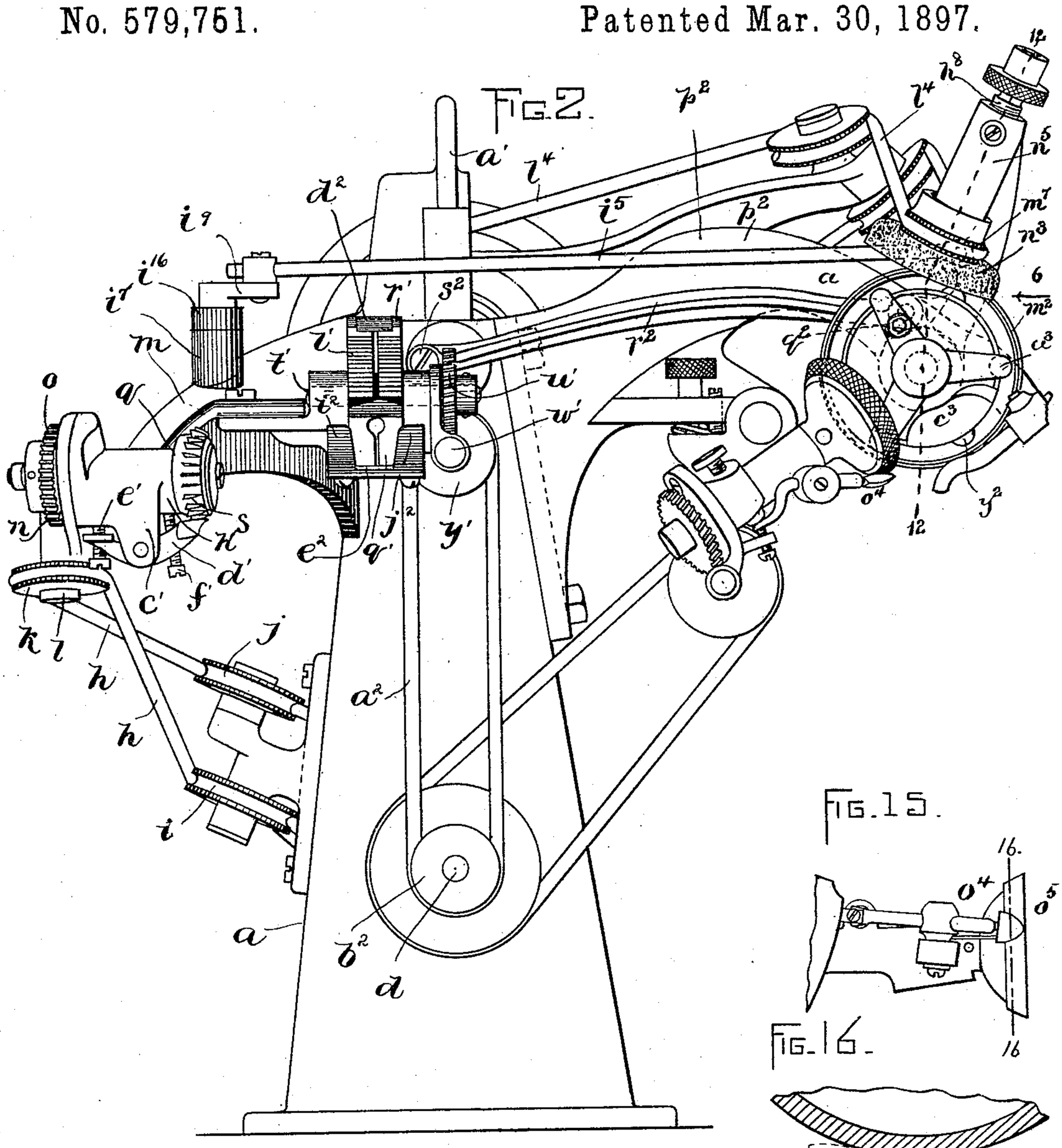
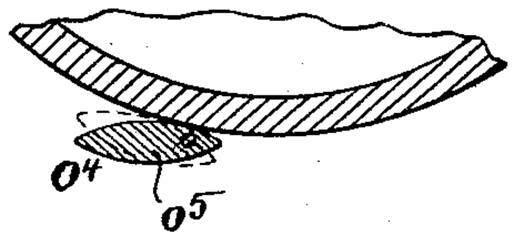



FIG. 15.



FIG. 16.



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(No Model.) 4 Sheets—Sheet 3.

# E. S. HARRIS.

## INSEAM TRIMMING MACHINE.

No. 579,751. Patented Mar. 30, 1897.

FIG. 3.

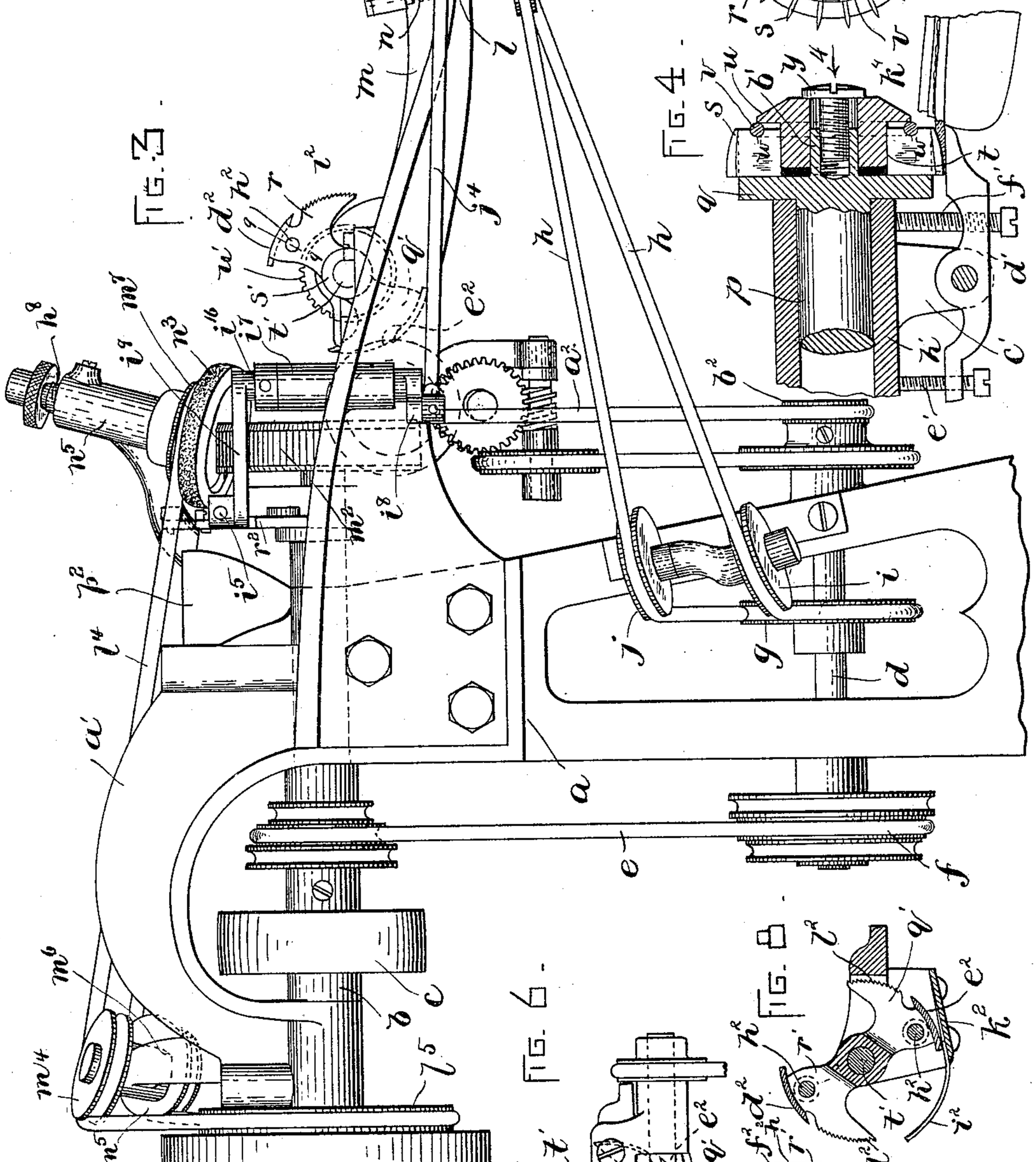

FIG. 5.

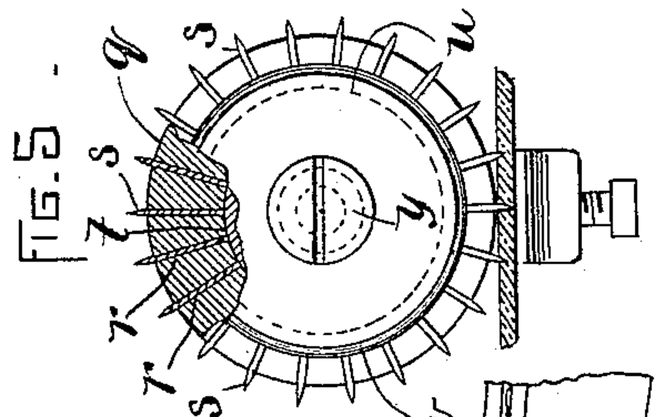

FIG. 4.



FIG. 6.



FIG. 7.



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(No Model.)

4 Sheets—Sheet 4.

# E. S. HARRIS.

## INSEAM TRIMMING MACHINE.

No. 579,751. Patented Mar. 30, 1897.

FIG. 13.

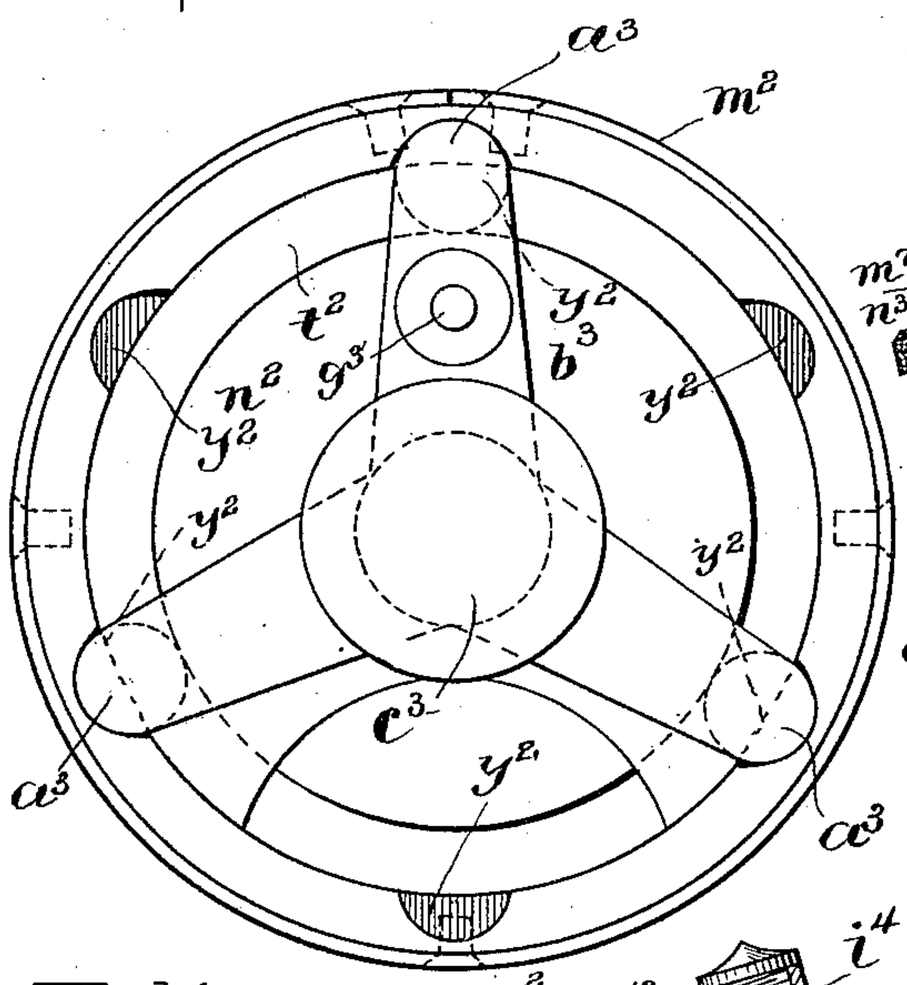



FIG. 11.

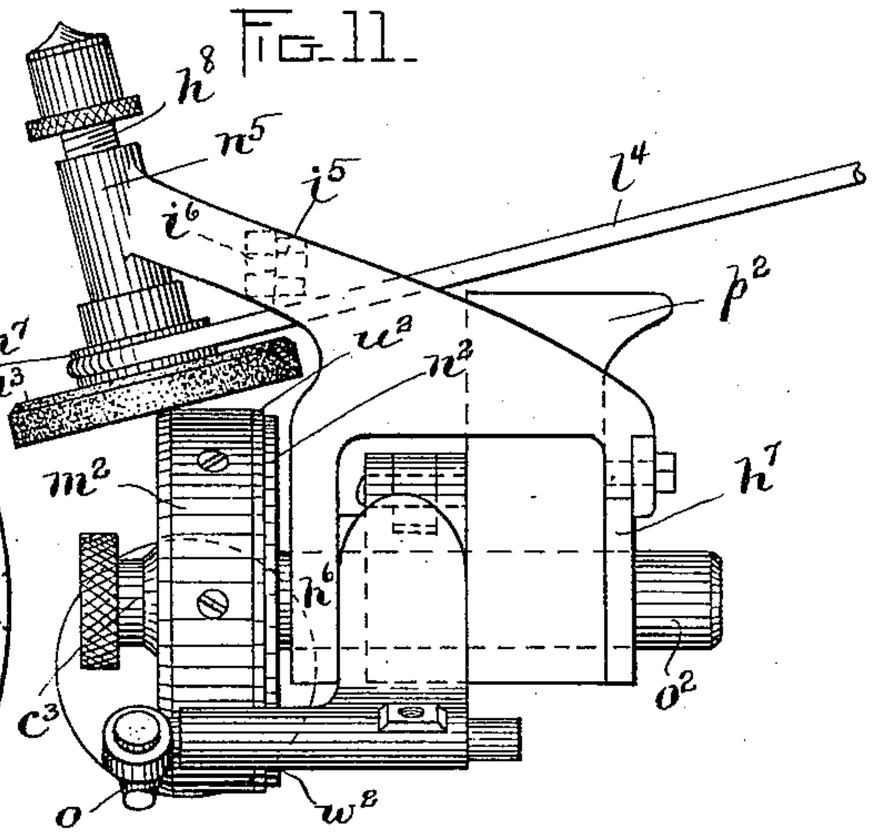



FIG. 14.

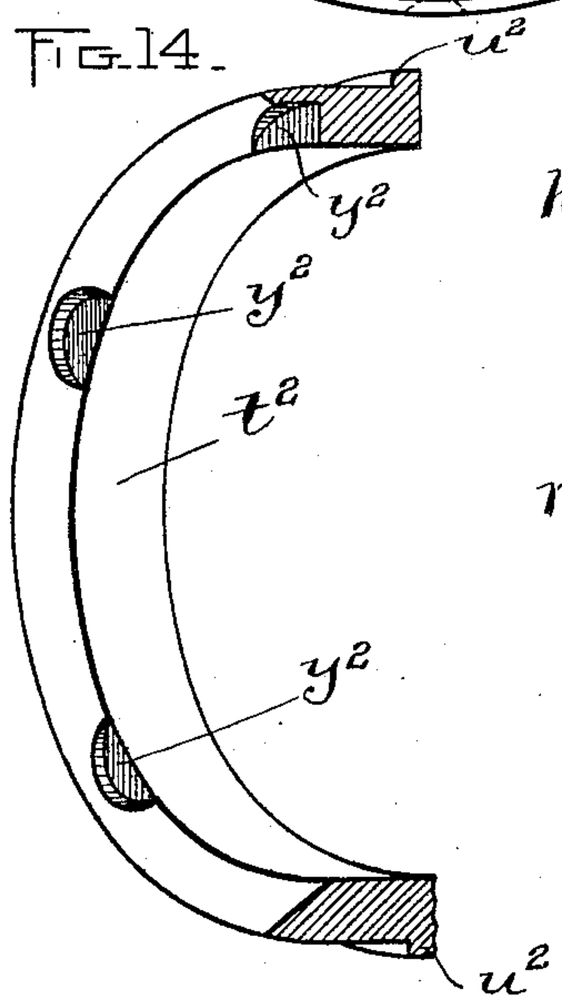



FIG. 12.

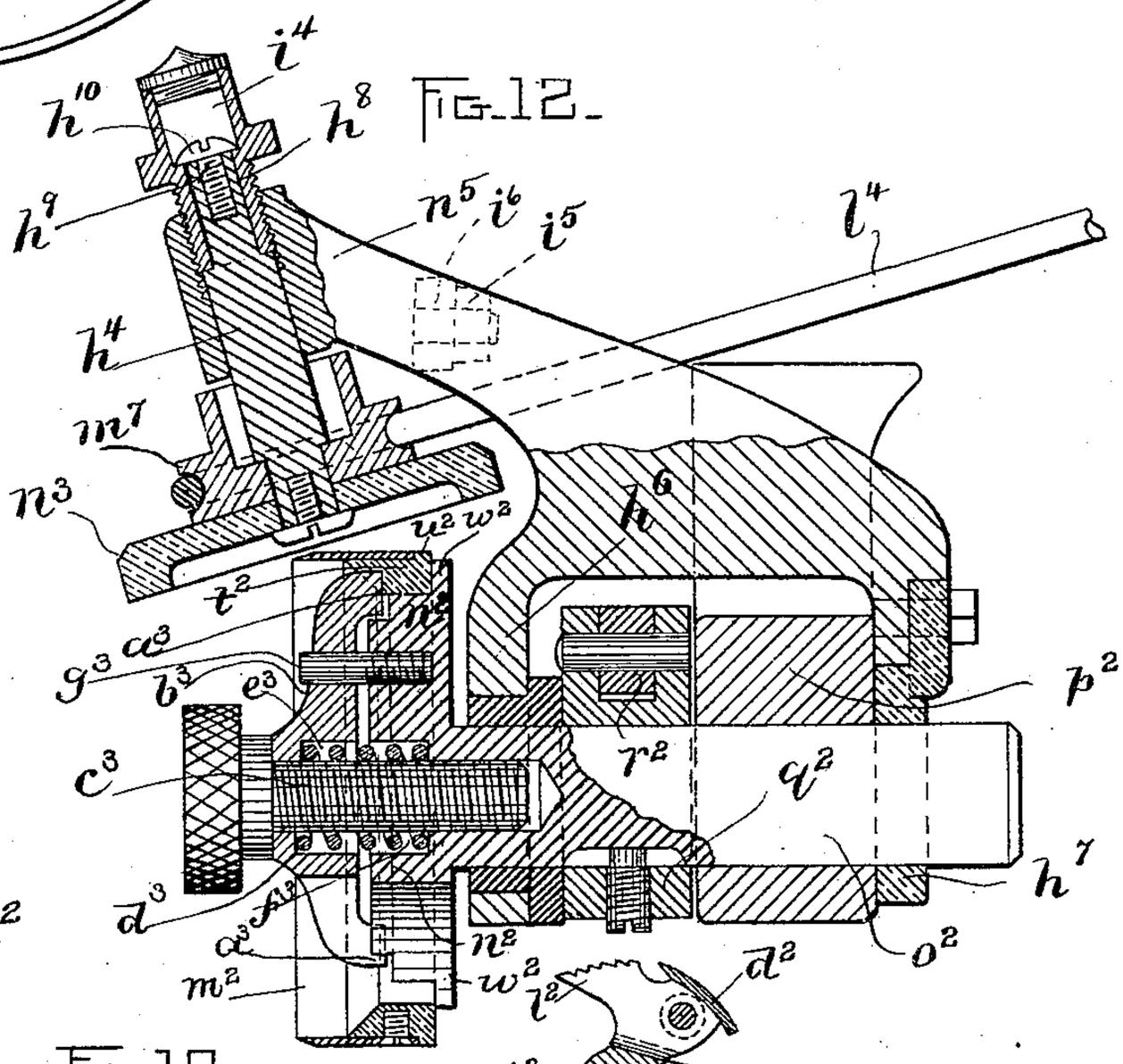
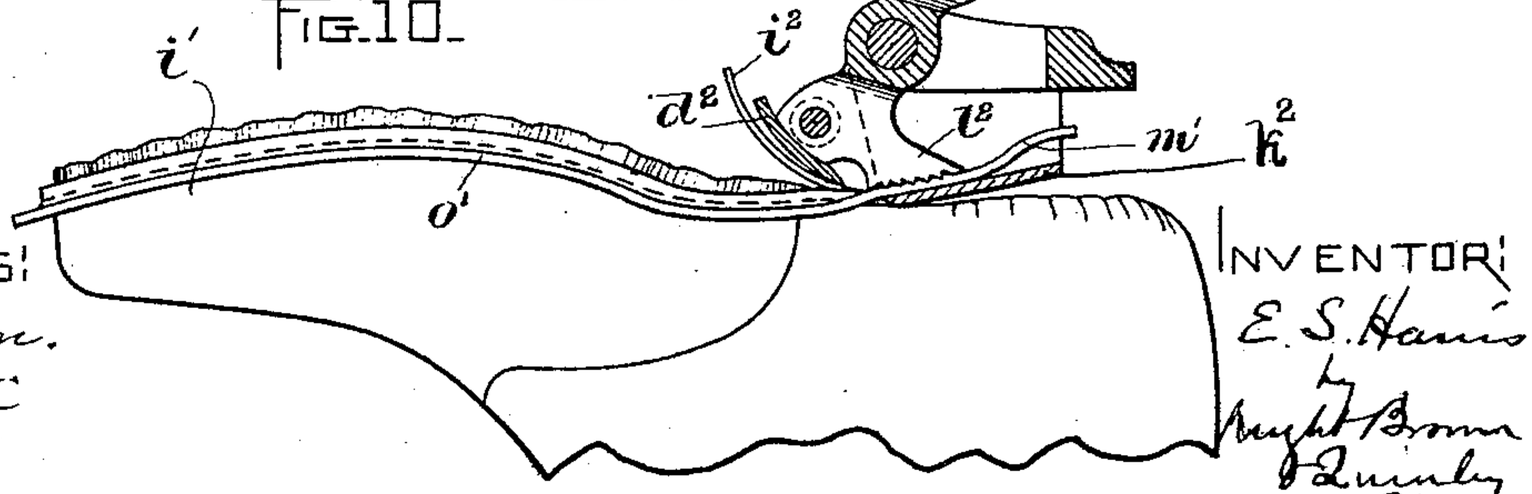



FIG. 10.

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# UNITED STATES PATENT OFFICE.

ELMER S. HARRIS, OF HAVERHILL, MASSACHUSETTS, ASSIGNOR TO THE GOODYEAR SHOE MACHINERY COMPANY, OF PORTLAND, MAINE.

## INSEAM-TRIMMING MACHINE.

SPECIFICATION forming part of Letters Patent No. 579,751, dated March 30, 1897.

Application filed May 22, 1896. Serial No. 592,527. (No model.)

*To all whom it may concern:*

Be it known that I, ELMER S. HARRIS, of Haverhill, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Inseam-Trimming Machines, of which the following is a specification.

This invention relates to that class of machines used for trimming off the surplus material of the welt, upper, and inner sole of a welted boot or shoe at the seam which unites said parts; and it has for its object to provide a machine which shall combine means, first, for slitting or gashing the welt at the toe portion of the shoe; secondly, means whereby the loose ends of the welt may be removed, and, finally, means for trimming off the surplus material of the welt, upper, and inner sole, as above mentioned.

The invention also has for its object to provide an improved trimming-knife and means for securing and adjusting the same, also improved arrangements of the knife-sharpening mechanism.

The invention also consists in novel arrangements for operating the several parts in combination, as I will now proceed to describe and claim.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a top plan view of a machine embodying my invention and the manner of presenting the work thereto. Fig. 2 represents an elevation of the machine looking in the direction of the arrow 2, Fig. 1. Fig. 3 represents an elevation looking in the direction of the arrow 3, Fig. 1. Fig. 4 represents a section on line 4 4, Fig. 1. Fig. 5 represents an end elevation of Fig. 4, looking in the direction of arrow 4. Fig. 6 represents a side elevation looking in the direction of arrow 5, Fig. 1. Fig. 7 represents a perspective view of the welt-cutter hereinafter explained. Fig. 8 represents a section on line 8 8, Fig. 1. Fig. 9 represents a section on line 9 9, Fig. 3. Fig. 10 represents a section similar to Fig. 8, hereinafter explained. Fig. 11 represents an elevation looking in the direction of the arrow 6, Fig. 2. Fig. 12 represents a section, on an enlarged scale, on the line 12 12, Fig. 2. Figs. 13, 14, 15, and 16 represent detail views of parts hereinafter explained.

The same letters of reference indicate the same parts in all the figures.

In carrying out my invention I provide a support *a*, having an arm *a'*, the outer end of which is provided with a bearing in which is journaled the outer end of a shaft *b*. The inner end of said shaft is journaled in a suitable bearing upon the top of the support *a*. The shaft *b* has a suitable pulley *c* attached thereto adapted to be connected by a belt to any suitable motor. The shaft *b* constitutes the driving-shaft of the machine and is connected with a counter-shaft *d* by a belt *e*. Said counter-shaft is journaled in suitable bearings upon the support *a* and is provided with a pulley *f* upon its outer end, with which the belt *e* engages. To the counter-shaft is attached a pulley *g*, over which passes a belt or band *h*, which belt passes over idle-pulleys *i j*, journaled in bearings attached to the support *a*. The belt engages and imparts rotation to a wheel *k* upon a shaft *l*, journaled in bearings upon the outer end of an arm *m*, the inner end of which is secured to the upper end of the support *a*.

To the shaft *l* is attached a worm *n*, meshing with a worm-wheel *o* upon a shaft *p*, which shaft is suitably journaled in bearings upon the arm *m*, as shown in Figs. 1, 3, and 4. To the outer end of the shaft *p* is attached a head *q*, provided with radial slots *r r r*, Fig. 5, adapted to receive thin strips of steel *s*, having a cutting edge at their outer ends, their inner ends resting upon a hub *t*, having a flange *u*, which flange engages an annular wire retaining-ring *v*, which engages semicircular recesses *w* in the outer edges of the cutters, so that when the flanged hub is pressed inwardly by the screw *y*, which engages a projection *b'*, upon which the hub is centrally held, the flange is engaged with the ring *v* and through the latter holds the knives securely in position, as shown in Figs. 4 and 5.

To the under side of the bearing of the shaft *p* are attached lugs *c'*, to which is adjustably pivoted a rest or support *d'*, (see Figs. 2 and 4,) the outer end of which is adapted to support the toe portion of the welt of a boot or shoe

when the latter is presented to the cutters, which are adapted in rotating to form an incision in the welt, which prevents the latter from wrinkling when the outer sole is stitched thereto. The rest or support $d'$ also serves as a guide for the shoe while being operated upon and is adjustable for welts of varying thickness by screws $e'$ $f'$, the upper ends of which engage the under side of the bearing $h'$ of the shaft.

Referring to Fig. 4, it will be observed that the supporting-face of the rest $d'$ is not parallel with the line of the cutting edges of the steel strips $s$, but is at an acute angle thereto. The result of this arrangement is that the incisions formed by the cutters are of gradually-decreasing depth toward the shoe, this being a form of cut that is desirable in order to produce the best results when the outer sole is stitched to the welt.

Heretofore, so far as I am aware, the forming of the incisions in the toe portion of the welt has been performed by hand, which is necessarily a slow operation compared with the above-described means, by which I am enabled to save much time in the production of a large quantity of goods.

The manner of presenting the boot or shoe to the cutter is represented in Fig. 1, in which a plan view of the bottom of the shoe $i'$ is shown, the toe portion $j'$ of which is being treated to receive the incisions $k'$, heretofore described. The operation carries the heel portion in the direction of the arrow $l'$ marked thereon, and when the welt has received the required number of incisions the shoe is in position to be presented to the welt-cutter for the removal of the projecting ends $m'$ $n'$ of the welt $o'$, which I will next describe.

In Fig. 7 I have shown a perspective view of a cutter $p'$, composed of two segmental radial portions $q'$ $r'$, having a central hub $s'$, adapted to be secured to a shaft $t'$, journaled in bearings secured to the arm $m$. Said shaft is provided at one end with a worm-wheel $u'$, which meshes with a worm $v'$ on a shaft $w'$, journaled in bearings suitably secured to the bearings of the cutter-shaft (see Figs. 1 and 6) and having upon its outer end a pulley $y'$, driven by a belt $a^2$, which is engaged with a pulley $b^2$ upon the inner end of the counter-shaft $d$, by which means suitable rotation is communicated to the cutter $p'$. The cutter-head $p'$ is provided with cutting-blades $d^2$ $e^2$, secured in dovetailed slots $f^2$ $g^2$ in the periphery of the segmental portions, and are held adjustably in position by screws $h^2$ passing through the cutter-head at right angles to the direction of their length and gripping the knives firmly in place, the segmental portions being slotted to permit their sides to be drawn together with sufficient force to hold the knives when the screws are tightened and to spring apart to allow the ready removal or adjustment of the knives when the screws are loosened, all of which will be readily understood by reference to Figs. 7, 8, and 9.

The cutter is provided with suitable guards $i^2$ $j^2$, which project outwardly in front thereof, as shown in Figs. 1, 2, 6, 8, and 10. Said guards also serve as guides in presenting the projecting end of the welt to the cutters. In Fig. 10 I have shown one of the cutters in operation upon the projecting end of a welt, in which a bed-plate $k^2$ is provided at the under side of the cutter and secured to the cutter-support, which bed-plate is arranged with only sufficient clearance between the upper surface thereof and the edge of the knives to allow the latter to pass. The curve of the bed is of substantially the same radius as the path of the edge of the cutting-knives, so that when either of the projecting ends $m'$ of the welt $o'$ is presented it is drawn in between the bed-plate and the corrugated or notched peripheries $l^2$ of the segmental portions until the stitched portion of the welt where the latter is joined to the shoe engages the edge of the bed-plate, whereupon the shoe is held stationary, and the edge of the knife engages the welt and takes a skiving cut on the welt, as shown in the above-mentioned figures.

The operation just described has heretofore been performed by hand, and by my device I am enabled not only to accelerate the operation, but I accomplish a more uniform cut, which is an advantage in placing the heel-seat in position.

In United States Letters Patent No. 556,146, granted to me March 10, 1896, I have shown a trimming-machine in which two alternately-operative oscillating trimming-knives are employed and a grinding device arranged to act upon the knife which is not in operation, thus preparing it for its next period of operation. In my present improvement I provide a circular oscillatory trimming-knife in combination with an oscillating grinding device, said grinding device adapted to operate upon one part of the trimming-knife while another part is employed, which I will next describe.

The trimming-knife $m^2$ is adjustably mounted upon a holder $n^2$, said holder being formed upon one end of a rock-shaft $o^2$, journaled in bearings on the outer end of an arm $p^2$, the inner end of which is secured to the supporting-frame $a$. The rock-shaft is provided with a short arm $q^2$, adjustably secured to the shaft $o^2$, said arm being connected by a rod $r^2$ with a crank $s^2$ on the driving-shaft $b$, so that the rotation of said shaft imparts a rocking or oscillating motion to the knife-supporting shaft $o^2$.

The knife $m^2$ is preferably formed of a single piece of metal and is secured by screws to a ring $t^2$, said ring having a flange $u^2$ upon one side thereof, against which the rear edge of the knife $m^2$ is adapted to bear. The ring is placed upon the holder $n^2$, which has a flange $w^2$, against which the ring $t^2$ is adapted to bear. The ring is provided with recesses or depressions $y^2$ upon its front surface, with which are adapted to engage the feet $a^3$ of a three-legged spider $b^3$, detachably secured to

the head by a screw $c^3$, the head of which bears against the outer surface of the central portion of the spider. A spring $d^3$, situated in a chamber $e^3 f^3$, formed in the spider and holder, normally exerts pressure against the spider, so that when the screw is retracted the spider will be pressed away from the head until the feet of the spider are clear of the depressions $y^2$ in the ring $t^2$, so that the ring may be rotated around the holder $n^2$ until the depressions $y^2$ $y^2$ are adapted to be engaged by the feet of the spider, the arrangement being such that the knife may more readily present a sharpened portion of its cutting edge to the work. The spider is held from rotary movement by a pin $g^3$, which passes through one of its arms and is secured to the holder $n^2$, the spider being adapted to move longitudinally of the pin $g^3$, which will be understood by reference to Figs. 12, 13, and 14.

$n^3$ represents a grinding-wheel adapted to engage the cutting edge of the knife $m^2$. Said wheel is suitably secured to a shaft $h^4$ at the bottom end thereof, which shaft is journaled in a bearing formed upon an arm $n^5$, upon the lower end of which are formed standards $h^6$ $h^7$, which are pivotally attached to the cutter-shaft $o^2$. The upper portion of the grinder-shaft is reduced to fit a sleeve $h^8$, adjustably secured to the bearing of the shaft by screw-threaded connection. The grinder-shaft is held vertically by a screw $h^9$ in the upper end thereof, the head $h^{10}$ of which is of larger diameter than the reduced portion of the shaft, so that the under side of the screw-head rests upon a shoulder formed by the increased diameter of the counterbore $i^4$ in the upper portion of the sleeve $h^8$, so that when necessary to raise and lower the grinding-wheel the turning of the sleeve in its screw-threaded socket will accomplish the result, as clearly shown in Fig. 12.

The grinding-wheel is oscillated by means or a rod $i^5$, one end of which is connected to a lug $i^6$ on the grinder-supporting arm $n^5$ and the other end to an arm $i^9$ on a vertical rock-shaft $i^{16}$, supported in suitable bearings $i^7$ upon the arm $m$. To the lower end of said vertical rock-shaft is attached an arm $i^8$, projecting at substantially a right angle to the upper arm $i^9$. To the outer end of said arm is pivotally attached one end of a connecting-rod $j^4$, the other end being connected to the worm-wheel $o$, which drives the cutter $k^4$, the arrangement being such that oscillatory motion is imparted to the grinding-wheel by the means just described intermediate of the arm $n^5$ and the worm-wheel $o$. In order to attain a free oscillatory movement of the grinding-wheel, I have arranged the belt $l^4$, which drives said wheel, to pass over a pulley $l^5$ upon the outer end of the driving-shaft $b$, which belt passes over idle-pulleys $m^4$ $m^5$ upon an arm $m^6$, which pulleys are located in line with the grinding-wheel pulley $m^7$ and a sufficient distance therefrom to permit oscillation of the grinding-wheel without exerting undue strain upon the belt, which will be understood by reference to Figs. 1 and 3.

$o^4$ represents a rest which is secured to the machine in any suitable way and is arranged to bear upon the face of the inner sole at a point near the inseam to insure the proper position of the sole relatively to the knife and prevent the knife from cutting out the sole at the inner side of the seam. The portion of the rest which is in contact with the work is adapted by its peculiar shape to beat out the wrinkles which may occur in the welt and leave the latter in condition to be stitched to the outer sole, said rest being in substance a round-nosed tool $o^5$, having a thin edge and being wedge-shaped longitudinally, and in cross-section it is convex, as shown in Figs. 15 and 16. The arrangement of the feed-wheel is the same as that shown and described in my hereinbefore-mentioned patent and needs no description here.

I claim—

1. In an inseam-trimming machine, the combination of a feed-wheel, an oscillating trimming-knife, means for adjustably securing said knife to the holder, an oscillating grinding device arranged over the trimming-knife, and adapted to engage the trimming-knife, and means for imparting an oscillating and rotary motion to the grinding mechanism.

2. In an inseam-trimming machine, the combination of a cutter having radial knives adapted to form incisions or slits in the toe portion of the welt of a boot or shoe, mechanism for operating said cutter, and a rest or support for the welt, the face of said support being at an acute angle to the line of the cutting edges of said knives.

3. In an inseam-trimming machine, the combination of a rotary trimmer having projecting segmental portions, cutting-knives adjustably secured to said segmental portions, guides and guards in connection with a bed-plate whereby the projecting end of a welt is introduced to the path of the cutter, and mechanism substantially as described for operating said rotary trimmer.

4. The combination of a trimming-knife, a recessed ring to which the trimming-knife is secured, a spider having radial arms engaging a part of the depressions, means for securing the spider to the holder whereby the knife-holding ring may be rigidly secured to the holder, and means for releasing the spider to adjust the knife-holding ring upon the holder.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 16th day of April, A. D. 1896.

ELMER S. HARRIS.

Witnesses:
CHARLES H. POOR,
ALMA S. NICHEILL.