(No Model.)

4 Sheets—Sheet 1.

O. ASHTON.

WIRE THREADING MACHINE.

No. 603,394. Patented May 3, 1898.

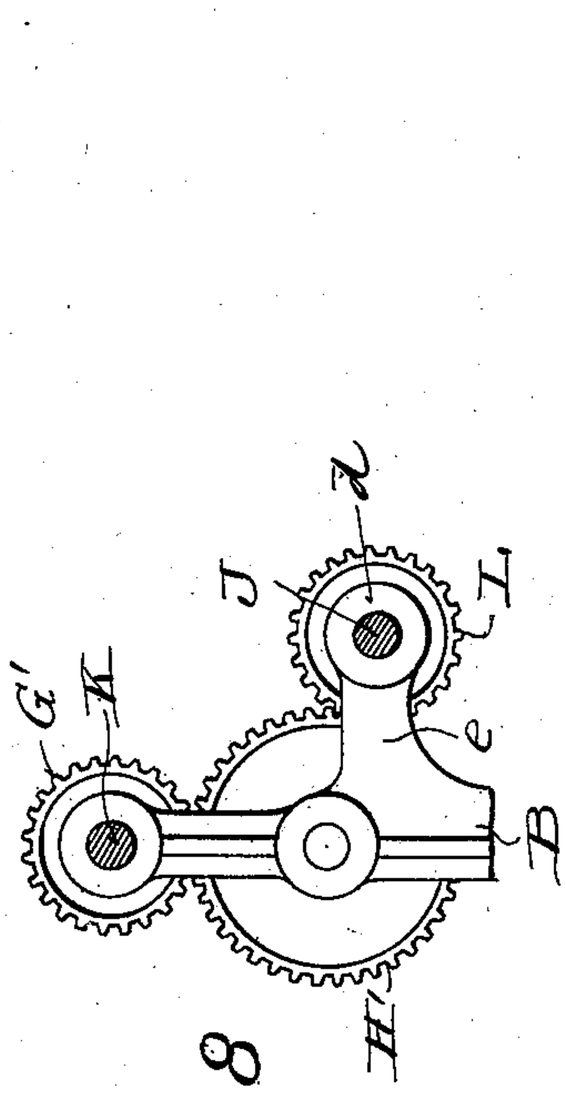

Fig. 8

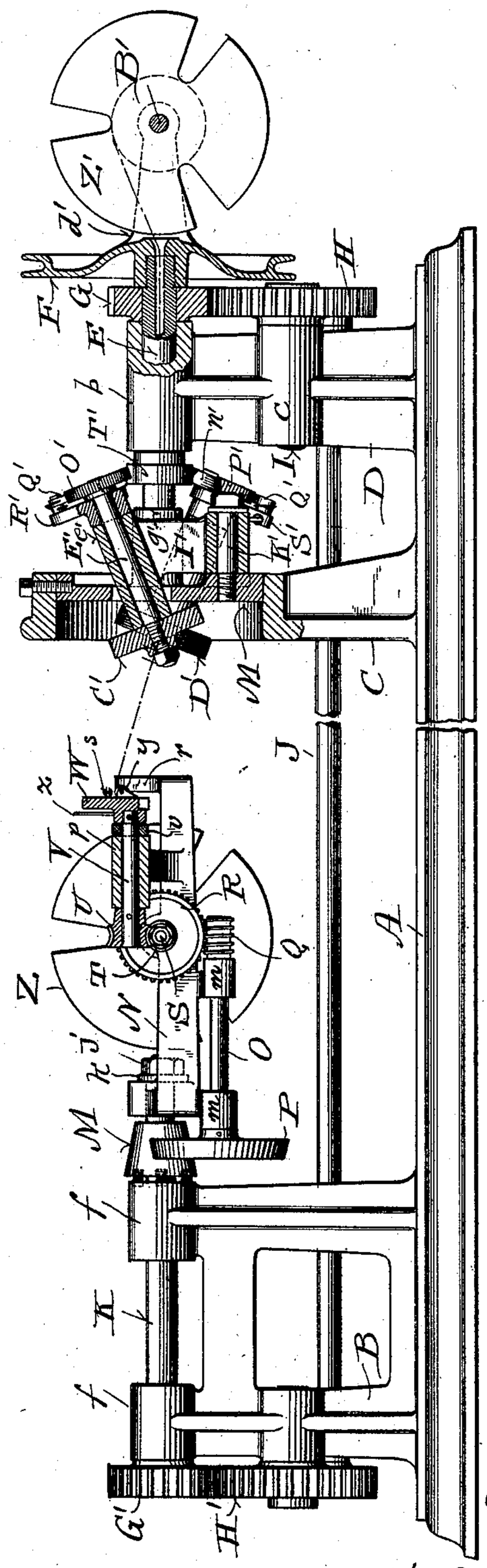

Fig. 1.

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Inventor:
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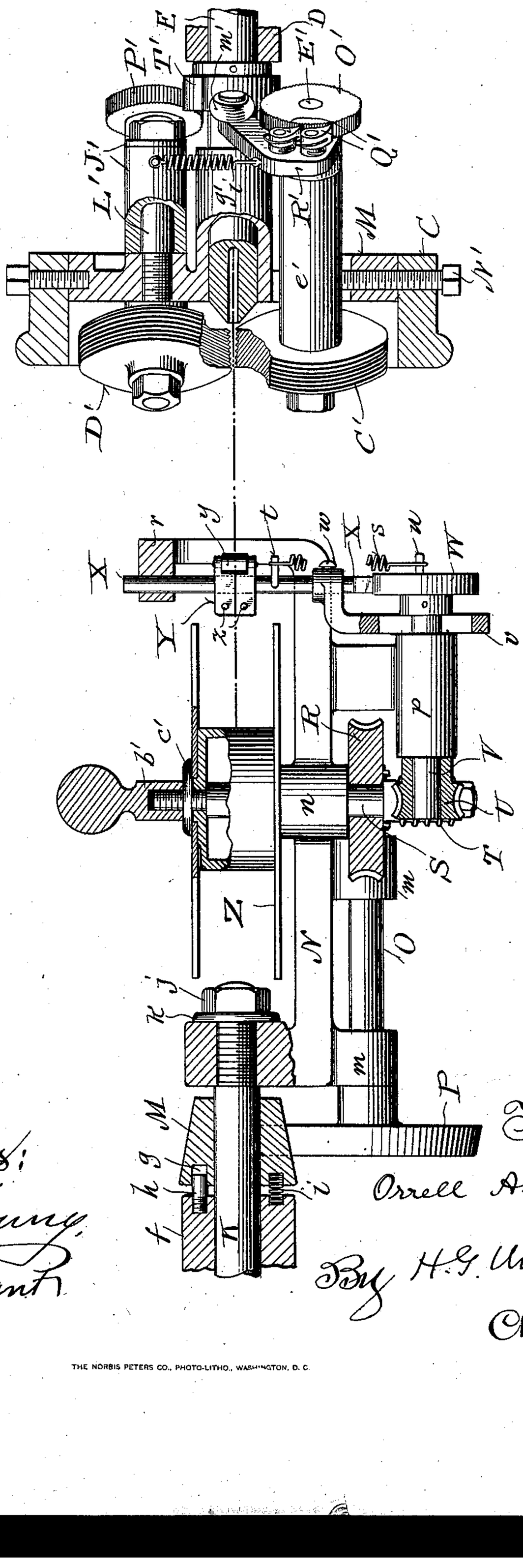
Fig. 2.



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4 Sheets—Sheet 3.

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WIRE THREADING MACHINE.

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Fig. 4.

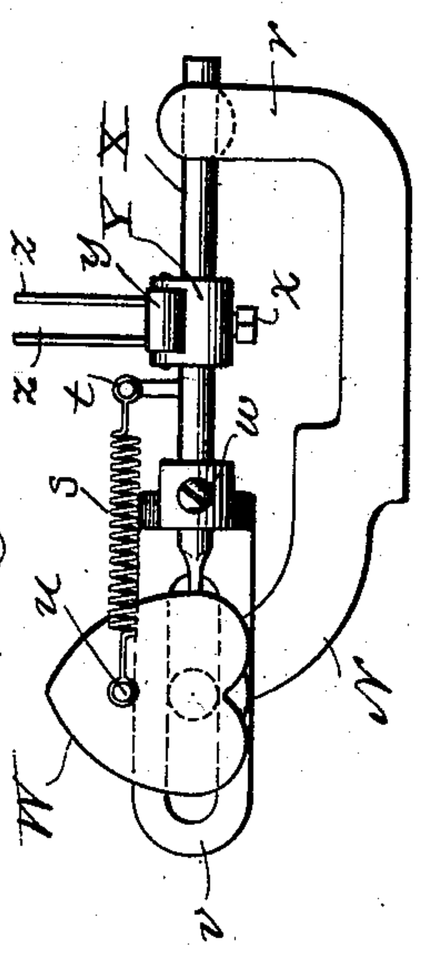


Fig. 5.

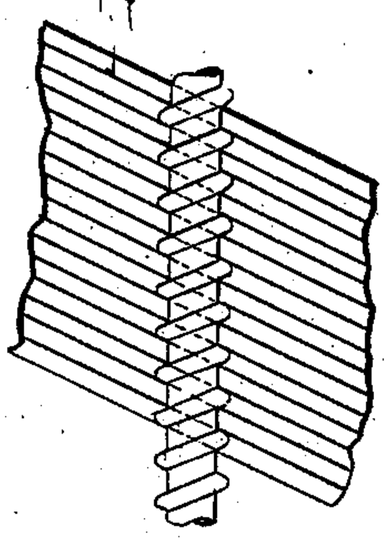


Fig. 6.

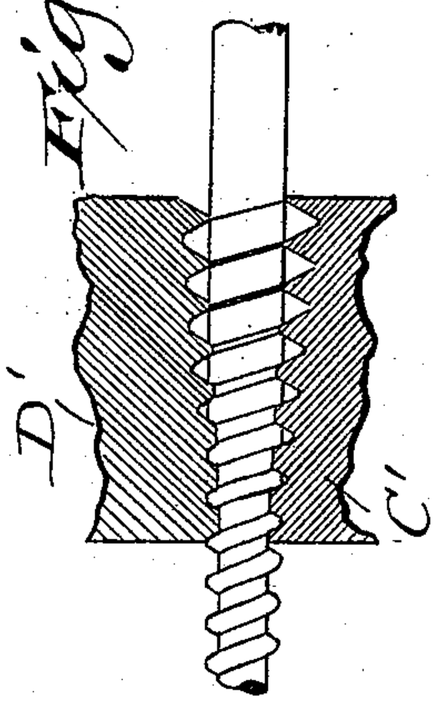


Fig. 7.

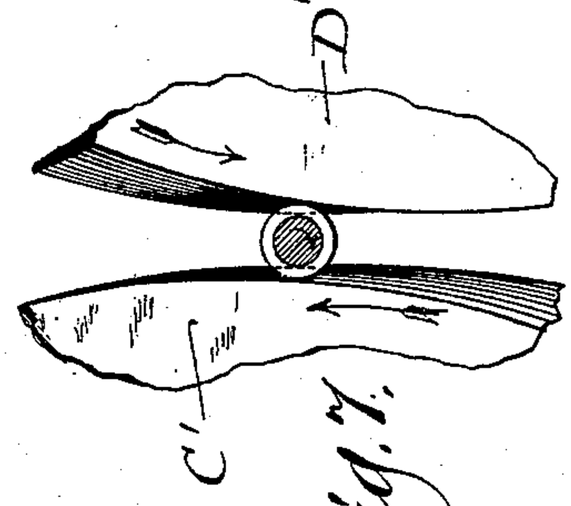
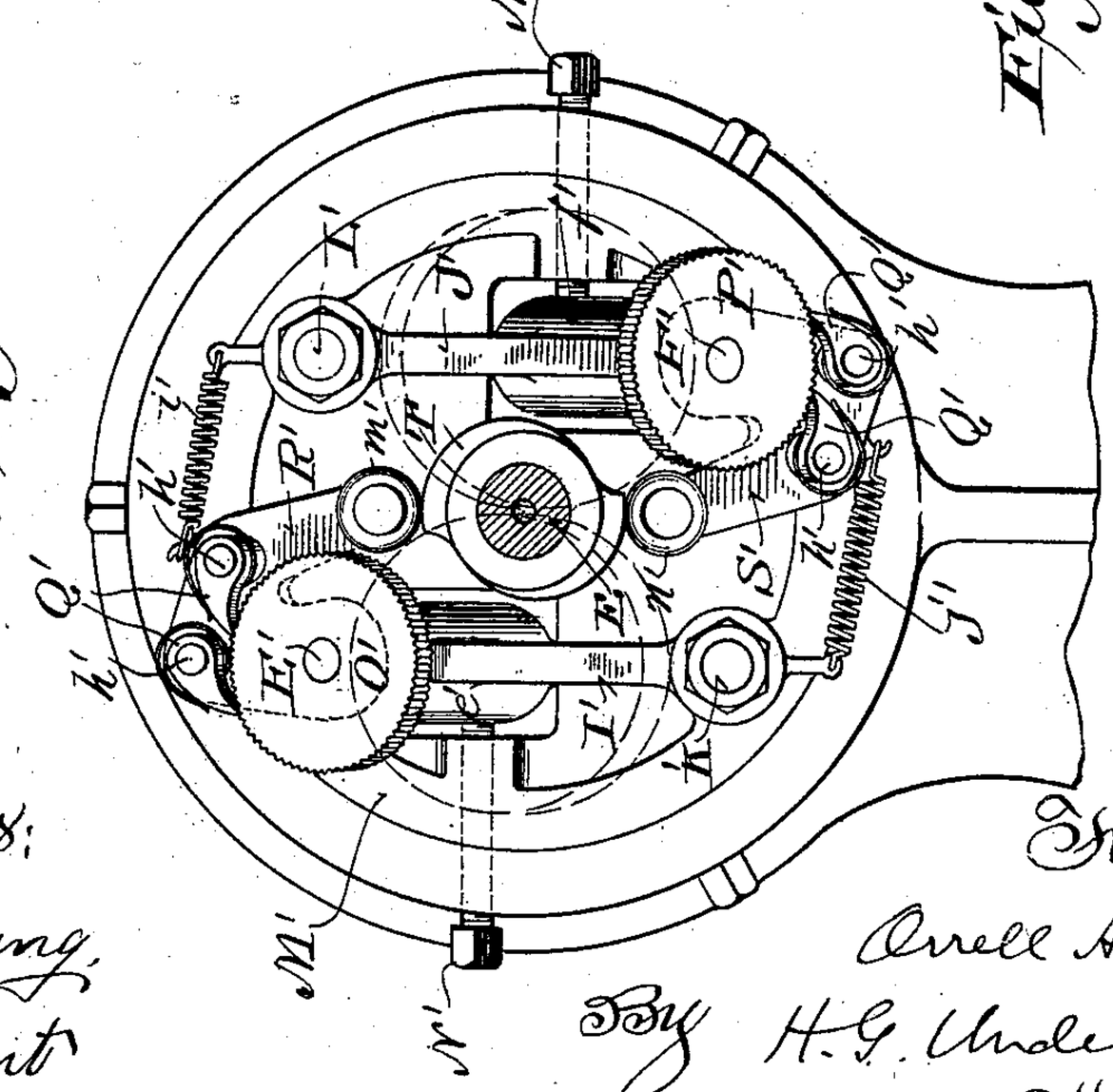


Fig. 3.



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4 Sheets—Sheet 4.

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Fig. 10.

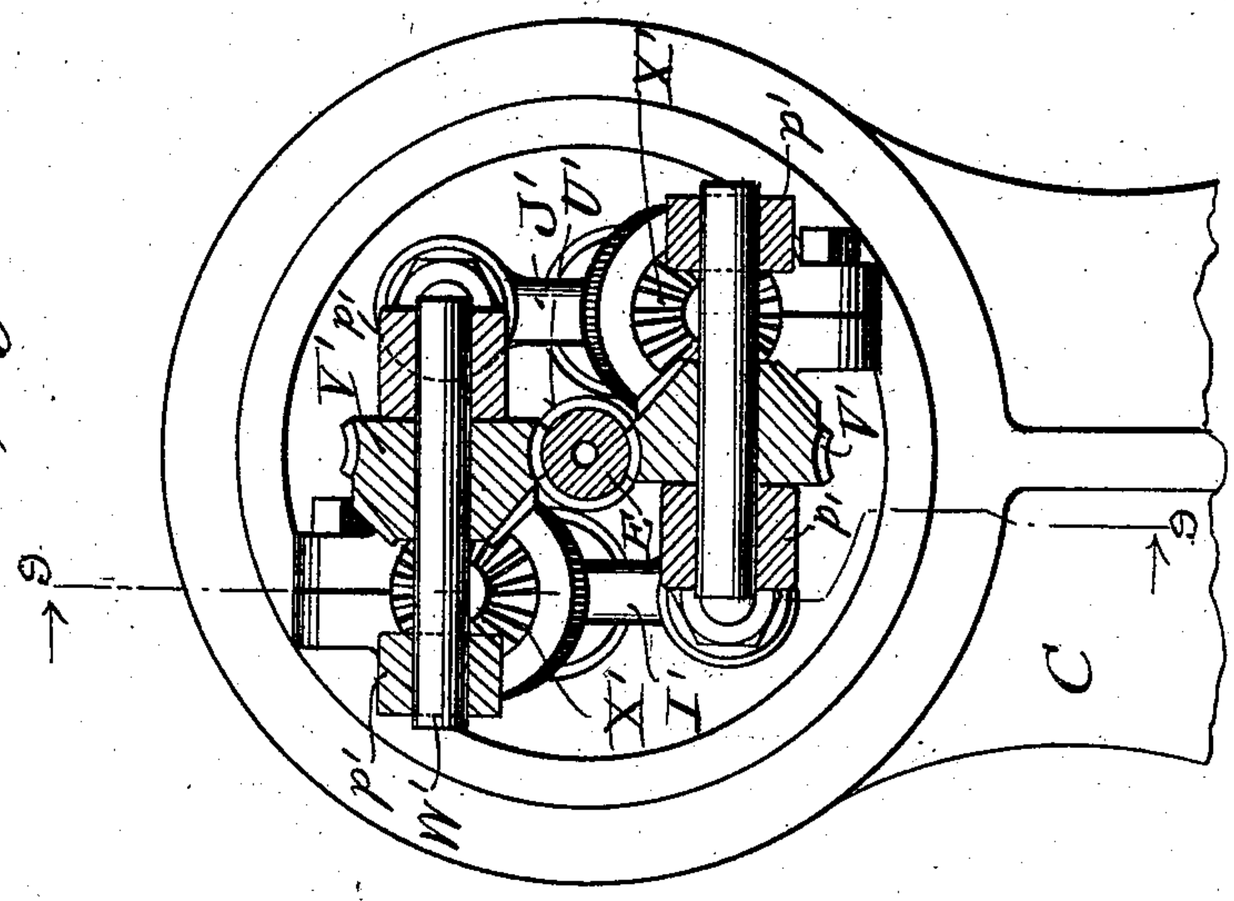


Fig. 11.

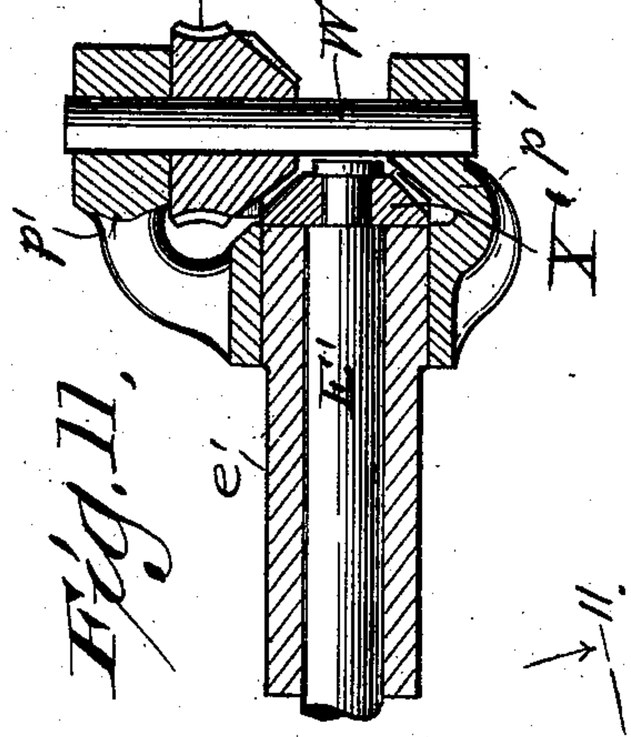
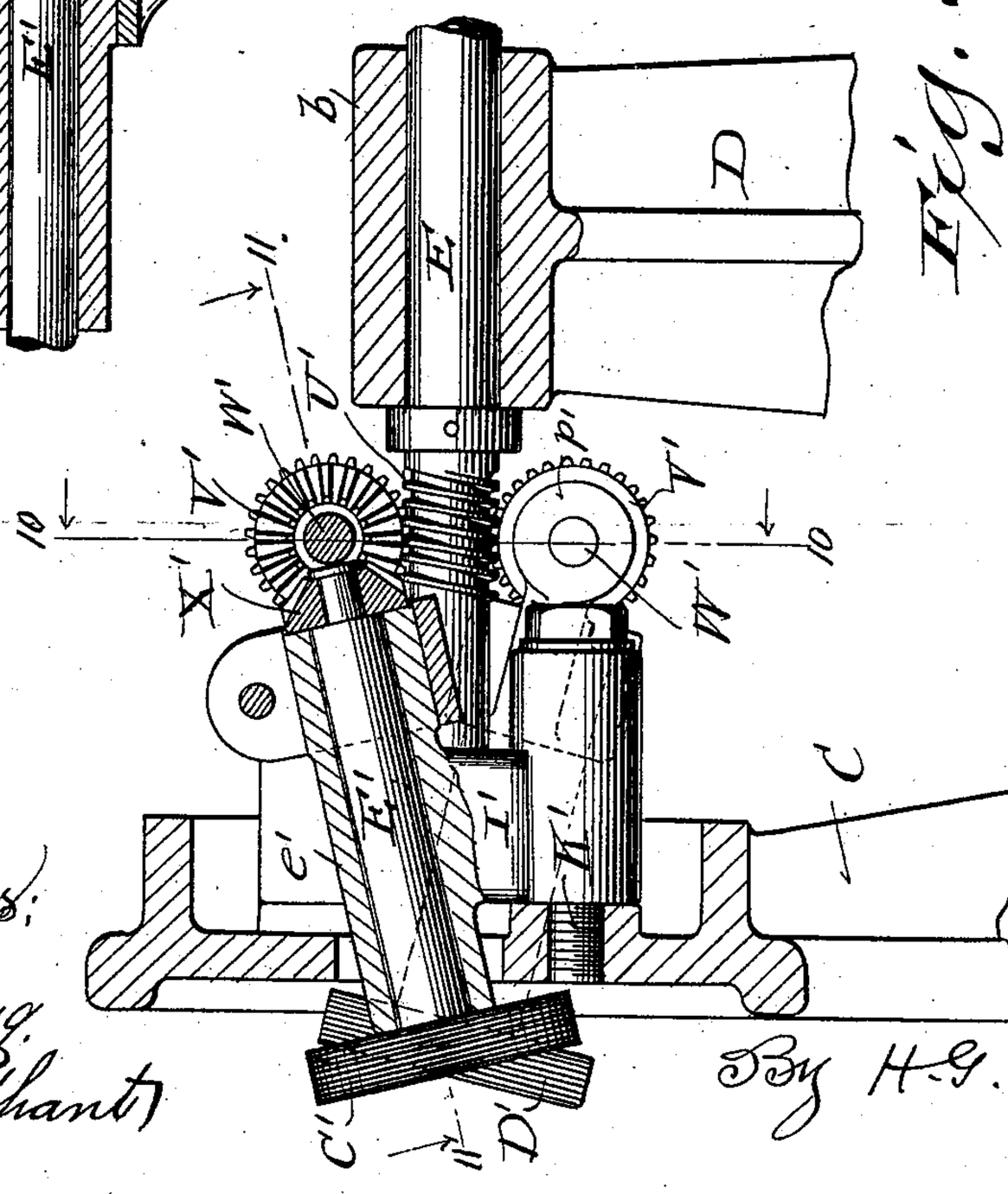


Fig. 9.



Witnesses:
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Attorneys

UNITED STATES PATENT OFFICE.

ORRELL ASHTON, OF MILWAUKEE, WISCONSIN.

WIRE-THREADING MACHINE.

SPECIFICATION forming part of Letters Patent No. 603,394, dated May 3, 1898.

Application filed September 24, 1897. Serial No. 652,800. (No model.)

To all whom it may concern:

Be it known that I, ORRELL ASHTON, a citizen of the United States, and a resident of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Wire-Threading Machines; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention has for its object to simplify and cheapen that class of machines employed for spirally threading wire utilized in the manufacture of boots and shoes, as well as to increase output and improve the product. Hence it consists in certain peculiarities of construction and combination of parts hereinafter set forth with reference to the accompanying drawings and subsequently claimed.

In the drawings, Figure 1 represents a side elevation of an organized machine, partly in section and embodying the several features of my improvements; Fig. 2, a plan view of the upper portion of the machine, partly in section; Fig. 3, a rear elevation of said machine, also partly in section; Fig. 4, a detail rear elevation of a wire-guide mechanism constituting one feature of my improvements; Fig. 5, a diagram illustrating the pitch of thread on finished wire produced by a pair of threading-rollers set at an angle to said wire and themselves, one of the rollers being indicated in the diagram; Figs. 6 and 7, diagrams illustrating the action of the threading-rollers on a strand of wire; Fig. 8, a detail elevation of gear mechanism employed in the machine to transmit rotary motion; Fig. 9, a detail elevation, partly in section, on line 9 9 of Fig. 10, illustrating a drive mechanism for the threading-rollers, this drive mechanism being a substitute for that shown in preceding figures; and Figs. 10 and 11, detail sectional views respectively indicated by lines 10 10 and 11 11 in Fig. 9.

Referring by letter to the drawings, A represents a base having standards B C D rising therefrom at suitable intervals. The standard D is provided at its upper end with a bearing *b* for a hollow spindle E, and, as shown in Fig. 1, the spindle may carry a pulley F for a drive-belt. As a matter of detail the spindle is shown as having a screw-threaded end engaging the counterbored and tapped hub of the driving-pulley, a central aperture of the hub being in register with the bore of the spindle.

A pinion G, fast on the spindle E, meshes with a spur-wheel H in rigid connection with a stud I, that turns in a bearing *c*, constituting part of standard D, and this spur-wheel drives a shaft J, that has its bearings *d* in arms *e*, that extend laterally from said standard and the one B at the other end of the machine-base, one of these arms being shown in Fig. 8. By means of gearing similar to that above specified rotary motion is communicated from shaft J to a spindle K, having its bearings *f* on the standard B, the spur-wheel H′ and pinion G′ of the latter gear-train being illustrated in Fig. 1, a pinion L, common in both gear-trains as the means for connecting the spur-wheels H H′ with said shaft, being shown in Fig. 8.

As best shown in Fig. 2, a conical sleeve M may be loosely arranged on the spindle K and provided with a recess *g* for the engagement of a pin *h*, extending from the adjacent bearing for said spindle, the depth of the recess being such as will permit longitudinal play of the sleeve incidental to expansion of a series of spiral springs *i*, engaging registering recesses in said sleeve and bearing under compression.

An angular frame N has one end thereof in screw-thread connection with that end of spindle K nearest the conical sleeve and is held in place by a set-nut *j*, run on said spindle against a washer *k*, said frame being provided with bearings *m* for a spindle O, that carries a beveled friction-pulley P in contact with said sleeve. A worm-pinion Q on the spindle O meshes with a worm-wheel R on an arbor S, that has its bearing *n* on frame N, and another worm-pinion T on the arbor meshes with a worm-wheel U on another arbor V, having its bearing in an arm *p* of said frame at a right angle to the arbor aforesaid. The arbor V carries a heart-cam W, that faces against a rod X, loose in an arm *r* of the frame N, and a spiral spring *s* connects a lug *t* on the rod with a lug *u* on the cam. A longitu-

dinally-slotted bracket *v*, engaged with arbor V to slide thereon, has adjustable connection with rod X by means of a set-screw *w*, and a wire-guide is also held on the rod by a set-screw *x*, intermediate of the bracket and guide-arm for the rod. The wire-guide is herein shown as a bracket Y, carrying an antifriction-roller *y* and provided with a pair of vertical pins *z*, forward of the roller.

A reel Z is carried by arbor S in front of the wire-guide, and, as shown in Fig. 2, this reel is preferably organized to have a removable side plate held in place by a set-nut *b'*, run on said arbor against a washer *c'*, intermediate of said plate and nut.

From the foregoing it will be understood that the spindles E K run at the same speed and that the reel Z has a planetary movement, the rotation of the supporting-frame for said reel being intermittent in proportion to the tension of the wire drawn from a supply-reel Z', the latter in the present organization of the machine being rotative on a rod B', supported in arms extending rearward from the driving-pulley F, one of these arms *d'* being shown in Fig. 1. Hence this supply-reel is also planetary in its movement, and the wire drawn therefrom through spindle E to the take-up reel is acted upon by threading-rollers hereinafter set forth.

Incidental to the rotation of the heart-cam W on its own axis the wire-guide is reciprocated to lay the finished wire evenly on the take-up reel, and the conical sleeve M is kept in frictional contact with the beveled friction-pulley P by expansion of the springs *i* above specified, this pulley slipping on said sleeve when said wire is taut.

The friction-gear may be varied from what is herein set forth without change of result, and the machine may be organized to have the power communicated to the spindles E K from the shaft J, provision being made in the latter case for rotation of the feed-reel with the former spindle as well as on its own axis.

There are two threading-rollers C' D' in detachable connection with stems E' F', rotative in bearings *e' f'*, constituting parts of brackets I' J', pivotally adjustable on studs K' L', extending rearward from a plate M', bolted in the apertured upper portion of standard C, the upper or bearing portions of the brackets being extended forward through openings in said plate, these openings being of such area as will permit the necessary adjustment of said rollers with respect to the gage of the wire to be threaded, and, as herein shown, said plate may have a rearwardly-extending hub *g'*, constituting a bearing for the former spindle. The brackets I' J' are clamped against the standards in adjusted position on their studs by set-nuts run on said studs, washers being interposed between said brackets and nuts, as shown in Figs. 1 and 2, while at the same time set-screws N', extended through the annular portion of standard C and the plate M', also operate to maintain the adjustment of the aforesaid brackets.

The bearings *e' f'* for the stems E' F' are of such a predetermined angle that the threading-rollers C' D' are crosswise of each other in the direction of the wire, and from the foregoing it will be seen that provision is made for parallel adjustment of said rollers, this being one of the most important features of my invention in order that the angle of said rollers to each other and their angle of contact with the wire may be always the same independent of their adjustment or the gage of said wire.

Rotary motion may be imparted to the roller-stems E' F' in various ways, two mechanisms for the same purpose being herein shown; but it is desirable in any organization of the machine to have the faces of the threading-rollers run in harmony with the spindles E K above specified. As shown in Figs. 1, 2, and 3, ratchet-wheels O' P' may be rigidly secured to the roller-stems E' F' for the engagement of spring-controlled pawls Q', loose on studs *h'*, extending from carriers R' S', loose on said stems intermediate of their bearings and said ratchet-wheels, these carriers being connected by spiral springs *i' j'* with the opposite brackets I' J' and provided with antifriction-rollers *m' n'* in opposition to a cam-wheel T', fast on spindle E above specified. Rotation of spindle E operating cam-wheel T' against the antifriction-rollers *m' n'* at high speed causes a vibratory movement of the spring-controlled carriers R' S', and thus the pawls Q' are caused to actuate the ratchet-wheels O' P', the slip and push of said pawls being so rapid that there is no appreciable slack in the rotation of the threading-rollers in connection with the stems carrying said ratchet-wheels.

As shown in Figs. 9 and 10, a worm U' may be substituted for the aforesaid cam-wheel T' on spindle E and arranged to mesh with the worm-teeth of combined worm and bevel-pinions V' on arbors W', mounted in arms *p'* of the brackets I' J' to mesh with other bevel-pinions X', substituted for the aforesaid ratchet-wheels O' P' on the threading-roller stems, it being readily understood that the rotary motion of said spindle is communicated to said stems by the worm and bevel-gearing specifically set forth.

The rollers C' D' are substantially similar to those employed in other machines of the class to which my invention relates, being faced to present alternate parallel annular ridges and depressions of variable width for the purpose of burring up a thread and maintaining the pitch of the same on wire drawn from the supply-reel to the take-up reel. However, owing to the provision for parallel adjustment of the threading-rollers the latter do not have to have their faces beveled,

as is the case where the adjustment is otherwise than that specified, and hence said rollers are easier to manufacture and more accurate in their operation.

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

1. In a wire-threading machine, threading-rollers, each adjustable toward and from the wire, and each having its axis after adjustment parallel with the position it occupied previous to adjustment, and means for positively driving said rollers.

2. In a wire-threading machine, positively-driven threading-rollers, and adjustable mechanism for constantly maintaining each of the rollers at the same angle of contact with the wire.

3. In a wire-threading machine, threading-rollers, brackets for said rollers, and pivots for said brackets which are substantially parallel to the line of feed of the wire.

4. In a wire-threading machine, a fixed apertured support, pivot-studs extending from said support in lines substantially parallel to the line of feed of the wire, wire-threading rollers, and brackets for said rollers fulcrumed on said pivot-studs.

5. In a wire-threading machine, a fixed support, pivot-studs extending from said support in lines substantially parallel to the line of feed of the wire, wire-threading rollers, brackets for said rollers fulcrumed on said pivot-studs, and means for adjusting said brackets with relation to the wire.

6. In a wire-threading machine, a support, having pivot-studs arranged substantially parallel to the line of feed of the wire, brackets fulcrumed on said pivot-studs, and having inclined bearings, shafts in said bearings, wire-threading rollers on said shafts and mechanism for imparting rotary motion to said shafts.

7. In a wire-threading machine, a rotary spindle, rotary wire-threading rollers arranged obliquely to the wire, adjustable mechanism for maintaining said rollers at the same angle of contact with the wire irrespective of their movement toward and from the same, and mechanism for transmitting movement from said spindle to said rollers.

8. In a wire-threading machine, a rotary spindle, rotary wire-threading rollers arranged obliquely to the wire, adjustable mechanism for maintaining said rollers at the same angle of contact with the wire irrespective of their movement toward and from the same, mechanism for transmitting an intermittent movement from said spindle to said rollers.

9. In a wire-threading machine, a rotary spindle, wire-threading rollers, and mechanism actuated by the spindle for imparting a step-by-step movement to said rollers.

10. In a wire-threading machine, a rotary spindle, wire-threading rollers and mechanism including pawls and ratchets for transmitting a step-by-step motion from the spindle to the rollers.

In testimony that I claim the foregoing I have hereunto set my hand, at Milwaukee, in the county of Milwaukeee and State of Wisconsin, in the presence of two witnesses.

ORRELL ASHTON.

Witnesses:
H. G. UNDERWOOD,
B. C. ROLOFF.