(No Model.) 3 Sheets—Sheet 1.

L. GODDU.

MACHINE FOR MAKING SHOE SOLE WIRE.

No. 360,428. Patented Apr. 5, 1887.

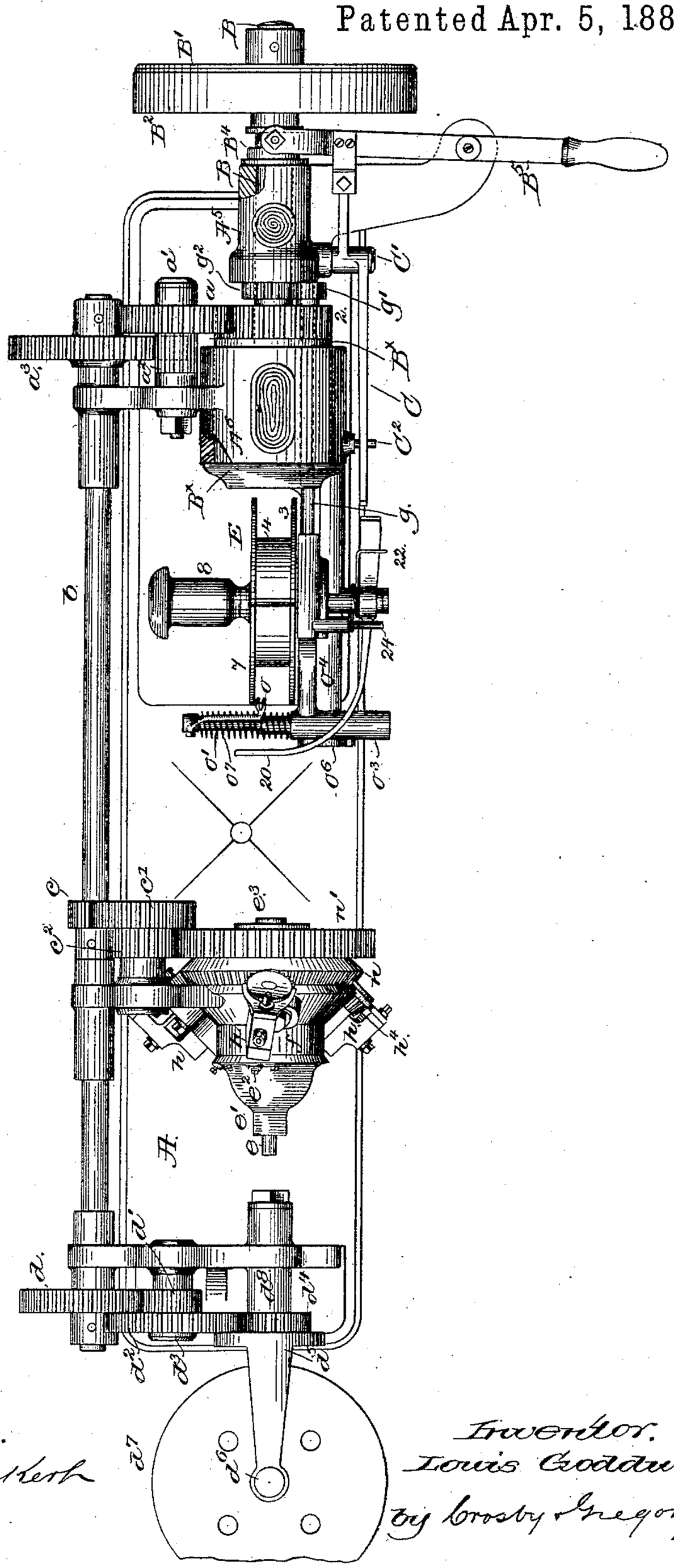

Fig. 1.

Witnesses.
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W. H. Sylston.

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(No Model.) 3 Sheets—Sheet 2.

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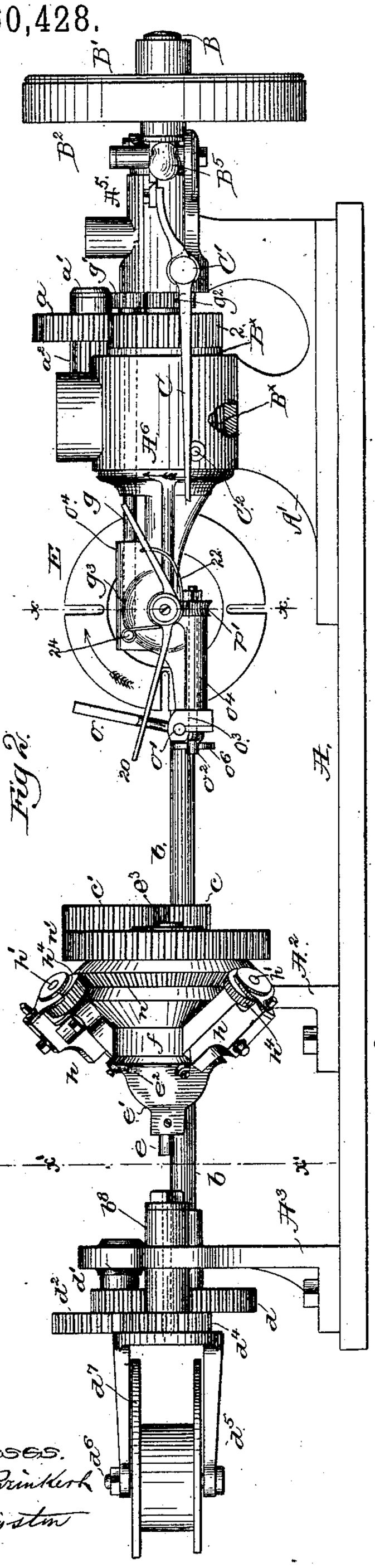

Fig. 2.

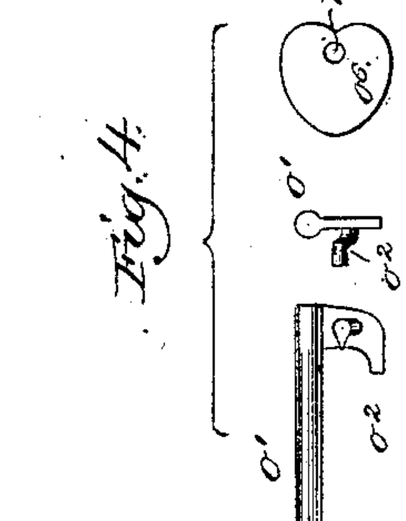

Fig. 4.

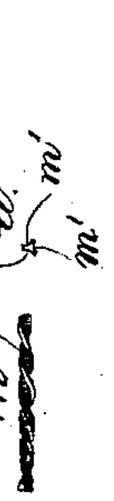

Fig. 5.

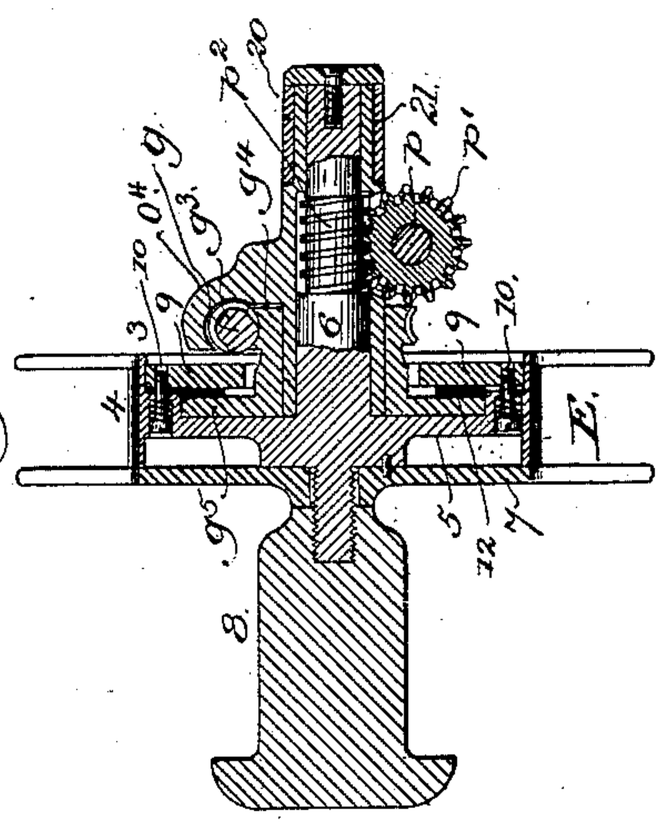

Fig. 3.

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(No Model.) 3 Sheets—Sheet 3.

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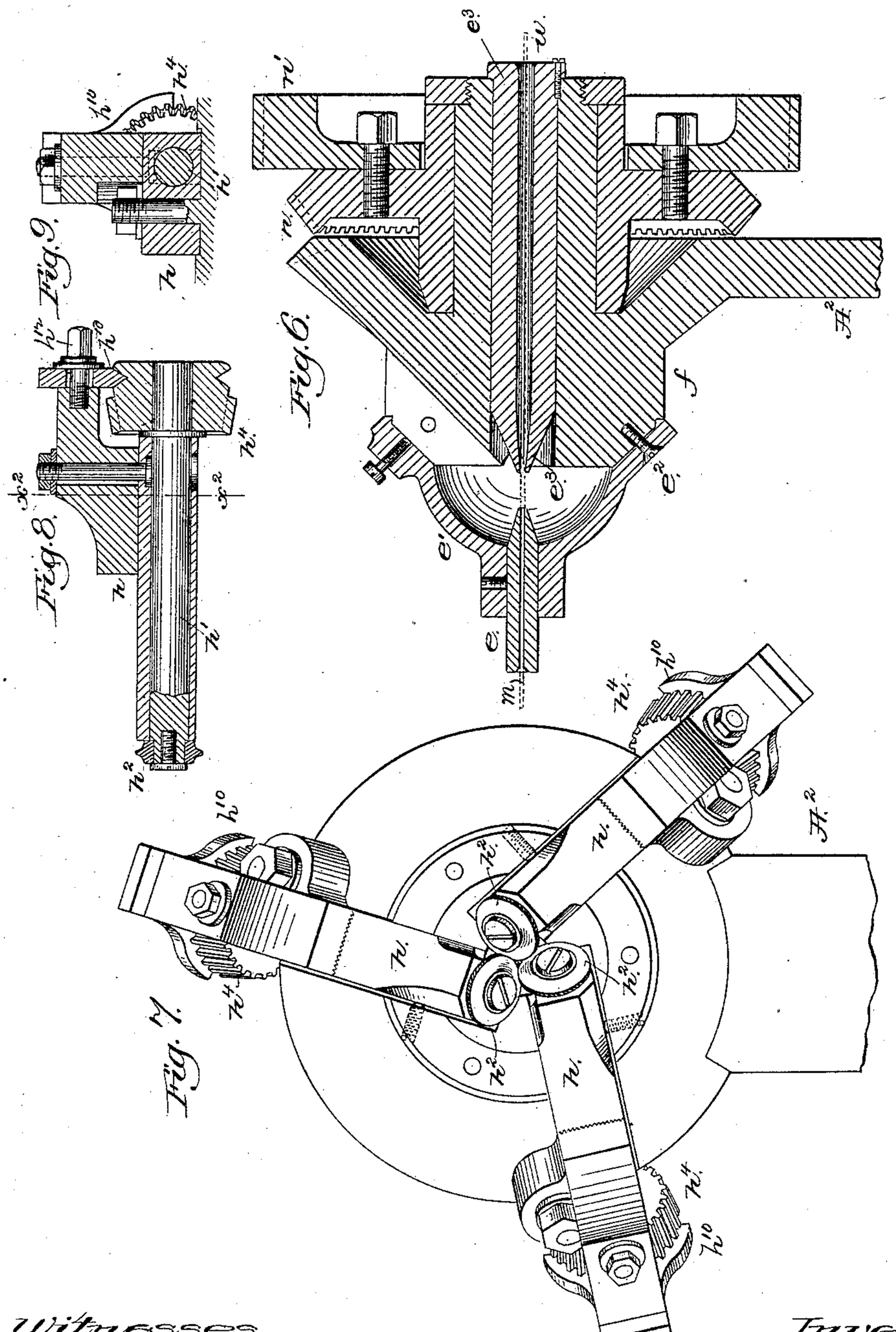

Witnesses.
John F. C. Printkert
W. A. Sylvester

Inventor.
Louis Goddu.
by Crosby & Gregory Atty's.

UNITED STATES PATENT OFFICE.

LOUIS GODDU, OF WINCHESTER,-ASSIGNOR TO JAMES W. BROOKS, TRUSTEE, OF CAMBRIDGE, MASSACHUSETTS.

MACHINE FOR MAKING SHOE-SOLE WIRE.

SPECIFICATION forming part of Letters Patent No. 360,428, dated April 5, 1887.

Application filed September 1, 1884. Serial No. 141,936. (No model.)

To all whom it may concern:

Be it known that I, LOUIS GODDU, of Winchester, county of Middlesex, State of Massachusetts, have invented an Improvement in Mechanism for the Manufacture of Sole-Fastening Wire for Boot and Shoe Work, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My invention has for its object the production of a machine by which to form in wire a series of helical channels, leaving parts of the wire between the said channels elevated to constitute helical projections or screw-threads, the said channels being concaved at bottom, and being preferably corrugated or indented to increase the hold of the fastenings cut from the wire when inserted into the material to be held together by the said fastenings, the said wire, by reason of the helical grooves therein, rotating slightly as it is being inserted into the leather.

This invention consists, essentially, in a machine for forming helical channels or screw-threads upon wire, the said machine containing as elements a series of positively-rotated axles having disks to act upon and indent the surface of the wire, and means for rotating the said wire, and also the disks, so that the surface speed of each shall be substantially the same, thereby avoiding twisting strains, as will be described.

My invention also consists in the combination, with reels or spools for delivering and for taking up the wire and rotating the same, of a support for the wire and a series of disks arranged on axles the centers of which are placed at acute angles with relation to the axis of the wire, the axles converging in the direction of the movement of the wire toward the said disks, and, as herein shown, the edge of each disk forming an independent channel. The surface speed of rotation of the wire and the surface speed of rotation of the disks are substantially the same, to thereby avoid twisting strain upon the wire, which would occur were either the wire or the disk rotated solely by pressure one against the other; or, in other words, the surface speed of rotation of the wire is substantially that which it would derive from the disks alone if the wire were not rotated positively by gearing, as will be described.

Prior to my invention a wire or rod has been acted upon at its periphery by means of equivalent disks secured to shafts, the said disks acting upon the wire—as, for instance, in United States Patent No. 181,010; but never prior to my invention have the wire and disks been rotated positively at the same surface speed.

Other features of my invention will be hereinafter specifically described, and pointed out in the claims at the end of this specification.

Figure 1 is a plan view of a machine embodying my improvements; Fig. 2, a side elevation thereof; Fig. 3, a section of Fig. 2 in the dotted line *x x;* Fig. 4, details of the heart and device operated by it to insure the winding of the wire from end to end of the barrel of the spool or reel; Fig. 5, a perspective view and cross-section of a piece of the fastening-wire; Fig. 6, a sectional detail to show the guides and supports for the wire between the points where it is acted upon by the disks, and also the head or block which supports the axles on which the disks turn, and the cap. Fig. 7 is a view of that part of the machine immediately at the right of the dotted line x' x', Fig. 2, the cap e' being, however, removed to show the disks in place. Fig. 8 is a detail, in longitudinal section and elevation, of a bearing for a disk-carrying axle; and Fig. 9 is a section of the device of Fig. 8 in the line x^2 x^2.

The bed-plate A has suitable uprights, A′ A^2 A^3, to sustain bearings for the working parts. The main shaft B has fast upon one end of it a clutch part or friction-disk, B′, and loose on the said shaft, at one side of the said disk, is a pulley, B^2, having, preferably, a conical recess to engage the conical face of the said disk frictionally and rotate the same and the shaft B, all as usual, when the loose collar B^4, provided with an annular groove, (see Fig. 1,) is moved on the said shaft by the hand-lever B^5, the inner end of which is adapted, as usual, to engage and operate the said collar.

In regular operation the hand-lever B^5 holds the collar B^4 pressed against the hub of the

loose pulley B^2, the said hand-lever being held in place by the short arm of a trip-lever, C, pivoted at C', the lever B^5, so held, causing the shaft B to be rotated. The longer arm of the trip-lever C is the heaviest, and rests normally upon a pin, C^2. The elevation of the long arm of the trip-lever C releases the hand-lever B^5, and relieves the pressure of the collar B^4 on the hub of the pulley B^2 when the hub stops.

The shaft B, extended through the bearing A^5, has attached to or formed as an integral part of it the enlarged head B*, which is fitted into the bearing A^6. At its rear end the enlarged head is provided with gear-teeth 2, which engage a toothed gear, *a*, and stud *a'*; and the said gear, by a pinion, a^2, attached to it, engages a toothed gear, a^3, on and drives the shaft *b*, which, extending along the side of the machine, is provided with the pinion *c* and the toothed gear *d*, to be described.

The gear *d* engages a pinion, *d'*, secured to the toothed gear d^2, which last-named gear is loose on the stud d^3, which said stud is secured to the upright A^3; and the said gear d^2 engages the gear d^4, fastened to the tubular neck of the rotating yoke or frame d^5, which supports the shaft or pin d^6, on which rotates the reel or spool d^7, which contains the wire to be acted upon, the neck of the said yoke or frame being extended through the bearing d^8 of the upright A^3. The wire led from the said spool d^7 through the said neck is passed through the guide or support *e*, firmly secured in the cap *e'*, attached by suitable screws, e^2, to the head *f*, the said head being in turn secured to the upper end of or made part of the upright A^2. The wire from the guide *e* is led into the conical end of the auxiliary guide or support e^3, held in the said head, and thence the wire is led to the take-up reel or spool E, composed of a number of parts to be described.

The enlarged head B* of the main shaft B is bored to receive the shaft *g*, which has fastened to its rear end the pinion *g'*. The pinion *g'* engages the teeth of a stationary gear, g^2, secured to the bearing A^5, and as the main shaft and its enlarged head are rotated the pinion *g'* has a planetary motion about the gear g^2. The end of the shaft *g* opposite the pinion *g'* is extended into the bearing or block o^4, and is provided with a worm, g^3, (best shown in Fig. 3,) which engages worm-teeth cut into the hub g^4 of a flanged collar, g^5, thus rotating the said collar, the collar having frictionally attached to it the take-up reel or spool E. This take-up reel or spool is composed, essentially, of a stem, 6, a head or disk, 5, a barrel, 4, and a flange, 3, and with these is a disk, 7, which is secured to the head 5 by a suitable nut, 8, and a ring, 9, which is placed at the rear or inner side of the said flanged hub, and is secured to the said head by suitable screws, 10, the shanks of which screws below their heads are surrounded by spiral springs, as shown in Fig. 3. Between the flanged hub and the collar 9, I introduce a friction-washer, 12, preferably of leather, to thus enable the spool or reel to slip more or less on its driver, (the flanged hub,) to thus enable the reel or spool to slip with relation to the rotating hubs g^4 as the mass of wire wound thereon increases in diameter. The head *f* has bolted to it in this instance three bearings, *h h h*, that receive the axles *h'*, which are placed in an acute-angle position with relation to the center of the guide e^3, and consequently of the wire to be acted upon. Each of these axles has fastened to it a disk, h^2, having an edge of substantially the thickness of the width of the channel, *m'*, which it is desired to make in the wire *m*, the said edge being adapted to thus corrugate the bottom of the helical groove *m'* and enable the wire the better to retain its position in the leather or material, especially when the thread is of long pitch. Each axle has fast upon it a toothed gear, h^4, which is engaged and rotated by the teeth of a large bevel-gear, *n*, bolted to the toothed gear *n'*, the gear *n* having its bearing upon the neck of the head *f*, as shown best in Fig. 6. The gear *n'* is driven from the shaft *b* by the pinion *c* and intermediates *c' c²*.

In Fig. 7 it will be noticed that the acting edges of the disks bear the same relation to the center line or axis of the rotating wire that the helical channels *m'* are to bear with relation to the center line of the wire.

The surface speed of rotation of the wire, derived, as herein shown and as before described, from the rotation of the reels or spools by means of the gearing described, and the surface speed of the disks h^2, are substantially the same, thereby avoiding twisting strain upon the wire, or, in other words, the surface speed of rotation of the wire is substantially that which it would derive from the disk alone if the wire were not rotated positively by gearing.

To manufacture screw-threaded wire, or to provide wire of comparatively small diameter with screw-threads, I have found it extremely desirable, to avoid straining and twisting the wire and breaking it off, that the disks or devices which indent the wire spirally or helically, as well as the wire itself, shall be rotated positively independent of each other, and by means which shall give to each substantially the same rate of surface speed at the contacting points of the disks and wire.

To wind the wire evenly and in uniform layers on the reel or spool E, I have provided a slotted finger, *o*, which is connected with and so as to form part of a sliding bar, *o'*, provided with a toe, o^2, (see Fig. 4,) and guided in the bearing o^3, placed at the end of and forming a part of the bearing or block o^4. The toe of the slide-bar *o'* is kept against the heart-cam o^6 by the spiral spring o^7, and the said heart-cam derives its motion of rotation from a shaft, *p*, provided with a worm-toothed pinion, *p'*, which is engaged and rotated by the worm p^2, forming part of the spool-stem 6, before described. The wire between the auxiliary guide e^3 and the traverse-bar is passed over one end of a stop-lever, 20, the hub of which is mounted upon the hub-like end 21 (see

Fig. 3) of the bearing or block o^4, so that the said stop-lever rotates in unison with the shaft B. The short arm of the stop-lever 20 is acted upon by a suitable spring, 22, and the short end of the said lever is held by the pressure of the wire upon its long end at such inclination as to keep the short end of the said lever out of range of the end of the trip-lever C and against the pressure of the spring 22, so long as the wire is unbroken or the spool is not fully filled; but should the wire break or the spool E become fully filled the lever 20 is permitted to turn under the action of the spring 22, and thereafter in the rotation of the shaft B in the direction of the arrow thereon (see Fig. 2) the short end of the said lever 20 strikes the long end of the trip-lever, releases the lever B^5, and effects the stopping of the machine. By the time that the spool is full the angle formed in the wire between the mass of wire wound on the spool and the end of the auxiliary guide e^3 is sufficient to remove the wire from the lever 20.

The pin 24 limits the movement of the lever 20 in opposition to the spring 22. The wire m (shown dotted in Fig. 6) is held by the guides e e^2 at each side the point where it is acted upon by the disks h^2.

The gears h^4 have annular grooves, which are entered by the forked plates h^{10}, adjustably held in place by the bolts h^{12}, the said plates preventing end-thrust of the shafts h'.

In another application, Serial No. 168,007, filed June 8, 1885, I have shown an organized machine for providing wire with threads by the action of rolls which roll against the wire; but in that application the rolls, in addition to their rotation about their own axes, have a revolution about the wire, or, in other words, have a planetary motion.

I claim—

1. The rotating shaft b, the reels or spools d' and E, and intermediate gearing to rotate the same to effect the rotation of the wire, and the head and guides or supports for the wire, combined with the disks and means to rotate the same at substantially the surface speed of the wire, for the purposes set forth.

2. In a machine for forming helical channels or screw-threads upon wire, the combination of the following instrumentalities, viz: a guide or support for the wire, a series of positively-rotated axles having attached disks to act upon and indent the wire, and means to rotate the said wire, whereby the surface speed of the independently-rotated disks and wire at their point of contact are substantially the same, thereby avoiding twisting strain upon the wire, substantially as set forth.

3. In a machine for forming helical grooves or screw-threads in wire, the rotating shaft B, the reel or spool E, arranged to be rotated in unison with it, and means, substantially as described, to rotate the said reel or spool about its own center, combined with the traverse-bar and heart-cam to operate it, and with means to rotate the said heart-cam, substantially as described.

4. The rotating shaft B and its attached reel or spool E, and the stop-lever controlled as to its position by the wire, combined with the trip-lever which is operated by the stop-lever.

5. The rotating shaft 6, the flanged hub mounted upon it, and means to rotate the said hub, combined with the spool E, held frictionally upon the said flanged hub, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

LOUIS GODDU.

Witnesses:
G. W. GREGORY,
W. H. SIGSTON.