(No Model.) 4 Sheets—Sheet 1

C. C. HILL.

WIRE COILING MACHINE.

No. 332,525. Patented Dec. 15, 1885.

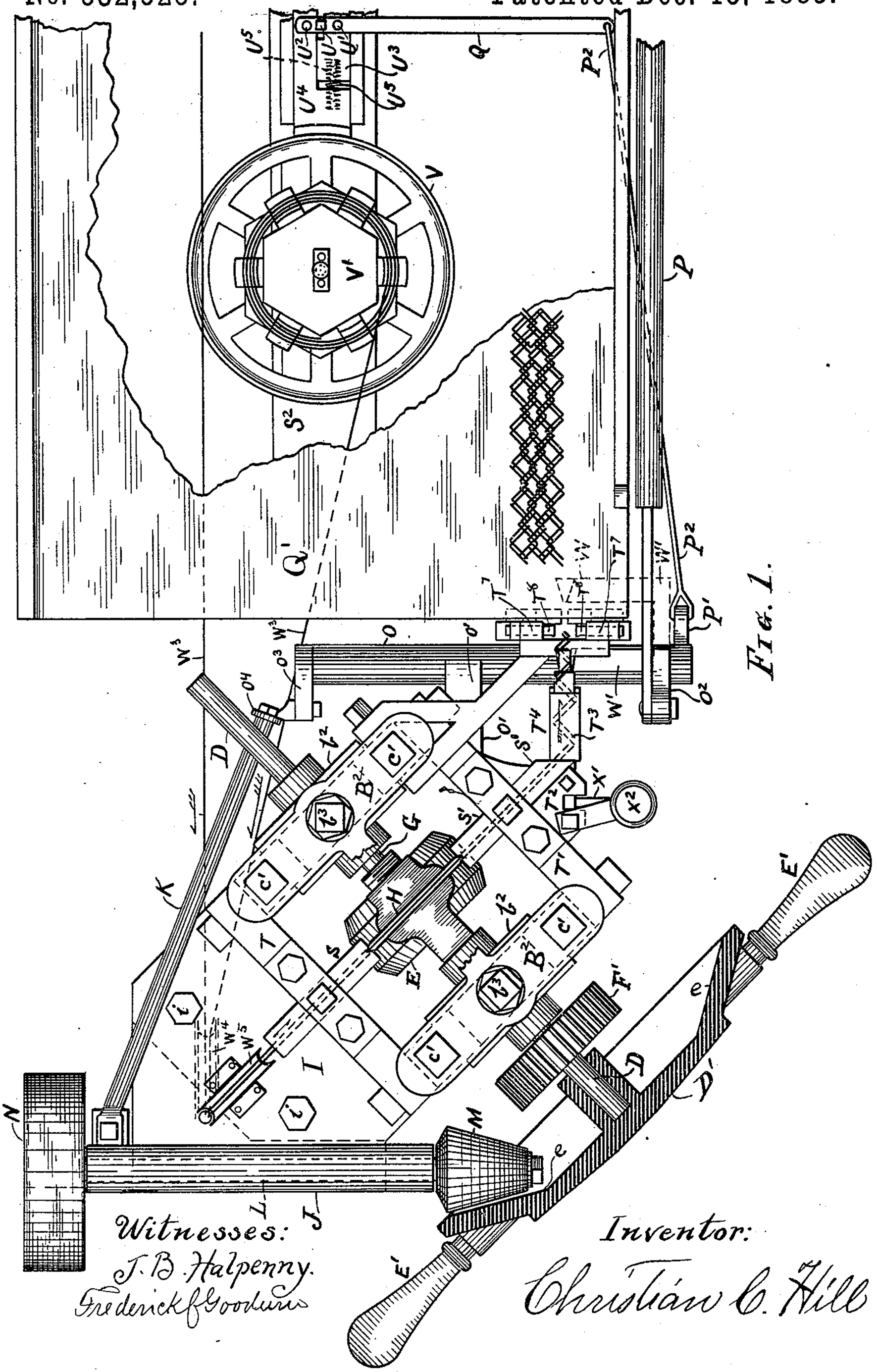

FIG. 1.

Witnesses:
J. B. Halpenny.
Frederick F. Goodwin

Inventor:
Christian C. Hill

(No Model.)

4 Sheets—Sheet 2.

C. C. HILL.

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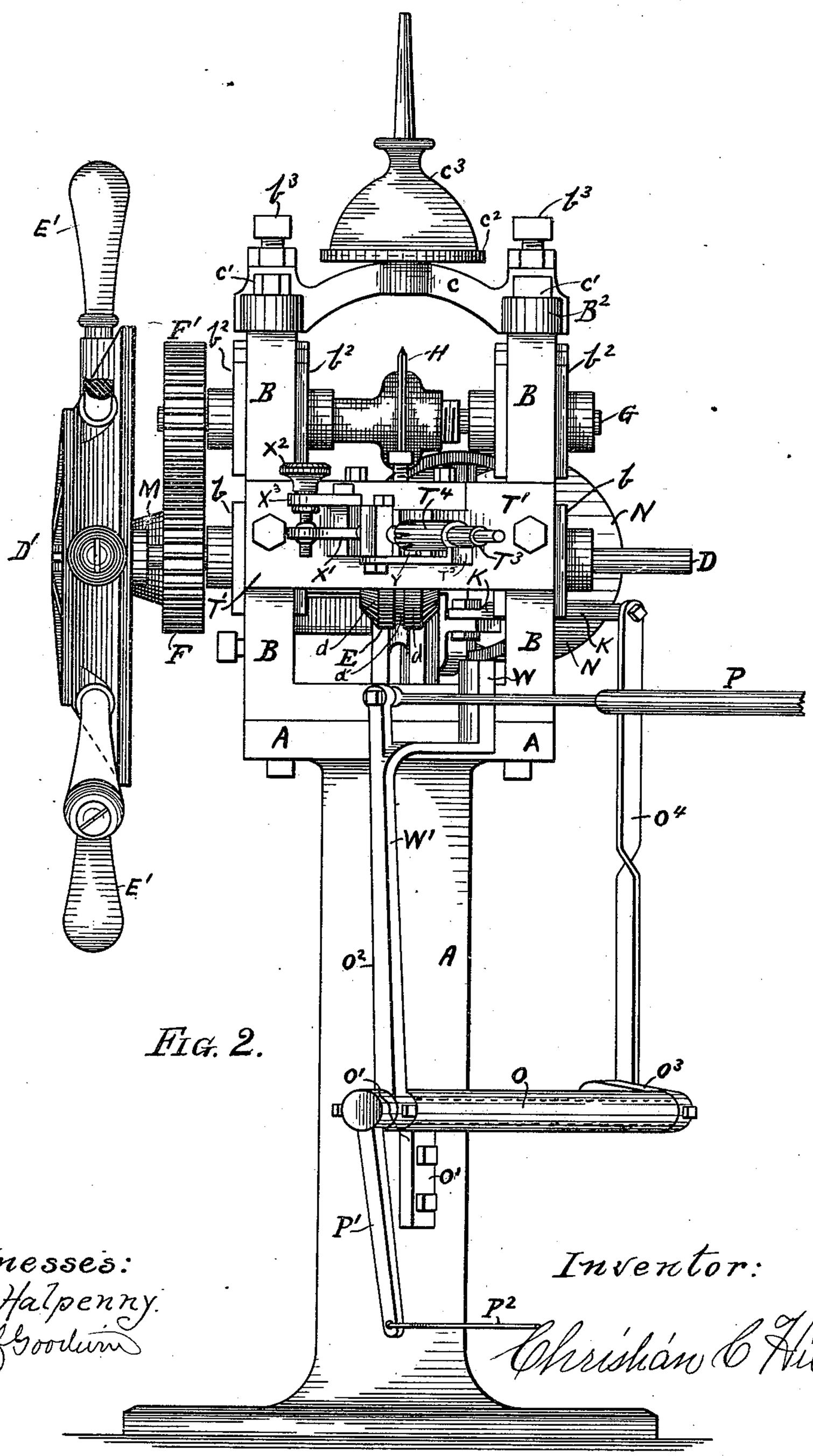

FIG. 2.

Witnesses:
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(No Model.) 4 Sheets—Sheet 3.

C. C. HILL.

WIRE COILING MACHINE.

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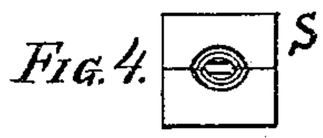

FIG. 4.

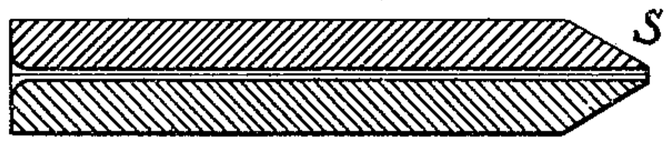

FIG. 5.

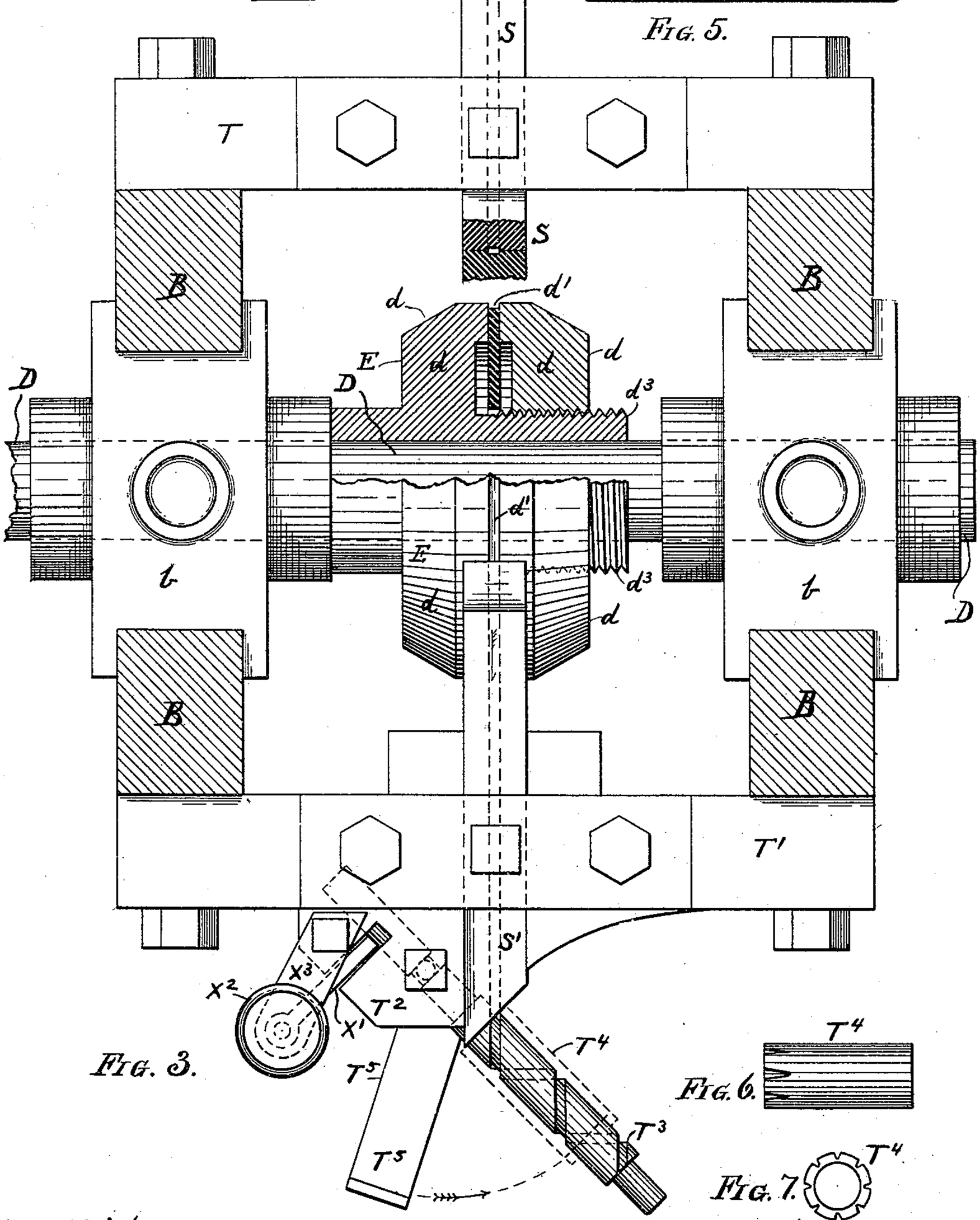

FIG. 3.

FIG. 6.

FIG. 7.

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(No Model.) 4 Sheets—Sheet 4.

C. C. HILL.

WIRE COILING MACHINE.

No. 332,525. Patented Dec. 15, 1885.

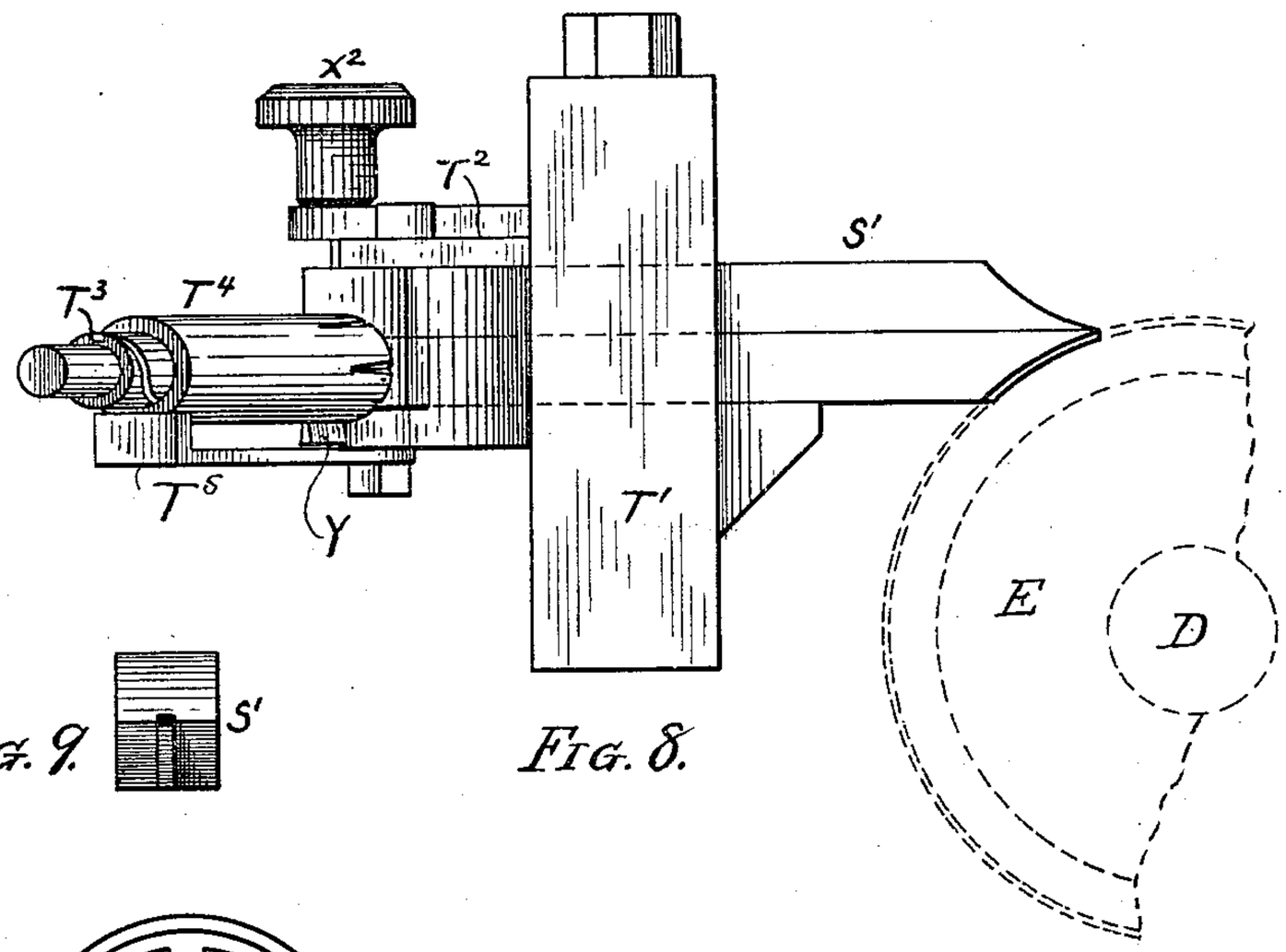

FIG. 9.

FIG. 8.

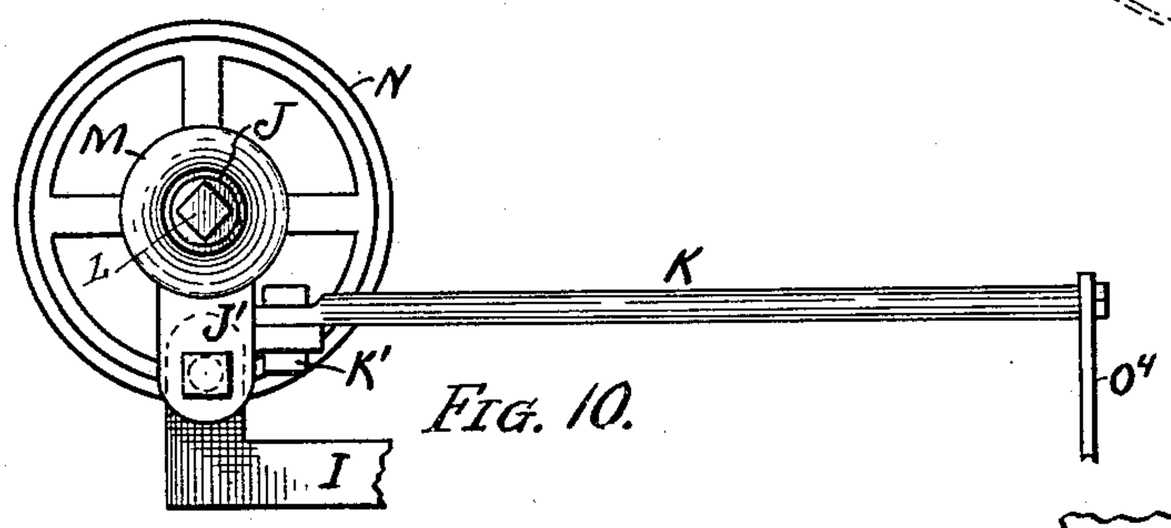

FIG. 10.

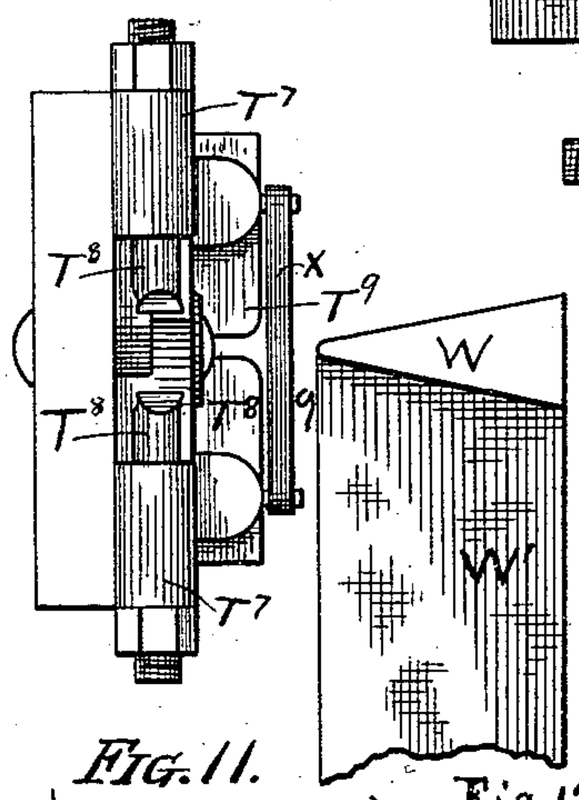

FIG. 11.

Fig 12

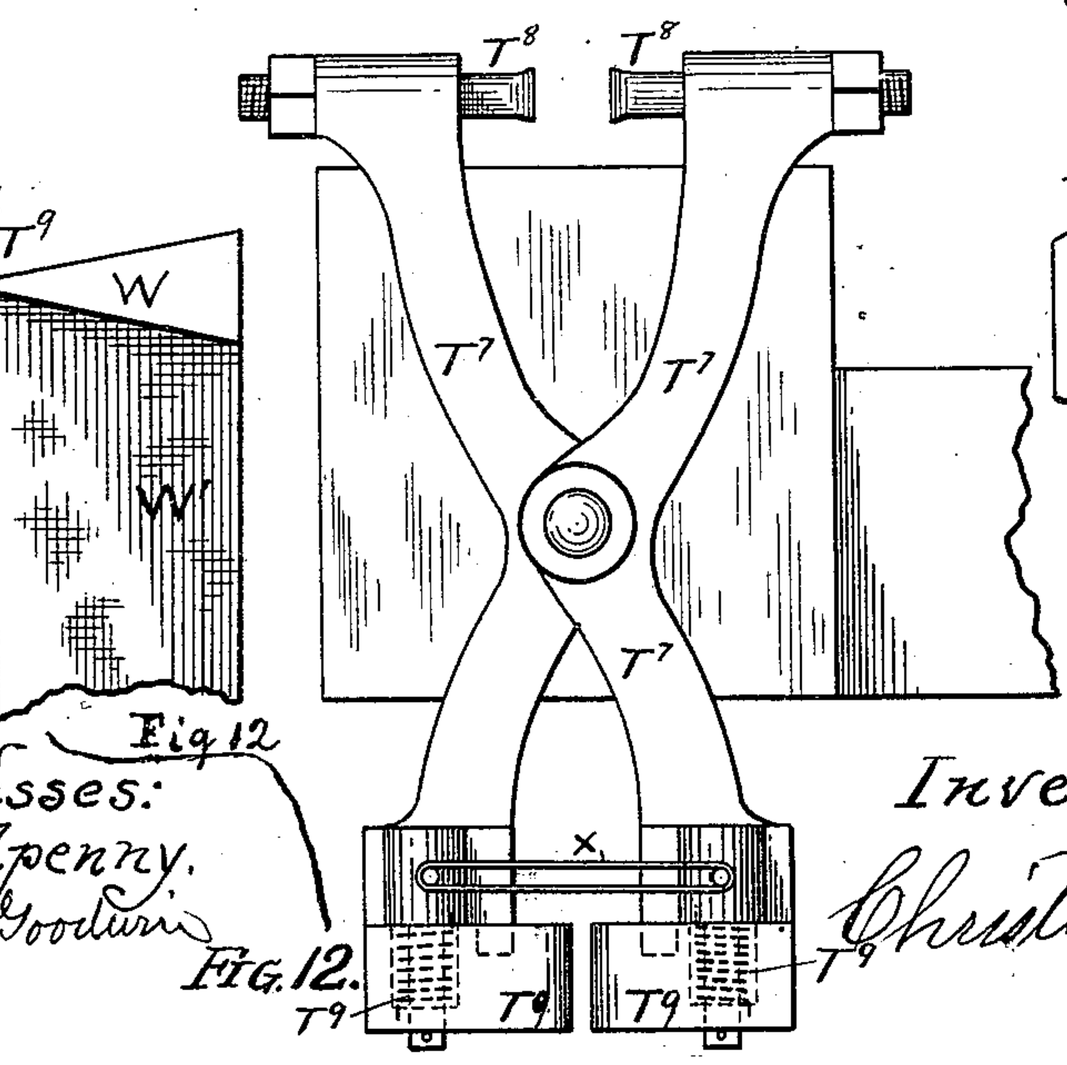

FIG. 12.

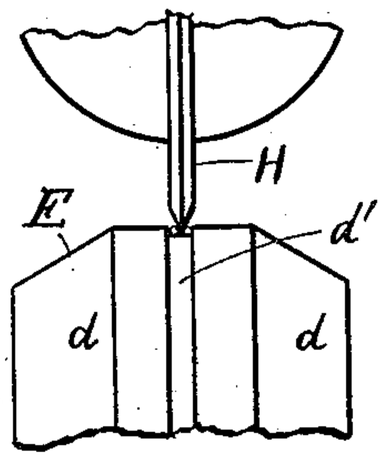

FIG. 13.

Witnesses:
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Inventor:
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UNITED STATES PATENT OFFICE.

CHRISTIAN C. HILL, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE UNION WIRE MATTRESS COMPANY, OF SAME PLACE.

WIRE-COILING MACHINE.

SPECIFICATION forming part of Letters Patent No. 332,525, dated December 15, 1885.

Application filed January 8, 1885. Serial No. 152,373. (No model.)

To all whom it may concern:

Be it known that I, CHRISTIAN C. HILL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Wire-Coiling Machines, of which the following is a specification.

My invention relates to improvements in wire-coiling machines; and it consists in new feeding devices for the wires, new application of the driving-power, new friction devices for the wire-spools, new wire-cutting devices, and other more subordinate features, set forth in the drawings and specification.

In the drawings, Figure 1, Sheet 1, is a plan view showing the coiling-loom, a portion of the table and wire fabric, also one of the spools and friction devices beneath the table. Fig. 2, Sheet 2, is a front side view of the loom. Fig. 3, Sheet 3, is an enlarged top view of the loom with the top roller removed, showing the construction of the lower roller, also the wire-guides and coiling devices; Figs. 4 and 5, respectively, an end and side view of the back wire-guide in section; Figs. 6 and 7, a side and end view of the sleeve to the coiler. Fig. 8, Sheet 4, shows the lower feed-roller, wire-guide, and coiler in an enlarged section and in proper relation. Fig. 9 shows the lip on the under side of wire-guide S′. Fig. 10 shows a section of the machine-stand with the rock-shaft pivoted thereon carrying the driving-pulley, shaft, and bevel friction-pinion, together with the rock-arm and a sectional portion of the connecting-rod. Fig. 11 shows a plan view of the cutting-nippers; Fig. 12, a side view of them and a side and perspective view of the wedge that operates the cutting-nippers, and Fig. 13 shows the position of the wires in the feed-rollers.

Like letters and figures indicate like parts, both in the drawings and specification.

A is a stand or foundation.

B is a frame secured to A with screw-bolts, and having vertical openings in its respective sides, in which journal-boxes *b b* and b^2 b^2 are fitted, the latter of which are adjustable up and down by set-screws through *c c*, which are caps to the upright openings in frame B, and upon which they are secured by cap-screws *c′ c′*, and c^2 is a flat disk upon the cross-bar connecting caps *c*, upon which to place an oil-can, c^3. In boxes *b b* is journaled a shaft, D, carrying within the frame a grooved roller, E, which is constructed of three parts, to wit: two outside disks, *d d*, (the left-hand one rigid upon the shaft,) of equal size, and a third disk, *d′*, between them, enough smaller than the outer ones to form a groove between them wide and deep enough for the two wires side and side to be coiled, as seen in Fig. 3, and in Fig. 2, Sheet 2, and indicated by letter *d′*. Disks *d d* are made of hard chilled iron or tempered steel, so as to resist wear, and are chambered inside and within their peripheries, as shown in Fig. 3, Sheet 3, so that they can be readily ground to new surfaces without the removal of the tight one from the shaft when found necessary to put them in repair. Upon the left-hand end of shaft D is secured a concave friction-pulley and hand-wheel, D′, the inner face of which is at an angle, as shown at *e*, Fig. 1, with radiating handles E′ upon its periphery. Between the hand-pulley D′ and frame B is secured a coupling gear-wheel, F. In the boxes b^2 b^2 is journaled a shaft, G, upon which is secured, between flanges, a steel disk, H, having a V-shaped periphery, and of the same diameter as the disk *d′* upon shaft D. This V-shaped disk is adapted to run in the groove of disk E, as shown in Fig. 13 of the drawings, and acts upon the two wires with equal force and pressure at all times, the required pressure being increased or diminished by the set-screws b^3. Shaft C has a cog-gear, F′, that couples it to shaft D, and thus secures a uniform motion of the two shafts. Upon the top of stand A is secured a bracket-plate, I, by screw-bolts *i i*, having a bearing, J, with ears pivoted to plate I at each end, leaving bearing J free to be rocked back and forth by an arm, K, which arm is rigidly attached to J by a bolt, K′. In bearing J the driving-shaft L is journaled, and carries a friction-pinion, M, upon its inner end adapted to engage with concave wheel D′ upon the outer end of shaft D, and at the opposite end of shaft L the driving-pulley N is secured.

O is a rock-shaft secured to stand A in a bearing attached to said stand by a bracket, O′, and said rock-shaft is provided with crank-arms O^2 and O^3 upon its opposite ends. Arm

O^3 is connected with arm K by a pitman, O^4. To O^2 is connected the hand shipper-rod P, all of said connections being free hinge-joints, so that when the shipper-rod is moved longitudinally it carries the friction-pinion M to and from the face of concave pulley D′, and thus causes it to stop and start the machine, as may be desired. Upon the front end of shaft O is an arm, P′, extending downward and having pivoted to its outer end a connecting-rod, P^2, the other end of which is pivoted to the outer end of bar Q, which bar is pivoted at U to the foundation or spool-bar S^2 of the machine and at U′ U^2 to friction-blocks U^3 U^4. Said friction-blocks are adapted to slide free in grooves, and have concave faces adapted to fit the periphery of wheels V upon the bases of the wire-spools V′, which are located at some adjacent and convenient place—say beneath the table Q′. Only one of said spools is shown in the drawings, whereas two entirely alike in all respects are mounted upon the spool-bar S^2, at the right of and in line with the spool shown in Fig. 1, and with the friction-blocks U^3 U^4 between them.

W^3 are the wires in the act of being drawn from said spools, over leading-wheels W^4 W^5, to the feed device.

When coiling two wires at the same time, friction-block U^3 (shown only in part) is the same as U^4, and acts the same on its spool. A spiral spring, U^5, is fitted between the friction-blocks, so as to act equally upon each, and to bear them against the spool-wheels when left free to act. Thus when the shipper-rod is moved to the right to start the machine the blocks are drawn away from the spools, leaving them free to turn upon their spindles, while the instant the rod is moved to the left to stop the machine spring U^5 forces the blocks onto the spool-bases and stops them at once.

The wire-spools are of the usual construction, with the addition of friction-bases of circular form with smooth peripheries. In the rear of and parallel horizontally with the groove in roller E is guide-plate S, with an opening longitudinally between the top and bottom plate composing it, and secured in a cross-bar, T, horizontally secured to the uprights of frame B by means of cap-screws. In front of the rollers is also secured a similar wire-guide, S′, in a similar cross-bar, T′, on which is an angular projection, T^2, which is perforated in a line parallel to the length of the table Q′, and in such perforation is secured a coiler, T^3, made out of a piece of round steel wire, with a spiral groove cut into its outer surface of the right width for two wires to lie side by side, and of the depth to bring them level with the outer surface of the coiler, the spiral being of the right pitch to form a coil of the required coarseness, usually five-eighths of an inch, the angle of the pitch in the coiler where the wire first reaches it being as nearly in accord with the line of the wires through the guides and rollers as practicable. Upon the coiler is secured a covering or sleeve, T^4, and held in place by latch T^5, which is turned in front of it to keep it on and around, as indicated by dotted lines, to release it and allow it to be slipped off over the end of the coiler. The rear end of the sleeve has a series of notches cut in the periphery adapted to engage a lug, Y, Fig. 8, upon the cross-bar T′, and thus to hold it in the position in which it is placed. When the friction of the coiling-wires has worn a spiral groove in its inner surface, said sleeve may be partly rotated and the lug Y engaged with its next notch, and so on successively until the sleeve is too much worn all around for use. Guide S′ is cut at an angle to correspond to the coiler, where they come together, so as to form a close cover to the wires until they pass within the sleeve, and thus have no chance to kink or escape out of their channel in their progress through the machine.

In front of the coiler is secured a pair of cutting-nippers, T^7, pivoted at their center, and with adjustable cutting-blades T^8, secured with screws, but so that their cutting-edges can be set at any angle and more or less together, as may be required. To the lower arms of the nippers are hinged wings T^9, so adapted and provided with coiled spiral springs as to present a resistance to wedge W, connected by an arm, W′, with the shipper-rod, so that when wedge W is forced between the wings it spreads them apart, and thus brings the cutting-blades together; and when the wedge is returned by the reverse motion of the shipper-rod the wings T^9 swing back and open, so that the wedge passes without any closing action upon the blades, the blades being normally kept apart by an elastic looped spring, X, that encompasses their lower portions. Through an opening in the projection T^3 that holds the coiler is secured to the coiler a lever, X′, and to said lever is attached a thumb-screw, X^2, supported by a bar, X^3, and all so adapted that by turning the thumb-screw either way the coiler is slightly turned or rotated by the tipping of lever X′, and such changes in the position of the coiler in relation to the wire-guide S′ has an effect upon the wires to cause them to run together or apart, as may be desired. Such a regulation becomes necessary when running two wires side and side simultaneously, or when necessary to slightly vary the pitch with a single wire.

I have described my machine generally as adapted for running two wires; but it also is equally well adapted for running one wire by using single wire-guides and coiler; but in use I most frequently coil two wires at once. Therefore I do not wish to limit my invention to a two-wire machine.

Having thus described my machine in detail, I will also state its mode of operation. Coils of suitable wire, W^3, preferably about No. 19, are placed upon the spools, and the free ends of each wire are carried backward, upward, and over to the rear end of the rear wire-guides upon suitable and properly lo-

cated guide-sheave pulleys. The ends of the wires are forced into the opening in the guide until grasped by the roller device, one upon each side of the V-shaped disk in the groove of the lower roller. When the rollers are put in motion, either by hand or power, they force the wires along into the coiler and around its spiral groove, thus spinning the coil out upon the receiving-table Q′ to any desired length, and when the proper length of coil is attained the hand shipper-rod P is moved to the left, thus taking the pinion off from wheel D′ and stopping the feed of the wire, and at the same time forcing wedge W between the wings of the cutting-nippers, which brings the blades together and severs the coil at the desired point, and also releases the friction-blocks U^3 U^4, so that spring U^5 forces them upon the bases of the wire-spools, thus instantly stopping them also. Moving the shipper-rod to the right releases the spools and starts the wire-coil, and at the proper time reversing it to the left stops the coil and spools and reverses the coil, a repetition of which process runs successive coils the one into the other until a web of any desired length and width is produced.

As stated before, if the two wires do not keep sufficiently close together I regulate them with the lever device of the coiler; or, if the wires do not feed through the rollers satisfactorily I adjust them together more or less by set-screws b^3.

Having thus described my invention, what I consider new, and desire to secure by Letters Patent, is as follows:

1. In a wire-coiling loom, the grooved feeding-roller, in combination with the V-shaped disk-roller, arranged and operating substantially as and for the purpose specified.

2. The grooved roller E constructed in separate parts, substantially as and for the purpose specified.

3. The concave pulley D′, provided with hand-holds and geared to the feed devices to actuate them, combined with driving-shaft L, provided with friction-pinion M and band-wheel N, and shipping mechanism to move said pinion M into or out of engagement with said disk D′, whereby the feed devices may be actuated by either hand or power, as set forth.

4. The coiler T^3, provided with a lateral arm, X′, combined with the stationary arm X^3, and the adjusting-screw X^2, whereby said coiler may be adjusted by partly rotating it, and then rigidly holding it in position.

5. The coiler T^3, combined with a sleeve having exterior peripheral notches at one end, and a stationary lug, Y, adapted to engage one or another of said notches and retain said sleeve from rotation in the position desired.

6. The cutting-nippers T^8, mounted on pivoted levers T^7, provided with wings T^9, in combination with the wedge W, arm W′, and the shipper-rod, substantially as and for the purpose specified.

7. The feeding devices, guide-plate S′, and coiler, in combination with the cutting-nippers, operated at will, substantially as shown and described.

8. In combination, the disk D′, whereby motion is communicated to the coiling mechanism, the friction-pinion M, moved into or out of engagement with said disk by connections with the rock-shaft O, the shipper P, friction-blocks U^3 and U^4, connected with and controlled by said rock-shaft, and the wire-spools V′, for the purpose of arresting or liberating the spools at the same instant and by the same act which arrests or starts the coiling mechanism.

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Witnesses:
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E. L. HUBER.