(No Model.) 3 Sheets—Sheet 1.

J. K. PROCTOR & J. H. KNOWLES.

APPARATUS FOR WINDING TOOTHED WIRE ON CARDING CYLINDERS.

No. 347,736. Patented Aug. 17, 1886.

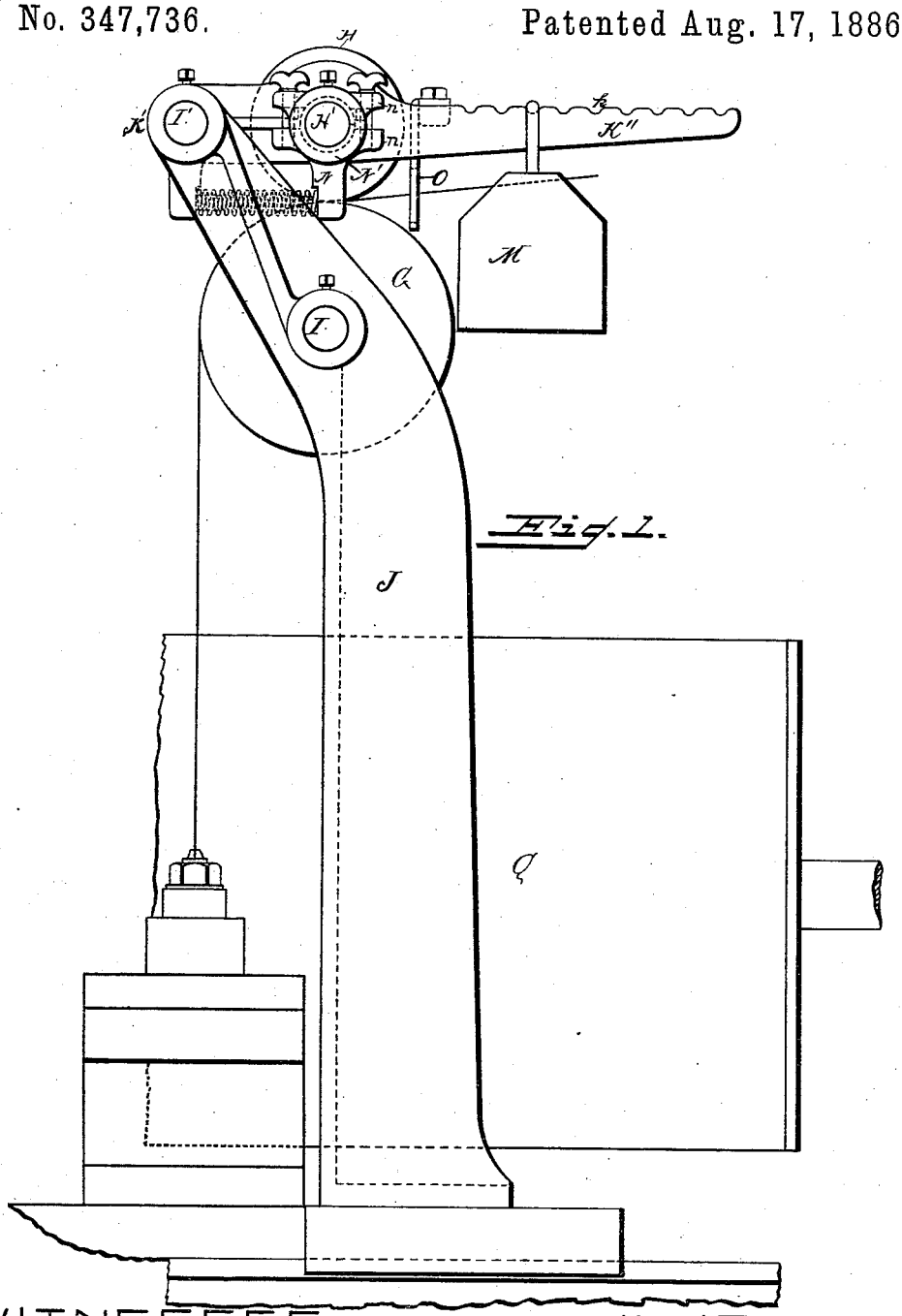

Fig. 1.

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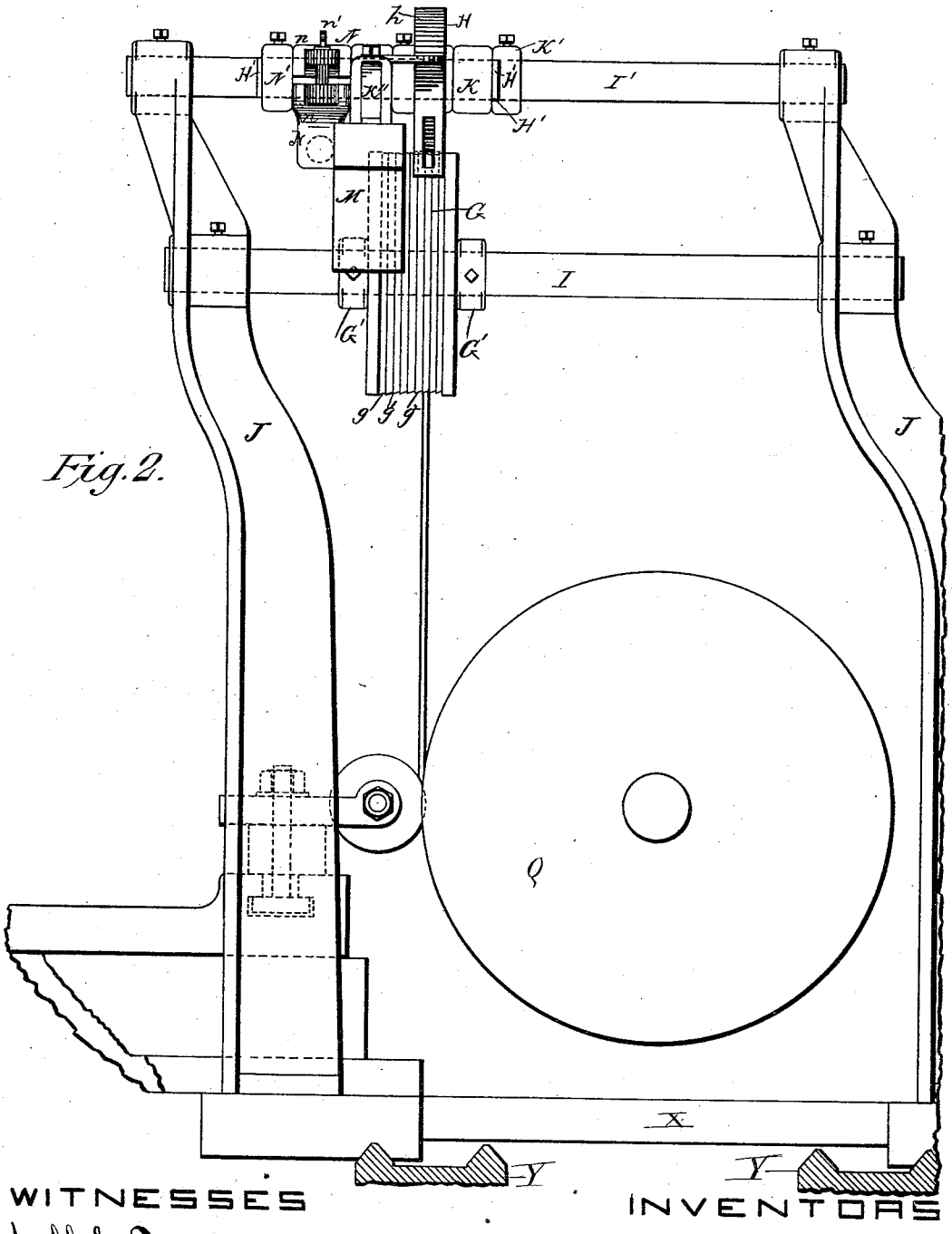

Fig. 2.

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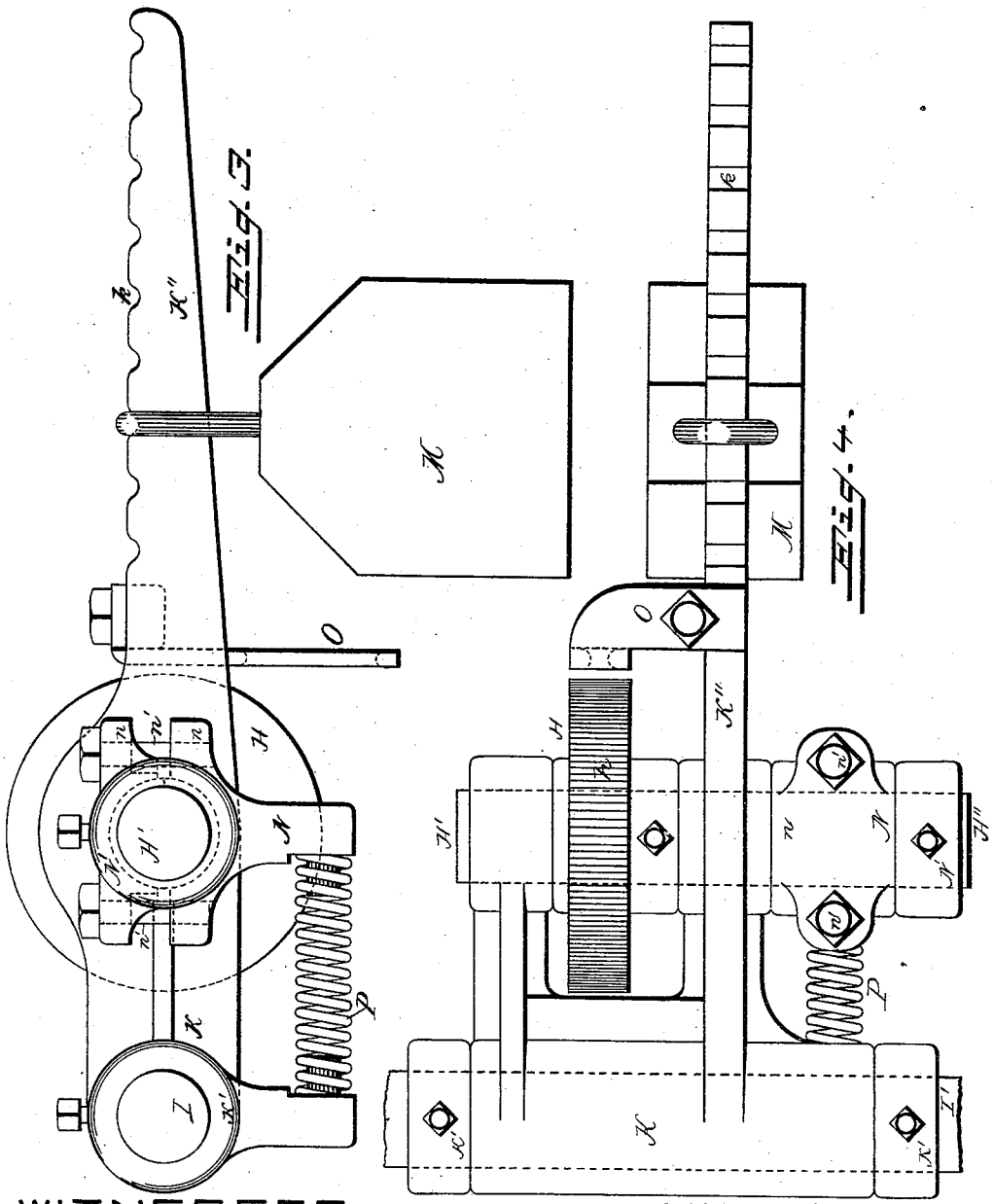

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UNITED STATES PATENT OFFICE.

JOSIAH K. PROCTOR AND J. HENRY KNOWLES, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNORS TO THE PHILADELPHIA TEXTILE MACHINERY COMPANY, OF SAME PLACE.

APPARATUS FOR WINDING TOOTHED WIRE ON CARDING-CYLINDERS.

SPECIFICATION forming part of Letters Patent No. 347,736, dated August 17, 1886.

Application filed March 24, 1886. Serial No. 196,395. (No model.)

To all whom it may concern:

Be it known that we, JOSIAH K. PROCTOR and J. HENRY KNOWLES, citizens of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Apparatus for Winding Toothed Wire on Carding-Cylinders; and we do hereby declare the following to be a full, clear, and exact description of the invention, reference being had to the accompanying drawings, which form part of this specification.

Figure 1 is a side elevation, and Fig. 2 a front elevation, of our improved apparatus in position on the carriage of a lathe, the latter having on it a cylinder to be clothed or wound with wire. Fig. 3 is a side elevation, and Fig. 4 a plan, both enlarged over Figs. 1 and 2, of a detail of our improved apparatus.

This invention relates to means for holding and guiding the toothed wire with which metallic carding-cylinders are clothed or provided while such wire is in process of being wound upon or into the grooves of such cylinders.

As is well known, these cylinders are made up of a metal cylindrical shell or body—usually wrought or cast iron—into whose outside surface after being turned true is or are cut a spiral groove or grooves from end to end of the cylinder, and into this groove or grooves is wound a serrated or toothed wire, the teeth of the wire projecting above the surface of the cylinder form the carding-surface. The base or thick edge of the wire is pressed down to the bottom of the groove, and by means of a suitable calking tool or instrument the adjacent metal of the cylinder is pressed tightly against the wire, holding it as in a vise.

In winding the toothed wire into cylinders it is necessary to draw it under considerable tension, in order to overcome the natural tendency of the wire to resist the edgewise bending it is subjected to as it is wound around the cylinder and to draw the thick edge of the wire snugly down to the bottom of the groove. Heretofore this tension has been secured by the application of a frictional binder to the reel containing the wire which is to be wound into the cylinder. This reel turns on a stud or mandrel, and is held in place by a nut or washer on the end thereof. Generally a leather washer is introduced between the nut and the hub of the reel, and by screwing up the nut the reel turns with a greater or less difficulty, according to the degree to which the nut may be screwed, and the wire leading from the reel is subjected to any degree of tension that may be desired. In its passage to the cylinder the wire passes over a guide-wheel, which is supported by a suitable framework attached to the carriage of the lathe supporting the cylinder. The objections to this plan are chiefly three: First, that from the circumstance of the friction being applied to the hub of a considerable-sized wheel, and, being created by the turning of a nut, the exact amount of tension on the wire could never be definitely known, and niceties of adjustment required for the different sizes of wire could not be obtained; hence the wire was not uniformly drawn to the bottom of the groove, the result being imperfect work, and with the smaller wires considerable loss of time has resulted from frequent breaking of the wire caused by improperly adjusted tension; second, as the toothed wire is wound flatwise on the reel in successive overlays, the reels generally being about three inches wide and one and one-half inches deep, the tension on the wire would often draw down the outer lap of wire between or under the underneath layers, thus cramping or binding it, and under such circumstances the withdrawal or unreeling of the wire while under tension resulted in the wearing away, bending, or breaking the delicate points of the teeth; hence after being drawn into the cylinder such wire was not as effective as it otherwise would have been; third, should at any time the wire break while under tension the freed end of the wire would fly or spring back with such force as to cause a considerable quantity to unwind from the reel, which would have to be replaced before the winding process could be continued.

In order partly to overcome the bad effects of producing tension on the wire entirely by means of the nut on the reel the wire has sometimes been drawn around a wheel placed out-

side of the reel and between the latter and the cylinder. In this case the wire made an entire lap about such wheel, and the wheel was either stationary, the wire slipping around it, or it revolved under friction produced similarly to the friction on the reel. This device only partly overcame the difficulties described and introduced another difficulty—viz., that as the wire both passed on and off of the intermediate wheel at the same point the wire crossed itself at that point, producing a rubbing action which was detrimental to the points of the teeth of the wire. By the use of this intermediate wheel the friction on the reel could be made less tight, but could not be wholly dispensed with.

Our improved apparatus entirely removes the objections specified, and the wire as it passes from the reel is under only so much tension as is necessary to revolve the reel to allow the wire to pass off, the friction being retained on the reel with only sufficient force to give steadiness to the motion of the latter.

As constructed by us our apparatus consists, essentially, of two wheels or rolls between which the wire passes, and by which it is nipped, so that it cannot slip between them, the necessary tension being produced by applying friction to one or both of the wheels or rolls.

In the accompanying drawings representing our invention, G is the bottom roller, in which are cut annular grooves of different sizes to receive the various sizes of wire, as may be seen at *g g' g''*, &c. These grooves are not sufficiently deep to receive the entire body of the wire, but leave a part of the latter above the surface of the roll, so that it can be pressed upon by the upper roller, the wire resting on its "flat" or side, and not on its edge, in the groove it occupies.

H is the upper roller, which is roughened by a series of ridges, *h*, raised on its surface, such ridges being arranged parallel to the axis of the roll. This roll is preferably of steel, and the ridges produced by a file-cutter's chisel, after which the surface of the roll is hardened to give it greater durability. This roll by its roughness gets a good hold on the wire and wholly prevents it from slipping between the rolls.

The roll G is mounted on the shaft I, which shaft has suitable bearings in the two standards J J. The shaft I may turn in its bearings, the roll G being attached to the shaft, or, as shown in the drawings, the shaft may be stationary, and the roll turn loosely on it; but in any case provision must be made for the lateral adjustment of the roll G that the wire may be guided vertically downward over the edges of the cylinder being clothed. This adjustment is required to suit the various diameters of cylinders. In the drawings the roll G is held between the two stationary collars G' G', one on either side of it, and by unscrewing and slipping the collars on the shaft the necessary adjustment of the roll is obtained.

The roll H is mounted through the medium of the shaft H' in a frame or cradle, K, which cradle is pivoted on the shaft I', the latter having bearings in the standards J J. The cradle K, where it rests on the shaft I', is held from lateral movement by the two collars K' K', one on either side of it, and by unscrewing these collars and sliding them on the shaft I' the cradle may be adjusted sidewise to any desired position, so as to keep the roll H always over and opposite to the roll G wherever the latter may happen to be placed.

One side of the cradle K has an extension or arm, K'', formed with notches *k*, to receive a suspended weight, M. By moving this weight along the arm K'' and by using various sized weights any degree of pressure desired may be applied to the roll H where it impinges on the wire that is passing between the rolls. For coarser wires a heavy pressure is required, but lighter and more delicate wires require less pressure. The object of this pressure is to bind the wire so it cannot slip between the rolls.

The roll H is securely fastened to the shaft H', so that when the roll turns the shaft must turn also. One end of the shaft H', at H'', projects beyond the side of the cradle K, and on this projecting end of the shaft is placed the friction-clamp N. This friction-clamp consists of two parts, *n n* fastened together by bolts *n' n'*, with a piece of leather between the parts and encircling the shaft. By screwing the parts of this clamp together with greater or less tightness any desirable degree of friction may be obtained. It is this friction which by opposing, but not wholly preventing, the rotary motion of the roll H gives the tension to the wire, which tension is varied as the friction is.

The friction-clamp N might be a part of or rigidly attached to the cradle K, but we prefer to make it with a projecting arm on one part of the clamp, the end of which arm rests against one end of a coiled wire compression-spring P, the other end of the spring being attached to or resting against a similar projection on the cradle K. By interposing the spring between the clamp and the cradle any irregularities in the turning of the roll G, caused by unevenness of the wire or dirt or other foreign substance on the wire or by other cause, is equalized and a more uniform average tension placed upon the wire. The collar N' is simply to keep the clamp N from slipping off the end of the shaft.

O is a guide for directing the wire accurately between the rolls G and H.

In the drawings the standards J J are shown attached to the carriage of the lathe, the ways Y Y of which are shown in cross-sections of the drawings, and the whole apparatus moves with the carriage X, which is shown mounted upon said ways and moving thereon in the ordinary

manner, and, the calking-tool being properly adjusted, the wire is always guided exactly into the groove of the cylinder Q wherever the carriage may happen to be placed; but, while we prefer to use our apparatus on the carriage as described it could be attached immovably to the end or other part of the lathe or otherwise supported from a post, the ceiling, or any appropriate means of support, and the wire led from the apparatus over a guide-wheel similar to that heretofore used, as already suggested.

Our apparatus may be variously modified and several well-known mechanical appliances used to carry the principle of our invention into effect. For instance, instead of the weight M, springs might be employed to put pressure on the roll H, and, instead of the cradle K being pivoted as described, the bearings of the shaft H′ might slide in vertical ways and the pressure obtained by weights or springs applied to such bearings. So, too, the coiled-wire spring on the clamp N might be an extension instead of a compression spring and placed on the other side of the lever, or the spring could be a flat spring or a piece of rubber, and, in place of the two rolls running together and nipping the wire, flat or curved slides or shoes might be used, between which the wire could be drawn to produce the required friction; or one roll only might be used and opposed to a stationary non-revolving wheel, slide, or shoe.

What we desire to secure by Letters Patent is—

1. The rolls G H, in combination with the shaft H′, cradle K, weight M, and clamp N, for the purpose of producing tension on the wire, for the purpose described.

2. The combination of the two rolls G and H, shaft H′, cradle K, weight M, clamp N, and spring P, substantially as shown and described.

3. The combination of the standards J J, rolls G H, cradle K, weight M, clamp N, spring P, and shafts I, H′, and I′, constructed and arranged substantially as and for the purpose described.

4. In combination with the carriage of a lathe, the standards J J, rolls G H, cradle K, shafts I, I′, and H′, weight M, and clamp N, all arranged and constructed substantially as described, for purposes set forth.

5. The laterally-adjustable roll G, having grooves of different widths for various sizes of wire, in combination with a roll or presser for producing friction or nipping the wire, substantially as shown and described.

In testimony that we claim the foregoing we have hereunto set our hands this 8th day of March, 1886.

JOSIAH K. PROCTOR.
J. HENRY KNOWLES.

Witnesses:
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CHARLES S. WESTCOTT.