(No Model.) 4 Sheets—Sheet 1.

O. P. BRIGGS.

WIRE SPOOLING MACHINE.

No. 338,244. Patented Mar. 23, 1886.

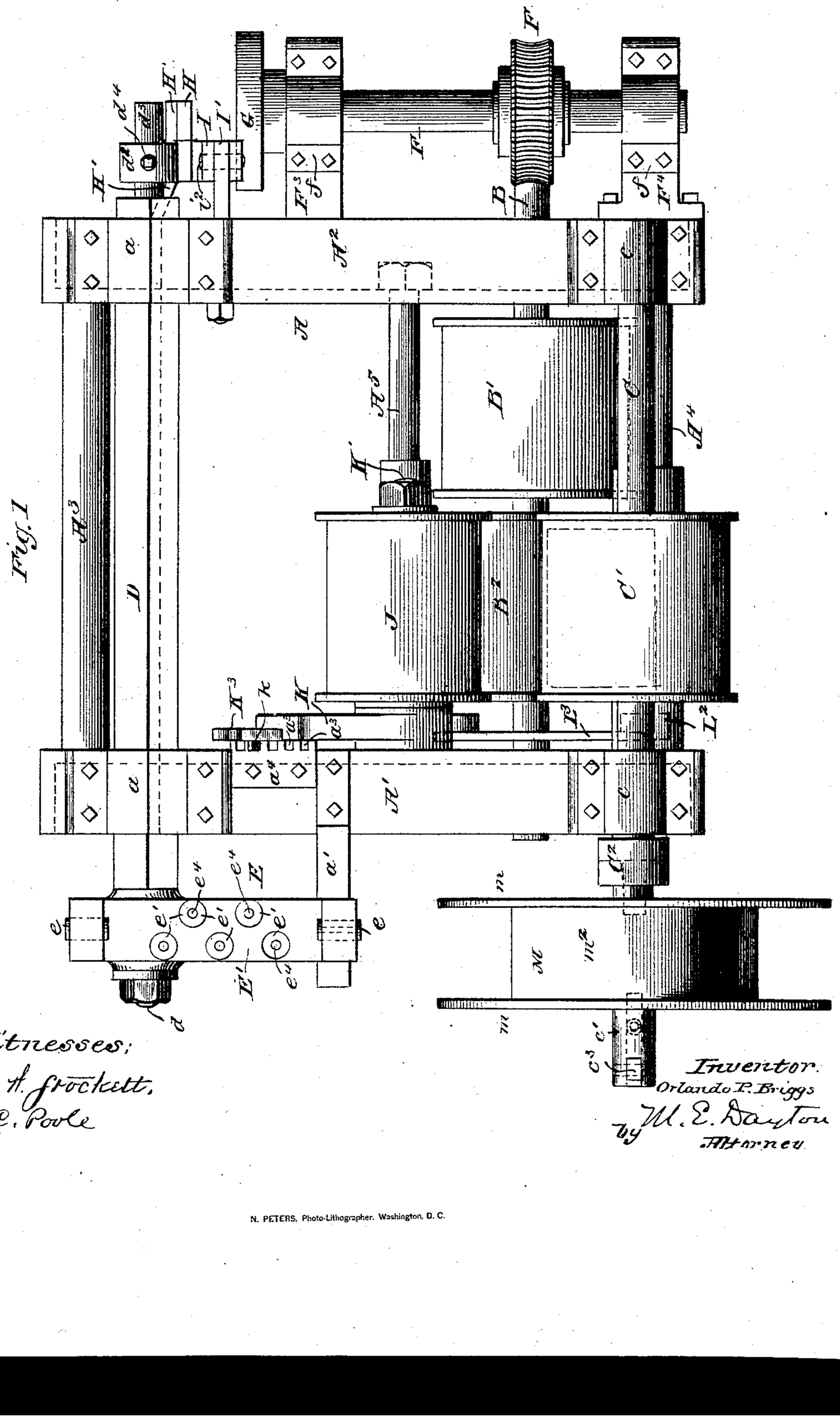

Fig. 1.

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(No Model.) 4 Sheets—Sheet 2.

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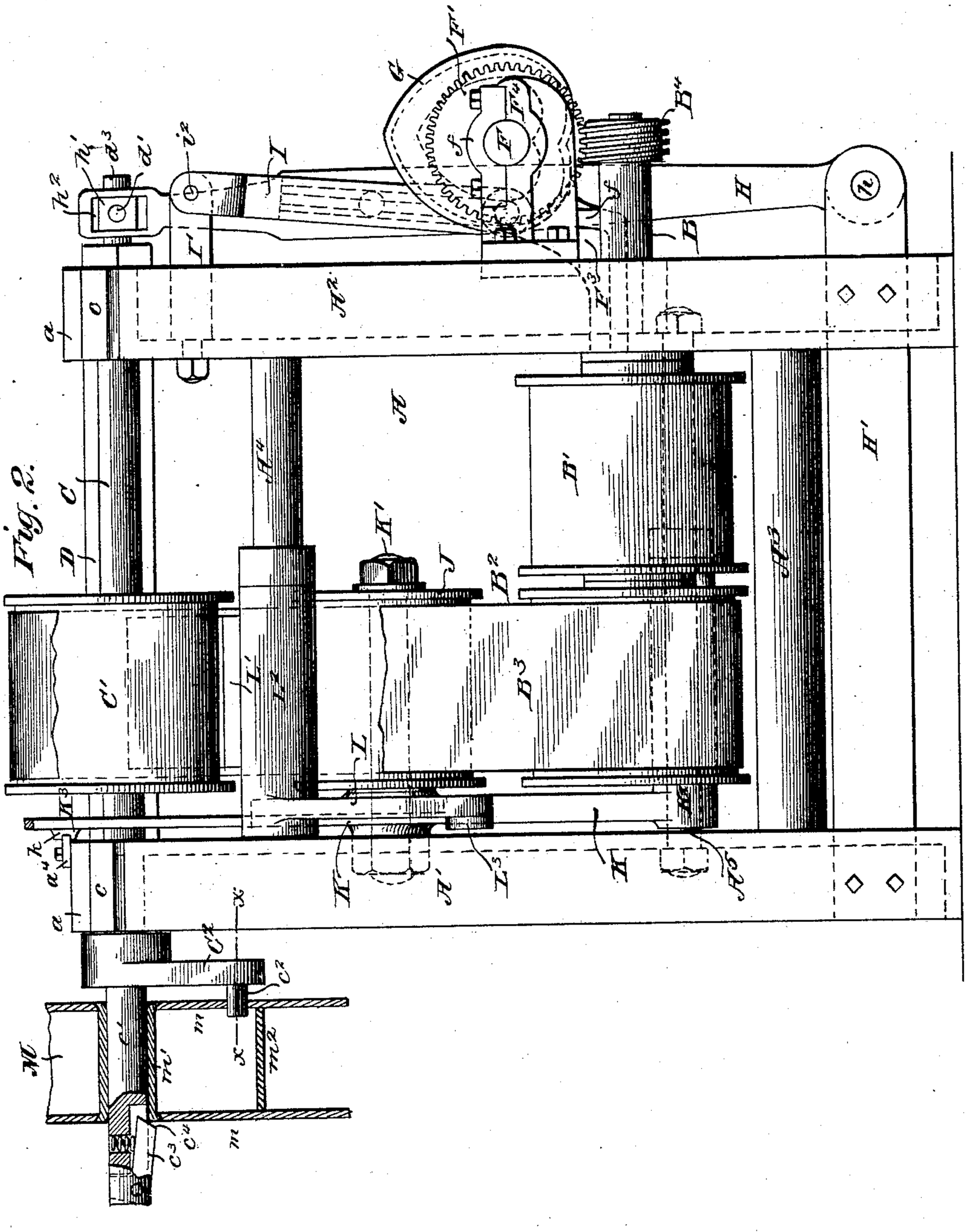
WIRE SPOOLING MACHINE.

No. 338,244. Patented Mar. 23, 1886.

Fig. 2.



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(No Model.) 4 Sheets—Sheet 3.

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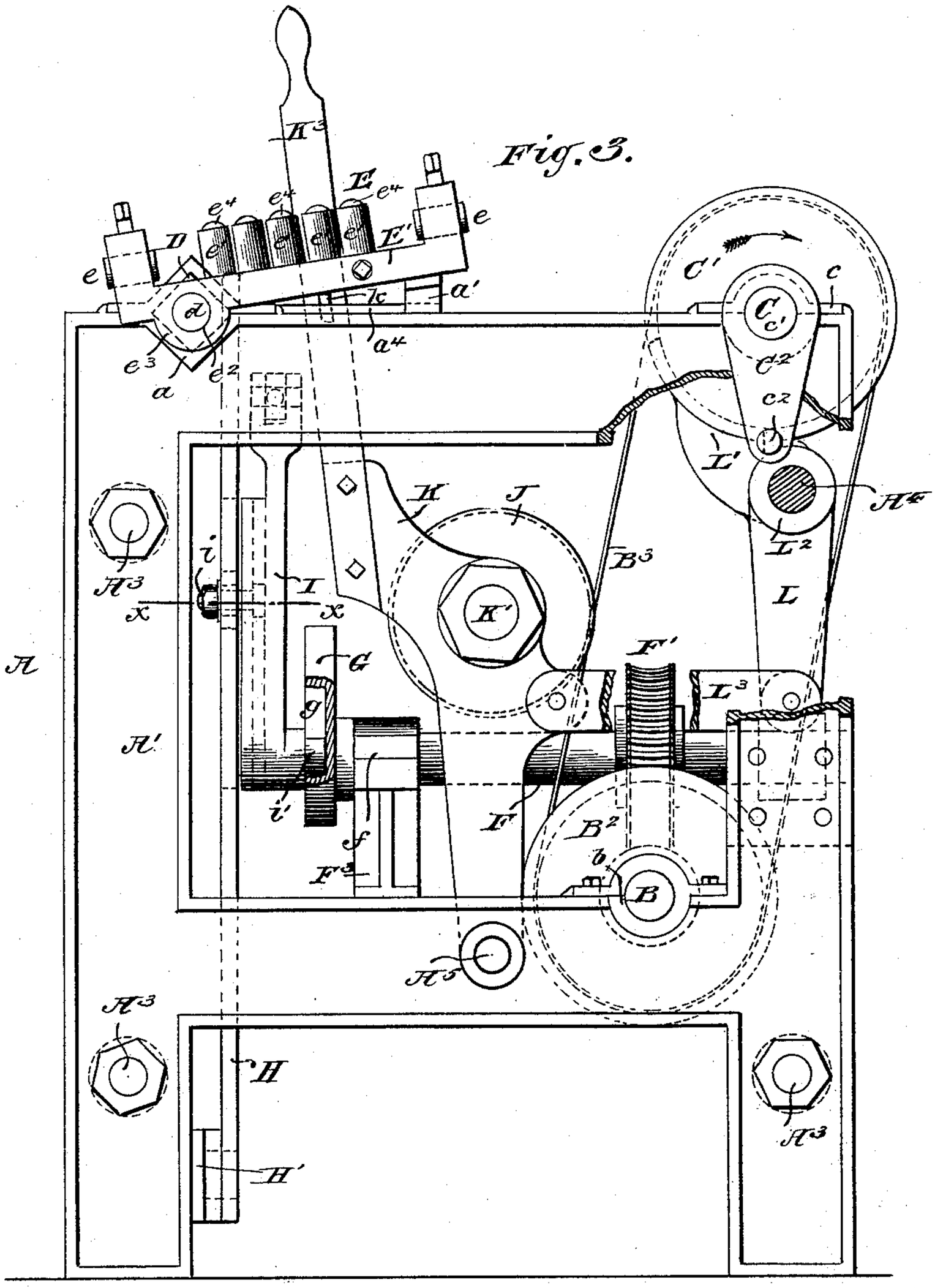
WIRE SPOOLING MACHINE.

No. 338,244. Patented Mar. 23, 1886.

Fig. 3.



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WIRE SPOOLING MACHINE.

No. 338,244. Patented Mar. 23, 1886.

Fig. 5.

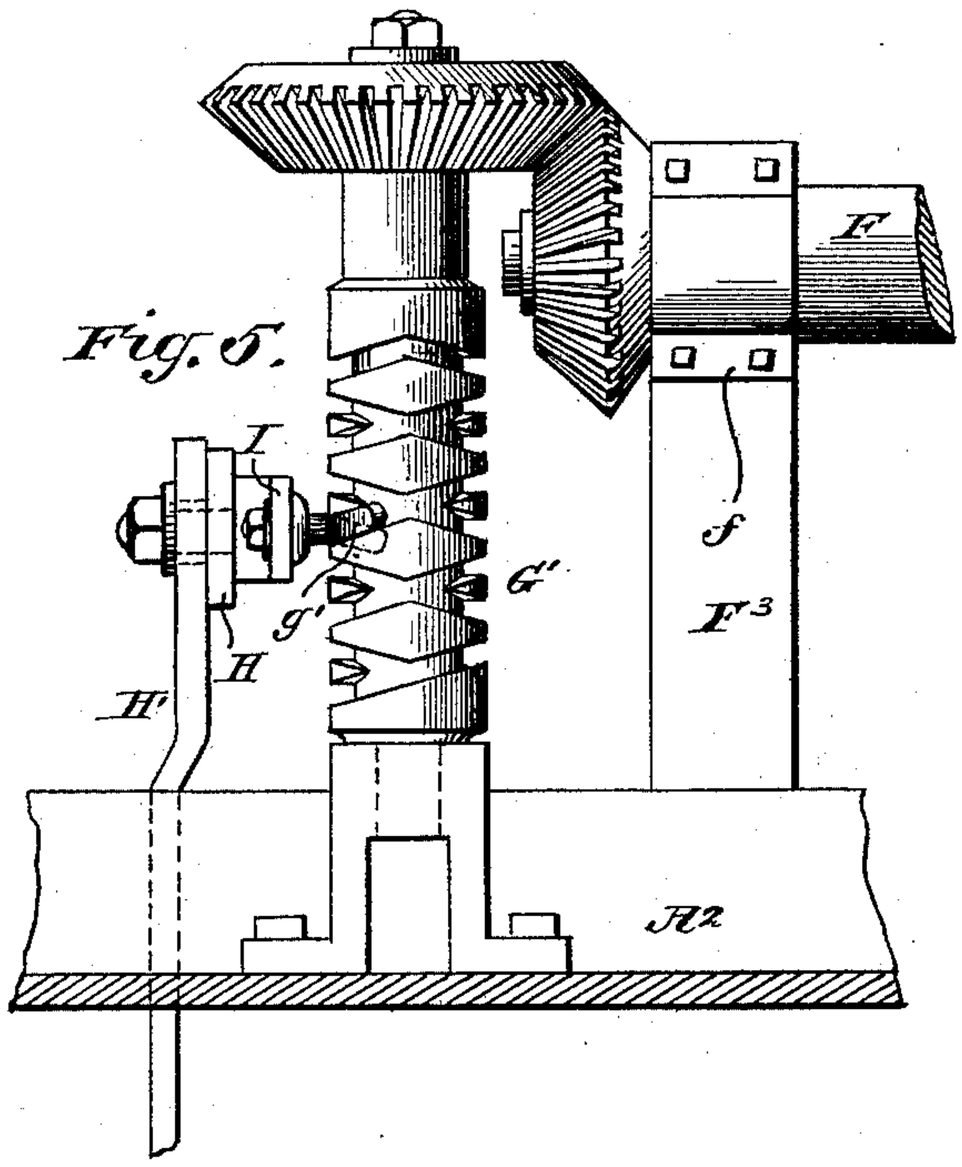


Fig. 4.

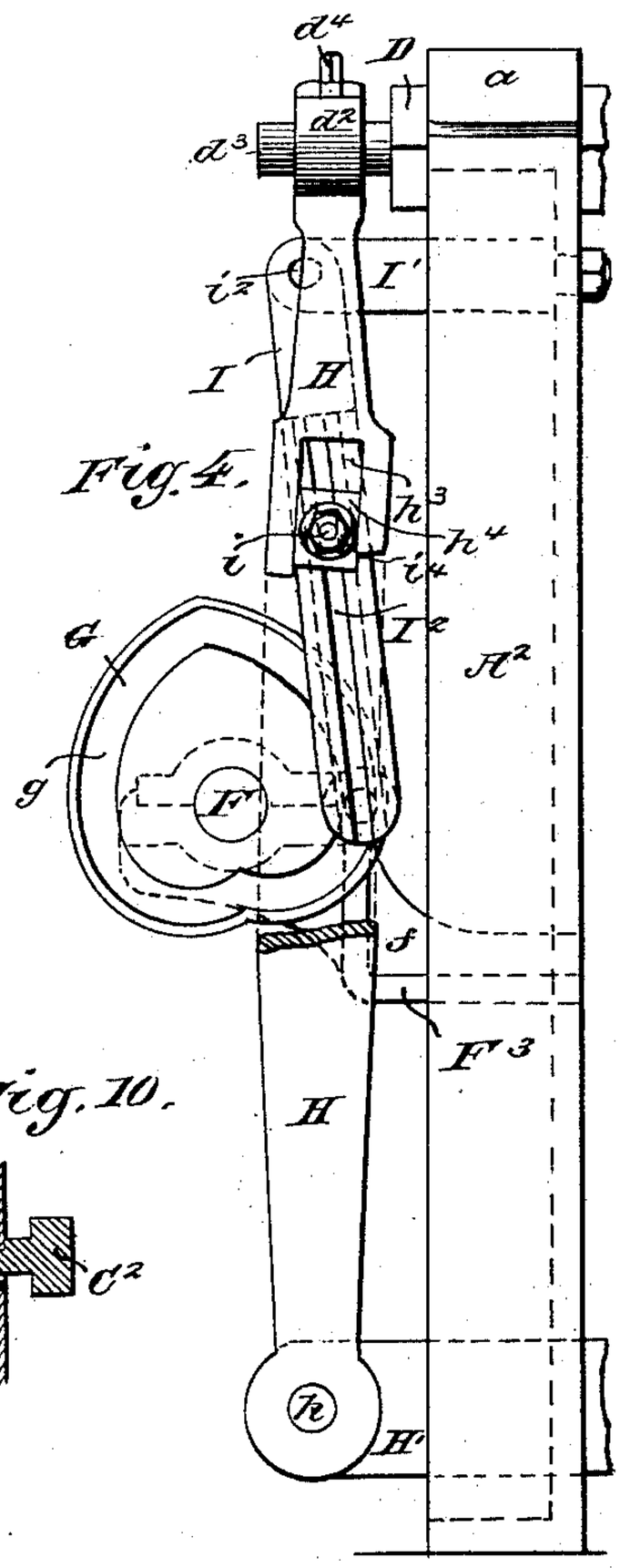


Fig. 10.

Fig. 9.

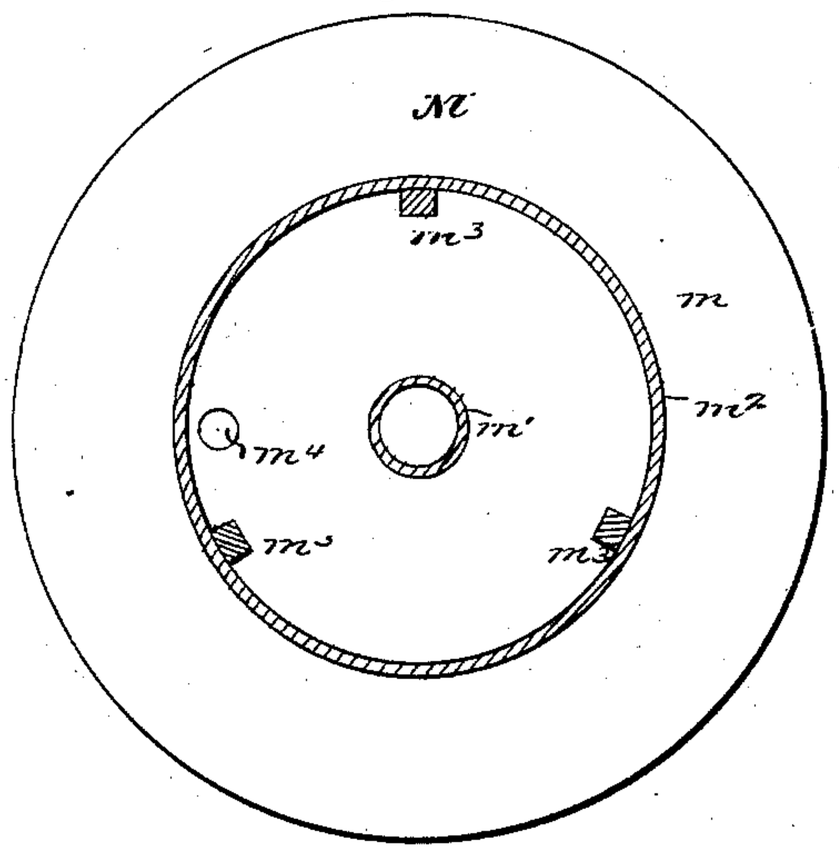


Fig. 6.

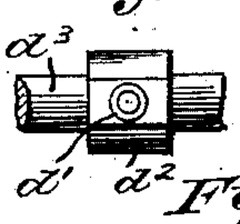


Fig. 7.

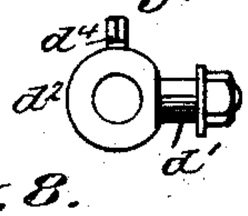
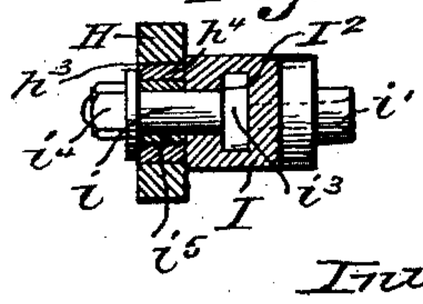


Fig. 8.



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Inventor:

Orlando P. Briggs

by W. E. Dayton

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UNITED STATES PATENT OFFICE.

ORLANDO P. BRIGGS, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE THORN WIRE HEDGE COMPANY, OF SAME PLACE.

WIRE-SPOOLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 338,244, dated March 23, 1886.

Application filed October 18, 1884. Serial No. 145,818. (No model.)

To all whom it may concern:

Be it known that I, ORLANDO P. BRIGGS, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Wire-Spooling Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to wire-spooling machines or apparatus for winding wire on spools in successive closely-wound layers from end to end of the spool, in order that it may be rapidly unwound therefrom without kinking or interlocking; and it consists in the means hereinafter fully set forth, and defined in the appended claims.

In the accompanying drawings, which illustrate a wire-spooling apparatus embodying the present invention, Figure 1 is a plan of the machine. Fig. 2 is a side elevation of the same, with parts shown in section. Fig. 3 is a front elevation of the same, with parts of the frame broken away to show parts beyond. Fig. 4 is a fragmentary view in detail of the devices by which transverse motion is imparted to the wire-guide, showing the side of those devices opposite to that shown in Fig. 2. Fig. 5 is a fragmentary top view in detail of a modified form of the devices for imparting a transverse motion to the wire-guide mechanism. Figs. 6 and 7 are details which will be hereinafter described. Fig. 8 is a detail section taken upon line *x x* of Fig. 3. Fig. 9 is a transverse section of a spool adapted for use with the machine herein shown. Fig. 10 is a section taken upon line *x x* of Fig. 2.

The frame A of the machine, as herein shown, consists of two end plates or castings, A' A^2, which are rigidly tied together by longitudinal rods or girts A^3, A^4, and A^5.

B is a main driving-shaft mounted in bearings *b b*. C is a spool-holding spindle mounted in bearings *c c*, and D is a longitudinally-sliding bar supported in bearings *a a* upon the frame, the said shaft B, spindle C, and bar D being horizontal and parallel with each other.

E is a combined wire guide and straightening device, which is attached to one end of the slide-bar D, as hereinafter more fully set forth.

The spool-holding spindle C is provided with suitable means for securing a spool thereon at one of its ends outside of the frame, and the combined wire guide and straightener E is attached to the outer end of the slide-bar D opposite the spool, and is reciprocated so as to move at a uniform speed from end to end of the spool by means of suitable devices operating upon the said slide-bar, as hereinafter described.

The means herein shown for actuating the said slide-bar consist of a shaft, F, arranged at right angles with the driving-shaft B, and actuated from the latter by means of a worm and worm-gear, a heart-cam, G, secured upon the said shaft, a vertically-arranged lever, H, fulcrumed at its lower end upon the machine-frame and connected at its upper end with the said slide-bar, and a lever, I, fulcrumed upon the frame at its upper end, engaged at its lower end with the cam, and connected with the lever H, so as to oscillate the latter, by means of a sliding bolt or pivot-pin, *i*.

The main driving-shaft B is provided with a pulley, B′, over which the belt for imparting motion to the machine is trained, and also with a pulley, B^2, from which the spindle C is actuated by means of a belt, B^3, trained over the said pulley B^2, and a pulley, C′, fixed to the said spindle. The belt B^3 is preferably made loose upon the pulleys B^2 and C′, and a tightening device is provided, consisting of a lever, K, pivoted upon the machine-frame and carrying a tightener-pulley, J, adapted to bear upon the belt B^3 at a point between the said pulleys B^2 and C′, whereby the rotation of the spindle C and the spool thereon may be stopped, when desired, without stopping the driving-shaft.

For the purpose of instantly stopping the rotation of the spindle C when the belt is loosened, by moving the lever K, a brake-lever, L, pivoted upon the machine-frame and having a brake-shoe, L′, adapted to bear upon the cylindric face of the pulley C′, is herein shown as connected with the lever K in such manner that when the lever is moved to tighten the

belt the brake will be released, and when the lever is moved to loosen the belt the brake will be applied to the pulley, as will hereinafter more fully appear. A spool, M, of a form generally used in connection with the machine herein illustrated, is shown in Figs. 1, 2, and 9.

In the particular construction herein shown the shaft F is mounted in bearings *f f*, supported upon brackets F^3 F^4, bolted to the end plates, A' A^2, of the machine-frame, and the shaft B is extended beyond its bearing *b* upon the said frame-piece to a point beneath the shaft F, and is provided with a worm, B^4, engaging a worm-wheel, F', upon the said shaft F. The cam G is mounted upon the end of the shaft F, outside of its bearing in the bracket F^3, said cam, as herein shown, being of disk form and provided with a cam-groove, *g*, in its vertical face, which is engaged by a stud or roller pin, *i'*, upon the lower end of the lever I. The lever H is pivoted at its lower end, by means of a stud, *h*, to a horizontal bar, H', which is bolted to the frame-pieces A' A^2, and projects outwardly therefrom at one end, as shown, to furnish a bearing for the said stud *h*. The upper end of the said lever is connected with the slide-bar D by means of a stud, *d'*, upon a collar, d^2, which is adjustably fastened to the cylindric end d^3 of the said bar by means of a set-screw, d^4, as clearly shown in Figs. 1, 2. 6, and 7. The stud *d'* is engaged with and adapted to rotate freely in a block, *h'*, which is fitted to slide freely in a vertical slot, h^2, in the upper end of the lever H, in order to allow the stud to move longitudinally of the lever, as is rendered necessary by the curved path of the upper end of the lever and the rectilinear motion of the bar. The lever I is pivoted by means of a stud or pivot-pin, i^2, to a bracket, I', fixed to the frame-piece A^2, and the stud *i*, connecting the levers H and I, is adjustably secured in the lever I and slides freely in a longitudinal slot, h^3, in the lever H. As a preferred means of adjustably securing the said stud *i* in the lever I, the latter is preferably provided with a longitudinal T-groove, I^2, and the stud is provided with a suitable head, i^3, and is clamped upon the lever by means of a nut, i^4, which bears upon a sleeve, i^5, placed around the stud between the nut and the face of the lever, as shown in Figs. 4 and 8, and in dotted lines in Fig. 3. The stud *i* is preferably engaged with a sliding block, h^4, in the slot h^3 of the lever H; but this construction is obviously not essential.

In the operation of the cam and levers for actuating the slide-bar D an oscillating motion is given to the lever I by the engagement of the roller-pin *i'* upon its lower end with the groove of the revolving cam G, and this oscilatory motion is transmitted by means of the stud *i* to the lever H, which is connected at its upper end with and actuates said slide-bar. The groove in the cam G is made of the proper shape to give to the slide-bar a reciprocatory motion of uniform velocity in both directions, so that the wire-guide carried by the said bar will be moved at a uniform speed back and forth opposite the spool, and thereby cause the wire passing from the said guide to the spool to be laid thereon in closely-wound contiguous coils, the successive turns of which are all in contact with each other.

The purpose of making the stud *i* adjustable upon the lever I is to enable the relative effective lengths of the arms of the levers H and I to be changed, and the stroke of the slide-bar D to be thereby varied, so as to adjust it accurately to the width of the barrel of the spool upon which the wire is wound.

The slide-bar D is adapted to slide freely longitudinally, but not to rotate in the machine-frame, and for this purpose is preferably made square, and is mounted in the correspondingly-shaped bearings *a a* upon the frame-pieces A' A^2.

The wire-straightener and wire-guide E, which is attached to and carried by the said slide-bar, preferably consists of a plate or arm, E', provided with two wire-guides, *e e*, secured in the opposite upturned ends of the plate, and a wire-straightener of a well-known construction, consisting of anti-friction rollers *e'*, pivoted upon the plate between the wire-guide and at either side of the path of the wire and adapted to bear upon the latter. The said plate E is preferably pivoted upon the slide-bar D by means of a cylindric prolongation, *d*, upon the end of the slide-bar, which is engaged with an aperture, e^2, in a projection, e^3, upon the said plate, the plate being held upon the slide-bar by a nut and washer so adjusted as to allow the plate and parts carried thereby to swing and rotate freely, but not to move longitudinally of the bar.

As herein shown, the pivotal axis of the plate E is located near the end of the latter which is adjacent to the incoming portion of the wire, and its opposite free end projects from the slide-bar toward the spindle C, and is usually sustained by the strained portion of the wire between the wire-guides thereon and the spool. By this construction the said end of the frame is obviously free to rise as the cylindric mass of wire upon the spool increases in diameter, so as to maintain the line of wire tangent thereto, and to retain the axis of the wire-guides *e* in alignment with said strained portion of the wire, and thereby prevent any vertical bending of the latter after it has passed the straightener.

In order to prevent the free end of the plate E, which projects from the slide-bar toward the spool, from swinging downward when not supported by the strain of the wire, a supporting arm or bracket, *a'*, is bolted to the frame A in position to sustain the plate E with the axis of the wire-guide tangent to the top of the barrel of the spool when the latter is mounted upon the spindle.

The rollers *e'* of the straightening device are preferably mounted upon vertical studs e^4, fixed at their lower ends in the plate E', said

rollers being set to slightly bend the wire as it passes between them, in a well-known manner. The guides or guide-tubes *e* obviously operate to properly hold the wire while passing between the straightener-rollers, and to guide it in passing to the said rollers, and from the latter to the spool.

The spool-holding spindle C is, as herein shown, provided with a cylindric bearing, *c'*, at its end, upon which the spool is supported, said bearing being adapted to engage the central aperture of the spool, and an arm, C^2, is fixed upon the said spindle outside of the frame and adjacent to the bearing *c'*, and is provided with a stud or pin, c^2, adapted to engage the spool for the purpose of imparting rotary motion to the latter.

As a convenient means of holding the spool upon the spindle, a spring-actuated pivoted catch or detent, c^3, seated in a slot in the outer end of the bearing *c*, is provided, said detent being pivoted at its outer end to the spindle, and arranged to project at its inner end from the surface of the bearing, so as to engage the outer face of the spool, as clearly shown in Fig. 2. The end surface, c^4, of the detent c^3, which engages the spool, is preferably outwardly inclined, as clearly shown in Fig. 2, its angle with the axis of the spindle being such that the spool may be pulled off over the detent by the use of considerable force, though the detent is adapted to hold the spool upon the spindle under ordinary circumstances.

The spool M herein shown consists of two circular centrally-apertured end plates or disks, *m m*, a central tube, *m'*, secured at its ends in the apertures of the disks and constructed to fit upon the bearing *c'* of the spindle, and a barrel, m^2, of less diameter than the disks and secured to the latter concentrically with the tube *m'*, the parts mentioned all preferably being made of sheet-iron. The barrel m^2 is, as herein shown, sustained in position by three metal bars, m^3, secured at their ends to the end plates, *m*, preferably by riveting.

When the spool is constructed as above described, the stud c^2 upon the arm C^2 is preferably engaged therewith by means of an aperture, m^4, in one of the disks *m*, which is located in position for the insertion of the said pin. A safety device for insuring the retention of the spool upon the spindle while running is provided by making a transverse slot or notch, c^5, in the advance side of the pin c^2, and in position to engage the sheet metal at the margin of the aperture m^4. When the spindle is stopped, a slight retrograde movement of the spool upon the spindle will obviously release the engagement of the notch in the pin with the edge of the aperture, and permit the spool to be taken off.

In order to insure the true and steady running of the tightener-pulley J, the latter is mounted upon a long stud, K', fixed in and projecting from the lever K, an extended bearing being thus secured for the said pulley. For the same purpose the lever K is provided with a long hub or sleeve, K^2, at its lower end, which is mounted upon the horizontal rod A^5, which is secured at its ends in the frame-pieces A' A^2, as before mentioned. The upper portion of the lever K, which forms the handle thereof, is preferably made of a separate piece, K^3, bolted to the main portion of the lever and provided at its side adjacent to the frame-piece A' with a projection or lug, *k*, adapted to engage one of a series of notches, a^3, preferably formed in a plate, a^4, bolted to the said frame-piece A', so as to hold the lever immovably in any position in which it is placed, the part K^3 of the lever being made of relatively thin material and flexible laterally, so that it may be bent away from the side piece, A', to engage it with and disengage it from the notches a^3.

As a preferred construction in the brake device for stopping the rotation of the spool-holding spindle C, the lever L and brake-shoe L' are cast upon and in one piece with an elongated hub or sleeve, L^2, fitted to rotate upon the bolt or rod A^4, which forms one of the cross-girts of the frame, and which is located below the pulley C'. By this construction an extended pivot-bearing upon the frame is afforded for the said lever and shoe, and the latter is caused to bear upwardly against the pulley C' when the lever L is rotated in the proper direction upon its pivotal axis.

The lever L' is, as herein shown, attached in a depending position to the sleeve L^2, near the end of the latter which is adjacent to the frame-piece A', and the lower end of the said lever L is connected with the lever K by means of a bar, L^3, pivotally connected at its ends with both of the said levers, as clearly shown in Fig. 3. By this construction it is obvious that when the lever K is shifted to carry the tightener-pulley away from the belt B^3, so as to loosen the latter, the lower end of the brake-lever L will be drawn inward by the bar L^3, and the brake-shoe L' thereby forced upwardly against the pulley C'. When the tightener-pulley is pressed against the belt, also, the brake-shoe will, by the same motion, be disengaged from the pulley C', thus leaving the spindle C free to rotate. In carrying out my invention other well-known devices may obviously be used for varying the throw of the wire-guide instead of the levers H and I and the adjustable stud *i*, connecting them, herein shown.

As far as the operation of the said device for varying the throw of the wire-guide is concerned, also, it is obviously immaterial as to the particular means employed for imparting a reciprocating motion of uniform velocity to the said wire-guide. Other means than those above described may therefore be used for the purpose above mentioned—such, for instance, as is illustrated in Fig. 5 of the drawings. In this case a cylinder, G', provided with right and left hand screw-threads, or grooves arranged to cross each other, such as has heretofore been used in spooling appa-

ratus and for other purposes, is employed to give motion to the lever I, which is provided with a pivoted or swiveled traveler, g', adapted to engage the right and left hand grooves alternately, by which it is driven back and forth from end to end of the said cylinder in a well-known manner. By this means a reciprocatory motion of uniform velocity will obviously be imparted to the lever I and to the slide-bar D through the lever H.

I claim as my invention—

1. The combination, with a rotating spool-holding spindle, a reciprocating wire-guide and wire-straightening device, driving-connections giving a reciprocating movement to said guide and straightening device, and means for actuating the spool-holding spindle, said guide and straightening device being movable in a plane transverse to the axis of the spool-holding spindle, whereby the wire passing through said guide and straightening device may remain tangent to the exterior surface of the body of wire upon the spool during the operation of winding, substantially as described.

2. The combination, with the frame of a wire-spooling apparatus, a rotating spool-holding spindle, a slide-bar mounted upon the machine-frame parallel with the said spindle, a wire-straightener and a wire-guide pivotally connected with the said slide-bar, a cam for reciprocating said slide-bar, actuating devices between the cam and the slide-bar for actuating the latter from the former, and means for actuating the spool-holding spindle, substantially as described.

3. The combination, with the frame of a spooling-machine, a rotating spool-holding spindle, and means for actuating the spindle, of a reciprocating slide-bar mounted in bearings in the frame parallel with the said spindle, a plate or arm, E′, pivoted upon said slide-bar, a wire-straightener and a wire-guide mounted upon said plate, and means for actuating said slide-bar, substantially as described.

4. The combination, with the machine-frame, of a rotating spool-holding spindle and means for actuating the latter, a reciprocating slide-bar mounted in bearings upon the frame parallel with the said spindle, an arm or plate, E′, pivotally connected near one of its ends with the said slide-bar, a wire-straightener and a wire-guide mounted upon said arm or plate, an arm, a', upon the machine-frame supporting the free end of said plate, and means for actuating said slide-bar, substantially as described.

5. The combination, with a revolving spool-holding spindle, of a combined wire-straightener and wire-guide comprising a plate, E′, provided with guides e e, one at each of its ends, and a series of straightening-rollers, e', mounted upon said plate between its ends, means for giving a reciprocating movement to the said plate E′, and means for actuating the spool-holding spindle, said plate E being movable in a plane transverse to the axis of the said spool-holding spindle, whereby the wire may remain tangent to the mass of wire upon the spool during the operation of winding, substantially as described.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

ORLANDO P. BRIGGS.

Witnesses:
C. CLARENCE POOLE,
OLIVER E. PAGIN.