(No Model.) 2 Sheets—Sheet 1.

C. HILL.

MACHINE FOR WINDING THREAD ON SPOOLS.

No. 413,447. Patented Oct. 22, 1889.

Fig. 4

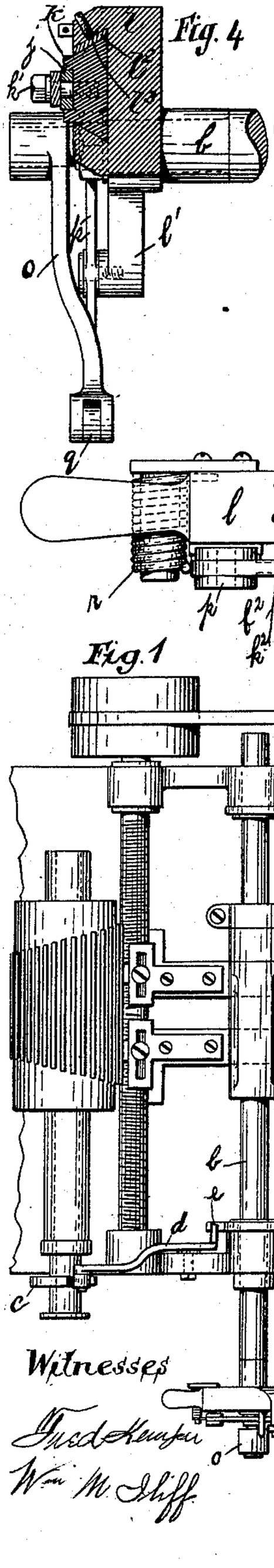


Fig. 2

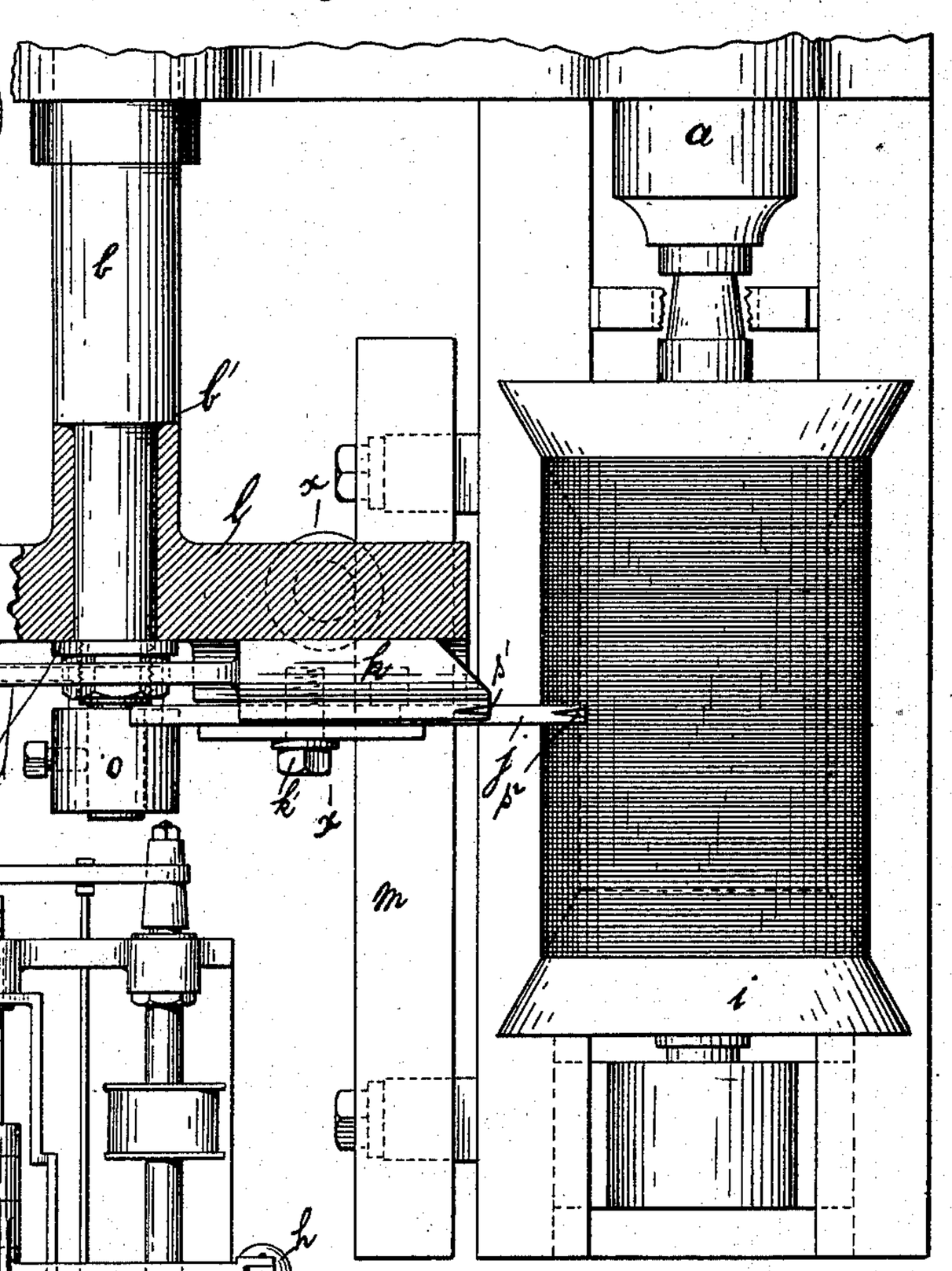
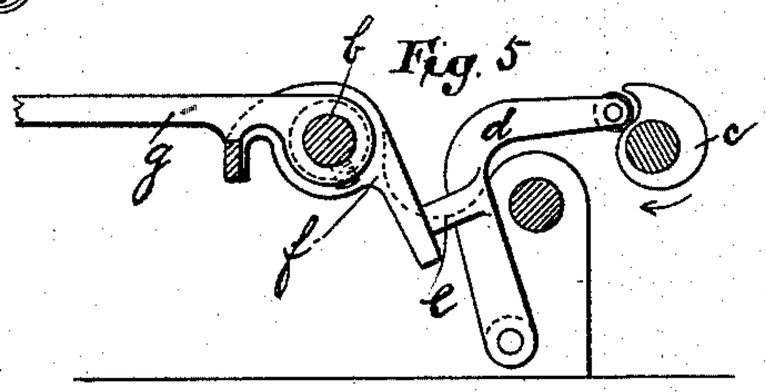


Fig. 1

Fig. 5



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by his attorneys

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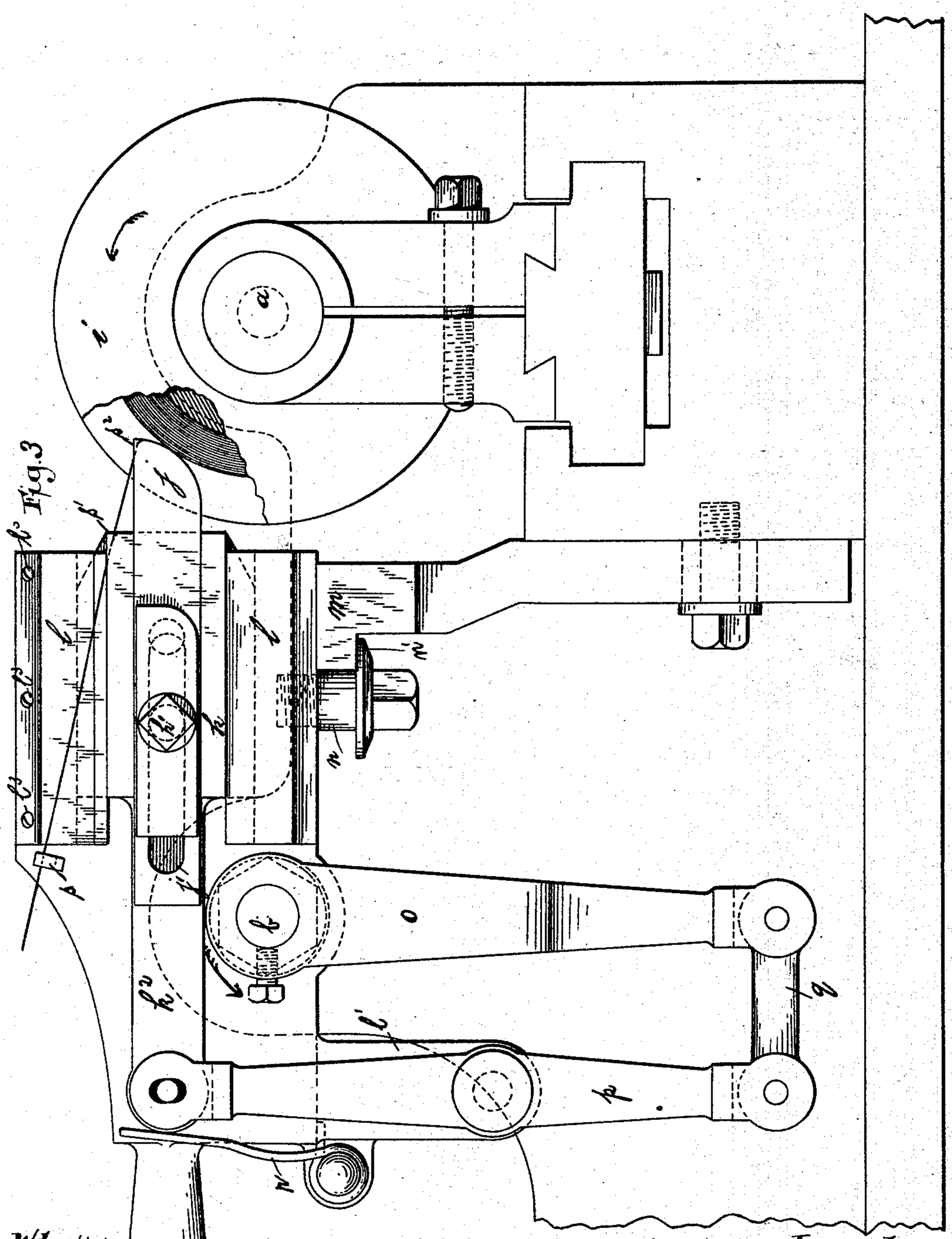

Witnesses
Fred Kemper
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Inventor
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UNITED STATES PATENT OFFICE.

CHARLES HILL, OF NEWARK, NEW JERSEY.

MACHINE FOR WINDING THREAD ON SPOOLS.

SPECIFICATION forming part of Letters Patent No. 413,447, dated October 22, 1889.

Application filed August 3, 1889. Serial No. 319,674. (No model.)

To all whom it may concern:

Be it known that I, CHARLES HILL, of Newark, county of Essex, State of New Jersey, have invented a new and useful Improvement in Machines for Winding Thread on Spools, of which the following is a specification.

This invention relates particularly to means for controlling the motions of the thread-guide.

In Letters Patent of the United States No. 26,415, dated December 13, 1859, is described a thread-winding machine, which, with certain improvements added, that I do not know to have been patented, is commonly referred to as the "Conant improved machine." In these machines it has been customary to give motion to the shaft bearing the thread-guide by means of a snail-cam and other mechanism, so as to positively raise the thread-guide as the winding proceeded. The thread-guide was mounted upon the shaft, and the nose of the thread-guide over which the thread passed moved in a circle with the shaft as a center, the effect being that the angle of inclination of the thread-guide varied at different stages of the winding, and as the nose of the thread-guide was lifted the angle at which the thread passed from it to the spool was rendered more acute, and the distance between the place of contact and the point of the guide was increased.

The object of my invention is to improve this machine by arranging the mechanism for moving the thread-guide so that the same shall as the winding proceeds be moved back from the spool in a direct line, so that the angle at which the thread passes from the nose of the guide to the spool shall remain constant at all stages of the operation.

Figure 1 is a plan view of the thread-winding machine containing my improvement. Fig. 2 is a plan view enlarged, showing the thread-guide and the spool and the adjacent parts for supporting each. Fig. 3 is an end view of the same. Fig. 4 is a cross-section through the line *x x*, Fig. 2, of the thread-guide and other parts. Fig. 5 is a detail showing the mechanism connecting the snail-cam with the shaft upon which the thread-guide is mounted.

a is a stationary revolving shaft, at the extremity of which the spool is mounted in the usual manner.

b is the shaft which traverses backward and forward longitudinally as the winding progresses, and at the end of this is mounted the thread-guide. The traverse-changer and other parts for giving motion to these two shafts are of the ordinary construction, and need not be herein particularly described, because no invention is claimed with respect to them. It is sufficient to say that the shaft *a* revolves continually, that the shaft *b* traverses so as to carry the nose of the thread-guide from one end of the spool-barrel to the other, the length of traverse increasing each time to provide for the flaring flanges in the spool, and that the shaft *b*, also with each change of traverse, rotates slightly in the same direction as the shaft *a*. This rotation of the shaft *b* is accomplished by means of the snail-cam *c*, mounted upon the shaft of the traverse-changer, so as to be moved only as the traverse-changer moves. A lever *d*, pivoted to the frame, rests at one end upon this snail-cam. A projection *e* on the lever *d* rests against one arm of the lever *f*, which is pivoted on the shaft *b*, and upon the other arm of which the arm *g* rests. This arm *g* is made fast upon the shaft *b* at one end, and at its opposite end is held down by a weight *h*. This weight tends constantly to rotate the shaft *b* in a direction to press the thread-guide against the thread upon the spool, and by varying this weight the intensity of such pressure may be varied at will.

i is the spool.

j is the thread-guide. This thread-guide is slotted at *j'*, and is secured to the face of a carriage *k* by means of a set-screw *k'*, passing through the slot of the thread-guide into the carriage. By this means the position of the thread-guide upon the carriage may be adjusted to accommodate spools of different diameters. The carriage *k* is mounted in dovetailed guideways upon the block *l*. This block is loosely mounted upon the shaft *b*, but is compelled to traverse with it by being held between the shoulder *b'* and the collar b^2, as shown in Fig. 2. It is held from rotation downward by means of a rest *m*, extend-

ing under its forward end the full length of the barrel of the spool. This rest is supported from below from the frame of the machine. A flanged bolt n, depending from the bottom of the block l, prevents that block from rotating upward by the lapping of the flange upon the bolt under the rest m, as shown in Fig. 3.

o is an arm fixed upon the extremity of the shaft b.

p is a lever pivoted upon the stud l', depending from the block l. One arm of this lever is coupled to the extremity of the arm o by the link q. The other arm of the lever p is pivoted to a rearward extension k^2 from the carriage k. The pivot connecting p and k^2 works in a slot, as shown in Fig. 3, to provide for converting circular into rectilinear motion.

r is a spring mounted upon the block l, and bearing against the extremity of the rearward extension k^2 from the carriage k, thus tending constantly to thrust the guide j toward the spool.

l^2 is a plate interposed between the carriage and one of its bearings in the block l. This plate, being controlled by set-screws l^3, may be employed to take up the wear.

The operation is as follows: The spool having been placed upon the spindle at the end of the shaft a, the thread-guide having been adjusted upon the carriage to suit the size of spool, the thread having been passed from the bobbin through the guide s and through the grooves s' and s^2 in the carriage and thread-guide, respectively, and having been fastened to the barrel of the spool at one end, the machine is set in operation. The spool will be turned in the direction of the arrow, Fig. 3, and the end of the thread-guide will be held against the barrel of the spool by the pressure produced by the weight h and spring r. As soon as the thread-guide has completed one traverse of the length of the spool-barrel the movement of the traverse-changer will, through the snail-cam c and other mechanism before described produce a partial rotation of the shaft b in the direction of the arrow, Fig. 3. This motion is communicated through the arm o, link q, and lever p to the rear extension k^2 of the carriage k, moving the carriage back a short distance corresponding about with the thickness of the layer of thread. The thread-guide now makes another traverse, at the end of which the same operation of moving back the carriage is repeated, and this occurs at the end of each traverse, so that on each succeeding traverse the thread-guide is moved back a distance approximating to the thickness of a layer of thread from the position which it occupied on the preceding traverse. The pressure of the thread-guide upon the thread is thus maintained uniform, and also the position which the thread-guide occupies with respect to the thread.

I do not desire to limit myself to the precise details of construction shown, since I am aware that the form of construction will be varied to a considerable extent without departing from the principle of my invention, and I desire to cover all such modifications as may embody such principles.

I claim—

1. In a thread-winding machine, in combination, the spool-holder, the thread-guide, guideways supporting said thread-guide, wherein the same may move back from the spool in substantially a rectilinear course, and mechanism whereby the thread-guide is moved back on such guideways at the end of the traverse, substantially as described.

2. In a thread-winding machine, in combination, the spool-holder, the thread-guide, guideways whereby said thread-guide is supported and wherein it may move back from the spool in a substantially rectilinear course, the shaft b, mechanism controlled by the traverse-changer, whereby said shaft is rotated, and mechanism connecting said shaft with the thread-guide, whereby the thread-guide is caused to respond with a substantially rectilinear movement for each partial rotation of the shaft, substantially as described.

3. In a thread-winding machine, in combination, the spool-holder, the thread-guide, the carriage upon which the thread-guide is mounted, the traversing-shaft and the block mounted thereon provided with guideways wherein the carriage moves, and the rest whereby the rotation of said block is stayed, substantially as described.

4. In a thread-winding machine, in combination, the spool-holder, the thread-guide, the carriage upon which the thread-guide is mounted, the guideways whereby the carriage is compelled to move in substantially a rectilinear course, the spring whereby said carriage is impelled forward, and mechanism whereby the carriage is moved backward for each traverse of the thread-guide, substantially as described.

5. In a thread-winding machine, in combination, the spool-holder, the thread-guide, the carriage, adjustable connections between the thread-guide and the carriage, whereby the position of the thread-guide may be adjusted to suit various diameters of spools, the guideways whereby the carriage is held to move in a substantially rectilinear course, and mechanism whereby the carriage is moved backward intermittently to accommodate the accumulation of the thread upon the spools, substantially as described.

CHARLES HILL.

Witnesses:
WM. RUSSELL,
GEO. W. DAVIES.