

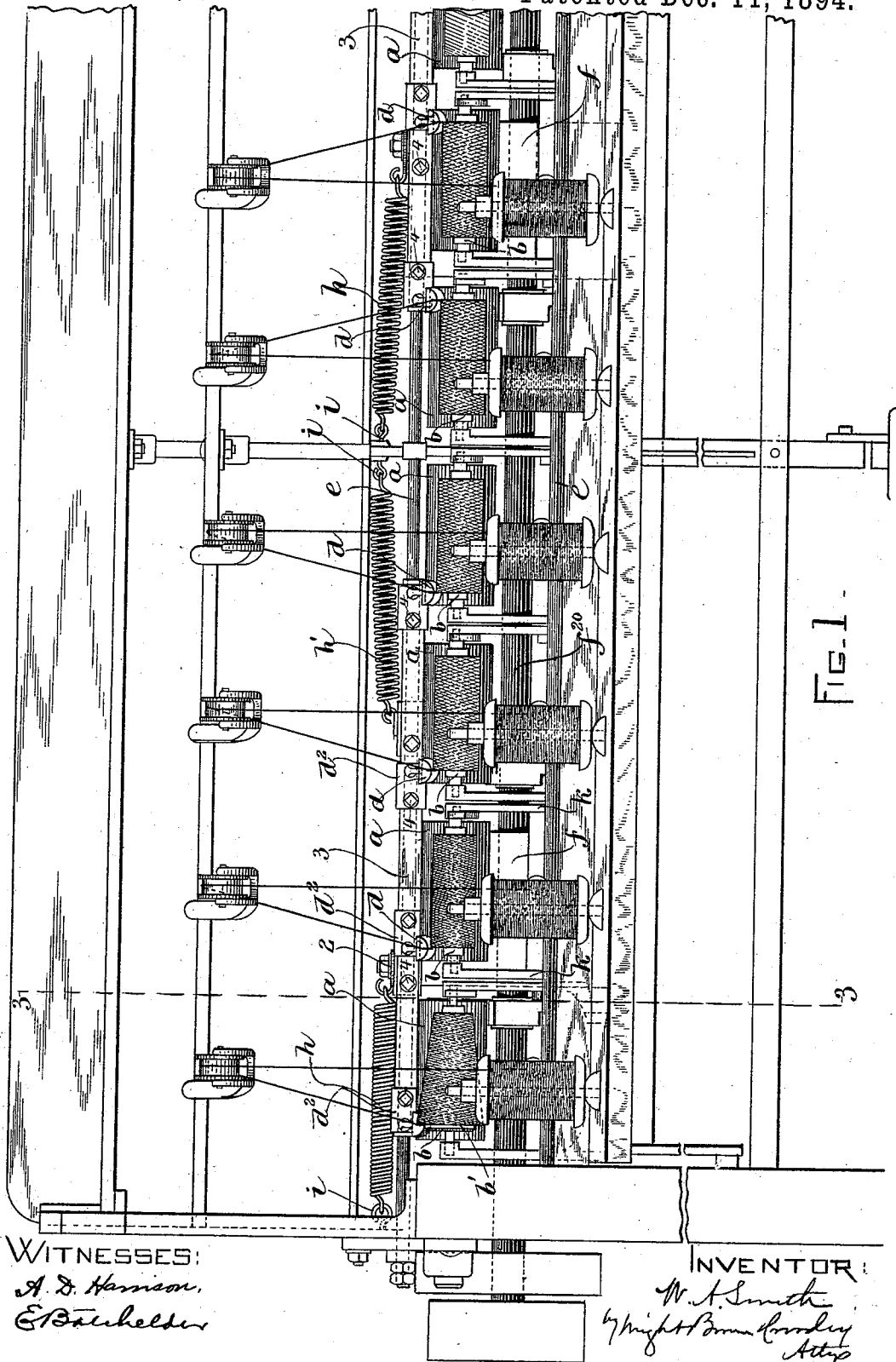
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6 Sheets—Sheet 1.

W. A. SMITH.
WINDING OR SPOOLING MACHINE.

No. 530,731.

Patented Dec. 11, 1894.



WITNESSES:
A. D. Harrison,
E. Baeholder

INVENTOR:
W. A. Smith
by Knight & Brown, Attorneys

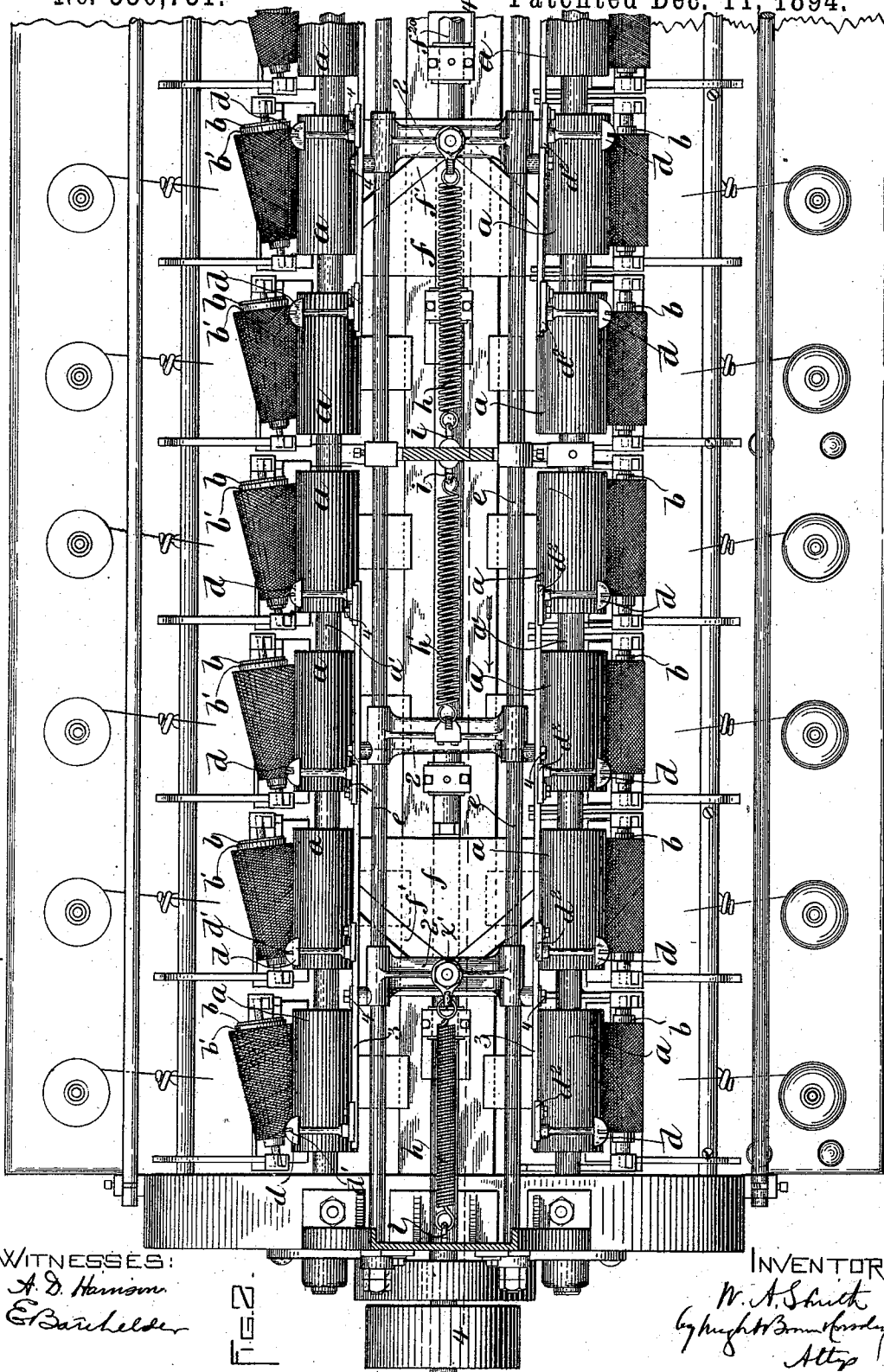
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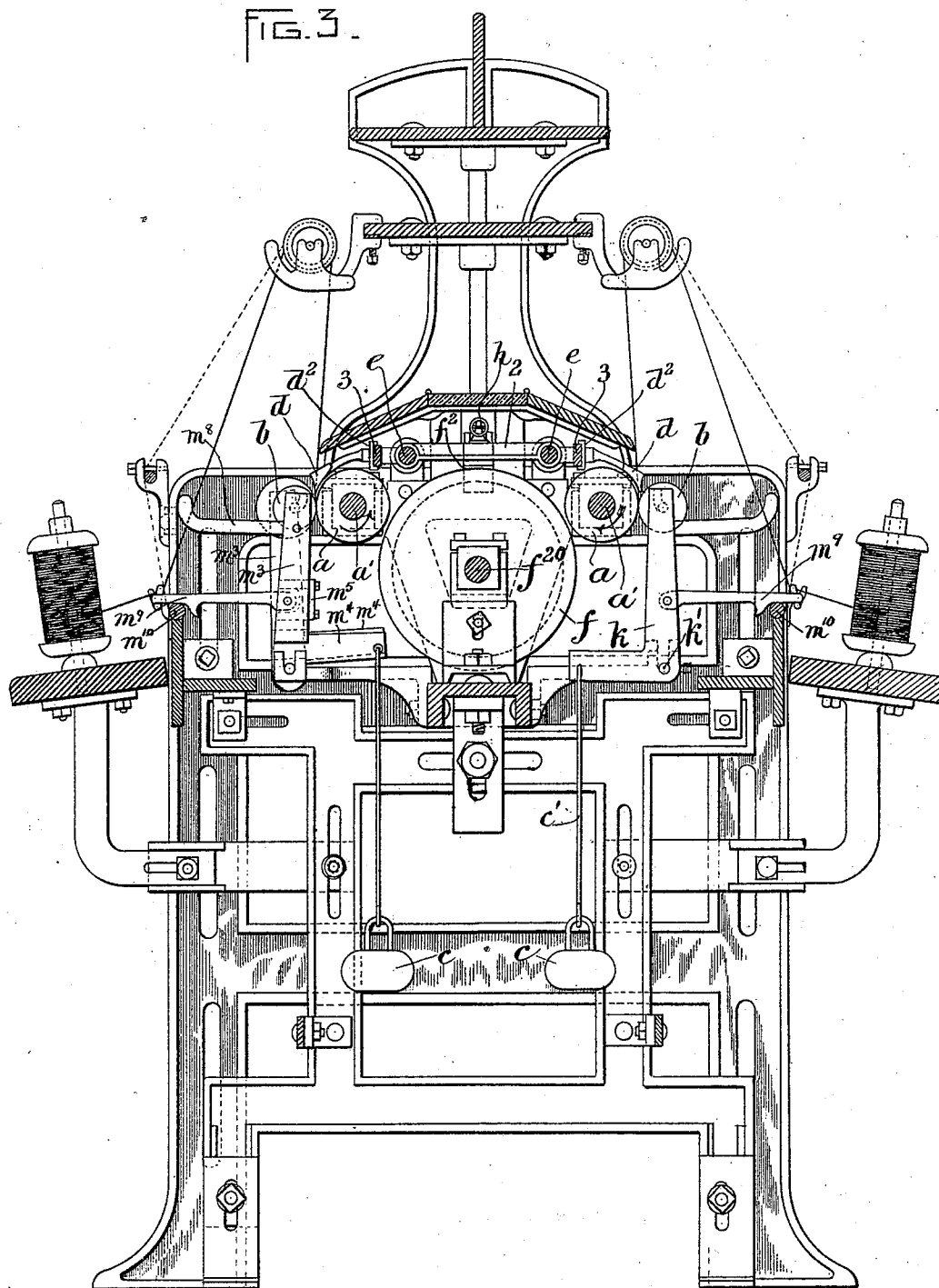
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FIG. 3.



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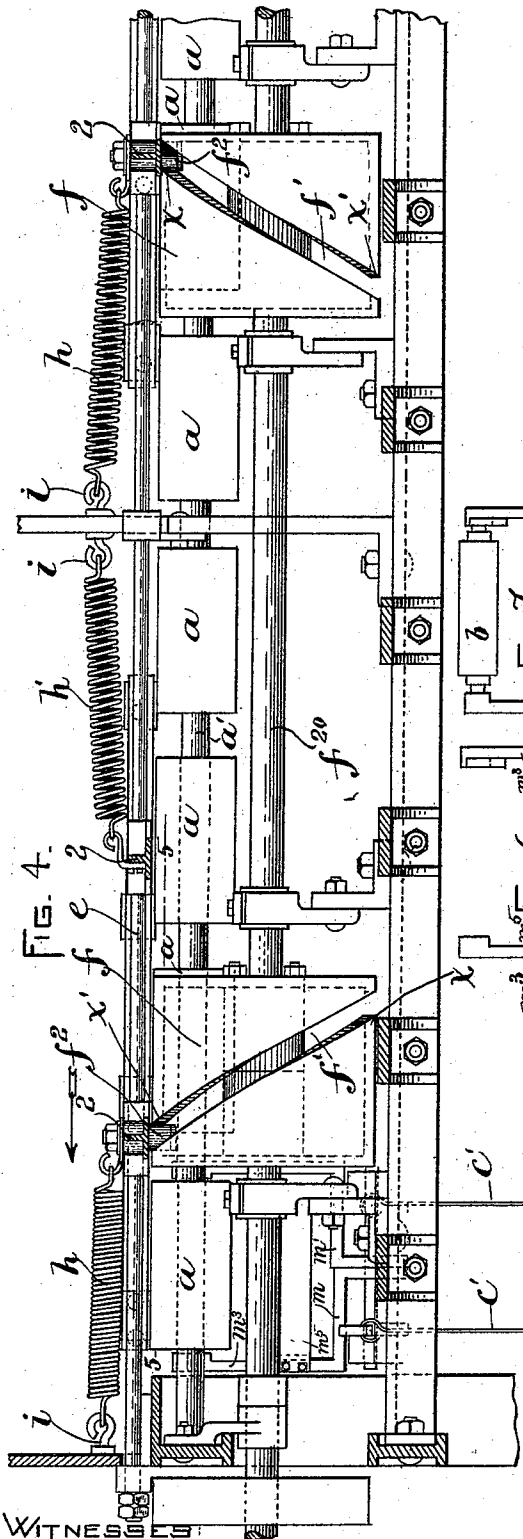
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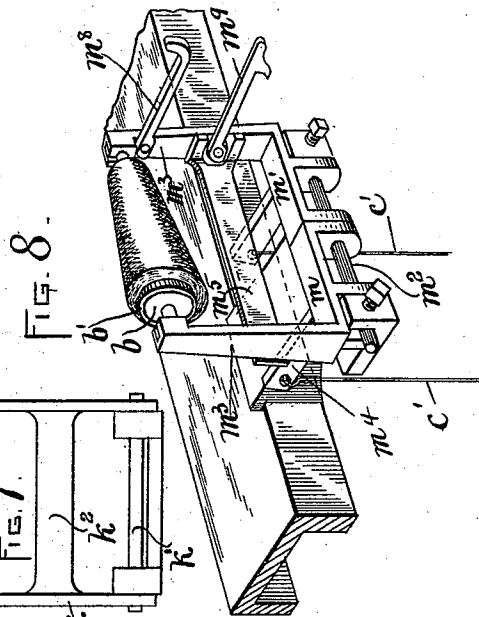
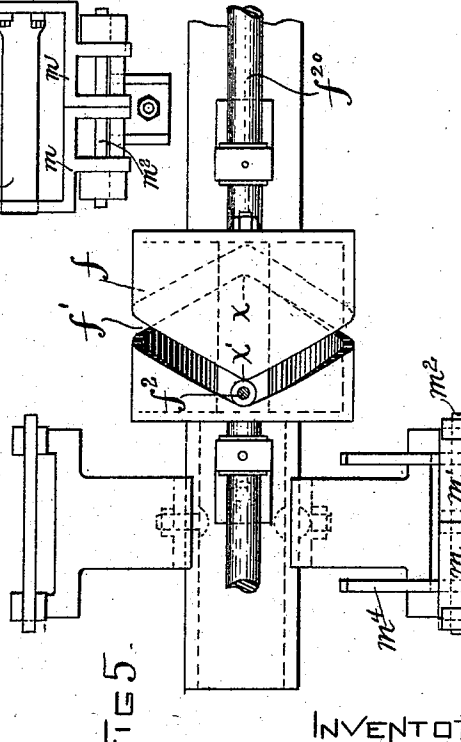
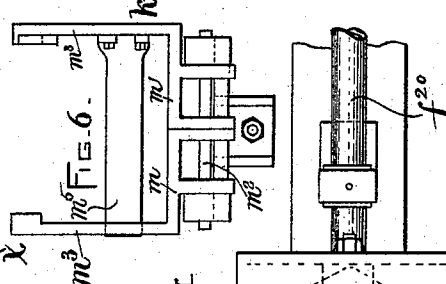
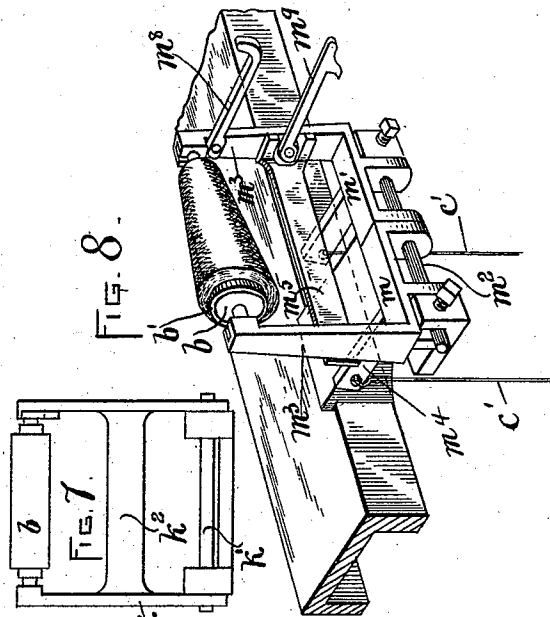
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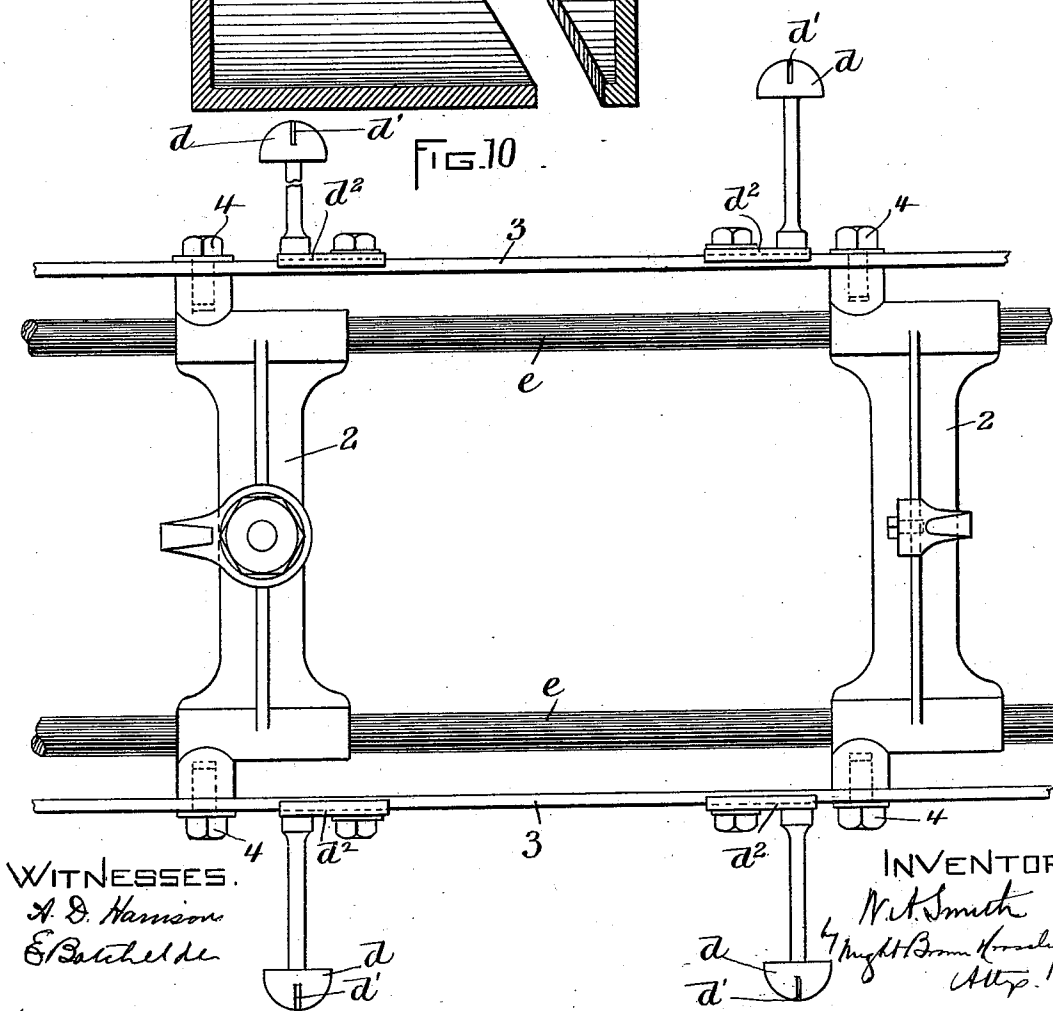
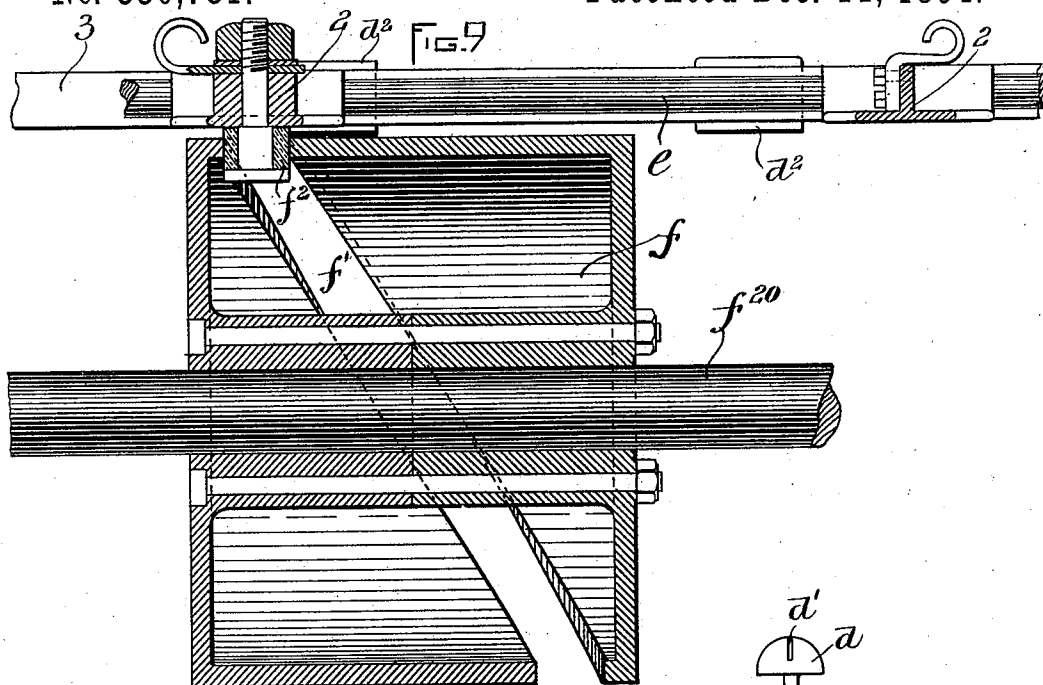
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WITNESSES.

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UNITED STATES PATENT OFFICE.

WILLIAM A. SMITH, OF LAWRENCE, MASSACHUSETTS.

WINDING OR SPOOLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 530,731, dated December 11, 1894.

Application filed March 30, 1894. Serial No. 505,718. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM A. SMITH, of Lawrence, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Winding or Spooling Machines, of which the following is a specification.

This invention relates to machines for forming accumulations of thread upon spools or cop tubes, either straight or conical by the operation of cross-winding—that is to say, feeding the yarn to a continuously rotating spool or tube by means of a reciprocating or traversing yarn guide. In organized machines of this character, a large number of spools or tubes are wound simultaneously, requiring the use of a large number of yarn-guides, and mechanism for reciprocating the same. In many spooling machines now in use a series of yarn-guides extending the entire length of the machine are connected in one gang, all moving simultaneously and all arrested simultaneously at the end of the movement in each direction, so that the reversal of the movement is attended with considerable jar, involving wear and strain of the machine, as well as a very objectionable noise and rattle. In other machines now in use, each guide is movable independently of all the others, but these machines are necessarily complicated and expensive, besides being very noisy when in operation.

My invention has for its object to provide a machine of this character, in which the objectionable features above mentioned shall be eliminated, so that the machine will run without objectionable shocks or jars, and with the minimum noise.

The invention also has for its object to enable the accumulation of yarn on a conical cross-wound spool or tube to be more evenly and uniformly wound from end to end than heretofore.

To these ends, the invention consists in the improvements which I will now proceed to describe and claim.

Of the accompanying drawings, forming part of this specification,—Figure 1 represents a side elevation of a portion of a spooling machine embodying my improvements. Fig. 2 represents a top plan view of the same. Fig. 3 represents a section on the line 3—3 of

Fig. 1. Fig. 4 represents a section on line 4—4 of Fig. 2. Fig. 5 represents a section on line 5—5 of Fig. 4, and a plan view of the mechanism below said line. Figs. 6 and 7 represent side elevations of two forms of bobbin and cop holder. Fig. 8 represents a perspective view of the form of holder shown in Fig. 6. Figs. 9 to 12 inclusive represent detail views.

The same letters of reference indicate the same parts in all the figures.

In the drawings—*aa* represent the driving-rolls which rotate the spools or dummy bobbins *b* on which the yarn is being wound, said bobbins being yieldingly pressed toward the rolls *a* and rotated by the frictional contact of the accumulations of yarn on the paper cop tubes *b'* placed upon said bobbins with said driving-rolls. The rolls *a* are affixed to shafts *a' a'*, which may be rotated as indicated by the arrows in Fig. 3, by any suitable means. The bobbins are supported and pressed inwardly toward the driving rolls by pivoted holders hereinafter described, which are acted on by weights *cc* to give the desired pressure of the yarn wound on the tubes placed on said bobbins, against the driving-rolls.

dd represent the reciprocating yarn-guides which deliver the yarn to the cop tubes, there being a guide for each tube, as usual in this class of machines. Each guide is here shown as an arm having a yarn-receiving slot *d'* in its outer end.

In carrying out my invention, I divide the yarn-guides into two or more groups or gangs, arranged end to end, so that the guides of the several gangs collectively constitute a series extending throughout the length of the machine; the guides comprising each gang being rigidly connected so that they move in unison, while each gang is movable independently of the adjacent gang. Machines of this character are usually of considerable length, so that in a machine of ordinary length there is room for several gangs, an even number being preferably employed.

In the simplest construction of the machine, two gangs of yarn-guides are employed, and for the sake of convenience I will describe the machine shown in the present case as having two gangs, although it will be obvious that a

much larger number of gangs may be employed. The guides of each gang are attached to a sliding frame or carriage which is movable on fixed guide-rods *e e*, the carriages
 5 being arranged end to end. Said carriages may be of any suitable construction, and each is here shown as composed of two cross-heads 2 2, having sockets in their end portions formed to slide on the rods *e e*, and side bars
 10 3 3 secured by set-screws 4 4 to the cross-heads. The yarn-guides have base plates *d*², which are securely bolted to the side bars 3. I have here shown eight yarn-guides (four on each side) grouped on one frame or carriage,
 15 but the number of guides in a gang may obviously be greater or less.

My invention includes the provision of means for moving the two gangs simultaneously in opposite directions, and for simultaneously reversing their movements, so that the shock or jar which attends the reversal of the movement of the yarn-guides when all the guides are connected in a gang extending the entire length of the machine is avoided, the
 25 stoppage of the movement of each gang being neutralized by the stoppage of the movement of the other gang. To this end, I provide two operating cams *f f*, one for each gang, the acting parts of each cam being the sides of a cam-shaped groove *f'* which receives a stud or trundle-roll *f*² on the corresponding yarn-guide carriage, one cam being engaged with the carriage of one gang, and the other with the carriage of the other gang. The cams
 30 are affixed to a shaft *f*²⁰ which is continuously rotated by any suitable means. Said cams are formed as shown in Figs. 2 and 4, so that each imparts a reciprocating movement to the gang of guides with which it is connected, the arrangement of each being the reverse of that
 40 of the other, so that while one cam is moving one gang in one direction the other cam is moving the other gang in the opposite direction. The cams are also arranged so that the movement of the two gangs will be reversed simultaneously, thus neutralizing the stoppage of the movement of one gang in one direction by the stoppage of the movement of the other gang in the opposite direction, the
 50 result being a very marked increase in the steadiness of the running of the machine, and a marked decrease of noise, wear, and strain, as compared with machines in which all the yarn-guides are rigidly connected in one gang
 55 extending the entire length of the machine.

I prefer to provide the carriage of each gang of guides with two springs *h h'*, which act alternately in yieldingly opposing the movement of the carriage as it approaches the ends
 60 of its movement, and thus preventing a blow of the trundle-roll *f*² against the outer side of the cam-groove when the movement is reversed. The said springs are attached, by their outer ends to fixed supports *i i* on the
 65 frame of the machine, and at their inner ends to the cross heads 2 2 or other suitable parts

of the yarn-guide carriage. The spring *h'* is extended by the latter part of the movement of the yarn-guide carriage in the direction indicated by the arrow in Fig. 4, and thus
 70 presses the trundle-roll *f*² against the projecting side *x'* of the cam when the movement of the carriage is being reversed. The spring *h* is extended by the latter part of the movement of the carriage in the opposite direction,
 75 and presses the trundle-roll against the projecting side *x* of the cam during the next reversal of the movement. Hence there is no objectionable noise or rattle when the movement is reversed.
 80

It will be seen that the springs *h h'* act alternately, the spring *h* being slack when the spring *h'* is under tension, and vice versa, so that there is no interference with the action of either spring by the other.
 85

When a cylindrical cop is employed, an ordinary form of holder for said cop may be employed, such, for example, as that shown in Fig. 7 and at the right-hand portion of the machine in Fig. 3, said holder comprising two
 90 angular side pieces *k k* connected by a pivot rod *k'* to fixed supports on the frame, and connected to each other by a cross-bar *k*². The upper ends of the vertical arms of said side pieces have bearings for the dummy
 95 bobbin *b*, and the weights *c* are suspended by rods *c'* from the horizontal arms.

When a conical cop is employed, I prefer to support the same in a holder of improved construction adapted to permit the ends of
 100 the cop to move independently toward and from the accompanying driving-roll *a*, so that the axis of the cop may stand more or less obliquely to the axis of the said driving-roll. The construction of the said holder is clearly
 105 shown in Figs. 6 and 8, the holder consisting of two base sections *m m'* having ears which are mounted to turn on a pivot rod *m*², each having a vertical arm *m*³ supporting one end of the bobbin *b*, and a horizontal arm *m*⁴ supporting one of the weights *c*. The arm *m*³, which supports the smaller end of the bobbin, has a bar *m*⁵ which projects across the space
 110 between the arms and extends behind the inner edge of the other arm *m*³ which supports the larger end of the bobbin. This construction permits the smaller end of the cop to move outwardly faster than the larger end, each end being always under the same pressure. The bar *m*⁵ enables both sections to be
 120 moved outwardly together, when it is desired to displace the holder and separate the mass of yarn from its driving-roll, the arm *m*³ of the section *m'* having a handle *m*⁸ by which said section may be swung outwardly, and
 125 when this is done the same movement is imparted to the arm *m*³ of the other section by the bar *m*⁵. A sufficient space is left between the bar *m*⁵ and the arm behind which it projects to prevent the bar from bearing on the
 130 arm during the winding operation. *m*⁹ is a latch on the holder adapted to engage a fixed

rod m^{10} on the frame of the machine to secure the holder in its displaced position.

A bobbin formed by cross-winding yarn on a conical cop increases more rapidly at the smaller end of the cop than at the larger end, and I have found that if the ends of the cop are not independently movable, the mass of yarn will be wound unevenly, giving the periphery a wavy or corrugated appearance. By the sectional construction of the holder above described, the winding is made uniform, so that the mass presents a symmetrical periphery.

I do not limit myself to the described details of construction and relative arrangement of parts, as the same may be variously modified without departing from the spirit of my invention. The springs $h h'$ may be arranged, to act by compression instead of by extension. While said springs are very desirable for the purpose of diminishing the noise attending the operation of the machine, it will be seen that the advantage gained by the operation of the gangs of yarn-guides arranged end to end as described by two oppositely acting cams moving the gangs simultaneously in opposite directions is not dependent on the springs.

I do not claim the construction of the yarn-guides here shown and described, as the same is not of my invention. I may use any other suitably constructed yarn-guide, such as a wire arm bent to form a slot or eye through which the yarn may pass.

I am aware that the yarn-guides of a spooling machine have been divided into two independently movable gangs arranged side by side, one including all the guides at one side of the machine and the other all the guides at the opposite side of the machine, said gangs being moved simultaneously in opposite directions. My arrangement differs from that last mentioned in that the guides are divided across the machine into gangs arranged end to end instead of being divided lengthwise of the machine into gangs arranged side by side. The short gangs arranged end to end are much lighter than the elongated gangs arranged side by side, so that when the gangs are oppositely reciprocated, as described, the machine runs much more smoothly and with less strain and wear than would be the case if the gangs extended lengthwise of the machine.

I claim—

1. A spooling machine comprising in its construction a plurality of gangs of yarn-guides arranged end to end, one gang being movable independently of another, and mechanism for oppositely reciprocating said gangs to neutralize the jar caused by the reversal of their movement, as set forth.

2. In a spooling machine, the combination of two gangs of yarn-guides arranged end to end each gang being movable independently

of the other, and two oppositely arranged cams, one engaged with one gang and the other engaged with the other gang, said cams being formed to move the two gangs simultaneously in opposite directions and to simultaneously reverse their movement, as set forth.

3. A spooling machine comprising in its construction a plurality of gangs of yarn-guides arranged end to end, mechanism for independently reciprocating said gangs and for simultaneously reversing their movement, and alternately acting springs applied to each gang, one spring acting during one reversal of movement while the other spring acts during the other reversal of movement.

4. A spooling machine comprising in its construction two gangs of yarn-guides arranged end to end each gang being movable independently of the other, two oppositely arranged cams engaged with said guides, and two springs acting to yieldingly oppose the movement of said gangs in one direction, and two other springs acting to yieldingly oppose the movement of the gangs in the opposite direction, as set forth.

5. A spooling machine comprising in its construction a supporting frame having fixed guides, two carriages arranged end to end movable on said guides, each carriage supporting a gang of yarn-guides, and two oppositely arranged cams engaged with projections or trundle-rolls on said carriages, said cams being formed to move the two carriages simultaneously in opposite directions and to simultaneously reverse their movement, as set forth.

6. In a spooling machine, the combination of two independently movable carriages arranged end to end each having a gang of yarn-guides, two oppositely arranged cams engaged with trundle-rolls or projections on said carriages, and two springs engaged with each carriage, one opposing the latter part of the movement of the carriage in one direction while the other opposes the latter part of the movement of the carriage in the other direction, as set forth.

7. In a spooling machine, the combination with a friction driving-roll and a traversing yarn-guide, of a holder composed of two sections independently pivoted to fixed supports, each section having a weight whereby it is pressed inwardly, one section having a bar projecting behind the other section and adapted to communicate an outward movement to the latter, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 20th day of March, A. D. 1894.

WILLIAM A. SMITH.

Witnesses:

HORACE BROWN,
A. D. HARRISON,