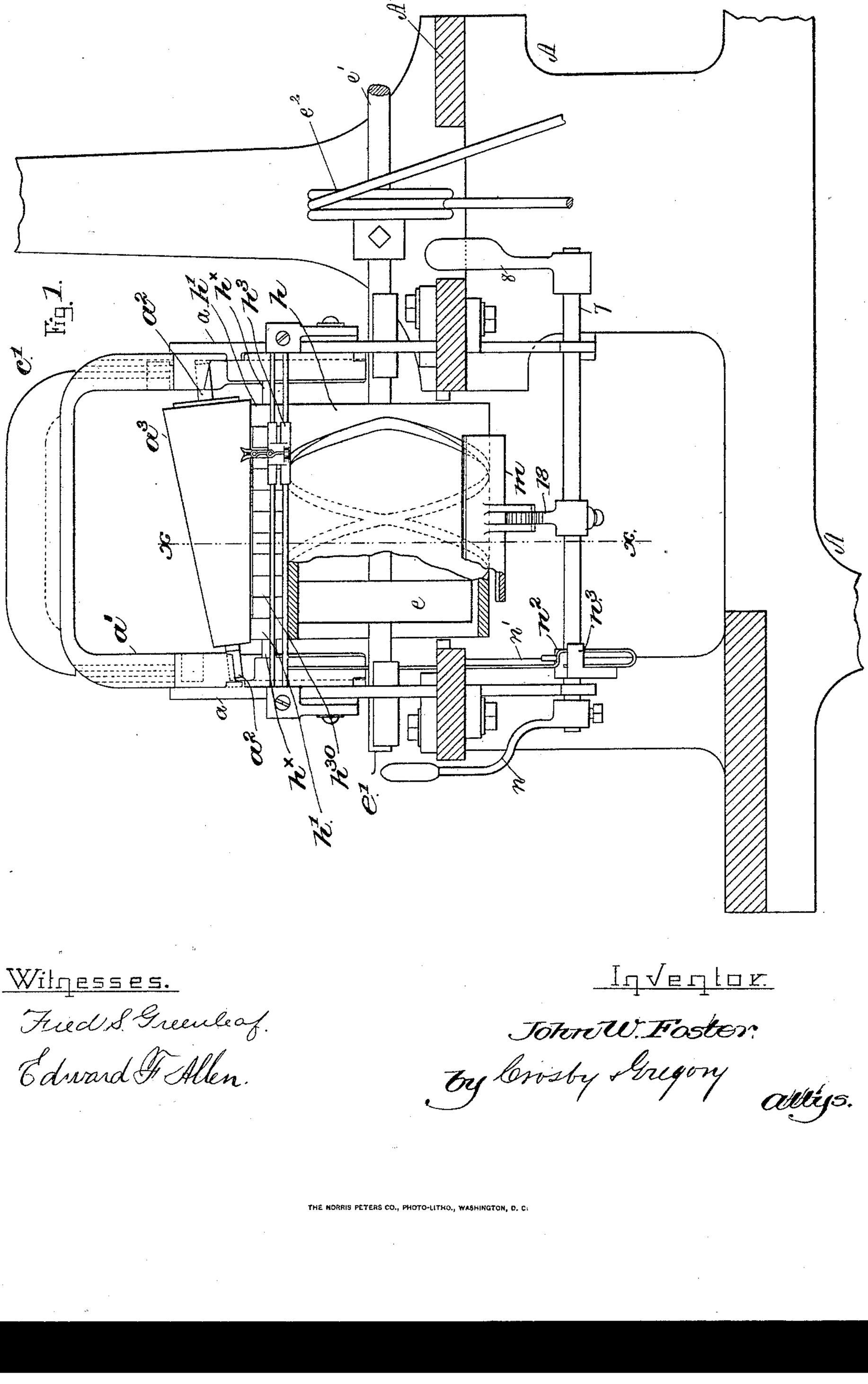
(No Model.) 2 Sheets—Sheet 1.

# J. W. FOSTER.

## YARN SPOOLING MACHINE.

No. 459,040. Patented Sept. 8, 1891.

Fig. 1.




Witnesses.

Fred'k S. Greenleaf.

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attys.

(No Model.) 2 Sheets—Sheet 2.

# J. W. FOSTER.

## YARN SPOOLING MACHINE.

No. 459,040. Patented Sept. 8, 1891.

Fig. 5.

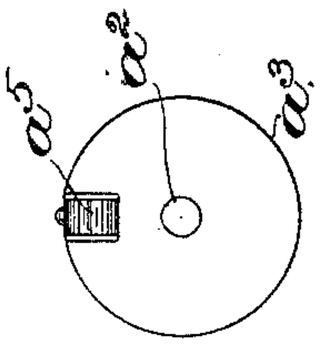



Fig. 4.

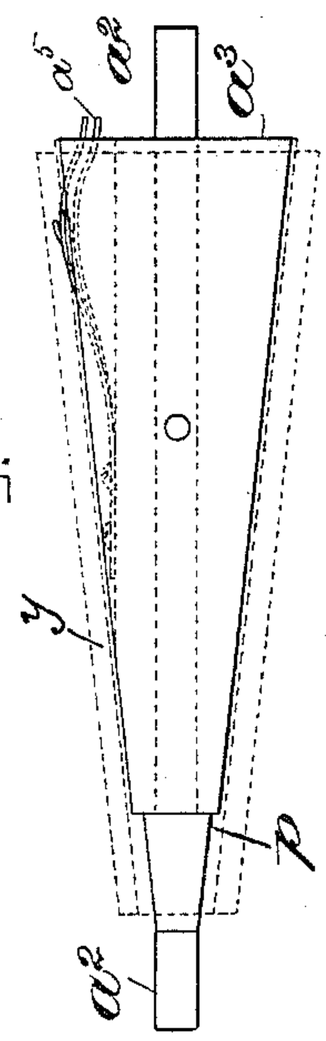



Fig. 3.

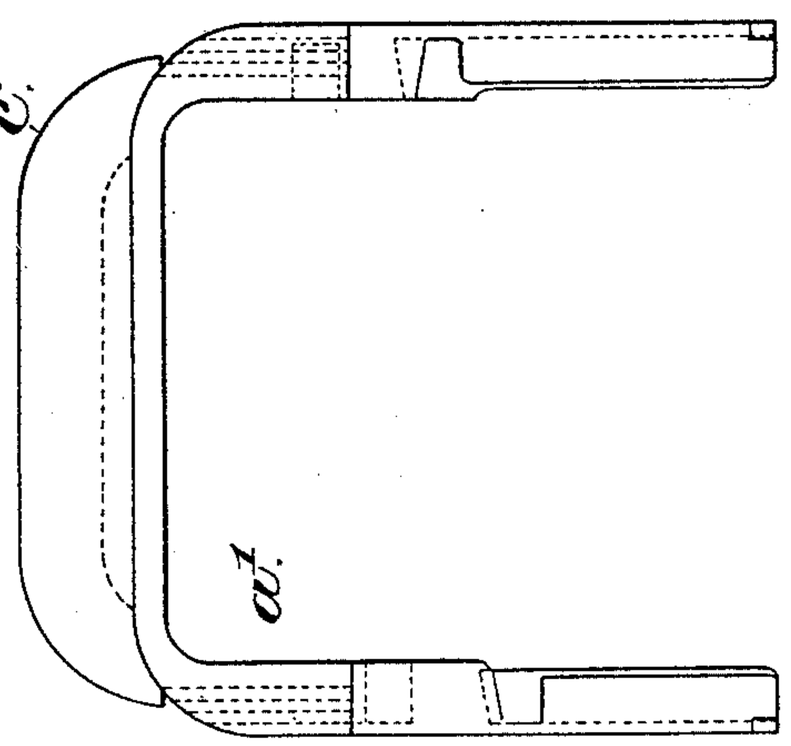



Fig. 6.

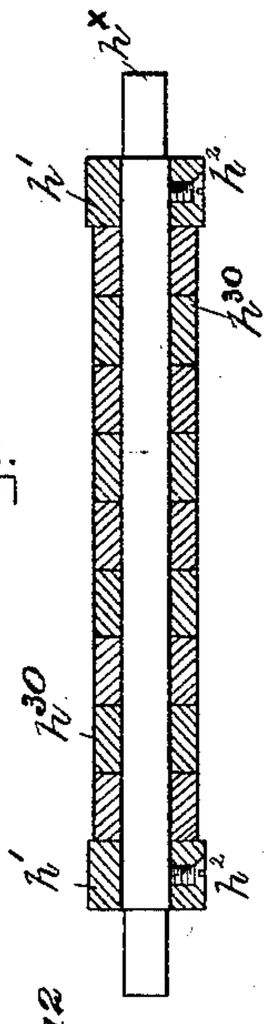
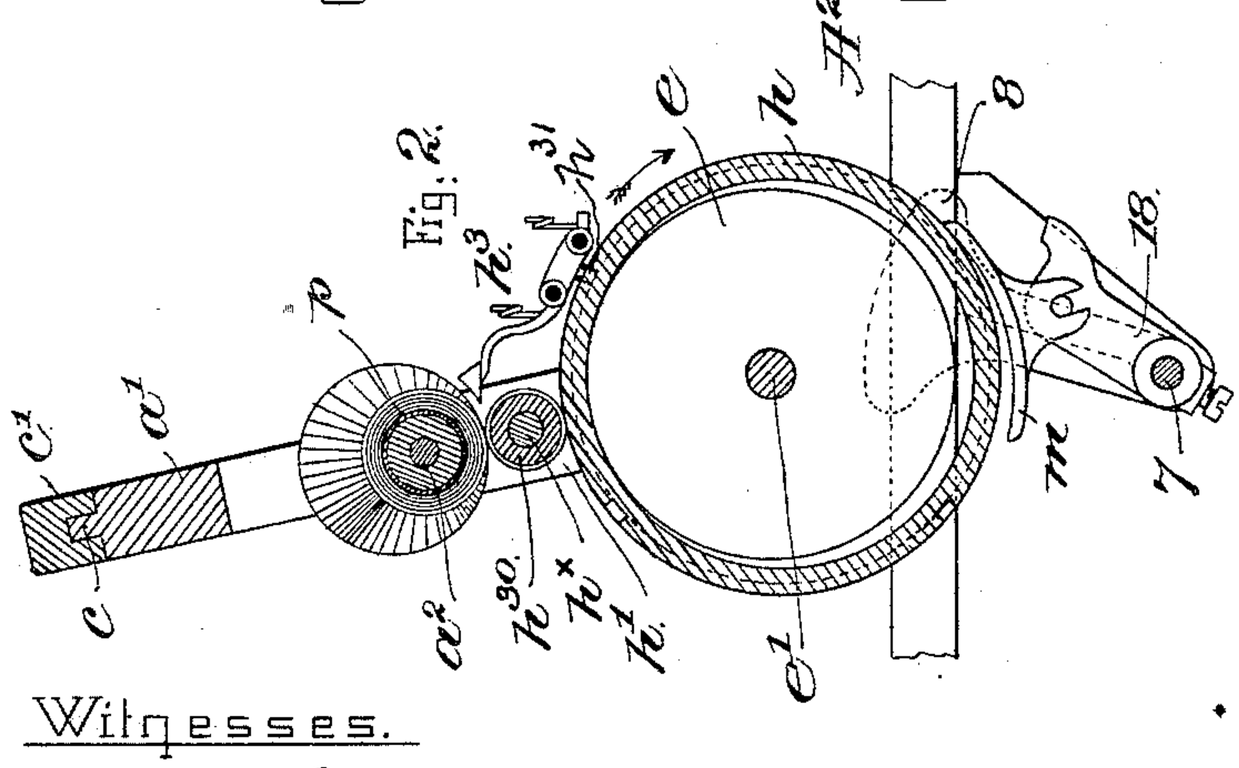



Fig. 2.




Witnesses.

Fred S. Greenleaf.

Edward F. Allen.

Inventor

John W. Foster:

by Crosby & Gregory Attys

# UNITED STATES PATENT OFFICE.

JOHN W. FOSTER, OF SPRINGFIELD, MASSACHUSETTS.

## YARN-SPOOLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 459,040, dated September 8, 1891.

Application filed May 18, 1891. Serial No. 393,155. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN W. FOSTER, of Springfield, county of Hampden, State of Massachusetts, have invented an Improvement in Yarn-Spooling Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

The invention is intended as an improvement on the spooling-machine described in my application, Serial No. 357,331, filed July 1, 1890. In the said application the so-called "intermediate roll," located between the shell-roll and the cone having the conical cop-tube or other usual surface to be supplied with yarn or thread, is represented as a solid roll. It will be understood in the rotation of a cone that its surface velocity is faster where the cone is of greatest diameter, and vice versa. In practice this difference in surface velocity is objectionable for some classes of yarn, and to overcome this difficulty is the chief object of my present invention. In my present invention I have therefore devised an intermediate roll composed of a shaft and a series of loose rings or cylinders placed thereon between two collars fast upon the shaft, the external diameters of the rings being preferably somewhat less than the external diameters of the collars. When a conical surface is being rotated by a cylindrical surface, as in the application referred to, the yarn going upon the larger diameter of the cone is subjected to very much more strain, friction, and abrasion than the yarn going upon the smaller part of the cone, and with fine yarn this causes very much trouble and delicate yarns are broken or unduly stretched or strained; but when the intermediate roll which contacts with the cone or the yarn being wound thereon is made in sections, as a series of loose rings, each loose ring will be driven, it will be understood, only by the friction between itself and the rotating shaft upon which it is mounted, and the surface speed of the rolls will consequently be adapted to the surface speed of the cone from end to end, the rings upon the shaft opposite the larger end of the cone slipping very much more than the rings on the shaft opposite the smaller end of the cone. In this way many parts of the cone are engaged, as it may be said, separately by separate rings or drivers, each one urging the cone forward by a like strain, and in this way the strain is so evenly distributed upon the yarn going upon the cone from end to end that the most delicate yarns may be wound with safety.

In cone-winding machines as heretofore made it has been customary to surface the cone, if of paper, with sawdust, &c., or to roughen the cone or provide suitable appliances to prevent the slipping of the first layers of yarn from the large toward the small end of the cone. In this present invention the employment of the collars of greater external diameter than the rings renders such rough-surfaced cone unnecessary, for when the cone is first applied in the machines its extremities bear upon the collars, while between the collars the cone does not contact with the rings. When the first layers of yarn are applied, the cone is rotated solely by the collars, and the yarn then moved is not subjected to friction or pressure of any kind by the rings; but after two or three layers have been wound, so as to furnish enough material to contact with the loose rings, then the rings become the drivers for the cone and the cone is lifted from the collars. There is no danger of the yarn slipping after two or three layers have been properly laid. In the application referred to the journals of the cone are acted upon by a yoke mounted loosely in guide-stands of the frame-work, so that the weight of the yoke keeps the cone pressed against the roll, which latter rotates it, the yoke rising as the yarn accumulates upon the cone. For different classes of work this yoke has to be varied as to its weight, and I have therefore so constructed the yoke that additional weights of the proper size may be readily applied thereto.

One part of my invention consists in a spooling-machine containing a cone-rotating roll made up of a series of loose rings adapted to slip more or less upon their carrying-shaft to correspond with the surface speed of the cone, substantially as will be described.

Other features of my invention will be hereinafter described, and pointed out in the claims.

I have shown my invention in cone-driving

rolls as applied to a so-called "shell-roll" constructed and driven as provided for in said application; but I desire it to be understood that my improved cone-driving roll, composed of loose sections or rings, is equally applicable to other forms of spooling-machines, wherein the drums are made solid or without loose shells.

Figure 1 in section and elevation represents a sufficient portion of a spooling-machine to enable my present improvements to be understood; Fig. 2, a section in the line $x$ $x$, Fig. 1, looking from the left. Fig. 3 is a front view of the yoke with its attached weight. Fig. 4 shows the cone, upon which will be placed any usual conical cop-tube, the cop-tube being shown in dotted lines; Fig. 5, a right-hand end view of Fig. 4; Fig. 6, a sectional view of my improved cone-driving roll.

Referring to the drawings, A represents the frame-work of part of a spooling-machine of usual construction. This frame-work supports suitable sills $A^2$, having suitable bearings for a shaft $e'$, upon which is mounted one or more disks or wheels $e$, which wheels are surrounded loosely by and support at times a cylindrical shell $h$, represented as provided externally with a crossing groove, as indicated by dotted and full lines, to receive a shoe connected with a foot $h^{31}$ of a traversing carriage $h^3$, which is adapted to be slid longitudinally on suitable guide-rods $h^{10}$. The shaft $e'$ is provided with a pulley $e^2$, over which is extended a belt $e^3$, driven by a pulley or drum $e^4$ on a shaft $e^5$. Below the shaft $e'$ and parallel to it is a rock-shaft 7, having attached to it at one end a weight 8 and at its opposite end a hand-lever $n$, the said rod having between its ends an attached arm 18. Pivoted on the arm 18 is a shoe $m$, having a concaved surface, which, when the yarn is being wound properly and the spool or cop-tube has not been sufficiently filled, rests below and out of contact with the shell. The shaft 7 has an attached hook device $n^2$ $n^3$, with which co-operates the lower end of a rod $n'$, connected to a yoke $a'$, having shoulders to bear upon the journals of a cone $a^3$, so that when the cone—or it may be a spool—has been filled with yarn the elevation of the cone caused by the increased amount of yarn causes the upturned end of the rod $n'$ in contact with the hook device to turn the rock-shaft 7 slightly, so that the arm 18 lifts the shoe in contact with the shell $h$, the shell by its momentum, assisted by the force of the weight, which is then turned past its center, causing the shoe to lift the shell at its interior from the upper side of the wheels $e$, thus instantly stopping the rotation of the said shell, and consequently the winding operation. These parts, so far as described, are and may be substantially as in my application, Serial No. 357,331, to which reference may be had.

In this invention I have shown the yoke $a'$ as provided at its upper end with a projection, as $c$, to be embraced by the forked or notched lower side of a weight $c'$, there being in practice weights of different sizes to be added to the yoke in order to adapt it to the work to be done. It is obvious that the weight may be kept in place on the yoke by a projection on one entering a groove in the other, and it is immaterial which has the groove or projection.

I have shown the cone $a^3$ as provided with a tube-holding spring $a^5$, suitably constructed and shaped to engage any usual conical tube $p$ of paper or other material, which may be applied upon the cone to have the yarn wound thereon, the said cop-tube and yarn $y$ thereon represented by dotted lines in Fig. 4.

The cone-driving roll (represented enlarged in Fig. 6) is composed of a shaft $h^\times$, having two collars $h'$, each fast thereon by a suitable screw $h^2$, and between these collars the shaft is surrounded loosely by a series of rings $h^{30}$. The collars $h'$ rest directly on the drum $h$ of whatever form used to rotate the roll; but the rings are rotated only by the contact of the shaft with the inner sides of the rings. When the cone, having a suitable conical cop-tube or otherwise, is first put in position to receive yarn, the ends of the cone will rest upon the collars $h'$, and the latter will rotate the cone until that part of the cone opposite the rings, of less diameter than the collars, has received one or more layers of yarn, and said layers go on without friction or strain against the yarn by the rings. When, however, the cone has received one or more layers of yarn and the same has been properly laid, then the yarn comes in contact with the loose rolls and the cone is lifted from contact with the collars, and thereafter as the cone-driving roll is rotated the loose rings are rotated only at a surface speed corresponding with the surface speed of that part of the cone or yarn thereon with which they are in contact, the shaft $h$ slipping the most in that ring nearest the large end of the cone, and vice versa.

It is not intended to limit this invention to the exact width of the loose rings, nor to the number of rings used in making up the cone-driving roll.

Instead of the particular drum herein shown, I may employ a drum such as represented in my patent, No. 404,831, of June 11, 1889, and the traverse mechanism for laying the yarn may be as in the said patent and yet be within the scope of my invention.

In this present instance of my invention the traverse carriage $h^3$ has a foot which enters the crossing grooves in the shell-roll, all as provided for in my said application.

I claim—

1. In a spooling-machine containing a drum adapted to rotate a cone, a cone-driving roll composed of a shaft having a series of loose rings mounted thereon, the said rings being driven by friction between themselves and the said shaft, substantially as described.

2. A rotating drum and a conical roll, combined with a cone-driving roll composed of a

shaft having fixed collars to rest upon and be driven by the rotating drum and having a series of loose rings to contact with the cone or the yarn thereon, the said rings being rotated only by the friction between themselves and the shaft upon which they are mounted, substantially as described.

3. A rotating drum and a conical roll, combined with an intermediate cone-driving roll having fixed collars to rest on the drum and provided with a series of loose rings of less external diameter than the collars, to operate substantially as described.

4. A shell-roll and means to rotate it, and a conical roll, combined with a cone-driving roll composed of a shaft having fixed collars, and a series of loose rings surrounding the said shaft, substantially as described.

5. A shell-roll and means to rotate it, and a conical roll, combined with a cone-driving roll composed of a shaft having fixed collars, and a series of loose rings surrounding the said shaft, and a yoke adapted to receive gaffs or bars of different weight, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN W. FOSTER.

Witnesses:

FREDK. J. BARNARD,

FRANK BULKELEY SMITH.