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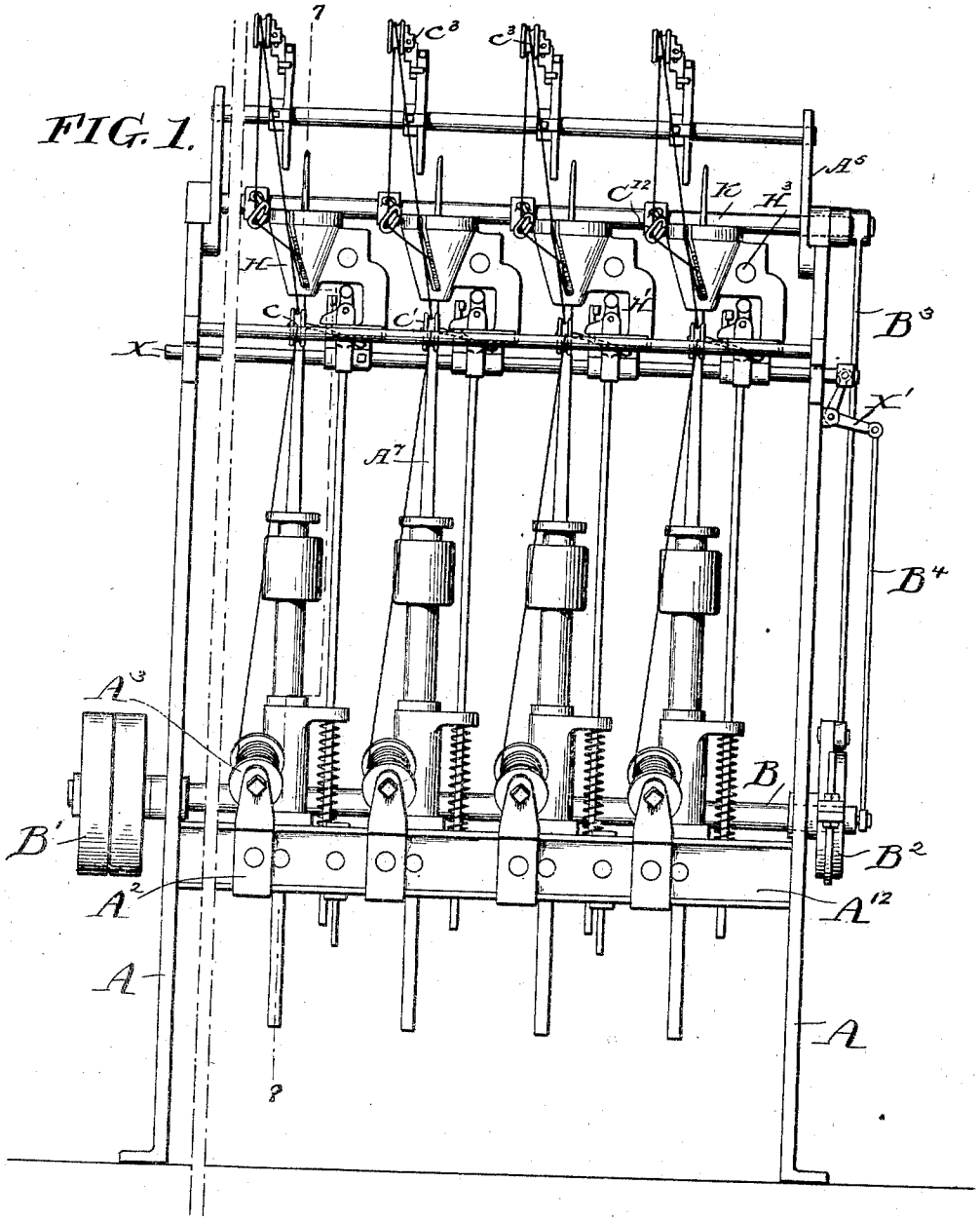
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O. LEVER & W. S. GRUNDY.

COP AND BOBBIN WINDING MECHANISM.

No. 503,325. Patented Aug. 15, 1893.

FIG. 1.



Witnesses:

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by their Atty

F. B. Carlow

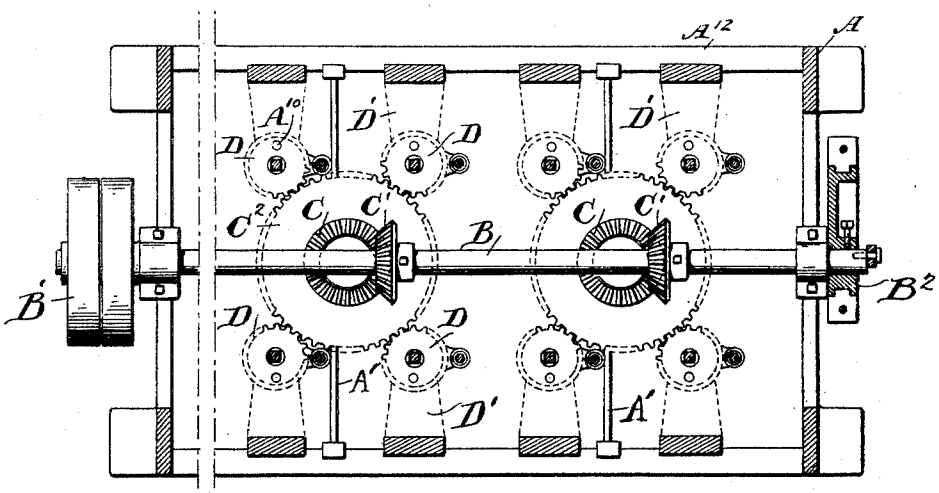
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O. LEVER & W. S. GRUNDY.

COP AND BOBBIN WINDING MECHANISM.

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FIG. 2.



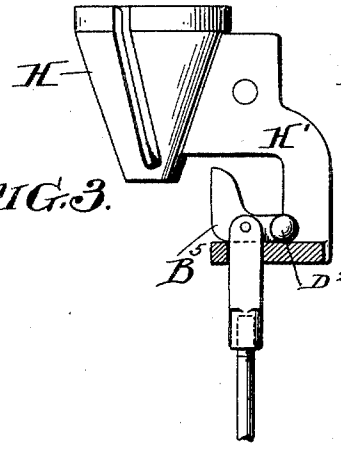


FIG. 3.

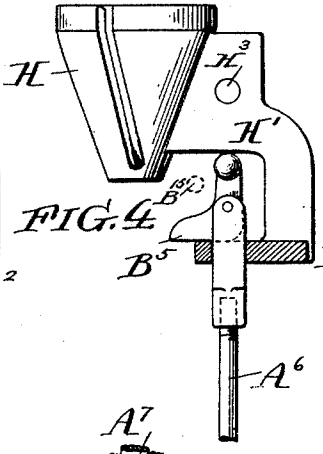


FIG. 4.

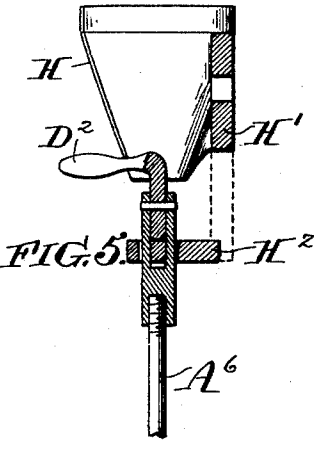


FIG. 5.

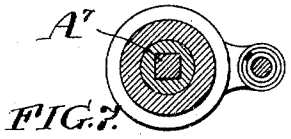


FIG. 7.

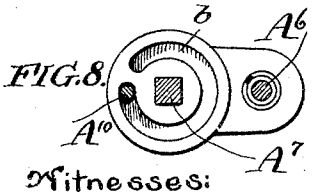


FIG. 8.

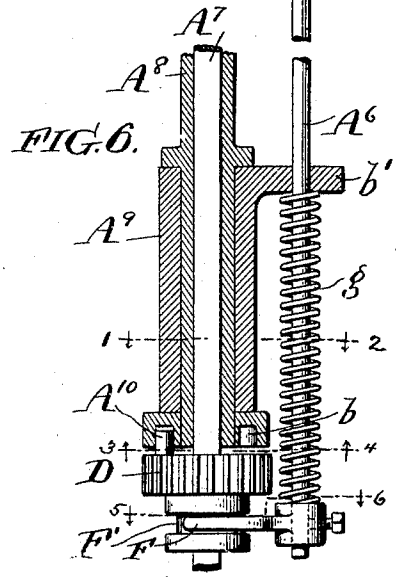


FIG. 6.

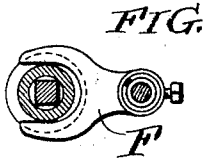


FIG. 9.

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O. LEVER & W. S. GRUNDY.

COP AND BOBBIN WINDING MECHANISM.

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FIG. 10.

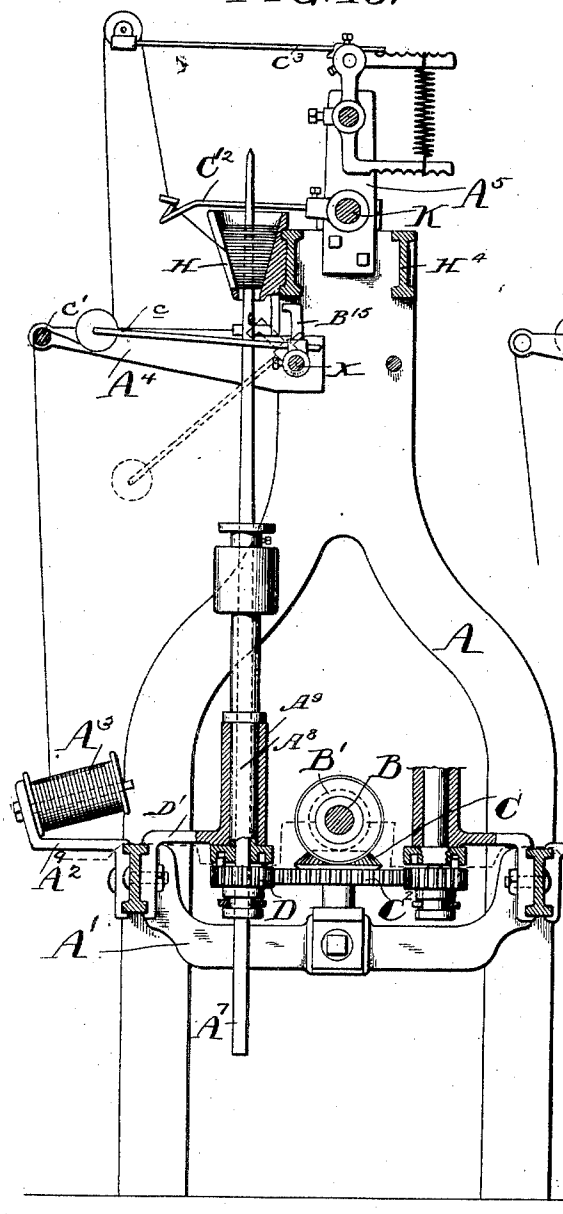
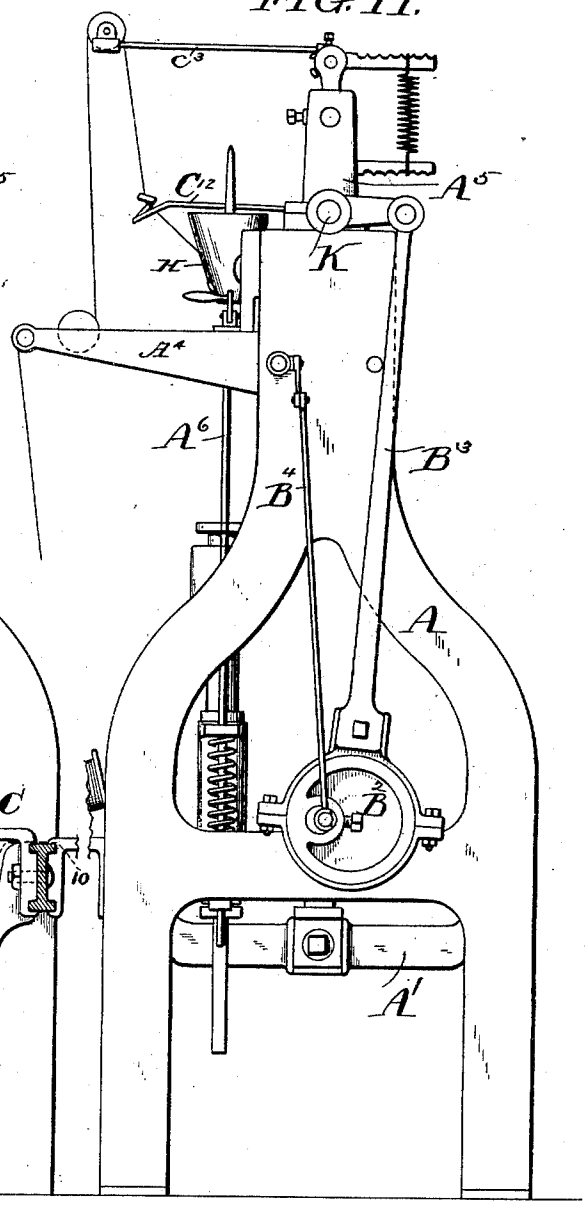


FIG. 11.



Witnesses:
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(No Model.)

4 Sheets—Sheet 4.

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COP AND BOBBIN WINDING MECHANISM.

No. 503,325. Patented Aug. 15, 1893.

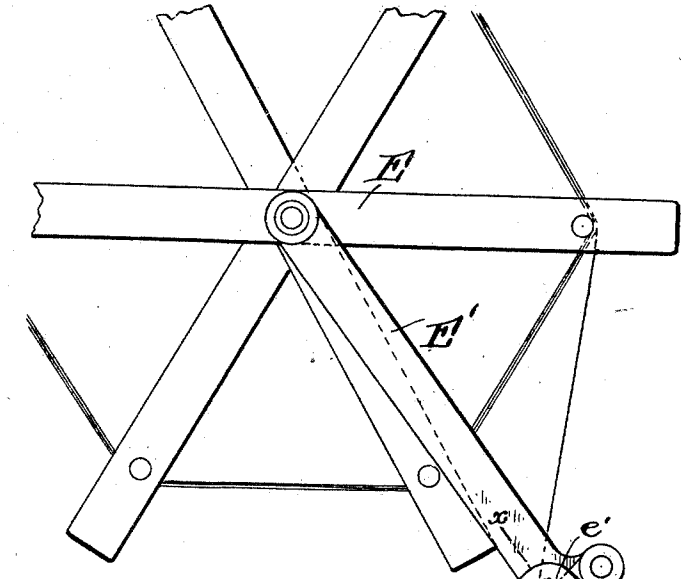
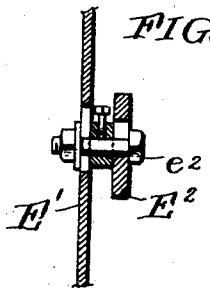
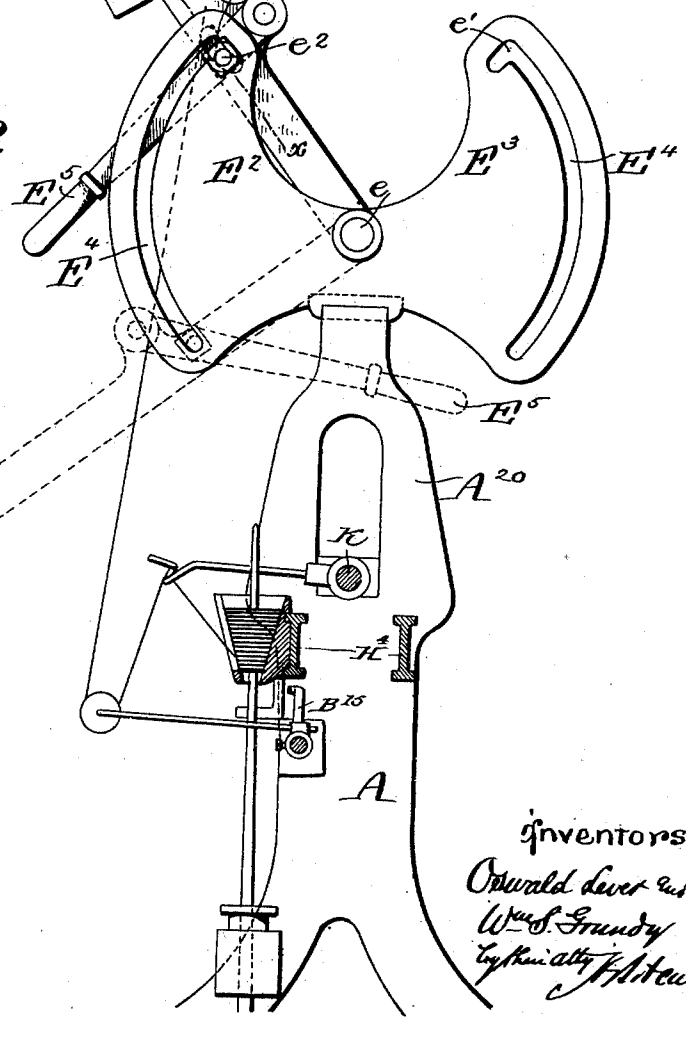
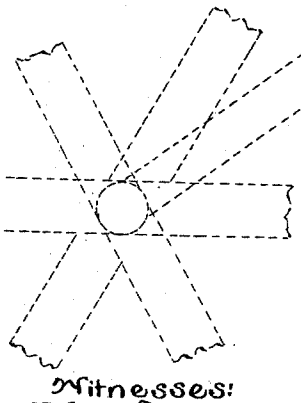


FIG. 12.

FIG. 13.







Witnesses:
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C. St. Beck

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Oswald Lever and
Wm. S. Grundy
by their Atty
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UNITED STATES PATENT OFFICE.

OSWALD LEVER AND WILLIAM S. GRUNDY, OF PHILADELPHIA, PENNSYLVANIA.

COP AND BOBBIN WINDING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 503,325, dated August 15, 1893.

Application filed May 12, 1892. Serial No. 432,715. (No model.)

To all whom it may concern:

Be it known that we, OSWALD LEVER and WILLIAM S. GRUNDY, citizens of the United States, and residents of the city of Philadelphia, in the State of Pennsylvania, have jointly invented certain new and useful Improvements in Cop and Bobbin Winding Mechanism, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

Our invention relates to cop and bobbin winding mechanism, and consists, first, in the combination with sets or groups of vertically arranged spindles and their actuating gearing, of driving devices adapted to directly gear with and simultaneously actuate each member of each set or group separately but with uniformity and precision; second, in the supporting and actuating devices driving and operating the vertical spindles; third, in the combination therewith, and with the frame of the machine, of the stop mechanism operating on the breaking of a thread to disengage the driving gear of the particular spindle carrying such thread; and finally of the combination and arrangement with the yarn guides, their actuating devices, the frame supporting the same, and the rotating spindles, of the yarn-supplying devices and the mechanism for supporting and adjusting the same.

In the accompanying drawings illustrating our invention, Figure 1 is a side view of two sets, each consisting of four vertical spindles, mounted in their actuating devices; the single driving shaft for the same; the yarn guides; and the cop forming mechanism. Fig. 2 is a horizontal sectional view of part of the same, through the line 9, 10, of Fig. 10, showing the arrangement of the spindles and their actuating devices, in groups or sets, and the driving gearing for the same, set in the frame of the machine. Figs. 3, 4 and 5 are views of the cop forming device and of the mechanism for stopping the rotation of a spindle on the breaking of its thread; shown in its two positions. Fig. 6 is a vertical sectional view of the supporting and actuating device for the spindle. Fig. 7 is a section through the line 1—2 of Fig. 6. Fig. 8 is a section through the line 3—4 of Fig. 6. Fig. 9 is a section through the line 5—6 of Fig. 6. Fig. 10 is a vertical sectional view through the line 7—8 of Fig. 1. Fig. 11 is a right hand side view of Fig. 1. Fig. 12 is an elevation showing the upper portion of the frame supporting the upper and lower yarn guides and their shafts; the cop forming devices and their supporting rails, and the mechanism of the yarn supplying reels. Fig. 13 is a section through the line x—x of Fig. 12.

Mounted in the frame of the machine consisting of the uprights A and cross pieces A′, is a horizontal driving shaft B, actuated by a pulley B′; and extending through the frame and carrying an eccentric B^2 to which is connected a strap B^3, and a rod B^4. The eccentric B^2 actuates the strap B^3 which drives the yarn guide C^{22}. The same eccentric carries the rod B^4 for the purpose hereinafter mentioned. Upon said shaft B are mounted two bevel gears C′, each meshing with inner bevel gearing C on the face of a cog C^2 mounted on the cross pieces A′ of the frame. This cog C^2 gears with cog wheels D supported indirectly by brackets D′, (see Figs. 2 and 10) secured to the frame. These brackets (see Figs. 6 and 10) support the spindle driving bearings. The cogs D and their brackets are so arranged in groups or sets in the frame on the opposite side-rails A^{12} that their peripheries will all mesh with the cog gearing on the periphery of the central cog C^2, which in turn is driven as aforesaid by the main driving shaft B. Secured to or made integral with the brackets D′ are sleeves A^9 which support the tubular shafts A^3 carrying the spindles. The said side-rails A^{12} A^{12} each support a series of projecting spool supports A^2 upon which are mounted the spools A^3. They also support the said spindle bearings hereinafter more particularly described and shown in detail in cross section in Fig. 6.

Mounted on each of the uprights A of the frame are supports A^4, carrying the guide rod c'. On each of said uprights A is also mounted a vertical arm A^5 in which a shaft K is journaled, said shaft actuating the several yarn-guides C^{12} in the series and which shaft is vibrated by the strap B^3. At the upper part of said vertical arm A^5 is also mounted the usual tension device c^3. The rod B^4

(see Fig. 11) imparts a lateral reciprocating movement to the shaft X through a bell-crank lever X′, (see Fig. 1,) the said shaft X carrying the lower yarn guide *c* and its stop pin B^{15}, which operates as hereinafter described. An extension A^{20} of the upright A (shown in Fig. 12) is provided to support the yarn reel E which is mounted on the end of an arm E′ the other end of which is pivoted at *e* in a double frame E^2 E^3 which is slotted in an arc of a circle on each side at E^4 E^4 terminating in a recess *e′*. The yarn reel arm E′ has an operating handle E^5 affixed to it, and a projecting pin e^2, the latter adapted to fit in the slot E and recess *e′*. This construction enables the yarn reel to be raised and lowered in an arc of a circle by grasping the operating handle of its supporting arm, and when raised the reel is adjustably locked in position by the pin e^2 resting in the recess *e′* of the slot E^4. The double frame E^2 E^3 supports a similar yarn reel and operating mechanism, on each side.

The spindle A^7 (see Figs. 6 and 10) is square at its lower end and rests in a square journal (see Figs. 7, 8 and 9) in the tubular shaft A^8 which rests in and upon the sleeve A^9 which is secured to or made integral with the bracket D′. The shaft A^8 is recessed on its under end at *b* to receive the pin A^{10} fixed on the face of the cog D. Said cog is maintained in proper lateral position, indirectly by the brackets D′ (see Fig. 2) supporting the sleeve A^9 and its contained tubular shaft A^8 (see Fig. 10) and actuates the spindles A^7 mounted in the tubular shaft A^8, and the said cog D carries on its under face a collar F′ which has its bearing in a pronged arm F on the base of the spring rod A^6 carrying the stop mechanism hereinafter described. By means of this spring rod the said actuating cog D is thus adjustably maintained vertically. The spring *g* encircles the rod A^6 between the said prong F and an extension *b′* of the sleeve A^9 and tends to withdraw the pins A^{10} of the cog D from the recesses *b* in the shaft A^8 when the rod A^6 is no longer held up by the stop mechanism B^5 hereinafter described. Said stop mechanism is shown in normal position in Fig. 4.

The cop forming cup H is constructed integral with its supporting bracket H′ and H^2, and is secured through the bolt hole H^3 to the supporting rail H^4 provided therefor (see Fig. 10). The rod A^6 passes through a recess in the base H^2 of the cup supporting bracket and above and resting on the same are secured thereto devices (shown in detail in Figs. 3, 4 and 5 and in connection with the tension devices in Fig. 10), for throwing the spindle out of gear when a thread breaks. These devices consist of a short cam B^5 provided with a handle D^2, and pivoted in a recess on the end of a bar screwed to the top end of the rod A^6. This cam is shown in normal position in Fig. 4, holding up the rod A^6, and keeping the driving cog D in register with the tubular shaft A^8. In Fig. 3 it is shown thrown down, whereby the rod A^6 is released and the driving cog D thrown out of register with the tubular shaft A. This is accomplished on the breaking of a thread, by means of the stop pin B^{15} which is mounted loosely on the shaft X and in this stop pin is fastened by a set screw, the end of the yarn guide *c* so that when the thread breaks the yarn guide drops (as shown in Fig. 10), its stop pin striking against and upsetting the cam B^5 releasing the spring controlled rod A^6. A handle D^2 on the cam enables it to be restored to normal position. The yarn guide *c* with its stop pin B^{15} is journaled on the shaft X, and this journal bearing, while free to rotate on the shaft X is fixed against longitudinal movement thereon, by means of collars, pins, or other equivalent devices. The shaft X has a lateral reciprocatory movement of a fraction of an inch produced by the strap B^4 actuating it through the bell crank lever X′ (see Fig. 1). On the breaking of the yarn, the yarn guide *c* will fall (as shown by dotted lines Fig. 10) thus carrying its stop pin B^{15} forward in line with the cam B^5. The shaft X having a lateral reciprocatory movement, as before mentioned, will carry the stop pin of the yarn guide mounted thereon, into contact with the cam and upset it (as shown in Fig. 3) and thus release the spring controlled rod A^6 and disconnect the gear D with the driving shaft of the spindle as before mentioned. The parts are restored to their normal position by re-threading the yarn guide, and raising the pivoted cam B^5 by means of its handle D^2 (see Figs. 5 and 11). The arms A^4 are projecting stationary posts on either side of the frame and support the guide post *c* (see Fig. 1) which directs the course of the several strands of yarn from the series of spools A^3 to the wheels on the end of the several yarn guides *c*.

The operation of the device is as follows:—Power being applied to the shaft B through the pulley B′, the horizontal cog C^2 drives the several cogs D in the group or series with which it is geared, separately but directly and with uniformity and at a minimum of expenditure of power; and the stoppage of the separate driving gear of any spindle in the group will not effect the continued operation of the remaining spindles in the group. Two or more of such groups or sets, of preferably four spindles each, may be thus mounted and driven from a single shaft; and the same shaft, by means of the eccentric B^2 and its strap B^3 fixed upon one of its ends, will, with equal uniformity and precision, operate the several yarn guides for each spindle in each of the several groups or series of spindles through the shaft K and in unison with the mechanism actuating the spindles.

Yarn may be supplied from the small spools A^3 (see Fig. 1) but preferably from and by means of our improved yarn supplying devices shown in Fig. 12. The spindles are

driven as described and form cops of yarn thereon, by means of the cop-forming devices in the usual manner.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The combination with the supporting frame A, A′, A^{12}, the horizontal driving shaft B, its gearing C′, horizontal cog gearing C, C^2 driven thereby, a series of horizontal cogs D actuating cop and bobbin forming spindles arranged to be driven directly and uniformly from said central driving gear C^2, and devices secured to the frame adapted to separately support and maintain each of said actuating cog gears D in register with the central driving gear C^2; substantially as described.

2. The combination with the vertical cop winding spindle, its actuating shaft A^8, recessed on its under face at *b*, the supporting sleeve A^9 in which it is mounted, the horizontal cog wheel D with the pin A^{10} on its upper face, the collar F′, the prong F, the spring controlled rod A^6 mounted therein, and mechanism mounted on said rod A^6 operating to release the rod and thereby stop the rotation of the spindle when a thread breaks, by dropping the pins 10 on the face of the cog D out of register with the recesses in the tubular shaft A^8; substantially as described.

3. In combination, a vertically mounted cop winding spindle and its tubular driving shaft, actuating devices adapted to gear with said shaft, a spring controlled rod supporting said actuating devices, a cop forming device provided with a recessed supporting arm through which said spring controlled rod may pass, a cam resting on said supporting arm of the cop forming device and pivoted to the end of the spring controlled rod, and a yarn guide with the reciprocating shaft on which it is mounted, said guide carrying a stop pin adapted to contact with said cam and upset it on the breaking of a thread and release the spring controlled rod; substantially as described.

4. The combination with the supporting frame A its extension A^{20}, and with cop-winding mechanism, of yarn supplying devices consisting of a reel E, mounted upon a pivoted arm E′, a lever E^5 provided with a locking pin e^2, a frame E^2 slotted at E^4 in an arc of a circle and recessed at its upper extremity at *e′* to receive said locking pin and support the reel in an upright position; substantially as described.

In testimony whereof we have hereunto affixed our signatures this 18th day of November, A. D. 1891.

OSWALD LEVER.
WM. S. GRUNDY.

Witnesses:
H. T. FENTON,
ROBT. GILLESPIE.