No. 641,420. Patented Jan. 16, 1900.

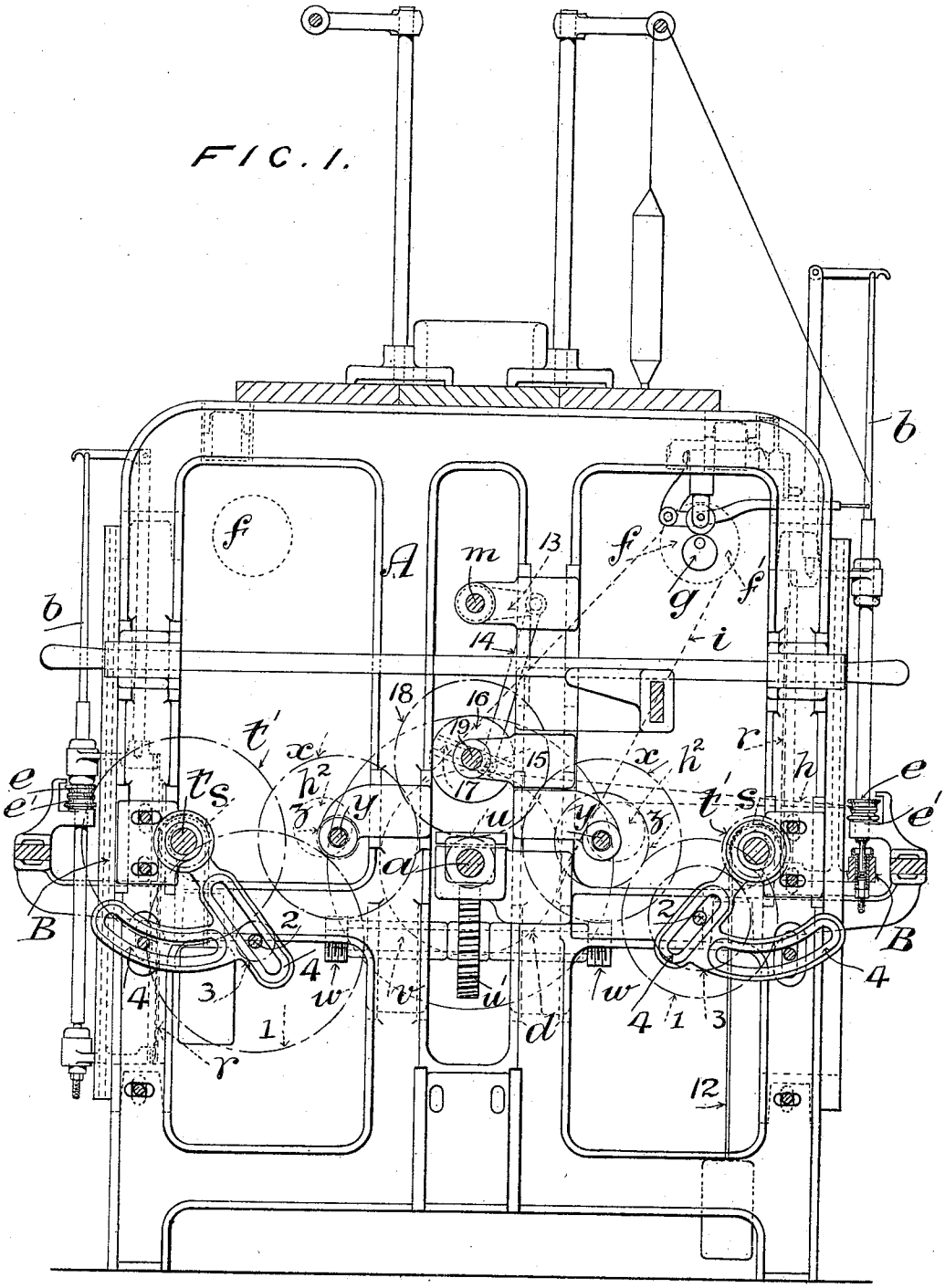
J. D. WHYTE.

YARN WINDING MACHINERY.

(Application filed July 10, 1699.)

(No Model.) 4 Sheets—Sheet 1.

FIG. 1.



WITNESSES.

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H. W. Hopping

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(No Model.) 4 Sheets—Sheet 2.

FIG. 2.

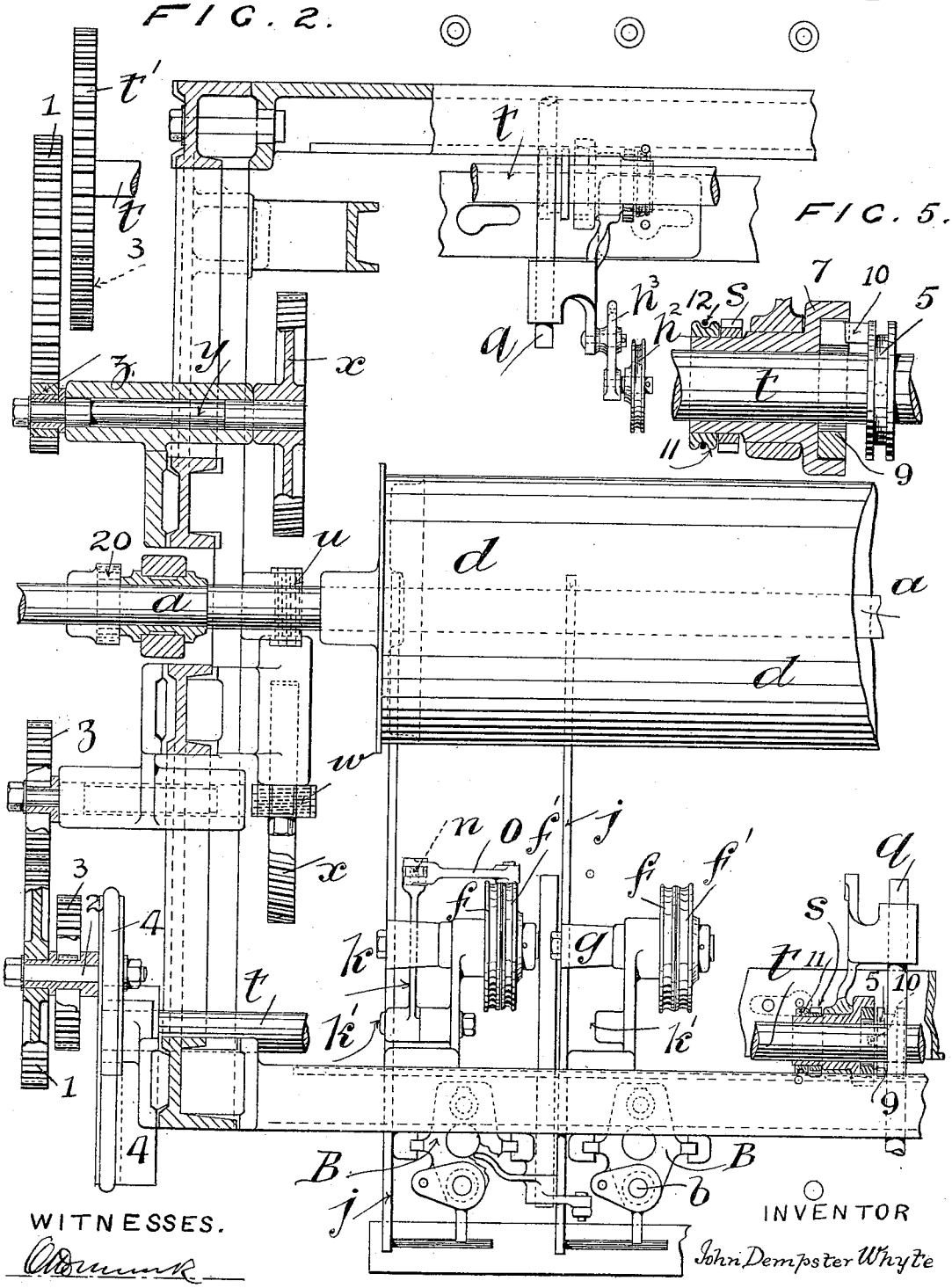

FIG. 5.

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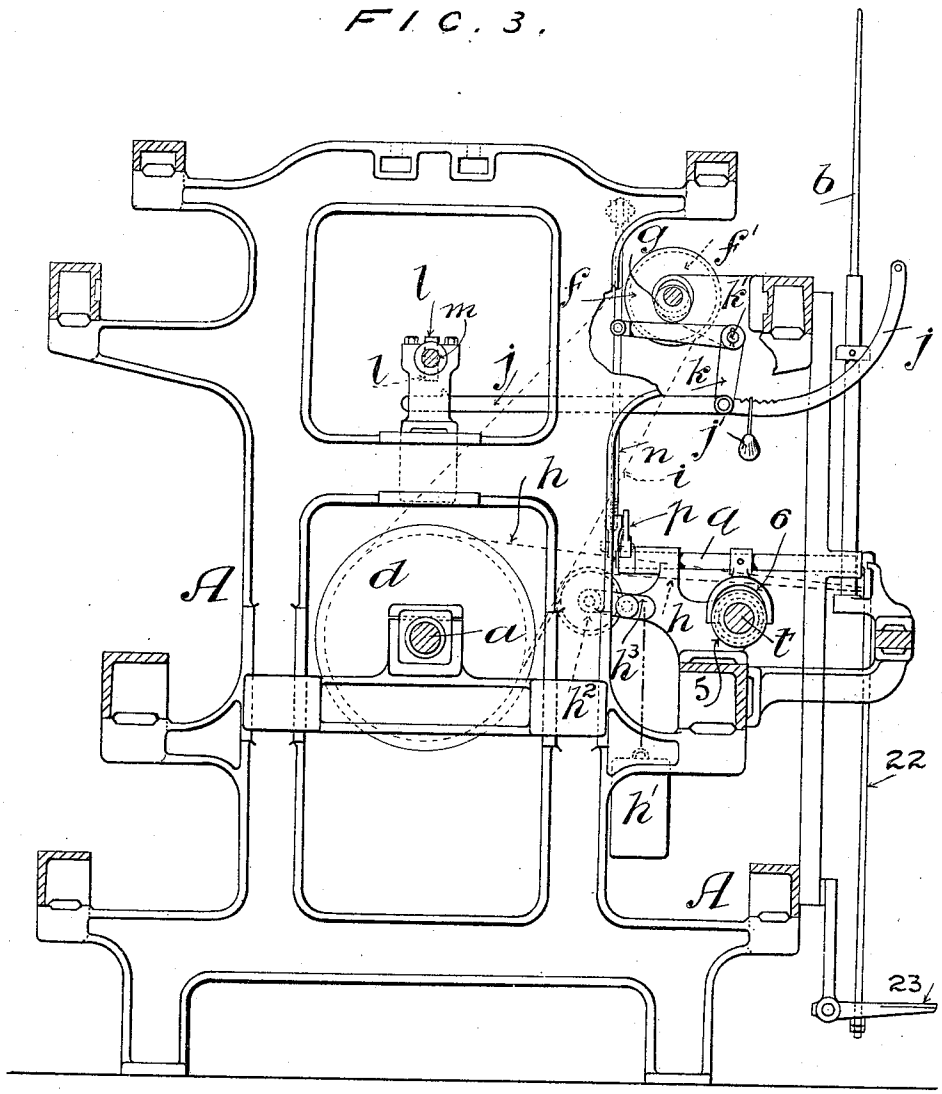
4 Sheets—Sheet 3.

FIG. 3.



WITNESSES.

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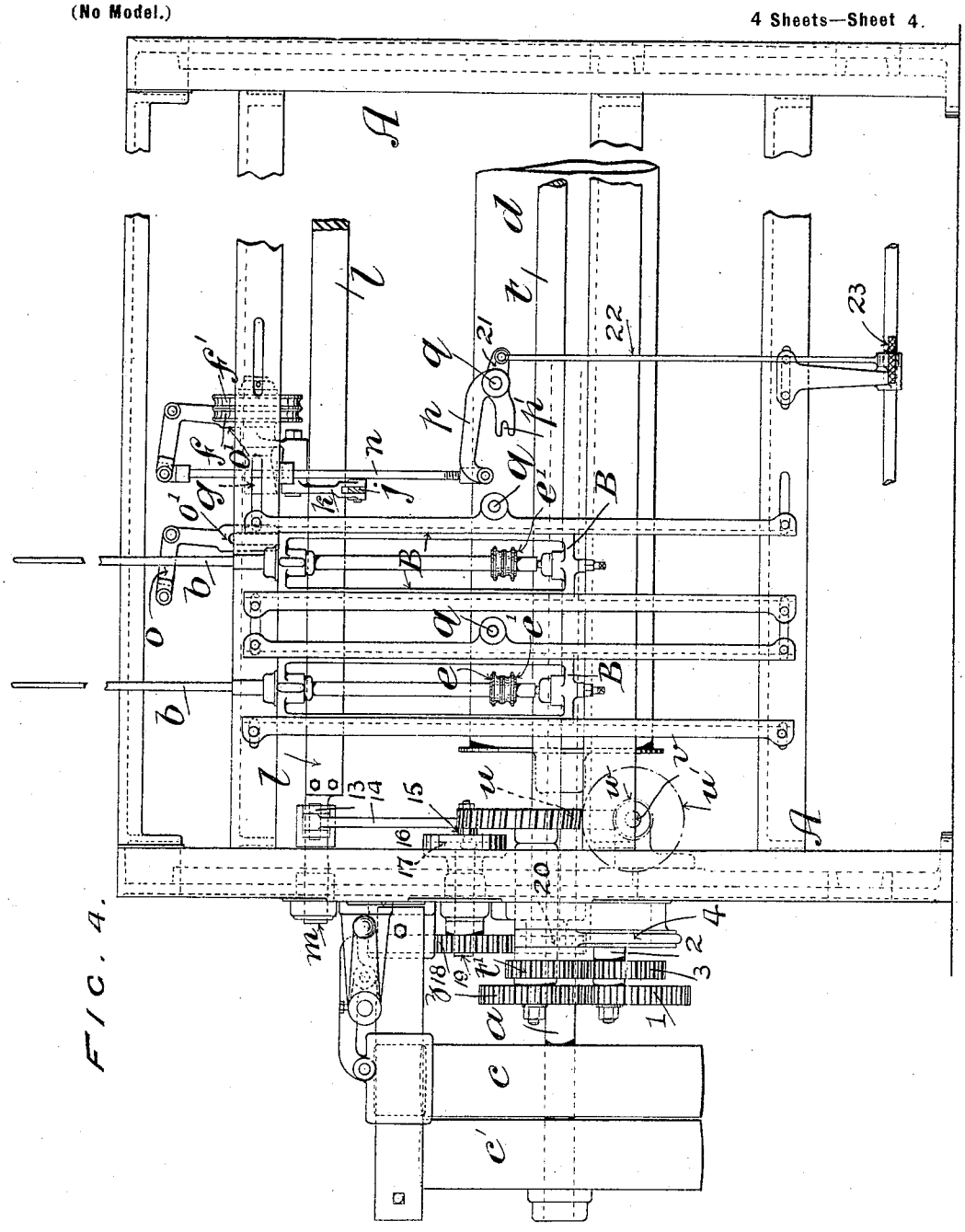

FIG. 4.

WITNESSES.

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INVENTOR.

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UNITED STATES PATENT OFFICE.

JOHN DEMPSTER WHYTE, OF URMSTON, ENGLAND, ASSIGNOR TO THE WHYTES PATENTS, LIMITED, OF MANCHESTER, ENGLAND.

YARN-WINDING MACHINERY.

SPECIFICATION forming part of Letters Patent No. 641,420, dated January 16, 1900.

Application filed July 10, 1899. Serial No. 723,385. (No model.)

To all whom it may concern:

Be it known that I, JOHN DEMPSTER WHYTE, engineer, a subject of the Queen of Great Britain and Ireland, residing at 31 Lime avenue, Urmston, near Manchester, in the county of Lancaster, England, have invented a certain new and useful Improvement in Yarn-Winding Machinery, (for which I have made application for patent in Great Britain, No. 26,574 dated December 16, 1898,) of which the following is a specification.

My invention relates to yarn-winding machinery, and has reference to improvements upon a former invention for which I have obtained Letters Patent of the United States of America Nos. 586,279 and 605,984.

My present invention refers to improved means of driving the spindles and cone-cam or its equivalent used to traverse the yarn-guide and for lowering the spindles to effect the building of the cops. I now arrange to derive all these movements from one shaft, thus greatly simplifying the construction of the machine.

In order that my invention may be distinctly understood, I have attached hereto four sheets of illustrative drawings, to which I will now refer.

Figure 1 of the drawings is an end elevation, partly in section, of the improved yarn-winding machine. Fig. 2 is a sectional plan thereof. Fig. 3 is a sectional elevation. Fig. 4 is a side view of the frame, and Fig. 5 a detail view of one of the parts.

In carrying my invention into effect I provide a central shaft a, mounted to revolve in bearings in the frame A of the machine. The shaft a is disposed centrally between the spindles b, which are carried at each side of the machine. The shaft a is provided with a fast and loose pulley c c', whereby the shaft is driven from any suitable source of power and stopped when required. Upon the driving-shaft a is mounted a driving-cylinder d. The sliding wharve e, shown in the specifications of my said former patents for driving the spindle b, is duplicated, one of which wharves e', however, runs loosely upon the spindle barrel or carrier. The driving-pulley f, mounted upon the axis of the cone-cam g, is also duplicated, a loose pulley f' being also mounted on the axis of the cone-cam g. The spindle-wharves are driven by means of bands h and the cam-pulleys by means of bands i from the cylinder d on the driving-shaft a. The tension of the bands h is maintained by weights h', acting on pulleys h^2, carried in pivoted forks h^3, as clearly shown in Fig. 3. On the breakage of a thread means are provided whereby the driving-bands h i are automatically shifted from the fast wharve e and pulley f to the loose ones e' f', so that the revolution of the cone-cam and spindle is stopped. In addition I also simultaneously effect the stoppage of the downward descent of the spindle.

Each thread is provided with a drop-finger j, which carries a weight j', which can be adjusted to secure the proper balancing of the finger j. The drop-finger j is pivoted to a bell-crank lever k, pivoted at k', and is held out of the path of an oscillating bar l, actuated by a rock-shaft m by the tension of the thread. The method of actuating the rock-shaft m is explained later.

The bell-crank lever k is connected to a vertical rod n, the upper end of which is connected to another bell-crank lever o, (seen more clearly in Fig. 4,) carrying a belt-fork o', embracing the band i, driving the cone-cam g. The lower end of the vertical rod n is connected to a lever p, secured to a rock-shaft q and carrying a fork p', embracing the band h, driving the spindle-wharve e.

The spindles b are mounted in carriages B, as in my said former invention, and are lowered by means of a rack r and pinion s, as described in the specification of my said former patent, No. 586,279; but instead of driving the pinions s by means of friction-disks I mount them loosely upon a counter-shaft t and drive such counter-shaft through a reduced train of gearing from the driving-shaft a. To effect this, I mount a worm u upon the shaft a, (see Fig. 2,) which gears with a worm-wheel u', Fig. 1. The worm-wheel u' is keyed upon a shaft v, carrying worms w, meshing with worm-wheels x, and thus drives the shafts y, as clearly shown in Fig. 1.

Secured upon the shafts y are spur-pinions z, gearing with spur-wheels 1, secured to shafts 2, which also carry spur-wheels 3, which gear

with spur-pinions t', fixed on the counter-shafts t. The spur-wheels 3 are interchangeable to allow for variable driving of the pinions t', the brackets 4 being so shaped as to readily permit this, as will be seen from an inspection of Fig. 1.

To start and to stop the loose pinions s, meshing with the rack of the spindle-carriage, I provide a clutch-half 5, slidably mounted on the counter-shaft t and revolving therewith. The clutch 5 is operated by means of a yoke 6, secured to the rock-shaft q. The arrangement of loose pinion s and clutch 5 is shown separately on an enlarged scale in Fig. 5. The pinion s is secured upon a sleeve 7, loosely mounted on the shaft t. The sleeve 7 is provided with a split ring 9, the ring being expanded by a wedge-shaped tooth 10 on the sliding clutch-half 5 when such half is moved, so that the pinion s is driven. The sleeve 7 and split ring 9 form the female half of the clutch. When the pinion s is idle, the clutch-half 5 is in the position shown in Fig. 5. The tooth 10 is in engagement with the split ring 9, which revolves with the clutch-half 5 and loosely within the hollow boss of the sleeve 7. On the sliding clutch-half being moved toward the sleeve 7 the tooth 10 expands the ring 9, which thus binds against the internal periphery of the boss of the sleeve 7 and drives the same. Also secured to the sleeve 7 is the grooved pulley 11 for the cord 12 of the counterbalance-weight of the spindle-carriage.

As already stated, the spindles b are carried at each side of the frame. It must be understood that the counter-shaft t at each side of the frame does duty for the whole of the spindles at that side. Each spindle, however, is provided with a loose pinion S, meshing with the rack of the spindle-carriage and operated by means of a clutch, as shown in Fig. 5, actuated by a yoke 6, secured to a rock-shaft q. The stopping of one spindle does not, therefore, affect the working of the remainder.

The oscillating shaft m is operated by means of a crank 13 and connecting-rod 14, the end of the connecting-rod being secured to a bolt 15, carried by a disk 16. The disk is formed with an undercut groove 17, in which the head of the bolt 15 may be slid to adjust the requisite throw of the crank 13. The disk 16 is driven by means of a spur-wheel 18, mounted on the shaft 19, which also carries the disk 16, the spur-wheel 18 gearing with a pinion 20, keyed to the central driving-shaft a.

The action of the parts is as follows: On the breakage of a thread the drop-finger j falls and the opposite end rising the finger is pushed forward by the swinging bar l, carried by the rock-shaft m. The vertical rod n is thus depressed by the bell-crank lever k, connected to the rod n and drop-finger j. This downward motion of the vertical rod n actuates the belt-forks o' p', so as to shift the driving-bands i and h from the fast pulley f and wharve e to the loose ones, thus stopping the revolution of the cone-cam g and spindle b. At the same time the rock-shaft q is operated by the vertical rod n to slightly retract the driving-clutch half 5, so that the split ring 9 ceases to drive the clutch-half 7, to which is secured the loose pinion s, gearing with the rack r. The downward descent of the spindle-carriage B is thus also arrested.

To start the machine after "piecing," the rock-shaft q is provided with a crank 21, secured to a pendent rod 22, operated by a foot plate or treadle 23, by depressing which the rock-shaft q is oscillated to return the parts to their normal positions, so as to bring the driving-clutch half 5 into action and operate the vertical rod n and belt-forks o' p' to simultaneously replace the driving-bands i h upon the fast pulley and wharve.

I declare that what I claim is—

1. In combination in a yarn-winding machine, a main driving-shaft a, a driving-cylinder d thereon, spindles b having fast and loose wharves, a band from the driving-cylinder for driving said wharves, a yarn-guide, a cone-cam having fast and loose pulleys for vibrating the yarn-guide, a band from the cylinder for driving said pulleys, a counter-shaft t, a reduced train of gearing from the shaft a for driving said shaft, a clutch interposed between said counter-shaft and gearing, a pinion s operated thereby, a rack r meshing with said pinion s and connected with the spindle-carriage, a vertical rod n adapted to shift the driving-bands of the spindle and cone-cam onto the loose pulley and wharve and to disengage the clutch 5, a drop-finger j for operating said bar on the breakage of a thread and a connecting-rod and treadle for returning the parts to normal position, substantially as described.

2. In a yarn-winding machine, means for effecting the lowering of the spindle-carriage comprising a counter-shaft, a reduced train of gearing for driving said counter-shaft from the main shaft, a clutch carried by said counter-shaft and a loose pinion meshing with a rack on the spindle-carriage, a clutch half or section connected to said loose pinion, a sliding clutch-half on said counter-shaft, a yoke connected to said sliding clutch-half and rock-shaft for operating said yoke, substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

JOHN DEMPSTER WHYTE.

Witnesses:
JOSHUA ENTWISLE,
ALFRED YATES.