

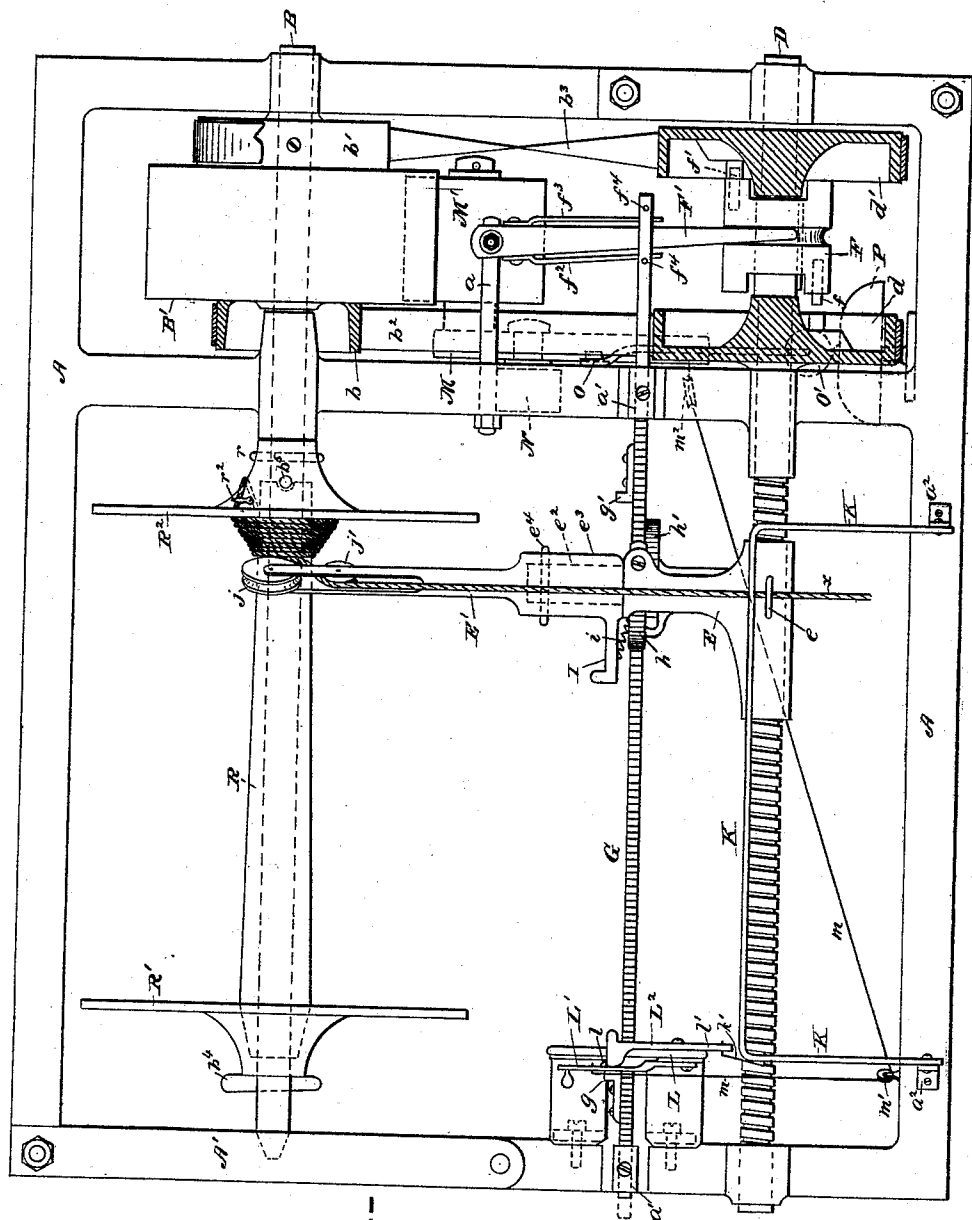
(No Model.)

3 Sheets—Sheet 1.

A. C. MILLER.
MACHINE FOR BALLING TWINE.

No. 462,984.

Patented Nov. 10, 1891.



WITNESSES:

Wm. Bell.

C. P. Swett

INVENTOR

Andrew C. Miller,

BY

Wm. Smith & Son

ATTORNEYS.

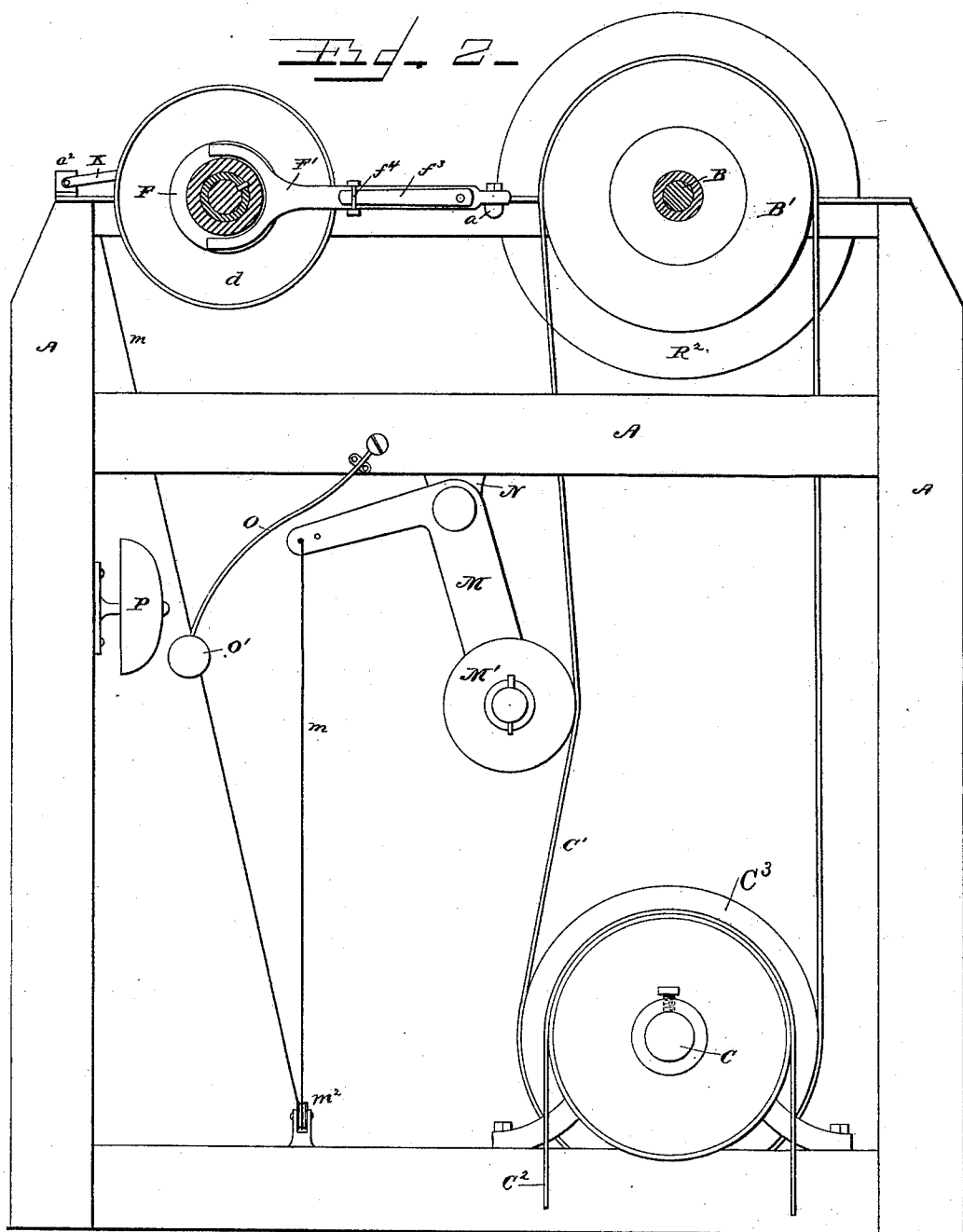
(No Model.)

3 Sheets—Sheet 2.

A. C. MILLER.
MACHINE FOR BALLING TWINE.

No. 462,984.

Patented Nov. 10, 1891.



WITNESSES:

Alvin Bell.
C. P. Swett.

INVENTOR

Andrew C. Miller.

BY

Will Smith & Son

ATTORNEYS.

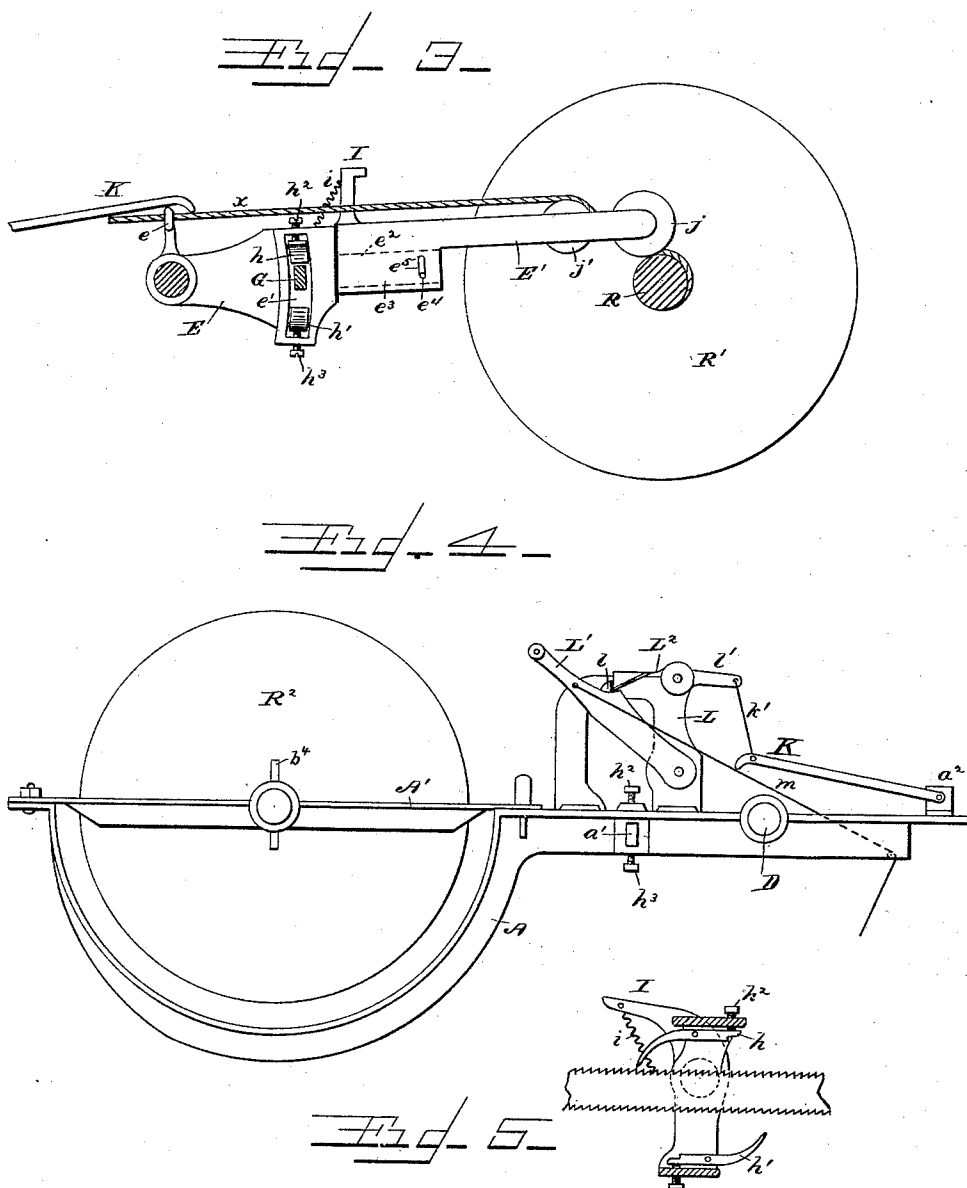
(No Model.)

3 Sheets—Sheet 3.

A. C. MILLER.
MACHINE FOR BALLING TWINE.

No. 462,984.

Patented Nov. 10, 1891.



WITNESSES:

Alvin Delt.
C. P. Swett

INVENTOR

Andrew C. Miller
BY *W. M. Smith & Son*
ATTORNEYS.

UNITED STATES PATENT OFFICE.

ANDREW CALVIN MILLER, OF AUBURN, NEW YORK.

MACHINE FOR BALLING TWINE.

SPECIFICATION forming part of Letters Patent No. 462,984, dated November 10, 1891.

Application filed October 23, 1890. Serial No. 369,078. (No model.)

To all whom it may concern:

Be it known that I, ANDREW CALVIN MILLER, a citizen of the United States, and a resident of Auburn, in the county of Cayuga and State of New York, have invented a new and useful Improvement in Machines for Balling Twine, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification.

My invention relates to certain improvements upon the machine for balling cord or twine described in my patent, No. 443,103, dated December 23, 1890, and more particularly to the construction of the cord-guide arm; to the arrangement of means for controlling the movements of said arm and for changing the direction of movement; to the means for automatically throwing the machine out of action, and to the means for stopping and starting the machine, the construction and arrangement of the cylinder and heads of the mandrel, and to certain details of construction and arrangement of parts of the machine, all as hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a plan view of a machine embracing my improvements. Fig. 2 is an end elevation, partly in section, showing the right-hand (see Fig. 1) or drive-wheel end of the machine. Fig. 3 is a vertical longitudinal section showing the cord-guide arm in side elevation; Fig. 4, a left-hand side elevation; and Fig. 5 represents a transverse vertical section through the cord-guide arm near the pivoted end thereof, showing a portion of the rack-bar and the pawls engaging therewith in elevation.

A indicates the main frame; A', a pivoted portion of the upper left-hand side bar thereof for facilitating the removal and replacing of the mandrel; B, the main driving-shaft of the machine carrying the mandrel; C, the counter or power shaft carrying a band-pulley C³, connected by a belt C' with a pulley B' on the shaft B for driving the latter and actuated by the belt C² from any suitable motor. The band-pulley B' carries two band-pulleys b and b', one on each side, fast either on the driving-pulley B' or on its shaft adjacent to said pulley, as preferred, and connected by belts b² b³, one straight and the other crossed, with

band-pulleys d and d' mounted loosely on the shaft D, which, between its central and outer left-hand bearings on the frame A, is screw-threaded and actuates the cord-guide arm E, pivoted through its internally-screw-threaded sleeve on said shaft. The pulleys d and d', as stated, are loose on the shaft D and are rotated continuously in opposite directions thereon by the belts b² and b³. They are provided on their inner adjacent faces each with a socket or clutch face or pin, and between these is a sliding clutch-sleeve F, feathered to the shaft for driving it when engaged with either of the pulleys d and d'. This has a central peripheral groove, with which the arms of a pivoted shifting-fork F' engage for sliding the sleeve endwise on the shaft D. It is provided on each end with a clutch face or pin f or f', adapting it to engage the adjacent faces of the pulley d or d', as desired.

The fork F' is pivoted at one end to a bracket or arm a on the frame and passes through a slot or fork in the inner or right-hand end of a rack-bar G. It is provided on its sides with flat springs f² and f³, fastened to the fork F' near its pivoted end, and also passing through the slot or between the pins f² f⁴ in the end of the fork of the bar G for the purpose of assisting, in connection with said rack-bar, to quickly shift the clutch-sleeve F into and out of engagement with the band-pulleys d and d'.

The rack-bar G has ratchet-shaped teeth on its upper and lower edges and stops g and g' near its ends, which serve to limit the lateral movements of the cord-guide arm, and is adapted to slide longitudinally in suitable slots or ways at a' a' in the frame.

The cord-guide arm is made in two parts E, indicating the part or end thereof connected by a threaded sleeve with the screw-shaft D, and provided above said shaft with a cord-guiding loop or eye e, through which the cord passes outward to the pivoted and swinging end of the arm indicated at E'. The part E at a point about centrally of its length is provided with an upright transverse slot e', curved in an arc of a circle of which the shaft D is the center, and through which the rack-bar G passes, as shown. h and h' are pawls pivoted within the slot e' and having heel-extensions, with which set-screws h² and

h³, passing through the upper and lower end walls of the slot, engage for effecting the adjustment of the pawls, as desired. The forward or swinging end of the part E is made in the form of a stud-shaft e² and the end of the part E', connecting therewith, has a cylindrical socket or sleeve e³, fitting and permitting the rocking of the part E' on said shaft. The stud or shaft e² has a through-pin e⁴ near its outer end, the ends of which pass through slots e⁵ in the sleeve e³ and serve to hold the sleeve in place and limit the rocking movement of the part E'. The inner or heel end of the part E' has a laterally-projecting arm I formed on it, to which one end of a spring i is connected, the other end of the spring being connected to the outer end of the part E, the tension of said spring serving to hold the arm I down with the forked outer end of the part E and the cord-guide pulleys j and j' therein in the inclined position shown in Fig. 1, in which it is best adapted to lay the cord in inclined layers on the mandrel.

K indicates a bail pivoted at its ends in brackets a² a² on the frame and resting on the cord x in front of the guide-eye e, for a purpose that will appear.

L' is an upright lever pivoted on the standard-bracket L on the outer or left-hand end of the frame and provided on one side near its upper swinging end with laterally-projecting spur l, with which a pawl-lever L² engages for locking the lever L' in operative position. The lever L' has one end of cord m connected with it near its upper swinging end, said cord extending forward over a guiding-sheave m' near the outer or left-hand front upper corner of the machine-frame, thence obliquely downward and across the machine to a guiding-sheave m² on the lower right-hand side of the side frame, thence up to the forward end of the horizontal arm of a bell-crank M, pivoted at its elbow in a suitable pendent bracket N, attached to the upper frame-bar. The other end of the bell-crank M carries a pulley M', which by the tension on the cord m is pressed against the driving-belt C' and serves to take up any slack therein and to give it the tension necessary for causing it to drive the band-pulley B', shaft B, and the ball-winding machinery connected therewith. When from any cause the lever L' is released from the latch-lever L², the weight of the pulley M' causes it to swing away from the belt C', relieving the tension thereon and giving slack enough to permit it to slip and so stop the operation of the shaft B and the parts actuated therefrom. The forward arm l' of the lever L² is connected by a cord k' with the bail K, resting on the cord x, and which by its tension serves to uphold the bail with the latch-lever L², engaging and holding up the lever L'. If the cord x from any cause becomes broken, the bail K drops by its own gravity and, operating through the cord k' on the lever L², releases the lever, and the latter

through the cord m allows the tension-pulley M' to drop away from the belt C' and so stops the machine until the broken ends of the cord x are reunited and the lever L' restored to operative position. Where a break occurs, as explained, the forward arm of the bell-crank lever M flies upward and strikes a spring-arm O, fastened at one end to the frame and carrying at its other end a hammer O', which is thereby thrown into contact with a bell P, secured to a frame upright, as shown, thereby giving notice of the breakage to the attendant. The latch-lever L² can of course be disengaged from the lever L' by hand and the operation of the machine stopped by the attendant whenever desired.

The spool on which the cord is wound is composed of the tapering mandrel R, the inner disk or head R², fastened by a pin r to the main shaft B, and the outer disk or head R', having a tapering socket in the inner end of its hub, matching the tapering outer end of the mandrel, which, together with the head R', is held in place on the shaft B by a wedge or key b⁴ passing through the shaft and holding the mandrel engaged with a pin b⁵ in the shaft B at the inner end of the mandrel, as shown in Fig. 1.

Just outside the socket in the head R² for the inner end of the mandrel R said head is perforated to permit the end of the cord to be passed through it, and to the outer face of the disk or hub a hook or clamp r² is secured, by which the end of the cord is held in beginning a ball. This hook or clamp arm is made, preferably, to diverge from the surface of the disk or hub, to which it is secured, so that the end of the cord can be fastened by simply wedging it under the arm.

The outer swinging end of the cord-arm is forked, as stated, and carries two grooved sheaves j and j' for guiding the cord, which passes over the inner or first sheave j' and under the outer sheave j to the mandrel.

In starting to wind a ball the end of the cord is secured to the clamp r² and the machine is started, with the cord-arm resting in close proximity with the head R² and against the stop g' and with the pawl h engaging a tooth of the rack-bar G. Under this arrangement it will be seen that the cord-arm can only move outward or away from the head R² just far enough to cause the pawl h, acting through the bar G and its connections with the shifting clutch, to reverse the movement of the cord-arm, when the latter immediately moves inward again and acts through the stop g' on the bar G to again reverse the movement of the cord-arm by the time it reaches the disk R². The movement of the cord-guide arm is thus limited in one direction by the stop g' and in the other direction by the pawl h. The cord-guide arm in moving to the right (see Fig. 1) strikes the stop g', and thus moves the rack-bar G to the right, thus reversing the direction of rotation of the

screw-shaft D, whereupon the cord-guide arm immediately moves in the opposite direction or to the left, Fig. 1. The cord-guide arm will continue to move to the left until the end carrying the guiding-sheave *j* passes beyond the layer of cord deposited in its previous movement, when the end of said cord-guide arm, being unsupported by said previous layer of cord, will descend into contact with the mandrel or sufficiently near thereto to lower the pawl *h* into engagement with the rack-bar, whereby the latter is moved to the left and the movement of the cord-guide arm reversed. In this way the cord-arm is at first moved back and forth within short limits until a tapering base is laid on the mandrel, such as is indicated, and there is cord enough thereon to lift the cord-guide arm and the pawl over the tooth with which it was first engaged, after which it drops into engagement with the next tooth of the rack, and so on until the desired diameter of ball or roll at the end adjacent to the disk *R*² is reached, regulated by the adjustment of the pawl *h'*, and the latter comes into action on the lower face of the bar *G* and acts in lieu of the stop *g'* for moving said bar inward in like manner as the pawl *h* by the descent of the arm is made to engage the upper face of the rack-bar for moving it outward.

Just before the cord-arm reaches the outer end of the mandrel in its outward movement and after it fails to fall low enough to cause the pawl *h* to operate the rack-bar it comes in contact with the stop *g* and through it operates the rack-bar, shifting-fork, and clutch-sleeve until the ball or roll is completed in the form described in my former application referred to. When the cord-guide arm gets near the outer limit of its movement and begins to lay the cord close up to the disk *R'*, the arm *I*, which is inclined upward, as shown in Fig. 5, strikes upon the upper face of the standard-bracket *L*, and being rocked upward thereby as the cord-arm continues its movement toward the disk *R'* the pivoted part *E'* of said arm is rocked, bringing the guiding-sheaves *j* and *j'* into vertical position, adapting them to lay the cord close up to the disk *R'*. When the cord-arm moves away from the disk, the spring *i* retracts it to its normal position for laying the cord in inclined layers. The springs *f*² and *f*³ on the shifting-fork *F'* are pressed against or toward the fork on that side toward which the rack-bar moves in the first endwise movement of the bar until by its tension it helps to release the clutch-sleeve from its driving-wheel on one side and to throw it into engagement with that on the other side.

Having now described my improvement, I claim as new—

1. The divided or two-part cord-guide arm having its inner or heel end pivoted to and in combination with its actuating-shaft and having its outer end pivoted to said inner end to rock on its longitudinal axis and the arm and spring for holding said pivoted outer part in

its normal working position, substantially as described.

2. The divided cord-guide arm having its outer part pivoted to its inner part, as described, and carrying the grooved cord-guiding sheaves, and the arm and spring attached to said outer part for adjusting it automatically relatively to the inner part, substantially as described.

3. The combination of the cord-guide arm, the screw-shaft for actuating said arm, the driving-wheels on said shaft rotating in opposite directions, the sliding clutch-sleeve for engaging said wheels with the shaft, the sliding rack-bar and the shifting-fork for operating said clutch-sleeve, and the pawls on the cord-arm for engaging and actuating said rack-bar, substantially as described.

4. The combination, with the cord-guide-actuating shaft, of the pulleys for actuating it mounted loosely and rotating in opposite directions on said shaft, the interposed clutch-sleeve feathered to and sliding on said shaft, the shifting-fork engaging said sleeve, the springs *f*² and *f*³ for assisting said shifting-fork, the rack-bar for actuating said springs, and the cord-guide arm pivoted on said shaft and carrying pawls for engaging and actuating said rack-bar, substantially as described.

5. The combination, in a machine for balling cord or twine, of the main driving-shaft *B*, the band-pulley *B'* thereon, the pulley *C*³ and belt *C'* for driving said shaft and pulley, the tension-pulley located at a point intermediate the pulleys *B'* and *C*³, the bell-crank or swinging lever pivoted to the frame and carrying said tension-pulley, the cord *m*, lever *L'*, and the latch-lever or pawl *L*² for holding the tension in operative position, and the bail connected to said latch-lever and operating substantially as described.

6. The combination of the pulleys *B'* and *C*³, the driving-belt therefor, the tension-pulley and its supporting bell-crank lever, the cord, lever and latch-lever for holding said tension-pulley lever in operative position, the bail connected to said latch-lever for releasing it, and the alarm arranged and adapted to be operated when the latch is released, in the manner substantially as described.

7. In a balling-machine, the tapering mandrel *R*, on which the cord is wound, the disk or head *R*², keyed to and in combination with the actuating-shaft, said disk or head having the eye or perforation and clamp *e*² for engaging the end of the cord, the outer head *R'*, and the key *b*⁴ and the pin *b*⁵ for connecting the mandrel and outer head *R'* with the shaft *B*, all substantially as described.

In testimony whereof I have hereunto set my hand this 18th day of October, A. D. 1890.

ANDREW CALVIN MILLER.

Witnesses:

J. LAURENE PAUL,
A. WOODRUFF.