No. 643,041. Patented Feb. 6, 1900.

G. W. CODDINGTON.

MACHINE FOR MANUFACTURING WAXED OR COATED STRINGS.

(Application filed June 17, 1897.)

(No Model.) 3 Sheets—Sheet 1.

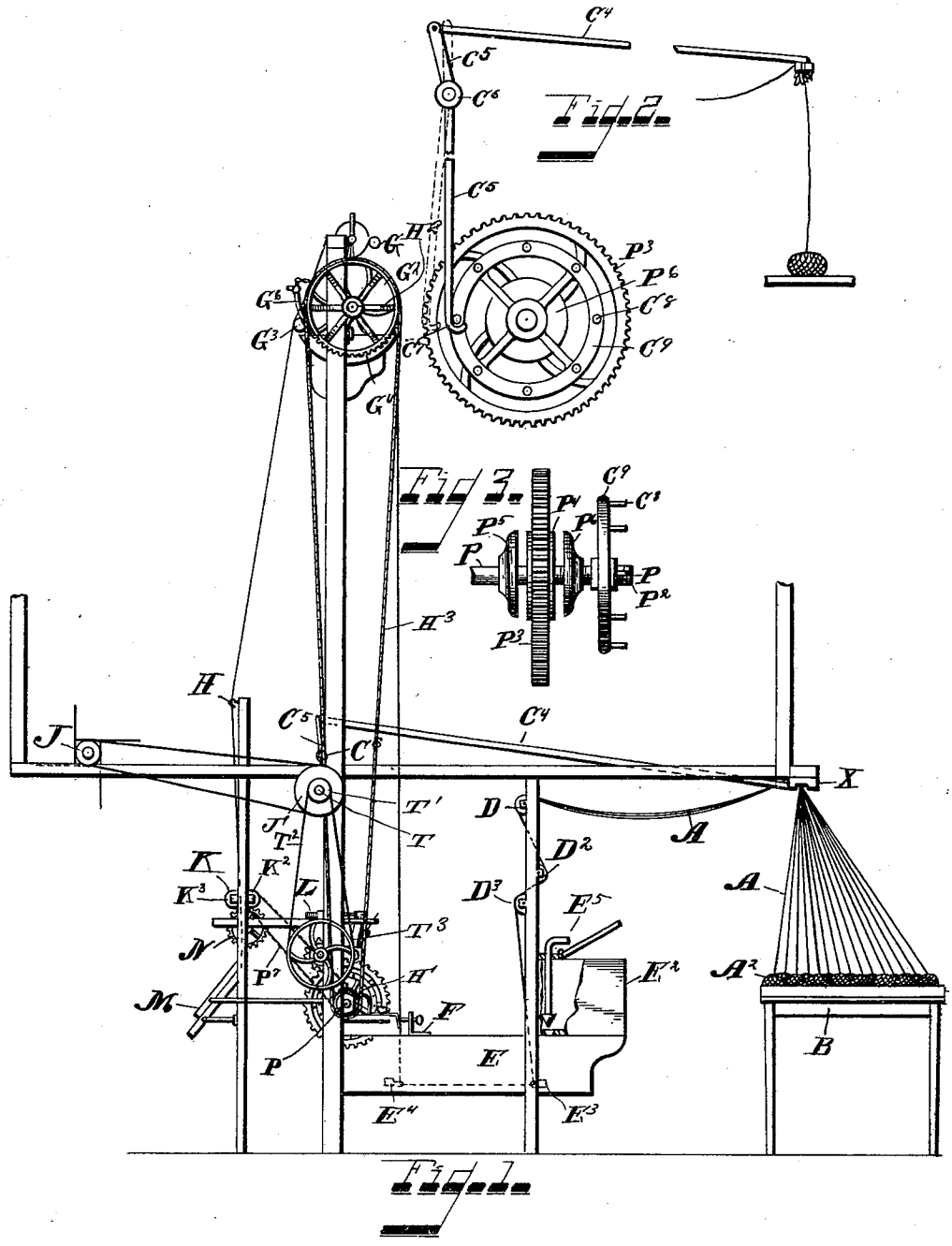

Fig. 1.

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Fig. 4.

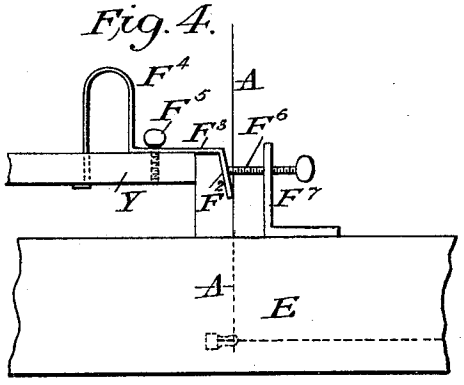


Fig. 5.

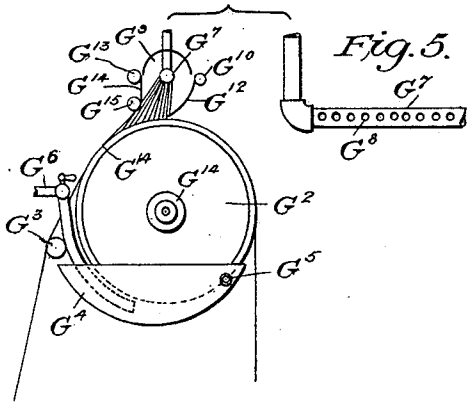


Fig. 6.

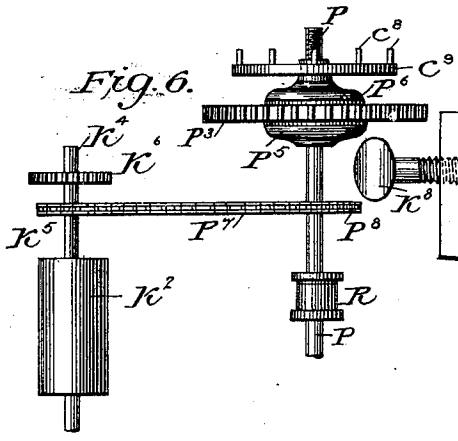


Fig. 9.

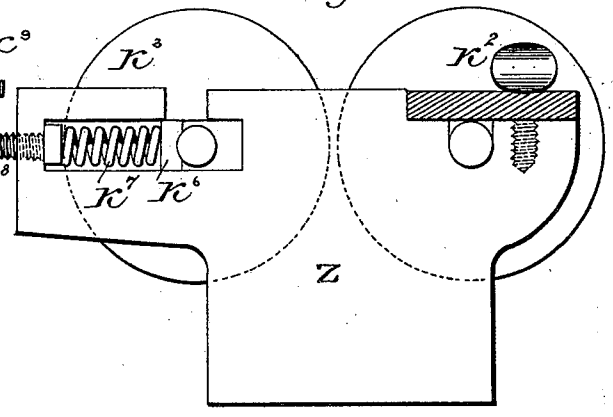
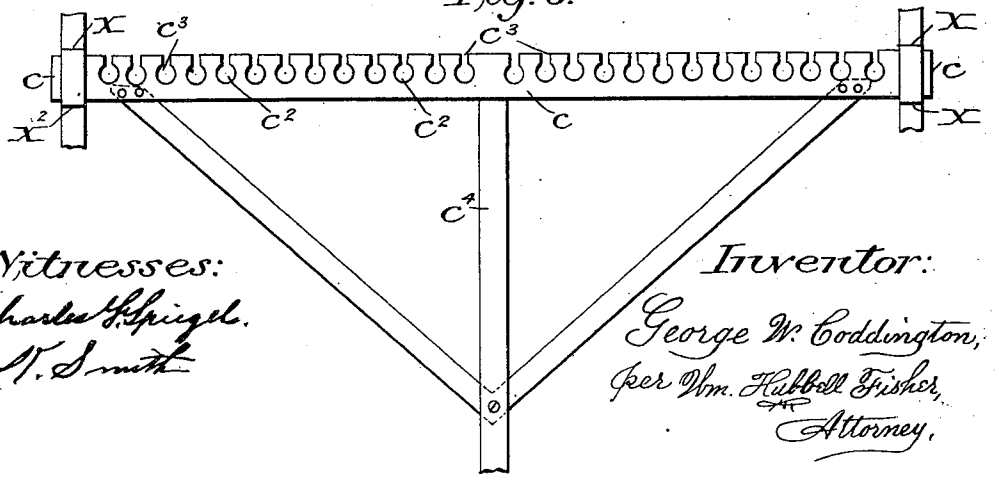


Fig. 8.



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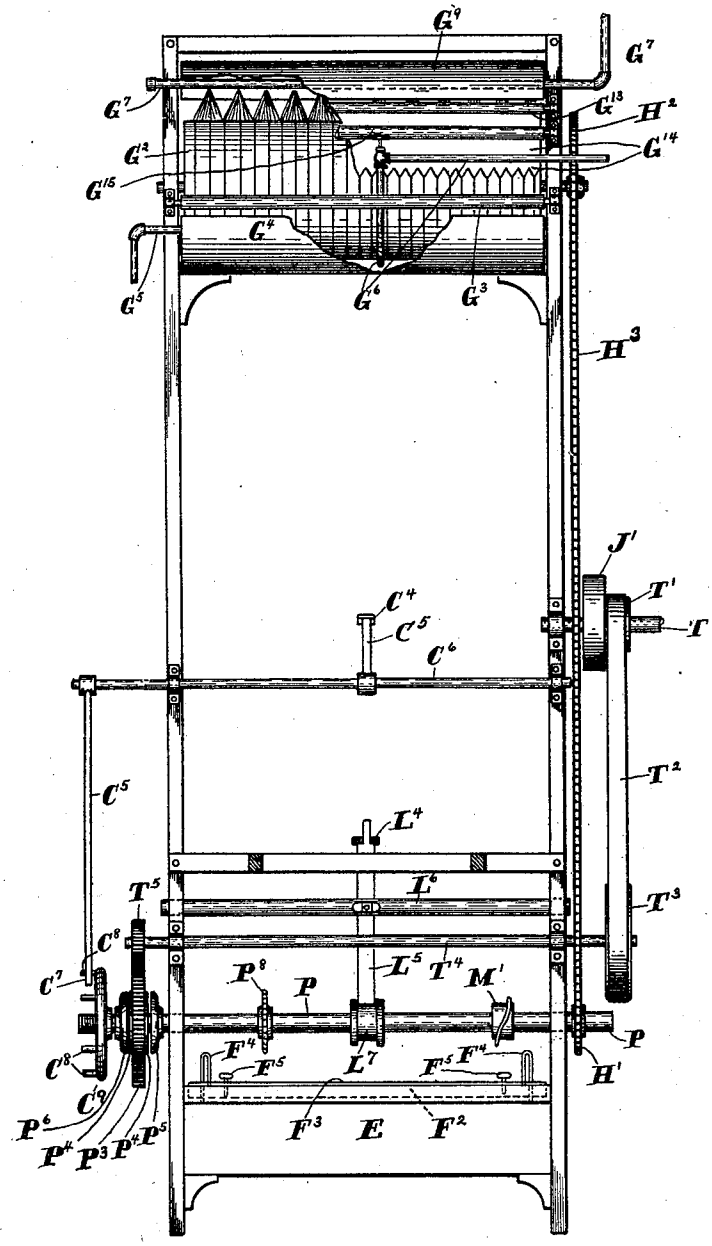

Fig. 7.

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MACHINE FOR MANUFACTURING WAXED OR COATED STRINGS.

SPECIFICATION forming part of Letters Patent No. 643,041, dated February 6, 1900.

Application filed June 17, 1897. Serial No. 641,164. (No model.)

To all whom it may concern:

Be it known that I, GEORGE W. CODDINGTON, a citizen of the United States, and a resident of the town of Heno, in the county of Butler and State of Ohio, have invented certain new and useful Improvements in Machines for the Manufacture of Waxed or Coated Strings, of which the following is a specification.

My invention consists of certain improvements relating to the machinery for manufacturing waxed tapers and coated strings, for which Letters Patent of the United States No. 303,984, dated August 26, 1884, were duly issued to me, and reference is hereby made to the said Letters Patent No. 303,984 for a full understanding of any portion of the herein-referred-to apparatus now treated as a part of the existing art and cursorily described in this specification.

The several features of my invention and the various advantages arising from their use, conjointly or otherwise, will be apparent from the following description and claims.

In the accompanying drawings, making a part of this specification and in which similar letters of reference indicate corresponding parts, Figure 1, Sheet 1, represents in general a side elevation of a machine embodying my improvements. Fig. 2 is a side elevation of another portion of the mechanism. Fig. 3 is an edge view of the wheel shown in Fig. 2, and also of the power-pulley and the friction-flanges and disks, showing in elevation a portion of the shaft on which these wheels are mounted. Fig. 4 is a side elevation showing the stripper-plate and the devices for adjusting that plate. Fig. 5 is a side elevation of the mechanism for keeping the composition of the strings at the requisite temperature to enable them to be properly cut by the knife into desired lengths. Fig. 6 is a plan view of the clutch and gearing. Fig. 7 is an elevation of that part of the machine which lies to the right of the plane through the dotted line 12 12 of Fig. 1. That face of the mechanism illustrated in this view, Fig. 7, is the one which faces toward the left in Fig. 1. Fig. 8 is an enlarged view of the guide through which the strings pass and showing the conformation of those passages in the guide which admit the strings. Fig. 9 is an enlarged side elevation of the feed and measuring mechanism.

Before proceeding to describe my improvements in detail I will give an outline of the mode in which the entire machine operates.

Balls A^2 of string A to be coated are first laid upon the table B. The strings A from their respective balls then pass up to the guide C. This guide C has as many passages C^2 through it as there are strings to be simultaneously coated, and each passage is connected to an open slot C^3, running from it to the front edge of the guide C, so that the string can be inserted in the passage-way laterally, and thus obviate the necessity of running the string endwise through the passage-way. The preferred number of strings simultaneously coated is twenty-five. Each string passes up through its passage C^2 and over the rear edge of the guide C and then goes rearward and passes over a roll D and thence in a direction generally downward back and against roll D^2 and forth against roll D^3 to cause the string to slightly resist a pull thereon and to prevent its bagging as it passes down through the composition wherewith the string is to be coated and which composition (technically called the "wax") is located in the tank E. The rolls D D^2 D^3 are to be rotatable or stationary, as required, and are to be varied in number according to the resistance to be required. The tank E is suitably supplied with wax, preferably from the reservoir E^2, and the delivery of the liquid or semiliquid wax from this reservoir E^2 is regulated by a suitable device, the simplest and best one consisting of the plug or stopple E^5, fitting into the floor of the reservoir E^2 and operated from above by a handle extended above the reservoir E^2. The strings A pass down into the composition and through stationary eyes E^3, located in the tank, thence pass on near to the bottom of the tank E and then through stationary eyes E^4, thence pass up past a device F, which draws from them the surplus wax, and then pass up into and through the device G for regulating the temperature and the consistency of the wax at the time it is to be cut. Thence the strings are brought together by a converging device H and are dried by the device J and are passed through a feed-

ing and measuring device K, composed of feed and measuring rollers K^2 K^3, and are next presented to a cutting device L, whereby they (the strings) are cut into equal and given lengths. These strings are then immediately upon being cut deposited in a box M, containing a given number of strings, and when the proper number of strings have been cut and deposited in the box the box is by mechanism N pushed to one side for delivering its strings in a condition to be packed for the market.

I will now proceed to describe my improvements in detail. First, when a tangle occurs in the string as it comes from the ball and before reaching the guide C, I provide the following-described mechanism, whereby the tangle stops the machine, viz: The ends of the guide-bar C respectively rest on the horizontal supports X X of the frame and have room to slide back and forth on said supports between the stops X^2 X^2 and beneath covers or superincumbent strips connected to said stops. This guide C is connected to a frame C^4 C^4 C^4, which extends rearward and is connected to one end of a lever C^5, pivotally fulcrumed at C^6 to the frame, and whose lower portion is provided with a hook C^7 in position when advanced to engage the nearest one of a number of pins or projections C^8, located on a wheel C^9, whose hub is interiorly a screw-thread, which latter engages a screw-thread P^2 on the main or power-transmitting shaft P. A power-pulley P^3, driven in any suitable way, is located on the shaft, so as to turn loosely thereon, and is between two friction-disks. One of these disks—viz., P^5—is fixed on the shaft, while the other, P^6, is loose thereon. The power-pulley has friction-faces P^4 on each side, whereon the friction-disks can press when the pulley is clamped between the latter.

The operation is as follows: When the devices are in usual working position and the strings are moving smoothly through the machine, the power-pulley P^3 is tightly clamped between the friction-disks P^5 P^6. The wheel C^9 is screwed tightly up against friction-disk P^6, and thereby clamps the power-pulley P^3 between the friction-disks. This wheel C^9 is revolving free of the hook C^7, the latter and its lever occupying the position indicated by dotted lines in Fig. 2. As soon as a tangle is present on a string A between its ball A^2 and the guide C and the tangle reaches the guide it catches its string moving on, draws the guide toward the lever C^5, and thus moves the frame C^4, which in turn moves lever C^5 and causes its lower end to hook with a pin C^8 of the revolving wheel C^9 and stops the latter from revolving. As the power-transmitting shaft P continues to rotate the latter is at once unscrewed from friction-disk P^6 and disengages the clamps P^5 P^6 and allows the power-wheel P^3 to be out of engagement with the power-transmitting shaft P. Thus relieved, the wheel P^3 will revolve and the mechanism it heretofore turned, including the feeding device K, whereby the strings were drawn along through the machine, will stand still. Opportunity is now given to the operator to take the tangle out of the string. As soon as he does this the machine is ready to be started. The operator now screws the wheel C^9 against the power-wheel and the latter against the friction-disk P^5, and thereby clamps the power-wheel and puts the latter in engagement with the revolving power-transmitting shaft P. The power-transmitting shaft now again revolves and operates the machine and the latter again works smoothly. It is to be understood that as the operator screws up the wheel C^9, as last aforementioned, the hooked end of lever C^5 by its weight drops away from the wheel C^9 and out of engagement with its pins, leaving the latter free to be turned.

This improvement effects a great saving of time. Heretofore when a tangle caught the machine had to be stopped or the thread (string) would break, and after the machine was stopped a new thread would have to be run often much of the way through the machine. The tangle would usually cause the string to break in the tank, and the broken string would then have to be fished out of the melted wax in the tank by means of a hook and then followed and tied to the part from which it had been torn. This occupied much time, consumed much delay and loss of material, and in the meantime all hands would have to be standing around waiting for the replacement to be made.

My present improvement in case of a tangle stops the machine and prevents breaking of the string. All that is required to be done is to untie (get out) the tangle (knot) and screw up the wheel C^9 and the machine goes right off again.

The location of the string-ball table A, as shown, is an improvement, as much more room is obtained in which to properly operate the machine and to work than heretofore. There is also more opportunity to observe the string and detect a tangle.

The location of the mixing tank or pan (reservoir) E^2 above and partly back of the forward end of the tank E, as shown, is an improvement. This arrangement enables the operator to dispense with kettles and the laborious lifting and carrying of these to the tank and filling the latter with wax from these kettles. It is to be understood that there are oil-lamps, steam-pipes, or other suitable heating apparatus beneath or in the tank E for keeping the wax hot, and consequently soft, and also inside or under tank E^2.

The construction of the stopple is obviously advantageous, the latter being of a conical form and fitting a conical hole (seat) in the bottom of the tank E.

Another improvement consists in the novel construction of the devices for stripping the extraneous wax from the string after being in tank E and emerging therefrom, carrying

a large amount of wax with it. This device (see Fig. 4) has the stripping-scraper F^2, fixed to a slide-plate F^3, continually pressed forward by a spring F^4. The latter is preferably a flat one of a bent form, one end of which bears against the frame-support Y and the other against the rear end of the slide-plate F^3. The latter is held down and prevented from lateral displacement by means of a set screw or screws F^5, passing through a slot in the plate F^3 and screwed into the support Y. What keeps the stripping-scraper F^2 at the correct distance from the axial centers of the waxed strings is the set-screws F^6, screwed through the fixed support F^7. These set-screws F^6 bear directly against the face of the scraper F^2 and when screwed forward hold the scraper farther back and allow the strings to carry more wax on with them, and vice versa. The use of the scraper results in compelling the waxed strings to be of a uniform and a given size. Otherwise they would not be. It will be understood that the scraper F^2 is a long one and reaches and operates on all of the twenty-five or more strings simultaneously. Two screws F^6 make the entire adjustment. It will further be observed that the springs F^4 keep the scraper always firm against the screws F^6, and thus make the adjustment of the scraper F^2 entirely under the control of the screws F^6.

Another feature of my invention relates to the construction of the devices G for keeping the wax of the strings at a proper temperature and degree of consistency for enabling them to be thereafter properly cut. This construction and its accompaniment construction is as follows: G^2 is a drum or roller having peripheral grooves in planes at right angles to the axis of the roller and covered with a fabric, usually woolen-blanket stuff, (cloth.) The cloth sinks into these grooves and leaves them perceptible. The waxed strings run over this drum, and each one runs in a groove in the drum, one for each string. The strings after running over the drum G^2 pass out over the roller or bar G^3, whereby they are carried away from the drum and out of contact with it. The roller G^3 is covered with woolen blanket to absorb or wipe up any surplus moisture from the string as it takes them after leaving drum G^2 on their way to the cutting-knife. Beneath the drum G^2 is a water-tank G^4 nearly full of water, and the lower portion of the drum is submerged therein. An outlet-conduit G^5 prevents the tank from overflowing.

G^6 indicates a steam-pipe for supplying steam for heating the water in the tank.

G^7 indicates a sprinkling-tube extending the length of the roller and above the latter. This tube is provided with the orifices G^8, from which the water issues and falls upon the strings to cool them as they pass over the roller. In practice the spray-jets are inclined toward the rear end of the roller, substantially as shown. A hood G^9 is preferably present over the tube G^7 to confine any scattering portions of the spray within the proper limits. A rod G^{10} in front of the spray-tube carries a piece of blanket G^{12}, the lower end of which drags on the upper face of the drum and prevents the water from the spray from running back and down the wrong (front) side of the drum. A rod G^{13} at the rear of the spraying-tube carries a blanket G^{14}, the lower end of which drags on the drum and assists in distributing the water over the waxed strings as they lie on the drum. A rod G^{15} holds this blanket down and causes it to more fully press against the drum and waxed strings. The water to supply the spraying device may be drawn from any suitable source. A feed-pipe may be present connected to the spraying-tube G^7 and adapted to receive the end of a hose stretched over it. In very warm weather the use of cool water from the spray is necessary to keep the wax of the strings from running and render it hard enough to be cut by the knife. This spray of cold water will be needed for a much longer period of the year where the apparatus is in a room and near a steam-boiler, &c., as is usually the case when the machine is operated by an engine. In cold weather warm water may be applied through the spraying device. The steam-pipe G^6 may be present to warm the water in the tank (in cold weather) and also to thaw this water when it happens to be frozen.

The drum G^2 is suitably rotated. In the present illustrative instance it is rotated by means of a sprocket-wheel H^2 on the shaft of this drum, and a sprocket-wheel H', fixed on the power-transmitting-shaft P, and a drive (sprocket) chain H^3, engaging the wheels H' and H^2.

My next improvement relates to the feed and measuring devices. The roll K^2 is the feed and measuring roll. It is a feed-roll, because it is positively driven, and, in connection with the companion roller K^3, draws the waxed strings along through the machine and delivers them to the cutting apparatus to be cut into lengths. The journals of the companion roll K^3 are in bearings K^6, sliding in slotted openings and pressed toward the journals of the roll K^2 by means of springs K^7, and the latter are compressed against the journal, preferably by means of two set-screws K^8, one on each end of roller K^3, screwed through the frame Z. The degree of pressure exerted by the spring K^7 against the journals of the roll K^3 can be regulated by turning the set-screws K^8, and thus the pressure of the rolls K^3 and K^2 upon the waxed strings as the latter pass between them can be varied as required. Thus the waxed strings can at all times be prevented from slipping between these rollers K^2 and K^3, and these rolls will always feed the strings forward at all times when the machine is at work.

The roller K^2 is driven from the power-

shaft P in such a manner that when this roller has rolled off a given length of strings, the knife advances and severs these strings from the remainder of the length. Usually the circumference of the roller K^2 will equal the length of the strings to be cut.

L indicates the cutting device as seen in Fig. 1.

There is a sprocket-wheel P^8 fixed on the main shaft P and a sprocket-wheel K^5 fixed on the shaft K^4 of the roller K^2. These sprocket-wheels are connected by a sprocket-chain P^7. Thus the roller K^2 is rotated.

On the shaft K^4 is a fixed gear-wheel K^6, having a desired number of cogs, as twenty-five, and this gear-wheel K^6 meshes with gear-wheel N, having a given number of teeth, as one hundred. Thus four revolutions of the gear-wheel K^6 are made to one of wheel N, and four sets of twenty-five strings cut in equal lengths have been cut and deposited in the delivery-box by the time the wheel N has made one revolution. The wheel N at each revolution—viz., at the time when one hundred strings have been deposited in the delivery-box M—works a device for shoving out the boxes of strings. This device for shoving out the strings is already described and covered in and by previous Letters Patent granted to me.

The location of the fan—in the present instance at the rear of the machine and facing the waxed strings, so as to cool them as they descend in readiness to be cut—is a great improvement. Heretofore I located the fan at the front of the strings—viz., to the right (see Fig. 1) of the strings as they ascend.

These various features of improvement obviously add greatly to the efficiency of the machine and increase the facility of its operation fully double the former capacity.

Before proceeding to specify what I claim I will briefly describe the means for operating the drying mechanism. The drying device consists of the gear-wheel T^5, meshing with the gear-wheel P^3 and fixed upon shaft T^4, duly journaled in the frame and carrying at its other end a pulley T^3, which through the agency of a pulley-band T^2 operates pulley T', fixed upon shaft T. Upon this shaft T is also fixed a pulley J', connected by a band with pulley T^3 aforementioned, which operates the drying device. This latter mechanism comprises no part of my invention claimed hereinafter.

What I claim as new and of my invention, and desire to secure by Letters Patent, is—

1. In a string-coating machine, the combination of the laterally-moving guide C, having openings C^2, and bearings for enabling the guide to move laterally, and the rod C^4, lever C^5, a hook C^7 on its lower end, and the wheel C^9 having pins C^8 for engagement with hook C^7, power-wheel P^3, having friction sides, friction-plates P^5 and P^6, one on each side of the wheel P^3, shaft P on which said wheels C^9 and P^3 and the friction-plates are located, the plate P^5 being fixed to the shaft, and plate P^6 being loose thereon, the shaft P being in part screw-threaded and engaging a screw-thread in the hub of wheel C^9, substantially as and for the purposes specified.

2. In machinery for coating strings, the tank, a stripper, for the strings as they come from the tank, comprising the elastically-pushed plate F^3, flange F^2 thereof, spring F^4, stationary abutment, screw-rod F^6 operated therefrom and bearing against the stripper-flange in opposition to the spring F^4, substantially as and for the purposes specified.

3. In machinery for coating strings, the combination of the table Y, stripper-plates F^2, F^3, having two slots, two holddowns F^5 thereof, two springs F^4 for pressing the stripper-plate toward the strings, and the opposing set-screws F^6, bearing on the stripper, and the supports F^7, in relation to which the screws are adjustable, substantially as and for the purposes specified.

4. In machinery for coating strings, the combination of the roller G^2, spraying device above, and blanket strip G^{12} lying on the roller at rear of the spraying device, substantially as and for the purposes specified.

5. In machinery for coating strings, the combination of the roller G^2, spraying device above, blanket strip G^{12} dragging on the roller at rear of the spraying device, and blanket strip G^{14} dragging on the roller, in front of the spraying device, substantially as and for the purposes specified.

6. In machinery for coating strings, the combination of the roller G^2, spraying device above, blanket strip G^{12} dragging on the roller at rear of the spraying device, and blanket strip G^{14} dragging on the roller in front of the spraying device, and the rod G^{15}, for depressing the last-named blanket, substantially as and for the purposes specified.

7. In machinery for coating strings, the combination of the rod G^{13}, blanket strip suspended therefrom, the roller G^2 related to the tank and on which this blanket strip can drag, and the tank G^4, and the conduit G^6 for heating the water, substantially as and for the purposes specified.

8. A device for regulating the temperature of the coating of the strings, and consisting of the felted grooved roller G^2, spraying device above, blanket strip G^{12}, and blanket strip G^{14}, and roller G^{15}, in contact with the latter, and tank G^4, receiving the lower part of the roller, conduit G^6 entering the tank, and roller G^3 for keeping the strings from the roller, substantially as and for the purposes specified.

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