(No Model.)

3 Sheets—Sheet 1.

G. W. CODDINGTON.

MACHINERY FOR MANUFACTURING WAXED TAPERS AND COATED STRINGS.

No. 303,984. Patented Aug. 26, 1884.

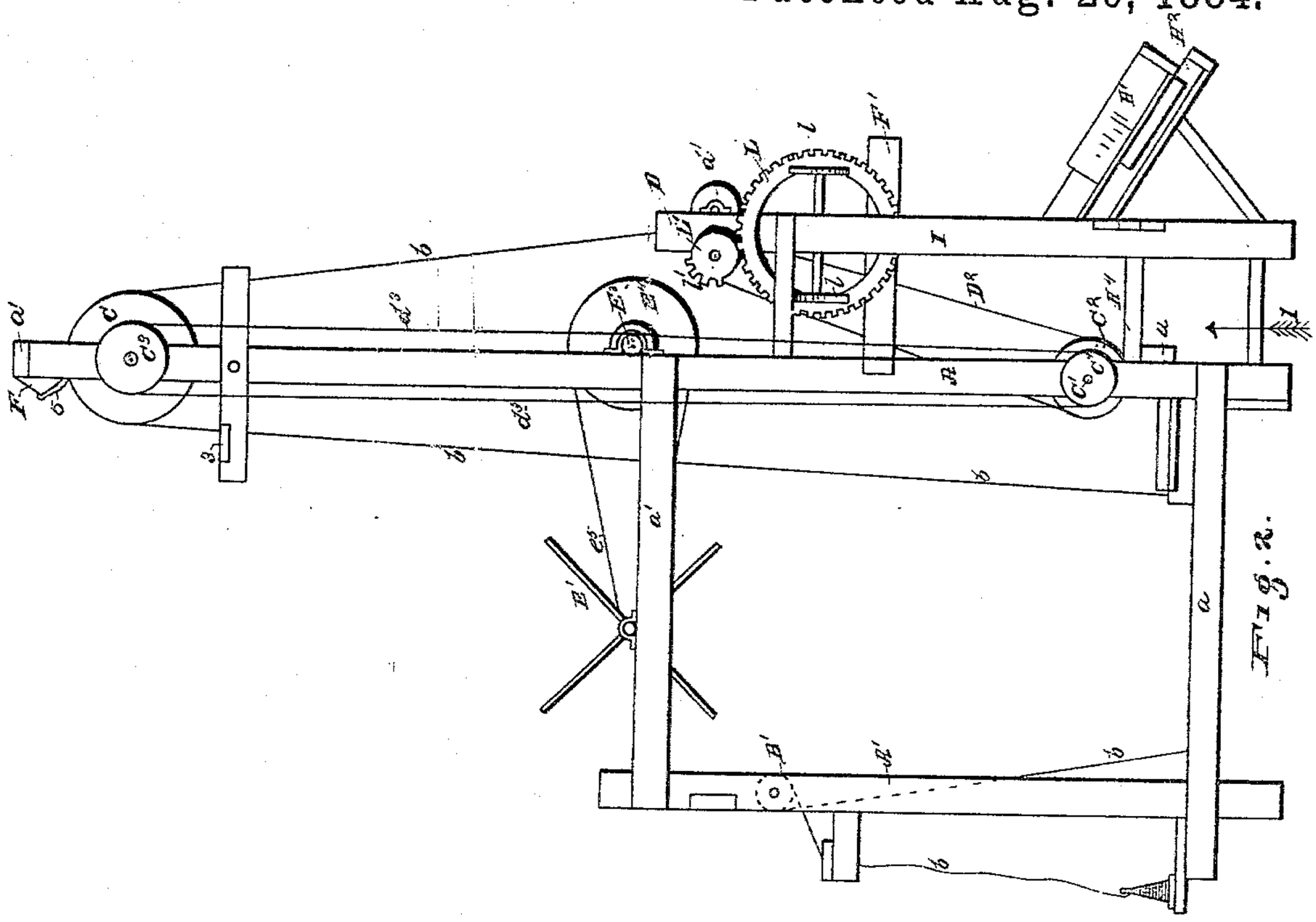

Fig. 2.

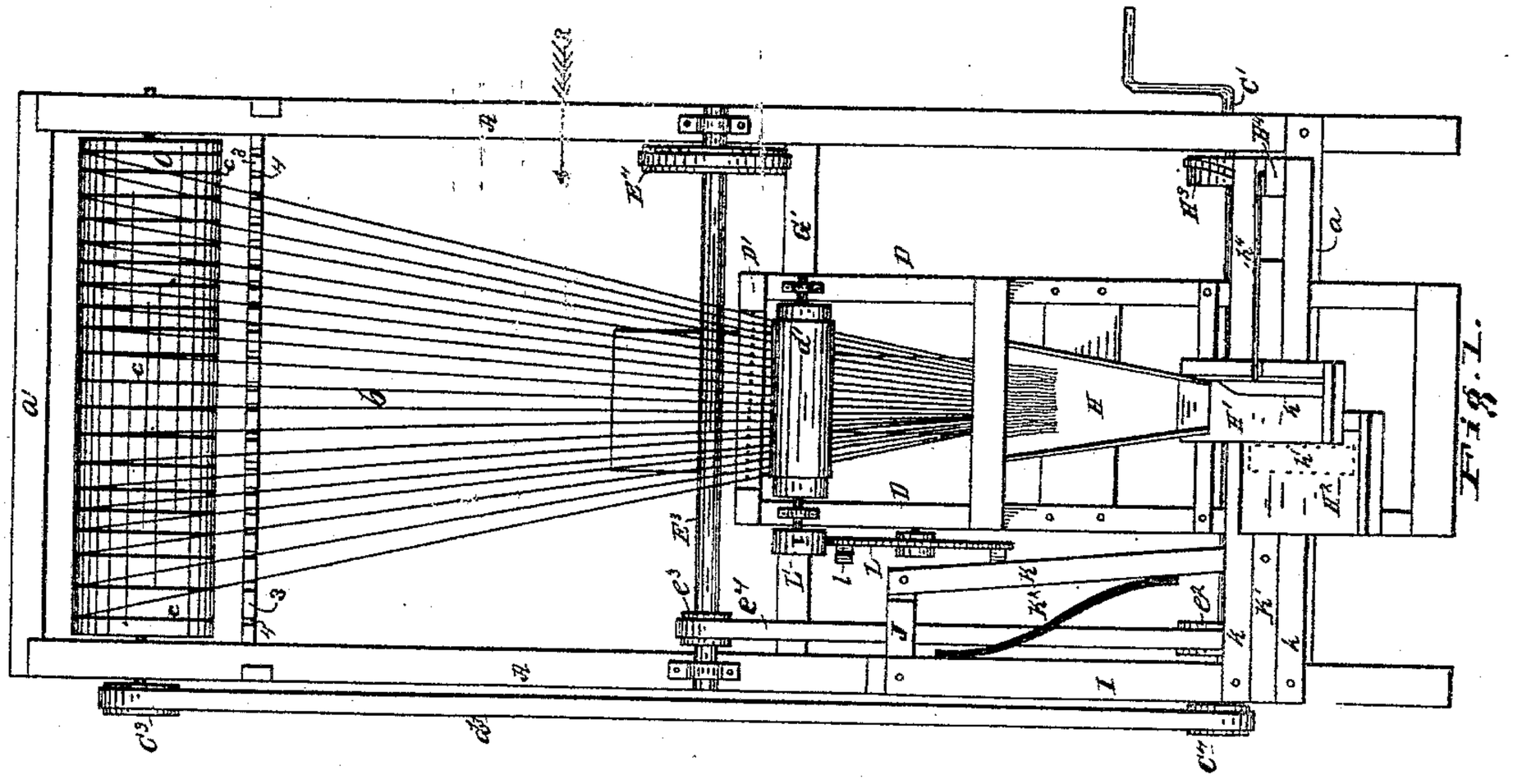

Fig. 1.

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INVENTOR_

George W. Coddington,

per Wm. Hubbell Fisher,

Atty

(No Model.) 3 Sheets—Sheet 3.

G. W. CODDINGTON.

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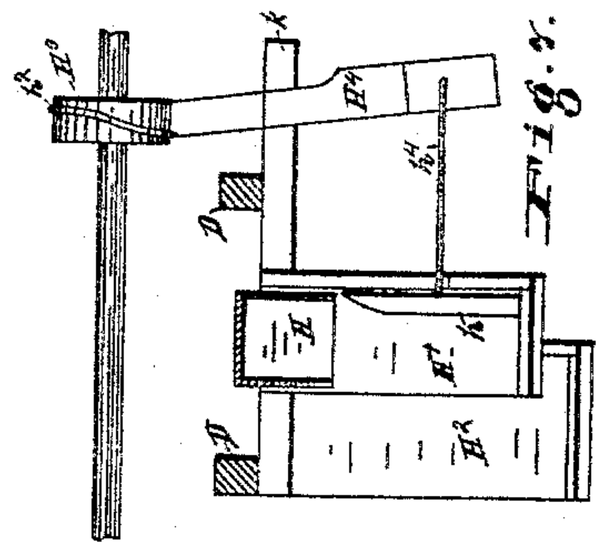

Fig. 4.

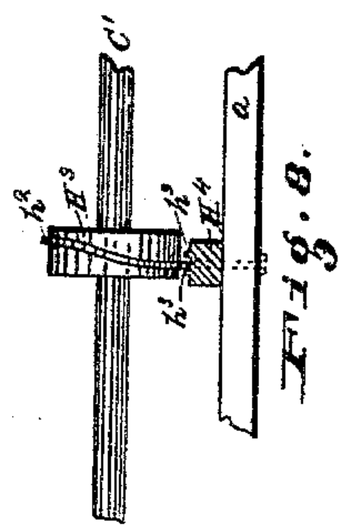

Fig. 8.

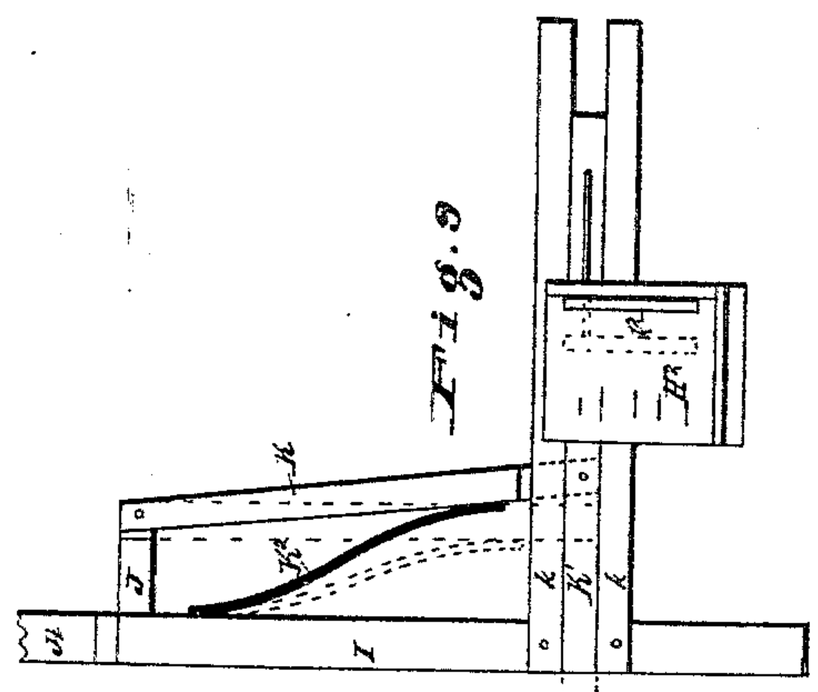

Fig. 9.

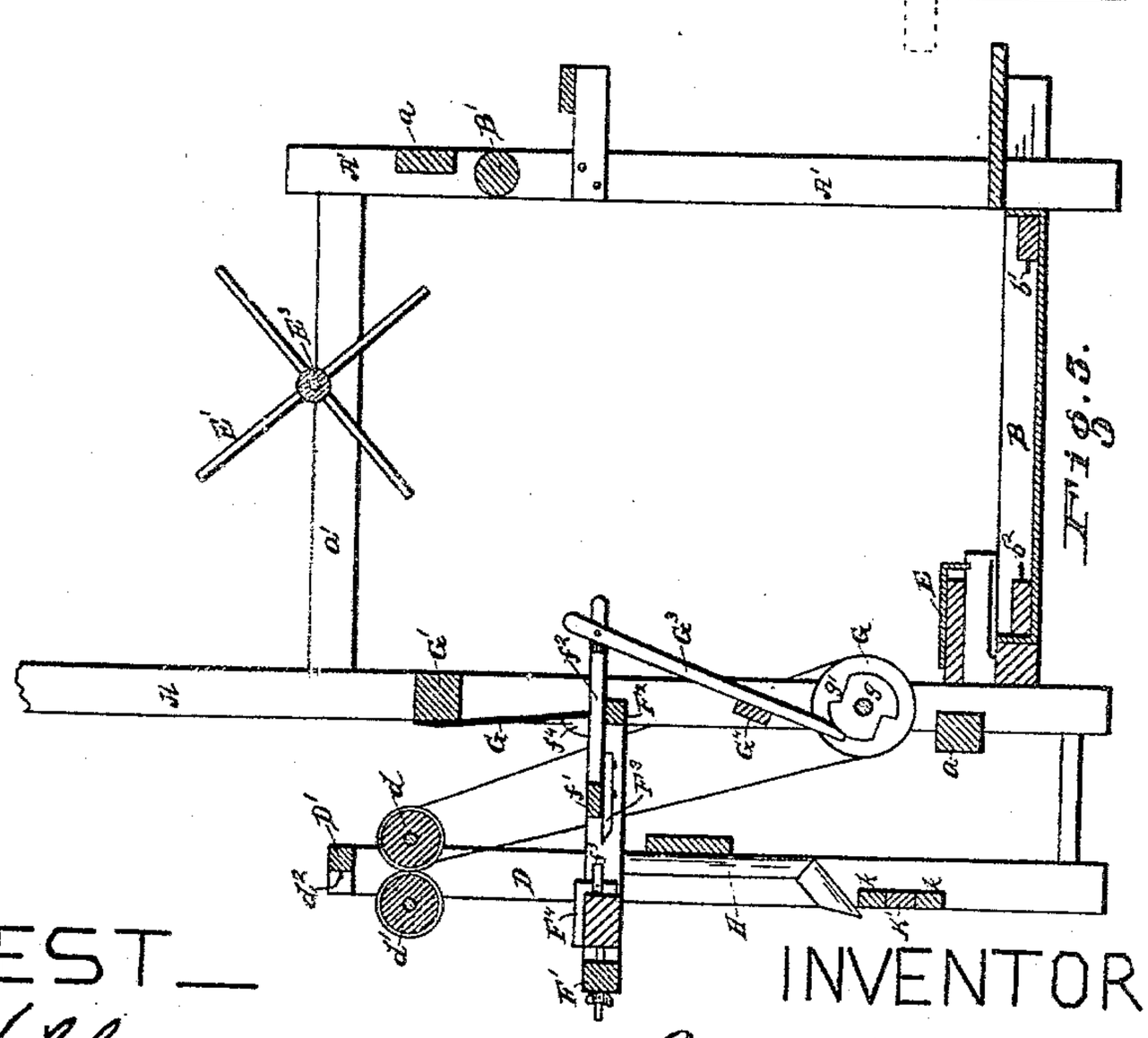

Fig. 5.

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(No Model.) 3 Sheets—Sheet 2.

G. W. CODDINGTON.

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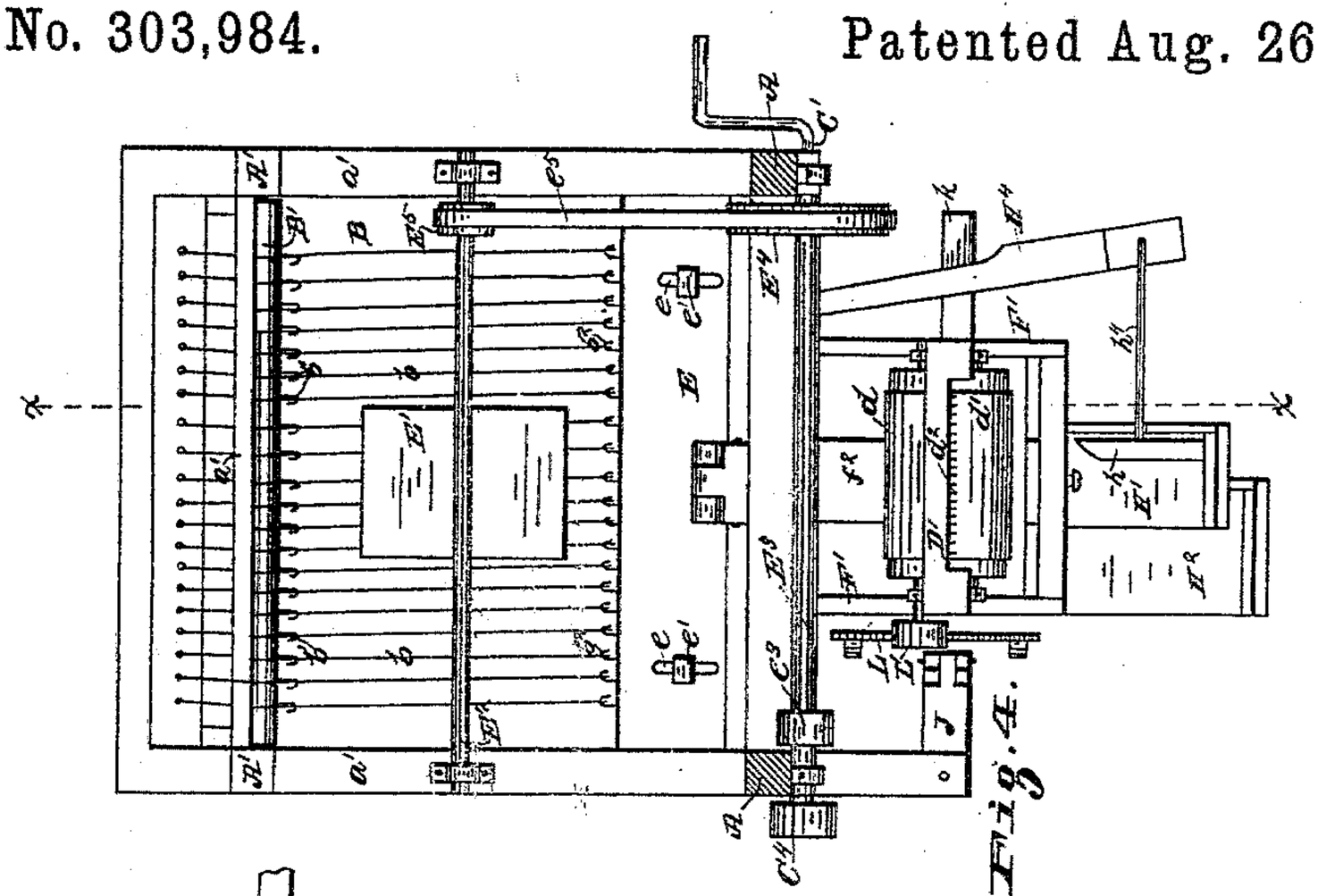

Fig. 4.

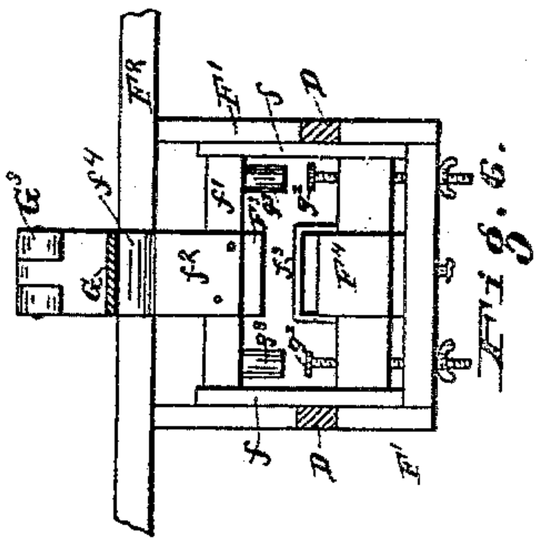

Fig. 5.

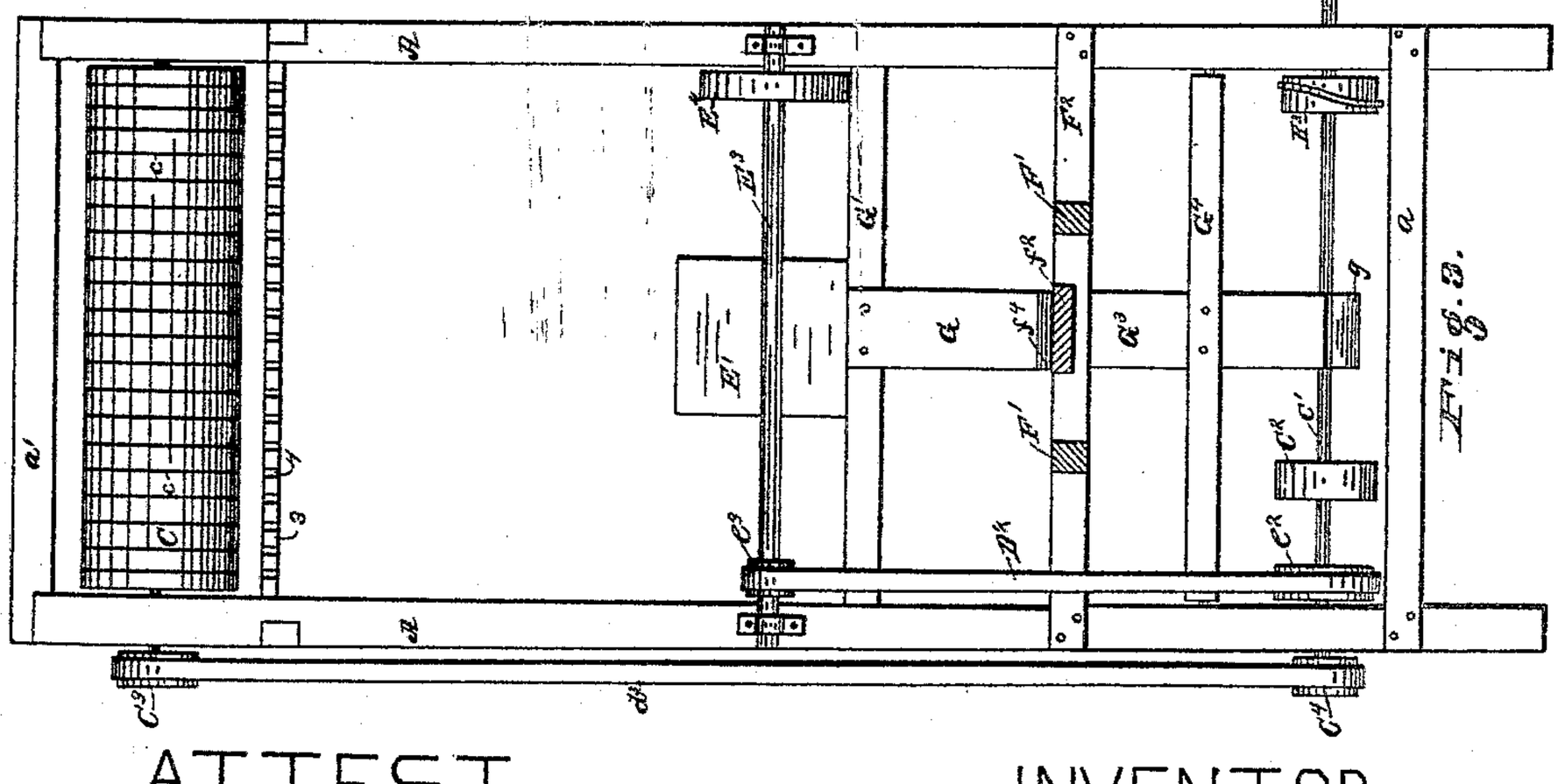

Fig. 3.

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UNITED STATES PATENT OFFICE.

GEORGE WARREN CODDINGTON, OF MIDDLETOWN, OHIO.

MACHINERY FOR MANUFACTURING WAXED TAPERS AND COATED STRINGS.

SPECIFICATION forming part of Letters Patent No. 303,984, dated August 26, 1884.

Application filed October 13, 1883. (No model.)

To all whom it may concern:

Be it known that I, GEORGE W. CODDINGTON, of Middletown, Butler county, Ohio, have invented certain new and useful Improvements in Machinery for Manufacturing Waxed Tapers and Coated Strings, of which the following is a specification.

The object of my invention is to provide a machine which shall rapidly and cheaply produce waxed strings or tapers for sealing fruit-cans or for lighting purposes. It has special reference, however, in the present instance to the manufacture of waxed strings for sealing fruit-cans.

Letters Patent No. 235,879, for method of sealing fruit-cans, were granted to G. F. Hunsaker on December 28, 1880; but heretofore it has been very troublesome and quite expensive to manufacture the waxed strings therein described; but my invention produces these strings very cheaply and rapidly.

Referring to the drawings forming part of this specification, Figure 1 is a front elevation of the machine. Fig. 2 is an elevation of one side of the same. Fig. 3 is a sectional elevation, looking toward the rear of the machine, all of that portion in front of the arrow 1 in Fig. 2 being removed. Fig. 4 is a plan view of the machine, that portion above the arrow 2 in Fig. 1 being removed. Fig. 5 is a sectional elevation taken at the line *x x* of Fig. 4, and looking toward the left in said figure. Fig. 6 is a plan view of the mechanism for cutting the strings to the desired length. Figs. 7 and 8 represent the mechanism for removing each cutting of strings. Fig. 9 represents the mechanism for counting and removing the strings from the machine.

The main frame of the machine consists of the posts A A′, connected by appropriate sills, *a*, and headers *a′*, framed together, the posts A at the front of the machine extending some distance above the tops of the posts A′ at the rear. Near the bottom of this frame, between the sills *a*, is secured a pan or vat, B, in which the melted wax with which the strings are to be coated is placed. This pan may be heated by any desired means which will prevent the wax in the pan from burning—as, for instance, by steam. The wax with which the strings are to be coated is preferably melted in any appropriate vessel before being delivered to the pan B, and is then poured into the said pan B, and this pan being suitably heated, the wax is kept in a liquid state.

This machine may be so constructed that any desired number of strings *b* may be coated at once, the strings being drawn through the wax in the pan B in a manner to be hereinafter described.

I prefer to so construct the machine that it will coat twenty strings at once, as this is a convenient number to handle, and I have illustrated in this application a machine constructed to coat this number. These strings are each passed over or around a roller, B′, journaled between the posts A′, above the pan B, and down to the pan, at the rear side of which each string passes through a staple or hook, *b′*, and, passing forward to the front side of the pan, each string passes up through another staple or hook, b^2. These staples or hooks in both sides of the pan are near its bottom, and the strings *b*, as they are drawn through the pan, are thus kept submerged in the molten wax in the pan B. After passing through the hooks b^2 the strings pass up to the top of the frame, where they pass over a roller or drum, C, journaled between the posts A, and, after passing over this drum C, the strings pass down between two guides or feed-rollers, *d d′*, journaled near the top of the posts D, in front of the posts A. This drum or roller C is provided with grooves *c*, in which the strings *b* lie as they pass over the drum, thus keeping them separated from each other until they have passed over the drum. A short distance below the drum C is a guide-bar, 3, suitably connected to the posts A, which bar is provided with notches 4, corresponding in number to the number of grooves *c* in the drum C, one of the notches 4 being located directly below each groove *c*, serving to guide the strings *b* into said grooves. These rollers *d d′* are shorter than the drum C, and consequently the strings *b* as they approach these rollers must converge to pass between the rollers, and this convergence is effected by means of a series of pins, d^2, in the front face of a cross head or bar, D′, connecting the top ends of the posts D, between which pins the strings pass, as shown in Fig. 1. The rollers

d d', at the points between which the strings *b* pass, are covered with felt or other soft pliable material, and thus the wax, which has become hardened on the strings before reaching these rollers, is not cracked, as would be the case were the rollers not covered by a soft material.

Between the posts A, near the bottom of the machine, is journaled the main driving-shaft C', which may be caused to revolve in any suitable manner, either by hand, steam, or other power. On this shaft is keyed a belt-pulley, C^2, around which pulley passes a belt, D^2, which passes around the feed-roller *d*, so that when the shaft C' is caused to revolve the feed-roller is also caused to revolve, and the strings *b*, passing between the rollers *d d'*, are drawn down, and hence through the molten wax in the pan B. To assist in this movement of the strings *b*, one end of the drum C over which the strings pass is provided with a pulley, C^3, and a belt, d^3, passes around this pulley and around a pulley, C^4, on the end of the driving-shaft C', and a revolution of the shaft thus causes the drum C to revolve. As the strings *b* are drawn through the pan B, the melted wax therein adheres to the strings, and as they leave the pan they are drawn against the edge of a plate, E, and this plate, being adjustable by means of slots *e* and set-screws *e'*, may be moved toward or away from the strings, and thus more or less of the wax may be scraped off from the strings as they leave the pan.

It is necessary to employ some means for cooling the wax and hardening it on the strings, and this I accomplish by means of a revolving fan, E', secured to a shaft, E^2, journaled in the headers *a'*. This fan is caused to revolve by appropriate mechanism from the driving-shaft C'. I preferably employ a shaft, E^3, journaled to the posts A above the driving-shaft C'. On the driving-shaft is a pulley, e^2, and on the shaft E^3, immediately above the pulley e^2, is a smaller pulley, e^3, and a belt, e^4, passes around these pulleys.

On the shaft E^3 is a large pulley, E^4, and on the fan-shaft E^2, in a line with the pulley E^4, is a smaller pulley, E^5, and around these latter pulleys passes a belt, e^5. Thus when the driving-shaft is caused to revolve the fan-shaft is caused to revolve at an increased rate of speed, and the wind from this revolving fan, blowing on the strings *b* as they pass up from the fan B to the drum C, cools and hardens the wax on the strings. In addition to this fan, if desired, a trough or bucket, F, may be placed above the drum C and kept supplied with water, which is allowed to drip on the strings as they pass over the drum. This drum C is covered with cloth, which is kept constantly moistened by water from the trough F, the preferred means for conveying the water from the trough to the drum being a strip of cloth, 5, one edge of which is in the trough, and the other edge resting on the drum. This strip 5 acts on the principle of a siphon, and keeps the cloth on the drum C moist, and the strings *b* are thus drawn between two moistened surfaces, and are thus cooled and moistened. The strings *b* having been coated with wax, it now becomes desirable to cut them into proper lengths for use, and this I accomplish by the following mechanism:

To the posts D, below the rollers *d* and *d'*, is secured a frame, F', one side of the frame being secured to a cross-piece, F^2, secured to the posts A. The sides of this frame are provided (see Fig. 6) with guides or ways *f*, between which slides a cross-head, *f'*, secured to a sliding bar, f^2, and to the end of this sliding bar f^2 is also secured a knife, F^3, which projects beyond the cross-head *f'*. At the side of the frame F', opposite to the cross-head *f'*, is secured a block, F^4, against which the edge of the knife F^3 strikes when it is thrown forward. At the front of this block F^4—that is, at the side toward the knife F^3—is a loop, f^3, through which the strings *b* pass after leaving the rollers *d* and *d'*, which loop holds all of the strings in front of the knife.

On top of the sliding bar f^2 is secured a lug, f^4, against which rests one end of a spring, G, the other end of which spring is secured to a cross-bar, G', connected to the posts A above the cross-piece F^2, and the tendency of this spring is to constantly force the knife F^3 toward the block F^4. The end of the sliding bar f^2, opposite to the knife, is pivoted to the upper end of a lever, G^3, which lever is secured to a pivot-bar, G^4, which is pivoted in the posts A between the cross-pieces F^2 and the driving-shaft C'. (See Fig. 3.) On the shaft C' is secured a cam-pulley, *g*, against which the lower end of the lever G^3 rests, and this pulley *g* is provided with one or more notches or grooves, *g'*, into which the end of the lever G^3 may drop when the pulley is turned to the proper position. When the end of the lever is out of the notches *g'*, the knife F^3 is held away from the block F^4, as shown in Figs. 5 and 6; but as soon as the end of the lever drops into one of the notches the spring G throws the knife forward against the block, and the strings against the block are thus cut. As the strings are constantly descending through the loop f^3 in front of the block F^4, the knife must not remain for any appreciable time against the block, as it would retard the progress of the strings, and to prevent this I provide two spring-buffers, g^2, and the cross-head *f'* is provided with the blocks g^3, which strike against the buffers when the knife is thrown forward, and the buffers are compressed to let the knife come in contact with the block; but the knife is immediately thrown back again from the block.

The circumference of the feed-roller *d* is preferably equal to the length to which it is desired to cut the strings, so that each revolution of this roller will present the required

length to the knife, and the size of the cam-pulley *g* and the location of the notches *g'* therein are such that at each revolution of the roller *d* the knife will be thrown forward and the strings cut. After being cut off the strings fall through a guide-trough, H, into a tray, H', and after each cutting of strings are thus dropped into the tray H' they are pushed from this tray by a follower, *h*, into a box, *h'*, (shown by dotted lines in Fig. 1,) in the tray H^2, below the tray H'.

The mechanism for pushing the strings from the tray H' is shown in detail in Figs. 7 and 8. On the driving-shaft C' is a pulley, H^3, around the periphery of which extends a cam-ridge, h^2. Below this pulley H^3 is a lever, H^4, pivoted near one end to the sill or bar *a*, below the driving-shaft C', and the end of this lever H^4, immediately below the pulley H^3, is provided with pins h^3, between which pins the cam-ridge h^2 on the pulley H^3 passes. The opposite end of the lever H^4 is connected to the follower *h* by a rod, h^4. As the shaft C and pulley H^3 are revolved, the cam-ridge h^2, operating on the pins h^3, moves the end of the lever H^4 back and forth, and the follower *h* is thus moved forward and pushes the strings off from the tray H'. The size of the pulley H^3 and the shape of the cam-ridge h^2 are such that the follower *h* is pushed forward immediately after each cutting of strings has fallen into the tray H'. When a certain number of strings—as, for instance, one hundred—have been thus pushed off from the tray H into the box *h'*, it is desirable that the box be automatically pushed away from the tray H'; and this I accomplish by the mechanism shown in Figs. 1, 2, and 9. At the side of the posts D is another post, I, to the top end of which is connected an arm, J, extending toward the post D, and to the end of this arm is pivoted the top end of a lever, K, the lower end of which lever is pivoted to a sliding bar, K', secured and capable of sliding between the bars *k*, secured to the posts D and I, below the tray H^2. Between the post I and the lever K is a spring, K^2, which may be as shown or in the form of a spiral spring, the tendency of which spring is to constantly press the lower end of the lever K away from the post I. To the sliding bar K' is connected one end of a rod, *k'*, the other end of which is connected to a follower, k^2, in the tray H^2. When the lever K is pushed away from the post I, the follower k^2 in the tray H^2 lies at one side of said tray and under the edge of the tray H', and the box *h'* is placed against this follower to receive the strings which are pushed off from the tray H'. To the side of the post D, between it and the lever K, is journaled a gear-wheel, L, on the face of which are one or more inclined planes, *l*, which engage the lever K as the wheel is turned, thus moving the lever toward the post I and pushing the box *h* away from the edge of the tray H'. The journal of the roller *d* extends beyond the post D, to which the wheel L is journaled, and on this end of the journal is keyed a spur-wheel, L', on one side of which are teeth or cogs *l'*, which engage with the cogs of the wheel L as the roller *d* is revolved. Every time the roller *d* is caused to revolve, the teeth *l'* engage with the wheel L and cause it to turn a limited distance, regulated by the number of teeth *l'* on the spur-wheel L'. The relative proportion between the number of teeth *l'* and the number of cogs on the wheel L is such that when the roller *d* has revolved the required number of times to fill the box *h'* with cuttings of strings, in the manner above described, one of the inclined planes *l* will come in contact with the lever K, and through the connections of the latter the box *h'* will be pushed away from the tray H', and when this inclined plane passes the lever K the spring K^2 moves the lever again toward the post D, and the follower h^2 is thus carried back to the side of the tray H^2. This relative proportion between the number of teeth on the spur-wheel L' and on the wheel L must always be preserved. For instance, in a machine by which twenty strings are coated at once the wheel L is preferably provided with one hundred teeth, and has two inclined planes *l* on its face. The wheel L' should then be provided with eight teeth, by which construction every revolution of the wheel L' moves the wheel L the distance of ten feet, and it will therefore require five revolutions of the roller *d* to turn the wheel one-half around, and the wheel L, having two inclined planes *l*, operates on the lever K at each one-half revolution. Five revolutions of the roller *d* cause five cuttings of finished strings to be cut off, and there being twenty in each cutting, one hundred strings will be delivered to the box *h'* before it is pushed away from the tray H'. If the wheel L has but one inclined plane *l*, the number of teeth *l'* on the wheel L' must be doubled, or the number of teeth on the wheel L must be diminished one-half.

From the above description it will be seen that at each revolution of the roller *d* one cutting of strings is delivered into the box *h'*, and at each five revolutions this box is pushed away to indicate that a certain definite number of strings have been delivered into the box.

By the aid of this machine these waxed strings may be very rapidly and cheaply produced, and they will also be more perfect than the strings or tapers heretofore manufactured.

While I have described my invention as applicable for the manufacture of strings such as are specifically specified in said Patent No. 235,879, I do not limit the application of my apparatus and improvements to any specific form or kind of string, but claim the right of their application, in whole or in part, to any and every kind of coated string to which they or either of them can be applied.

The various features of my invention are preferably employed together; but one or more of these features may be used without the re-

mainder. One or more of said features may be employed, so far as applicable, in connection with devices or machinery for use in coating strings other than those herein specifically described.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is as follows:

1. A machine for manufacturing waxed strings or tapers, by the aid of which machine said strings are waxed and automatically cut to the required length, substantially as and for the purposes specified.

2. A machine for coating strings with wax, consisting of a pan, B, in which to melt the wax, and mechanism, substantially as described, for retaining the strings in said pan and drawing them horizontally through the same, substantially as and for the purposes specified.

3. The combination of the vessel for holding the cord-coating material, devices for immersing the cord therein, drum or roller C, and feed-rollers *d* and *d'*, all supported in an appropriate frame, and mechanism, substantially as described, for causing said rollers to revolve, substantially as and for the purposes specified.

4. The combination of a vessel for holding the melted cord-coating material, staples or guiding devices having openings *b'* and b^2, and means for drawing the strings through the staples or guides b' b^2, substantially as and for the purposes specified.

5. In a machine for coating the cord or strings, the combination of a vessel for holding the liquid cord-coating material and devices for drawing the cord through the vessel and keeping the cord at the bottom of the vessel during a part of the immersion of said cord, substantially as and for the purposes specified.

6. In a device for coating the cord or strings, the combination of the extended shallow pan for holding the liquid cord-coating material and devices for keeping the cord near or at the bottom of said pan while being drawn through said pan, substantially as and for the purposes specified.

7. In combination with a vessel containing the cord-coating material, devices for keeping the string or cord taut while immersed in the coating material and subjecting it to the action of the said cord-coating material, substantially as and for the purposes specified.

8. In combination with suitable devices for applying the liquid cord-coating material, the stripping devices, substantially as and for the purposes specified.

9. In combination with suitable devices for applying the liquid cord-coating material to the cord or string, an air-blast applied to the cord after receiving the molten coating, and for the purpose of cooling the said coating, substantially as and for the purposes specified.

10. In combination with a suitable means for immersing the cord in the cord-coating material and suitable feeding devices, an air-blast applied to the cord after receiving the molten cord-coating material, substantially as and for the purposes specified.

11. The combination, with suitable devices for immersing the cord and suitable devices for feeding the cord, of means for creating an air-blast, the blast being applied between the devices for immersion and the devices for feeding, substantially as and for the purposes specified.

12. The vessel B, provided with hooks or guides b' b^2, in combination with the adjustable plate E, located above said pan, and mechanism, substantially as described, for drawing the strings to be waxed through said hooks or guides and against the edge of said plate, substantially as and for the purposes specified.

13. The vessel B, constructed substantially as described, and rollers C and feed-rollers *d* *d'*, for drawing the strings through the vessel, in combination with the revolving fan E', located above said vessel, substantially as and for the purposes specified.

14. In a machine for coating strings, the roller C, provided with a porous exterior, substantially as and for the purposes specified.

15. In a machine for coating strings, the roller C, provided with a soft porous exterior, substantially as and for the purposes specified.

16. In a machine for coating strings, the roller provided with a soft porous material located between the devices for applying the liquid coating to the string, and devices for cutting the coated cords into lengths, and means for keeping said soft porous material saturated with water or suitable liquid, substantially as and for the purposes specified.

17. The combination of suitable immersing devices and the grooved roller covered with a soft fibrous porous material, substantially as and for the purposes specified.

18. In combination with suitable immersing devices, the wet roller C, grooved and having a soft porous exterior, and subsequent cord-feeding devices intermediate between said roller and the cord-cutting devices, substantially as and for the purposes specified.

19. In combination with suitable cord immersing and cutting devices, the roller C, positively operated by belt or equivalent power to aid the feed-rollers *d* *d'* in feeding forward the coated cord, substantially as and for the purposes specified.

20. In combination, the feeding-rollers *d* *d'*, covered with felt or other soft fibrous porous material, for feeding forward the cord-coated material, and suitable cutting devices, substantially as and for the purposes specified.

21. The drum C, provided with grooves, and guide-bar 3, provided with notches 4 at less distance apart than the grooves of roller C, for enabling the cords to converge without coming in contact with one another to the feed-rollers *d* *d'*, substantially as and for the purposes specified.

22. The combination of mechanism, substantially as described, for coating strings with wax, and mechanism for automatically cutting the strings into the desired lengths after being coated, substantially as and for the purposes specified.

23. In combination with suitable feeding devices, the cutting-knife having a straight or chisel edge, and having a chisel-cutting action—that is to say, an action whereby the movement of the knife is at right angles to the line of its edge—and suitable means for imparting such action to said knife, substantially as and for the purposes specified.

24. The knife F^3, secured to a sliding bar, f^2, and adapted to strike against a block, F^4, in combination with a spring, as G, having a tendency to press the knife toward said block, and a pivoted lever, G^3, connected at one end to said sliding bar, the other end of said lever resting against a cam-pulley, g, on the driving-shaft C′, substantially as and for the purposes specified.

25. The frame F′, secured to the posts D, and provided at one side with a block, F^4, in combination with a knife, F^3, secured to a sliding bar, f^2, secured and capable of sliding in said frame, and operated by a spring, G, and a pivoted lever, G^3, connected at one end to the bar f^2, the other end of said lever bearing against a pulley, g, on the driving-shaft C′, said pulley being provided with notches g', into which the end of the lever drops as the shaft is revolved, substantially as and for the purposes specified.

26. The sliding bar f^2, provided with knife F^3, and cross-head f', capable of sliding in the frame F′, the cross-head being provided with studs or blocks g^3, in combination with the block F^4 and the spring-studs g^2, against which the blocks g^3 strike as the knife approaches the block F^4, substantially as and for the purposes specified.

27. The combination of the feed-rollers $d\,d'$, operated substantially as described, and the knife F^3, and connecting mechanism, substantially as described, by the aid of which the knife is caused to cut the waxed strings at each and every revolution of the feed-roller, substantially as and for the purposes specified.

28. The tray H′, located below the cutter herein described, in combination with the follower h, located at one side of said tray, and provided with means for causing it to move forward in said tray at each revolution of the feed-roller d, substantially as and for the purposes specified.

29. The tray H′, provided with a follower, h, located at one side thereof, in combination with the driving-shaft C′, having a cam-pulley, H^3, and a pivoted lever, H^4, one end of said lever engaging with the cam-pulley, and the other end connected to the follower h by a rod, h^4, said cam-pulley being shaped to move the end of the lever and the follower back and forth, substantially as and for the purposes specified.

30. The tray H′, provided with a follower, h, located at one side thereof, in combination with the driving-shaft C′, having a cam-pulley, H^3, and a lever, H^4, pivoted to the frame of the machine, one end of said lever engaging with the cam-pulley, and the other end connected to the follower h by a rod, h^4, said cam-pulley being shaped to move the end of the lever and the follower back and forth, substantially as and for the purposes specified.

31. The tray H^2, provided with a movable follower, k^2, connected to a sliding bar, K′, moved by a lever, K, in combination with the gear-wheel L, provided with inclined planes l, adapted to engage the lever K, said gear-wheel being caused to revolve by suitable means, substantially as and for the purposes specified.

32. The tray H^2, provided with a movable follower, k^2, connected to a sliding bar, K′, moved by a lever, K, in combination with the gear-wheel L, provided with inclined planes l, adapted to engage the lever K, said gear-wheel being caused to revolve by the feed-roller d, substantially as and for the purposes specified.

33. The lever K, sliding bar K′, and follower k^2, in combination with a spring, as K^2, gear-wheel L, provided with one or more inclined planes, l, and the spur-wheel L′, connected to the feed-roller d, and provided at one side with teeth or gear to engage with the gear-wheel L, substantially as and for the purposes specified.

34. The combination of the vessel B, cooling-fan E′, drum or roller C, feed-rollers $d\,d'$, and cutting and counting mechanism, all constructed and operated substantially as described, and for the purposes specified.

35. The drum C, covered with cloth, in combination with the trough F, and siphon-strips, 5, substantially as and for the purposes specified.

36. The combination of the trays H′ H^2, provided with the movable followers h and k^2, each follower being provided with mechanism for causing it to move independently of the other, substantially as and for the purposes specified.

37. As a new article of manufacture, lengths or cuttings of wax-covered cord arranged parallel to each other in boxes, substantially as and for the purposes specified.

GEORGE WARREN CODDINGTON.

Witnesses:
J. WM. STREHLI,
WALTER CHAMBERLIN.