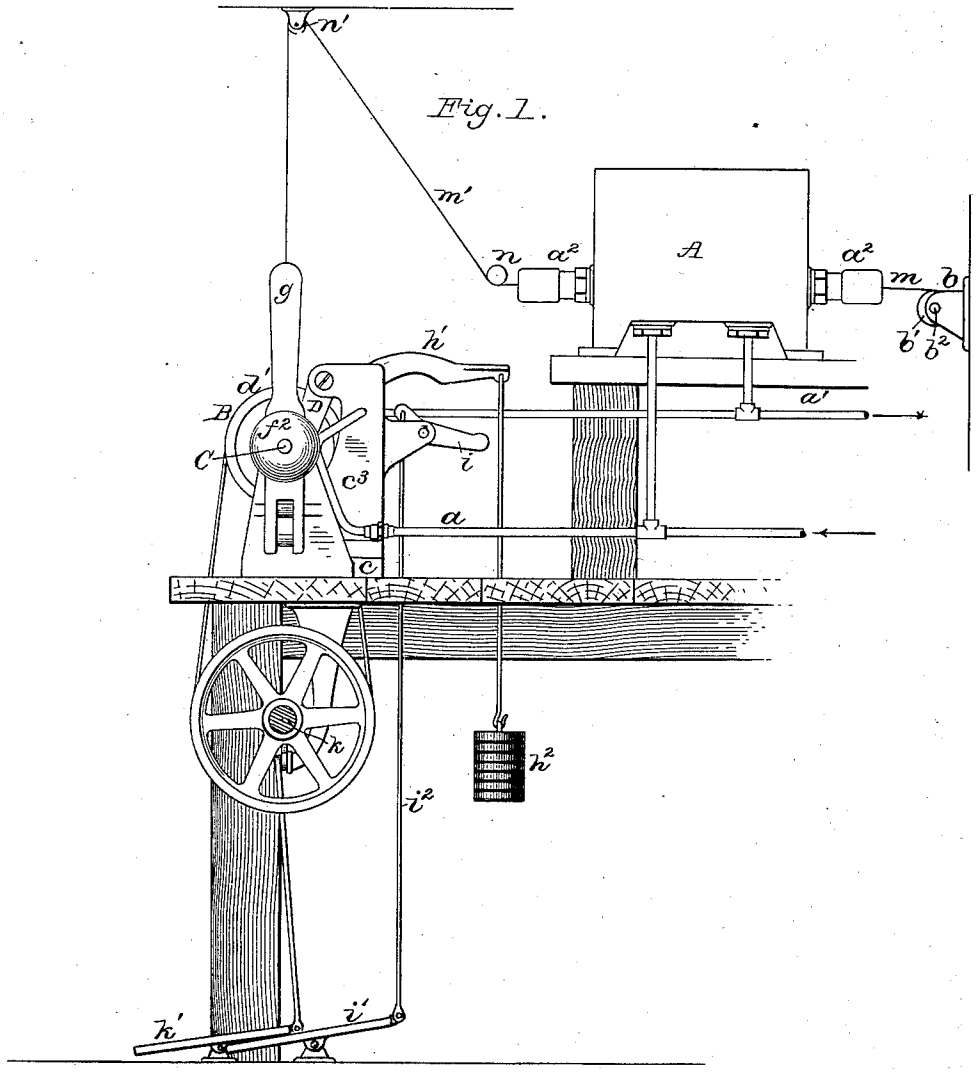
(No Model.) 4 Sheets—Sheet 1.

D. H. CAMPBELL.

MACHINE FOR WAXING THREAD AND WINDING IT INTO COPS.

No. 374,935. Patented Dec. 20, 1887.

Fig. 1.



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(No Model.) 4 Sheets—Sheet 2.

D. H. CAMPBELL.

MACHINE FOR WAXING THREAD AND WINDING IT INTO COPS.

No. 374,935. Patented Dec. 20, 1887.

Fig. 2.

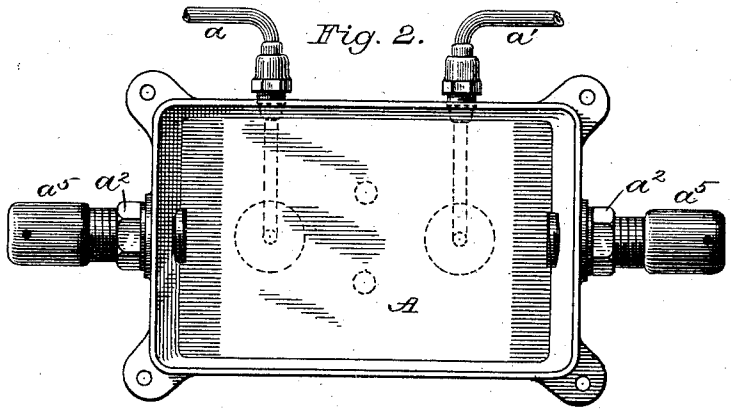


Fig. 3.

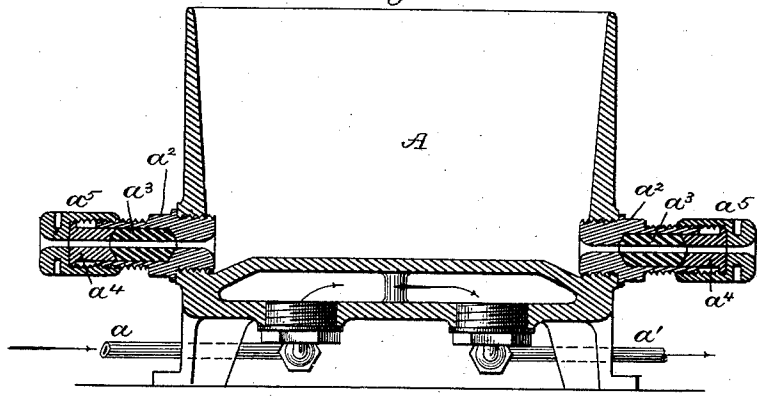
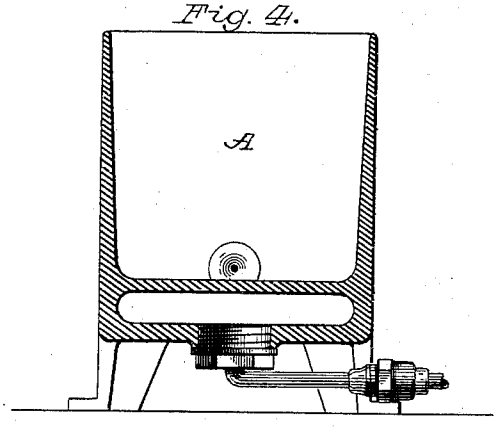


Fig. 4.



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4 Sheets—Sheet 3.

D. H. CAMPBELL.

MACHINE FOR WAXING THREAD AND WINDING IT INTO COPS.

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Fig. 5.

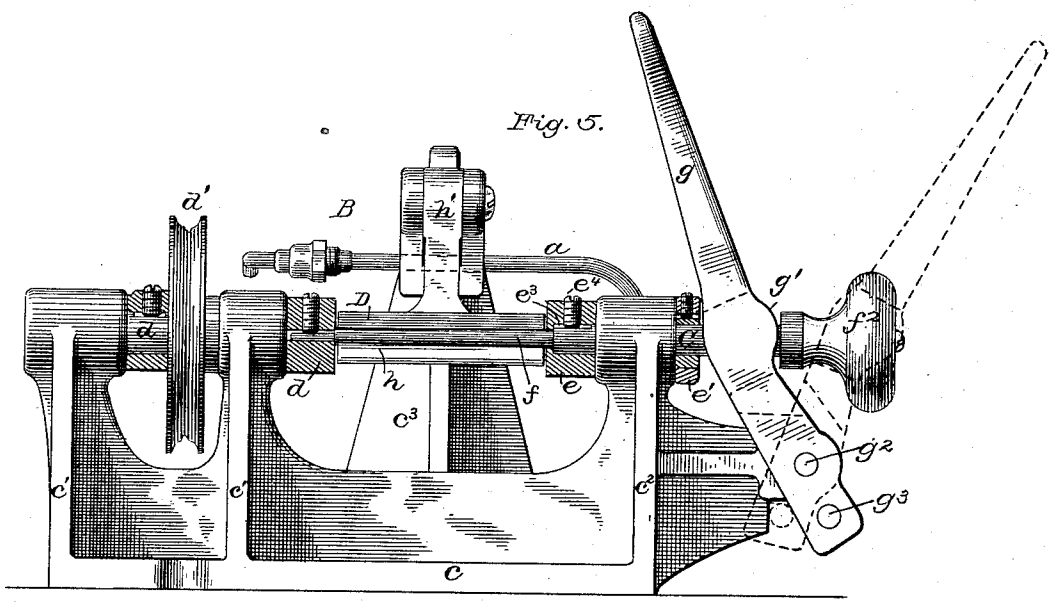
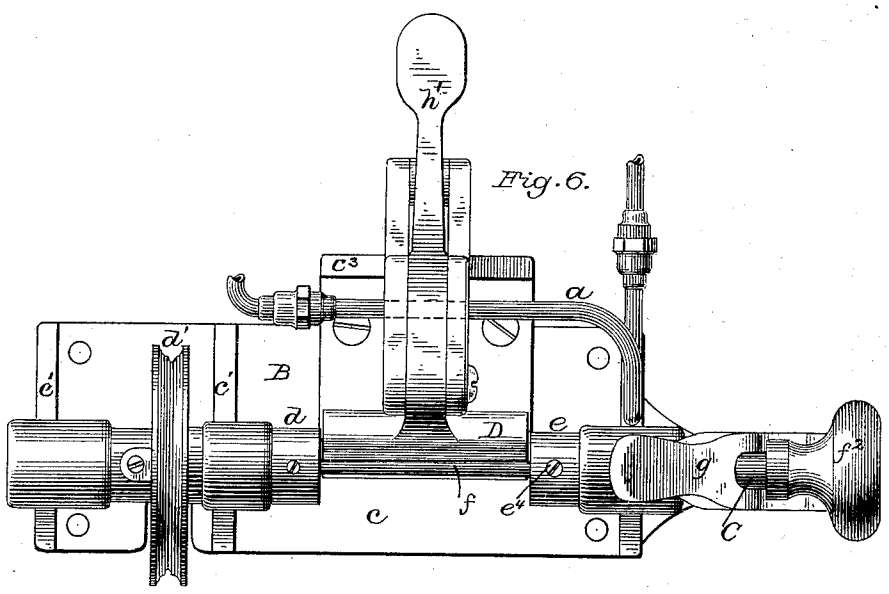


Fig. 6.



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(No Model.) 4 Sheets—Sheet 4.

D. H. CAMPBELL.

MACHINE FOR WAXING THREAD AND WINDING IT INTO COPS.

No. 374,935. Patented Dec. 20, 1887.

Fig. 7.

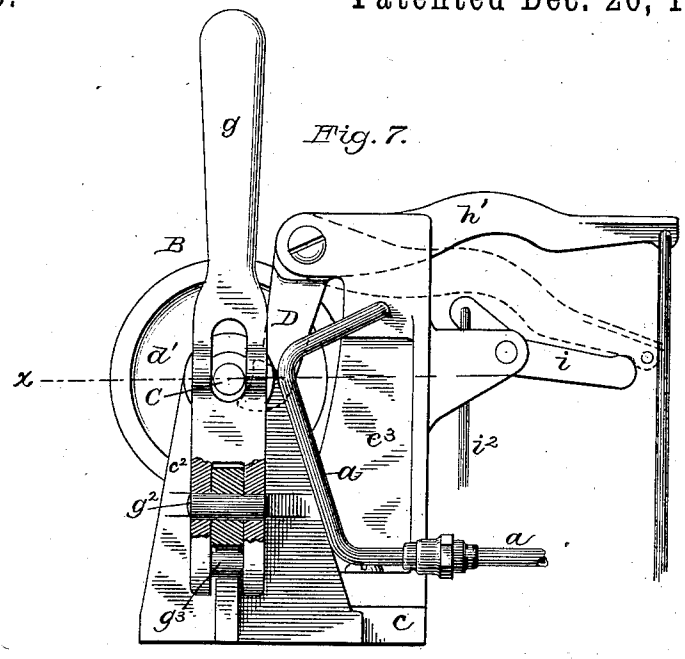


Fig. 8.

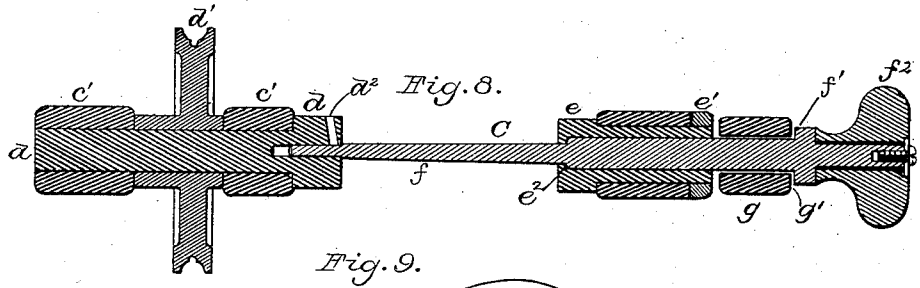


Fig. 9.

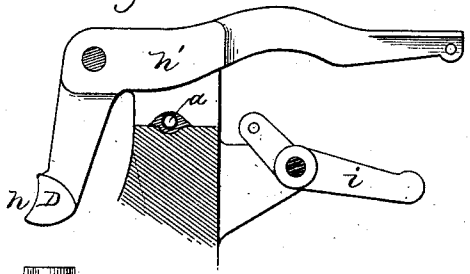
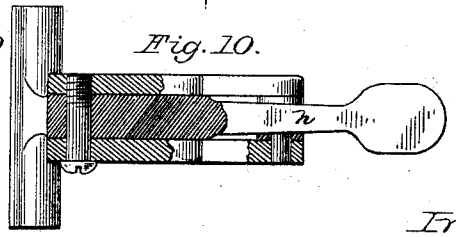


Fig. 10.



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Inventor:
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By Wm. C. Wood
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UNITED STATES PATENT OFFICE.

DUNCAN H. CAMPBELL, OF PAWTUCKET, RHODE ISLAND, ASSIGNOR TO THE CAMPBELL MACHINE COMPANY, OF SAME PLACE.

MACHINE FOR WAXING THREAD AND WINDING IT INTO COPS.

SPECIFICATION forming part of Letters Patent No. 374,935, dated December 20, 1887.

Application filed March 25, 1885. Serial No. 160,095. (No model.)

To all whom it may concern:

Be it known that I, DUNCAN H. CAMPBELL, of Pawtucket, in the county of Providence and State of Rhode Island, have invented a certain new and useful Machine for Waxing Thread and Winding it into Cops; and I do hereby declare that the following specification, taken in connection with the drawings furnished and forming a part of the same, is a clear, true, and complete description of the several features of my invention.

In the use of wax-thread sewing-machines heretofore devised by me, and patented September 7, 1880, No. 231,954, and January 31, 1882, No. 253,156, a cop of thread fully charged with hard wax is carried by a shuttle, and my present machine has been devised for thoroughly, rapidly, and economically waxing and winding thread into cylindrical cops suitable for use in my shuttles.

My machine in its best form embodies means for properly supporting a supply of dry shoe-thread, whether balled, spooled, or reeled, so that it may be freely delivered; also a wax-cup and means for heating its contents; also suitable tension and wax-stripping devices; also a rapidly-driven winding-spindle, provided with means for readily controlling its rotation, for readily securing the initial end of thread for winding, and also for withdrawing said spindle from a finished cop; also a self-adjusting presser-bar which compacts the thread toward the spindle during the winding operation and secures the proper to-and-fro traverse movement of the thread during the formation of the cop; also means for sufficiently heating the waxed thread adjacent to the winding-spindle, to secure a desirably compact cop.

If it be desired to wind thread which has already been waxed, a wax-cup may be dispensed with; but as means for heating and tension mechanism should always be employed a wax-cup as constructed by me can be relied upon for heating and compacting the wax already in the thread, and also for affording proper tension.

To more particularly describe my invention, I will refer to the accompanying four sheets of drawings, in which—

Figure 1 is a side elevation of my machine as organized for service. Figs. 2, 3, and 4 illustrate my wax-cup respectively in top view, longitudinal section, and lateral vertical section. Figs. 5, 6, and 7 are respectively front, plan, and end views of the winding mechanism, portions of the machine being broken away in Fig. 7 for better disclosing its construction. Fig. 8 is a horizontal longitudinal section of a portion of the machine on line x, Fig. 7. Figs. 9 and 10 illustrate in side elevation and plan views the cop-presser bar, with portions of its standard shown in section.

I will first describe the different parts of the machine in detail and then refer to the complete machine as shown in Fig. 1.

The wax-cup A of Fig. 1 is shown in enlarged views in Figs. 2, 3, and 4. It may be varied in form, but is preferably a rectangular tank having a chambered bottom supplied with steam by way of the induction-pipe a, and the discharge of steam and water by way of pipe a' affords proper circulation. Each end of the cup is provided with a tubular head, a^2, containing a centrally-perforated elastic or compressible plug, a^3, a follower, a^4, and a screw-cap, a^5, and said heads are so organized that thread can be drawn through them, with any desirable degree of peripheral compression on said thread, according to the pressure applied to the plug a^3 by means of the screw-caps and followers. This wax-cup (and its tubular heads) embodies features which constitute in part the subjects of other applications for Letters Patent. (See Serial Nos. 155,708 and 188,704.)

Opposite one end of the cup, as seen in Fig. 1, there are bearings b, for supporting a reel or spool, b', for containing dry thread, and having a loose axial pin, b^2, fitted to said bearings. If the dry thread be balled, a cage for the ball is employed. The dry thread may be located in any convenient position; but as here shown it is near the end of the cup, and so that the dry thread can be directly delivered to the adjacent tubular head a^2. The thread being passed through both heads a^2 and the cup filled with hard wax, heat is then applied. Both compressible plugs are so adjusted as to prevent the outward flow of wax. The head a^2 nearest the dry thread may be further adjusted so as to afford desirable tension in each

case, if the tension requires greater peripheral compression on the thread than is needed for preventing the outward flow of wax. The head a^2, through which the thread passes from the cup, must have a capacity for stripping surplus wax from the thread, and in doing so to force the wax into the body of the thread as far as practicable, and it may be relied upon for affording tension for the winding apparatus; but, as a rule, the opposite head can best serve as the tension device. It will be seen that if a cover of any kind be applied to such a cup while empty its interior can be highly heated, so that if the thread be already waxed said cup will properly soften the wax, compress it into the thread, and afford desirable tension for cop-winding; but I prefer that the wax be applied at the cup.

The construction of the heads a^2 is obviously such that they can be adjusted to properly operate upon thread of various numbers, both as to waxing and to tension.

The construction of the wax-cup and its heads and their location with reference to other parts of the machine may be widely varied without departure from certain portions of my invention.

The cop-winder B can be best described in connection with Figs. 5 to 10, inclusive. A bed-plate, *c*, has suitable standards located and arranged so as to properly support the working mechanism. The two standards c' support a spindle-chuck, *d*, on which a grooved pulley, d', is mounted for imparting motion to said chuck. The standard c^2 contains a tubular bearing for the reception of a spindle-bushing, *e*, which is provided with an annular shoulder and a collar, e', by which said bushing is longitudinally secured within its bearing. The inner end of the chuck *d* is axially bored and has a thread-eye, d^2, extending radially from its center. The bushing *e* detachably carries the spindle C, and is internally bored in two diameters to conform to a portion of the cop-winding spindle C, which has an annular shoulder, e^2, adjacent to one end of its blade *f*, which is tapered, and at its outer end slightly flattened at one side, so as to enter the spindle-chuck after an end of waxed thread has been passed outwardly through the thread-eye d^2, and thus to properly confine said end preparatory to winding.

The spindle has a heavy shank within the bushing *e*, an annular shoulder, as at f', and a handle, f^2, composed of material not liable to get too much heated for convenient handling. The frictional adhesion of the spindle with its chuck secures the rotation of the spindle, and the bushing *e* revolves therewith, because of a flattened seat, e^3, on the spindle-shank, which is engaged by the inner end of a screw, e^4, in said bushing. The inner ends of the chuck *d* and bushing *e* are truly parallel with each other, and limit the length of the cop and cause its ends to be built up squarely. The blade *f* of the spindle is tapered to enable its convenient withdrawal from a finished cop; but the adhesion of the cop and spindle is, nevertheless, so great that I employ a lever, *g*, for initially starting said spindle outwardly. This lever *g* is slotted for the passage of the spindle, and has on each side of its slot a curved bearing-face, g', for contact with the annular shoulder f' on the spindle-shank, and it is pivoted at g^2 below the spindle to a bracket projecting from the frame of the machine. For limiting the outward throw of said lever *g*, and hence obviating all liability of bending the spindle, a stop-pin, g^3, is employed at the lower end of the lever, and below its pivot g^4, which strikes against an adjacent portion of the bracket when the upper end of said lever has been swung outwardly to the proper position.

At a central point between the coincident ends of the chuck and bushing, and at their rear, on a standard, c^3, the cop-presser bar D is mounted. This bar has a longitudinal straight but vertically-concave face, *h*, generally conforming to the periphery of a cop, and of such length as to fully occupy the space between the faces or ends of the chuck and bushing, and it is adapted to swing toward and from the blade of the spindle, because it is mounted upon the short pendent arm of a bell-crank lever, h', which is pivoted upon said standard c^3. The presser-bar is forced toward the spindle-blade by means of a spring, or preferably by means of a weight, h^2, suspended from the long arm of the lever h', and said bar is moved away from said blade by means of a lever, *i*, beneath the long arm of the lever h', actuated by a treadle, i', coupled thereto by a link or cord, i^2.

It is important during the winding operation that the waxed thread be well heated adjacent to the spindle, so as to insure compactness of the cop, and this may be variously accomplished without departure from certain portions of my invention. If well-known automatic traverse mechanism be employed for delivering the thread to the spindle, fair results would accrue if the wax-cup were located so near the spindle that the thread would be delivered to the spindle in a properly-heated condition for winding. I prefer, however, for obtaining the to-and-fro traversing movement requisite for building up a cop, to rely upon the presser-bar, together with so delivering the thread to the spindle over a pulley located over the middle of the spindle-blade that when the thread has made a final coil of a layer at either end of the cop it will occupy such an inclination that by the aid of the presser-bar it will, after making an initial coil, readily proceed to coil toward the opposite end of the spindle-blade. With this arrangement the wax-cup is necessarily located so far from the spindle that the thread must be reheated adjacent to the spindle, and for doing this I heat the entire frame of the machine, and especially the standard c^3, on which the

presser-bar lever is pivoted. As clearly shown, a steam-pipe, *a*, passes through the standard c^3, and heat is radiated and conducted therefrom, not only to the presser-bar, but also to the entire machine. Dry heat can be employed in lieu of steam; but the latter is always preferable.

Referring now to Fig. 1, it will be seen that the mechanism described is mounted upon a suitable table supporting a driving-shaft, *k*, belted to the spindle-chuck pulley *d'*, and provided with a clutch, (not shown,) which is controlled by the treadle *k'*, thus enabling the operator to readily control the rotation of the winding-spindle.

Assuming the wax-cup A to be supplied with heated wax, and the dry thread *m* to have been passed through the heads a^2, it emerges as waxed thread *m'*, which is passed beneath a guide-pulley, *n*, thence upward over a pendent pulley, *n'*, and thence downwardly. For winding a cop the spindle is withdrawn from its chuck, the presser-bar is thrown rearwardly by depressing the treadle *i'*, the end of the thread passed into the chuck thread-eye, the spindle then entered into the chuck, and the presser-bar allowed to move forward into contact with the spindle, and then the treadle *k'* is depressed, causing the spindle to revolve and to coil the thread directly upon its blade until the face of the bushing *e* is reached, whereupon a second coil is commenced, and so on, until a cop is formed of a diameter equal to that of the bushing, whereupon the machine is stopped, the thread cut, the lever *g* thrown forward, and the spindle withdrawn, leaving the perfect cylindrical cop ready for removal from between the chuck and bushing, either by means of the presser-bar or by hand.

As a rule, my machine can be operated at such speed as will warrant an attendant for each; but two or more machines can be attended by a single person by the employment of well-known stop mechanism which will cause the spindle to stop when the last coil has been laid. It is sometimes desirable to fill shuttle-bobbins with waxed thread, and I have organized a machine for that purpose involving portions of the machine herein described, and containing features to be made the subject of a separate application for Letters Patent. (See Serial No. 169,149.)

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination, substantially as herein-before described, of the cop-winding spindle and a presser-bar provided with heating appliances for warming and forcing waxed thread toward the spindle and compacting the same during the formation of a cop.

2. The combination of the wax-pot, the cop-winding spindle, the driving-chuck, and the bushing revolving in bearings and detachably carrying the spindle at its rear end, with the presser-bar provided with heating appliances and movable toward and from the spindle and occupying the space between the coincident faces of said chuck and bushing, substantially as described, whereby the spindle is supported at each end of its blade, is readily detached from and applied to its chuck and its bushing, and thread drawn from the wax-pot, heated by the presser-bar, compacted, and caused to traverse to and fro in forming a straight cylindrical cop on said spindle.

3. The combination of the cop-winding spindle, the chuck, the bushing, and the lever for longitudinally moving said spindle outwardly through said bushing, substantially as described.

DUNCAN H. CAMPBELL.

Witnesses:
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FRANK MOSSBERG.