March 14, 1944. A. BURGENI ET AL 2,344,079

MECHANISM FOR WAXING THREAD

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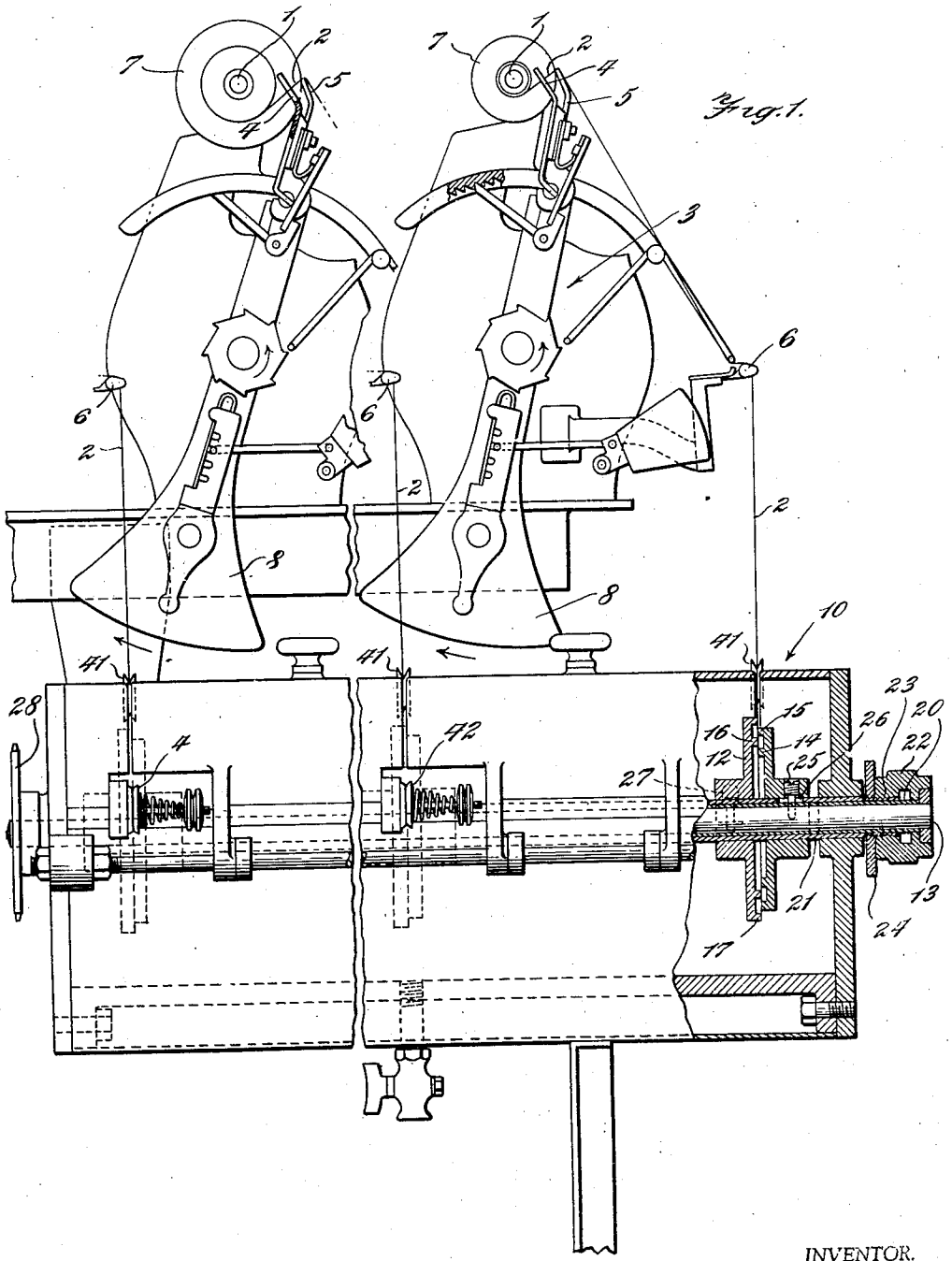

Fig. 1.

INVENTOR.
Alfred Burgeni
Roy L. Keown

BY
Gifford, Scull & Burgess,
ATTORNEYS

March 14, 1944. A. BURGENI ET AL 2,344,079

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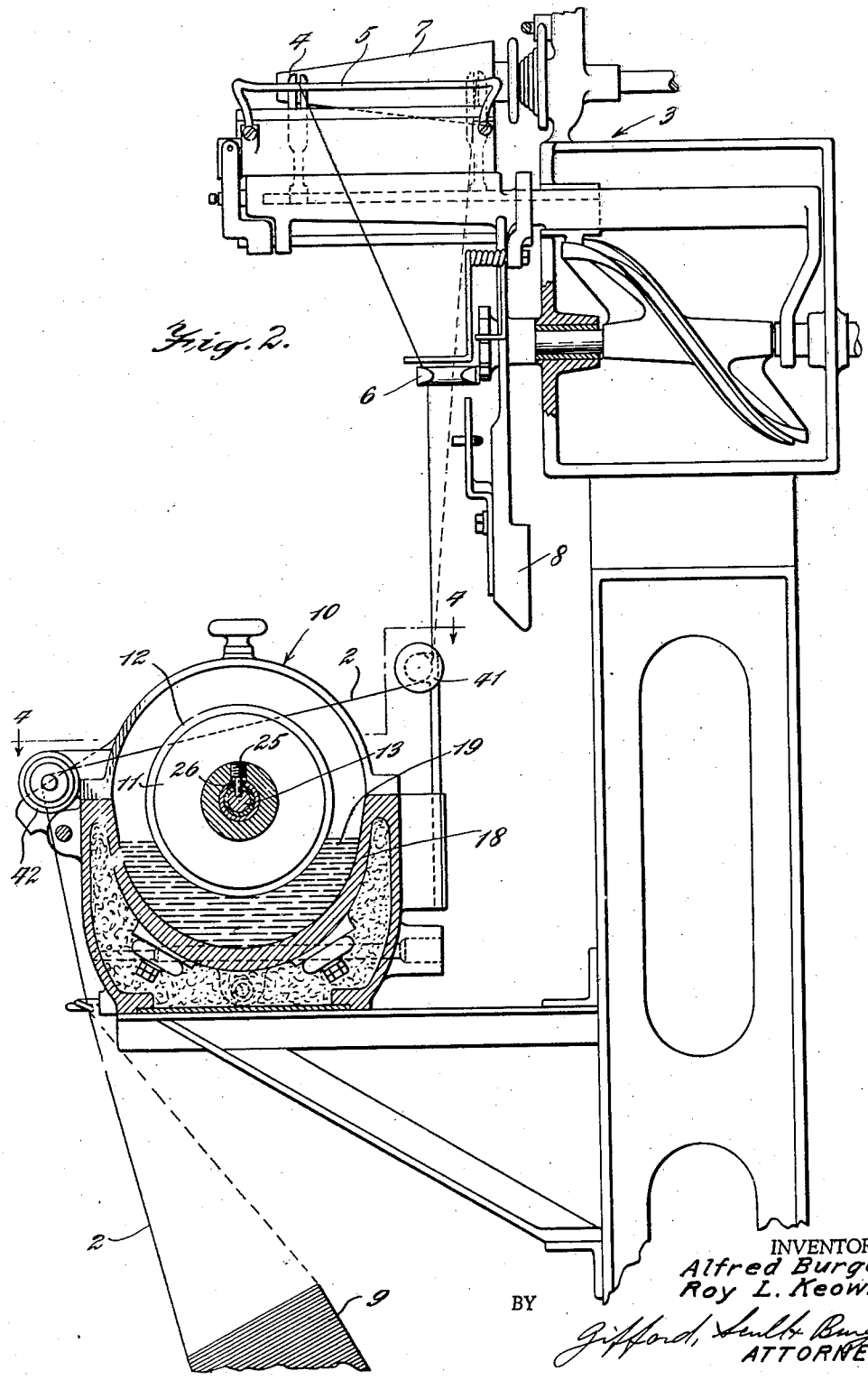
Fig. 2.



INVENTOR.
Alfred Burgeni
Roy L. Keown

BY

Gifford, Scull & Burgess
ATTORNEYS

March 14, 1944. A. BURGENI ET AL 2,344,079

MECHANISM FOR WAXING THREAD

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Fig. 3.

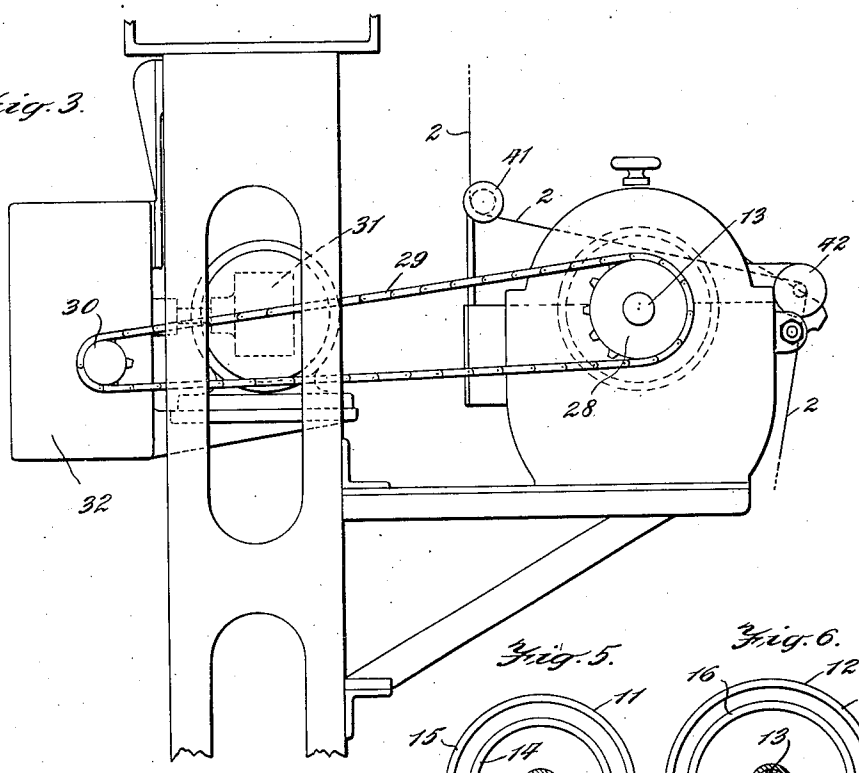


Fig. 5.

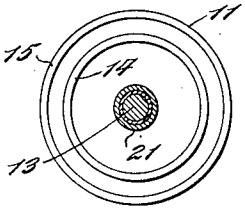


Fig. 6.

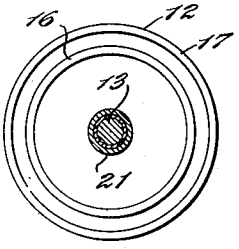
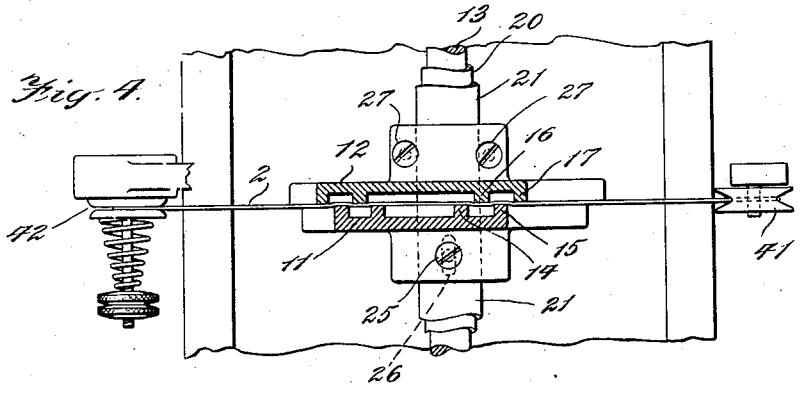


Fig. 4.



INVENTOR.
Alfred Burgeni
Roy L. Keown

BY
Gifford, Scull & Burgess,
ATTORNEYS

March 14, 1944. A. BURGENI ET AL 2,344,079

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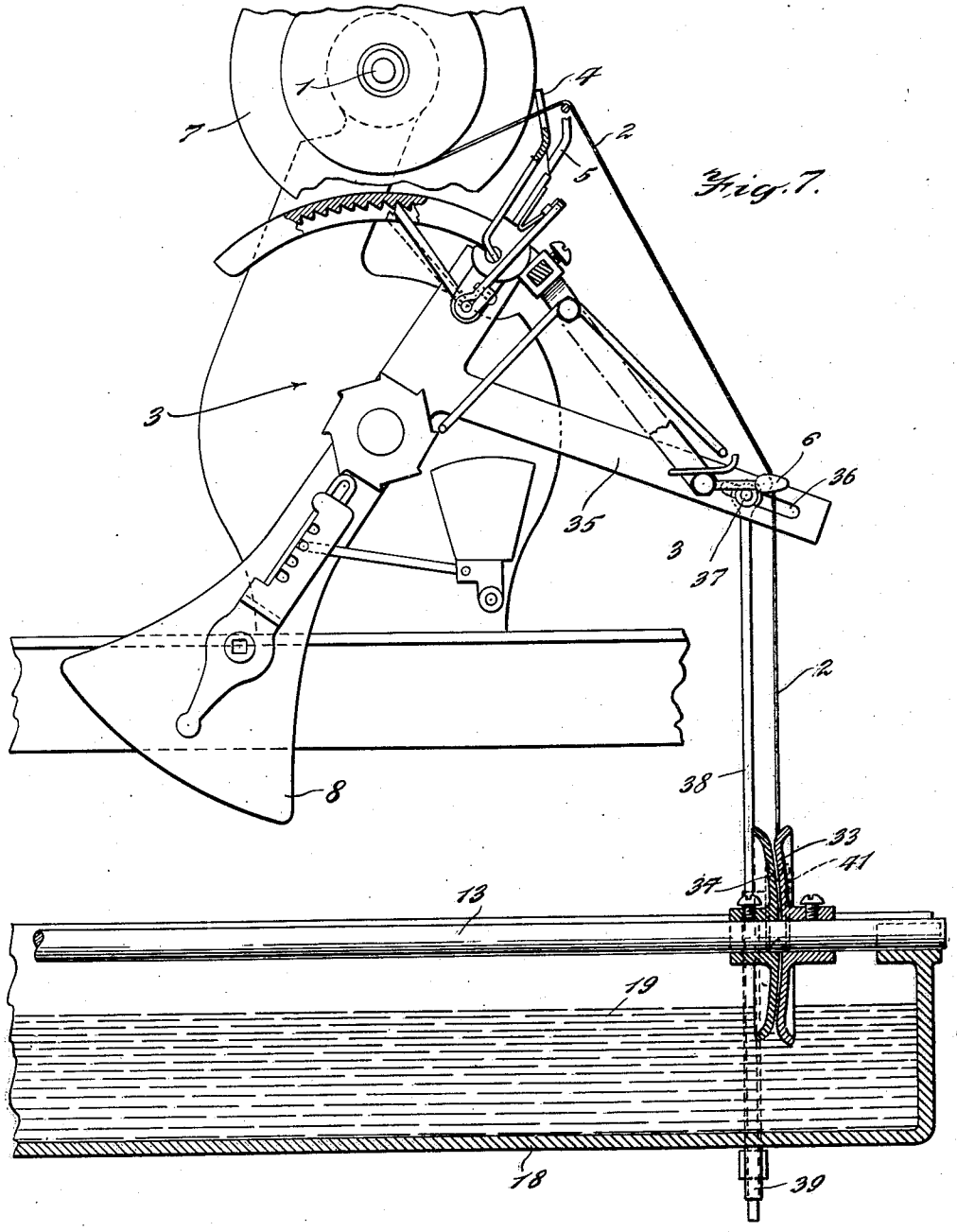

Fig. 7.

INVENTOR.
Alfred Burgeni
Roy L. Keown

BY
Gifford, Scull & Burgess.
ATTORNEYS

March 14, 1944. A. BURGENI ET AL 2,344,079

MECHANISM FOR WAXING THREAD

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Fig. 8.

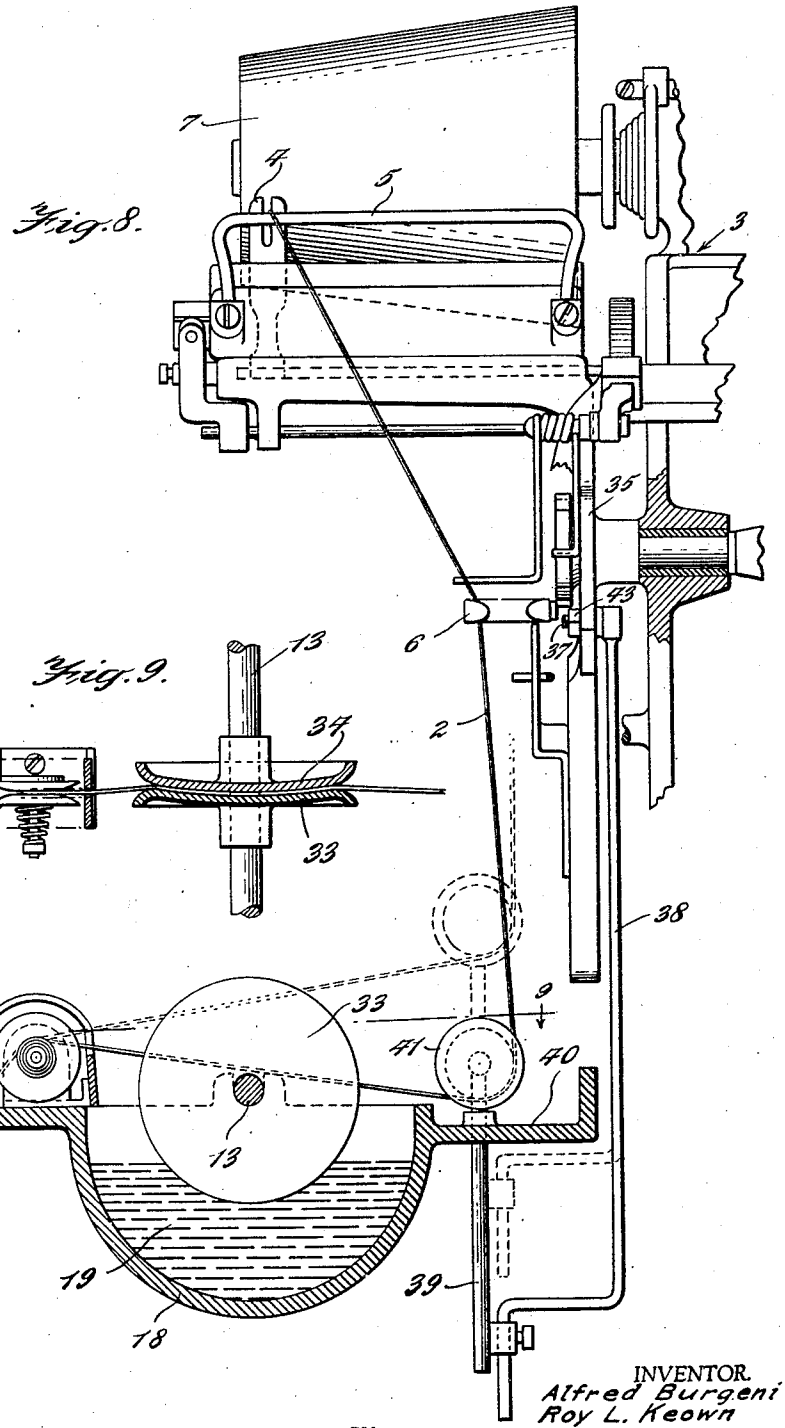

Fig. 9.

INVENTOR.
Alfred Burgeni
Roy L. Keown

BY
Gifford, Scull & Burgess,
ATTORNEYS

Patented Mar. 14, 1944 2,344,079

UNITED STATES PATENT OFFICE

2,344,079

MECHANISM FOR WAXING THREAD

Alfred Burgeni, East Orange, and Roy L. Keown, Belleville, N. J., assignors to The Clark Thread Company, Newark, N. J., a corporation of New Jersey

Application January 28, 1941, Serial No. 376,344

9 Claims. (Cl. 91—51)

This invention relates to a novel and improved mechanism for waxing thread or yarn. For the sake of simplicity, we shall refer to the material being waxed as thread, although of course the same mechanism may be used for waxing what is technically known as yarn instead of thread. In fact it may be used to treat any strand-like material. The invention will be better understood from the following description and the annexed drawings, in which we have shown selected embodiments of the invention and in which:

Fig. 1 is a front elevation of one embodiment of the invention, parts being broken away and other parts shown in section.

Fig. 2 is an end elevation of the mechanism appearing in Fig. 1, showing the mechanism as seen from the right-hand end of Fig. 1, parts being broken away or shown in section;

Fig. 3 is a fragmentary view of the mechanism appearing in Fig. 1 as seen from the left-hand end of that figure and illustrating the driving means;

Fig. 4 is a view approximately on the line 4—4 of Fig. 2;

Figs. 5 and 6 are face views of the two waxing plates shown in Figs. 1, 2, and 4;

Fig. 7 is a view similar to Fig. 1 showing a different embodiment of the invention;

Fig. 8 is a view of the embodiment shown in Fig. 7 as seen from the right-hand end of that figure;

Fig. 9 is a view approximately on the line 9—9 of Fig. 8.

Referring first to Figs. 1 to 6, inclusive, in which we have shown what we now believe to be the preferred embodiment of the invention, we have shown in Fig. 1 two winding mechanisms, which may be part of a battery or bank of such mechanisms as is common in the art, and which are used to wind thread upon spindles 1 which may take the form of cones or cylinders. We have illustrated packages as being in the form of cones, although the invention is not limited to that shape. The winding mechanism may be of the general type known as the Universal winder, such as shown for example in the patent to Mills et al. 2,183,442, and its details will not be described, as they are not necessary to an understanding of the invention.

It is sufficient to say that the thread 2 is wound into a package by being drawn onto the spindle 1 through a traverse and tension mechanism indicated generally by the numeral 3 and which comprises a guide finger 4 which is given a traverse motion back and forth lengthwise of the package. The thread is guided to the finger over a bar 5 to which it is led through a guide 6. As the package 7 is built up, the guide finger 4 is moved away from the spindle 1 against the action of a counterweight 8, as known in the art.

Before the thread is wound into a package 7, it is usually waxed, and it is to the waxing mechanism that our invention relates. A thread is drawn from any suitable source of supply indicated at 9 in Fig. 2 and is drawn past a waxing position to the winding mechanism just described. This waxing position is designated generally by the numeral 10 and at that position the thread is drawn through a waxing device shown as comprising two waxing elements in the form of plates 11 and 12 which are rotatable with a shaft 13. These plates are parallel to each other and the thread to be waxed is drawn between them so that the opposite sides of the thread are in engagement with the two elements.

In the preferred form of the invention, the two elements are of the form shown in Figs. 5 and 6 wherein each plate or disk is provided with one or more concentric rings. The plate 11 is provided with two concentric rings 14 and 15, while the plate 12 is provided with two concentric rings 16 and 17. It will be understood that the number of rings may vary without departing from the scope of the invention.

The rings on one plate are of different diameters than those on the other plate so that, as best shown in Fig. 4, the thread 2, when drawn between the two plates, contacts with a ring on one plate and then with a ring on the other plate. The thread as it is drawn between the plates forms or passes along a chord of each ring so that it crosses each ring twice. Thus one side of the thread engages the rings on one plate, while the other side of the thread is caused to engage with the rings on the other plate. The two plates are rotated in unison with the shaft 13 which is disposed above a tank 18 containing hot or liquid wax 19. Thus, as the thread passes between the two plates, wax is applied, first by the ring 17 to one side of the thread and then by the ring 15 to the other side of the thread. The waxing is then repeated by the rings 16 and 14, respectively, which engage opposite sides of the thread. Then as the thread passes the center of the shaft, it is again waxed by the rings 14, 16, 15, and 17 in order, thus insuring thorough waxing.

It will be seen that the waxing rings move transversely of the path of the thread as it passes through the waxing device, so that the rings tend

to roll the thread about its axis, thus applying wax to a large part of the periphery of the thread, a result which cannot be obtained by the usual waxing by means of rolls, such as shown for example in the aforesaid patent to Mills et al. and which is a more or less conventional arrangement. Moreover, as the thread is drawn through the waxing device, there is a tendency for the thread to "spiral" or turn on its axis because of the tension exerted on the thread by the resistance of the waxing device. This will in turn cause the wax to be applied through a large part of the periphery of the thread.

The waxing plates may be adjusted towards and away from each other on the shaft 13 so as to make the path followed by the thread through the waxing device more or less devious. In Fig. 4, it is seen that the thread is caused to follow the devious path as it engages the successive rings on the two plates, thus increasing the waxing effect of the rings. By making the rings overlap each other to a greater extent, more wax may be applied, and by moving the plates further apart, less wax may be applied.

Adjustment of the plates relatively to each other may be achieved by any suitable adjusting mechanism. For convenience, we have shown the shaft 13 as being secured to a sleeve 20 which is slidable within an outer sleeve 21. Secured to the sleeve 20 and thus to the shaft 13 is an adjustment nut 22 which is threaded on the sleeve 21, as shown at 23, and held in position by the lock nut 24. Thus, by turning the nut 22, the sleeve 21 may be moved lengthwise of the shaft 13. One of the plates 11 and 12 is secured to the sleeve 21 and the other is secured directly to the sleeve 20 or the shaft 13 through a slotted connection. We have shown the hub of the plate 11 as being keyed to the shaft by means of a set screw 25 passing through a slot 26 in the sleeve 21, whereas the hub of the plate 12 is clamped on the sleeve 21 by means of screws 27.

By the arrangement just described it will be seen that the lock nut 24 may be loosened and the distance between the two plates 11 and 12 may be varied within desired limits by turning the nut 22 and then when the nut 22 is locked by the nut 24 the sleeve 21 will be caused to rotate with the shaft 13. Thus both plates 11 and 12 will rotate in unison.

The rotation of the shaft 13 may be achieved by any desirable arrangement, here illustrated as a sprocket 28 secured to one end of the shaft and driven by a chain 29 engaging another sprocket 30 which in turn may be driven by a motor 31 through any suitable gear connections in a gear box 32. The gear connections may be easily interchangeable so that the speed of rotation of the shaft 13 may be varied as desired. Since the details of this gearing are not necessary to an understanding of the invention, they have not been illustrated or described.

Referring now to Figs. 7, 8, and 9, the embodiment shown therein has many features in common with those of the embodiment described above and therefore the same numerals have been used to designate similar or the same parts which will not be further described.

In this embodiment the two waxing elements are in the form of disks 33 and 34, both of which are secured to the shaft 13 and spaced apart such a distance that the thread 2 may be drawn through the space between the disks but in contact with both disks or plates so that wax may be applied to the thread, the disks picking up liquid wax from the bath 19 as before and the thread passing between the disks along a chord thereof.

By making one of the plates or disks concave and the other convex, the thread is caused to take a somewhat devious path through the space between the disks, as best shown in Fig. 9. At the same time the disks are moving transversely of the length of the thread and thus some of the same advantages are obtained as in the embodiment previously described.

In Figs. 7 and 8 we have shown how the amount of wax applied to the thread may be kept approximately uniform as the size of the package increases. As the size of the package increases and as well known in the art, the counterweight 8 will be moved in a clockwise direction as viewed in Fig. 7 and we have shown that counterweight as having an arm 35 attached thereto and extending to the right, as viewed in Fig. 7. Near the end of the arm is provided a slot 36 in which is slidably mounted the pivot 37 of a link 38 which at its lower end is secured to a rod 39 which is vertically movable in a fixed bracket 40. At its upper end the rod pivotally supports a guide roller 41 under which the thread passes during its travel from the waxing device to the package. The thread, before passing through the waxing device, passes through a tension device 42 and, in the embodiments of Figs. 1 to 6, inclusive, it also passes under a fixed guide roller 41. However, in Figs. 7 and 8 this guide roller 41 is vertically movable because of the arrangement just described above, and its vertical position is determined by the position of the arm 35. The pivot 37 may be held in any adjusted position in the slot 36 by means of the nut 43.

With the arrangement just described it will be seen that, as the size of the package increases with a consequent increase in the peripheral speed at which the thread is wound on the package, the guide roller 41 will be lowered, thus moving the thread from the position shown in dotted lines in Fig. 8 to the position shown in full lines. In the latter position, the chord formed by the thread as it passes through the space between the disks will be much longer than before and thus more wax will be applied to the thread during a given interval of time. Since the thread is moved very gradually from one position to the other, the increase in the amount of wax applied to the thread will increase in the same proportion, thus applying the wax to the thread in amounts which are substantially constant as the speed of the thread increases.

While we have shown the invention as embodied in certain specific forms, it is to be understood that other forms may be used and the details may be varied without departing from the scope of the invention as defined in the appended claims.

We claim:

1. In a mechanism for waxing thread, a waxing device and means for drawing thread past said device, said device comprising wax-applying elements movable transversely of the path of the thread as it passes through the device, said elements contacting with the thread at points spaced apart circumferentially of the thread, and means for applying wax to said elements.

2. In a mechanism for waxing thread, means for drawing thread past a waxing position, a plurality of waxing elements at said position and contacting the thread at points spaced apart circumferentially of the thread, and means for mov-

ing said elements transversely of the length of the thread and in contact therewith.

3. In a mechanism for waxing thread, means for drawing thread past a waxing position, two rotatable waxing plates at said position, said plates having parallel spaced faces, each with one or more concentric rings thereon, between which the thread is drawn and said faces being so spaced that said rings engage said thread, means to rotate said plates, and means to apply wax to said rings.

4. In a mechanism for waxing thread, means for drawing thread past a waxing position, two rotatable waxing plates at said position, said plates having parallel spaced faces, each with one or more concentric rings thereon, between which the thread is drawn and said faces being so spaced that said rings engage said thread, means to rotate said plates, means to apply wax to said rings, and means for adjusting said plates relative to each other.

5. In a mechanism for waxing thread, means for drawing thread past a waxing position, two rotatable waxing elements at said position and engaging opposite sides of the thread, means to rotate said elements, means to apply wax thereto, and means for adjusting said elements relative to each other.

6. In a mechanism for waxing thread, means for drawing thread past a waxing position, two rotatable waxing plates at said position, said plates having parallel spaced faces, each with one or more concentric rings thereon, between which the thread is drawn and said faces being so spaced that said rings engage said thread, means to rotate said plates, and means to apply wax to said rings, the rings on one plate being of different diameters than on the other.

7. In a mechanism for waxing thread, means for drawing thread past a waxing position, two rotatable waxing plates at said position and engaging opposite sides of the thread, means to rotate said plates, and means to apply wax thereto, one of said plates having a convex surface engaging the thread on one side thereof, and the other plate having a concave surface engaging the thread on the opposite side thereof.

8. In a mechanism for waxing thread, means for drawing thread past a waxing position, two rotatable waxing plates at said position and engaging opposite sides of the thread, means to rotate said plates, means to apply wax thereto, means to wind the thread into a package after it passes said plates, and means to move said thread towards the center of said plates as the diameter of the package increases.

9. In a mechanism for waxing thread, means for drawing thread past a waxing position, two rotatable waxing plates at said position and engaging opposite sides of the thread, means to rotate said plates, means to apply wax thereto, one of said plates having a convex surface engaging the thread on one side thereof, and the other plate having a concave surface engaging the thread on the opposite side thereof, means to wind the thread into a package after it passes said plates, and means to move said thread towards the center of said plates as the diameter of the package increases.

ALFRED BURGENI.
ROY L. KEOWN.