H. DEPPERMANN.

WINDING MACHINE FOR THREAD BUTTONS.

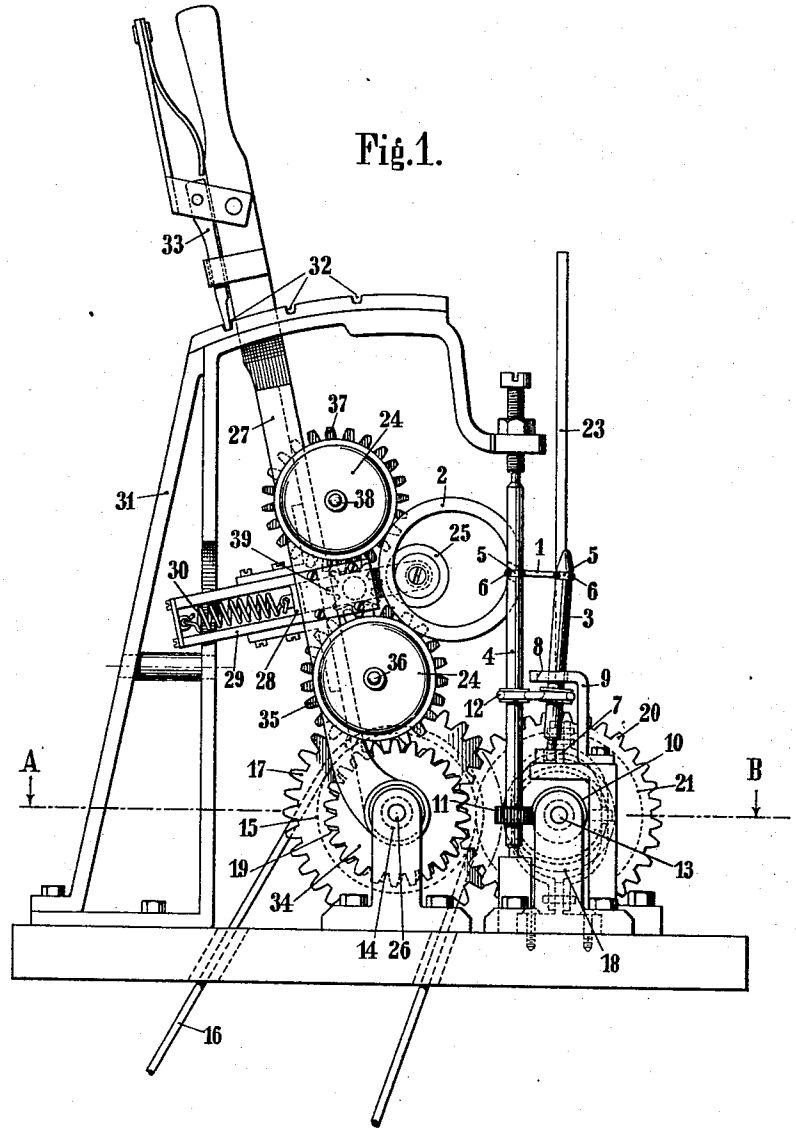
APPLICATION FILED MAY 13, 1913.

1,219,266.

Patented Mar. 13, 1917.

4 SHEETS—SHEET 1.

Fig. 1.



Witnesses:

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Hermann Deppermann,

By his Atty,

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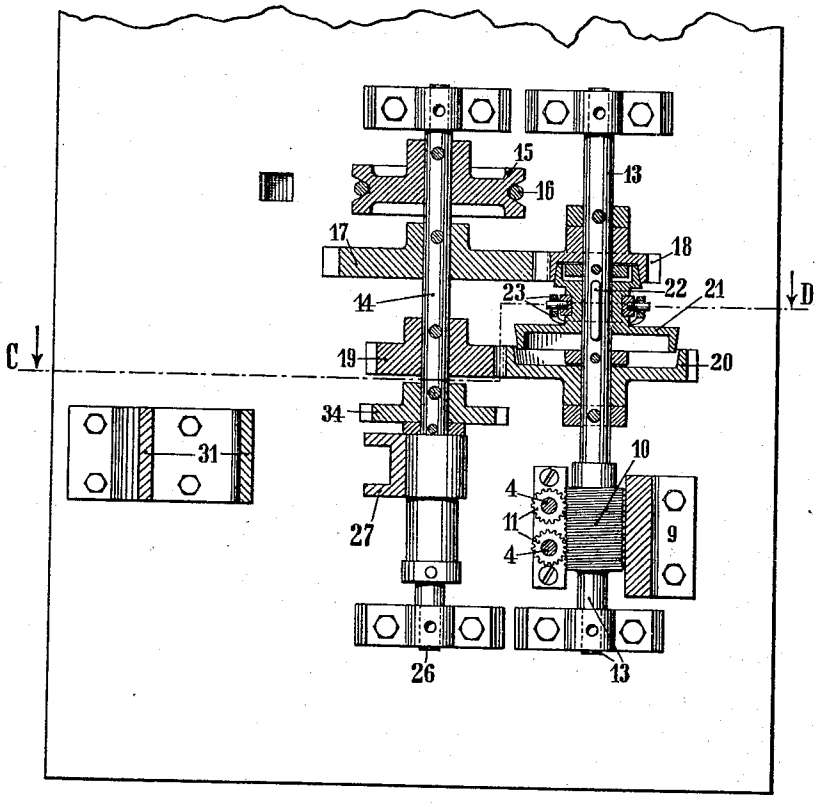
1,219,266.

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4 SHEETS—SHEET 2.

Fig. 2.

A—B.



Witnesses:

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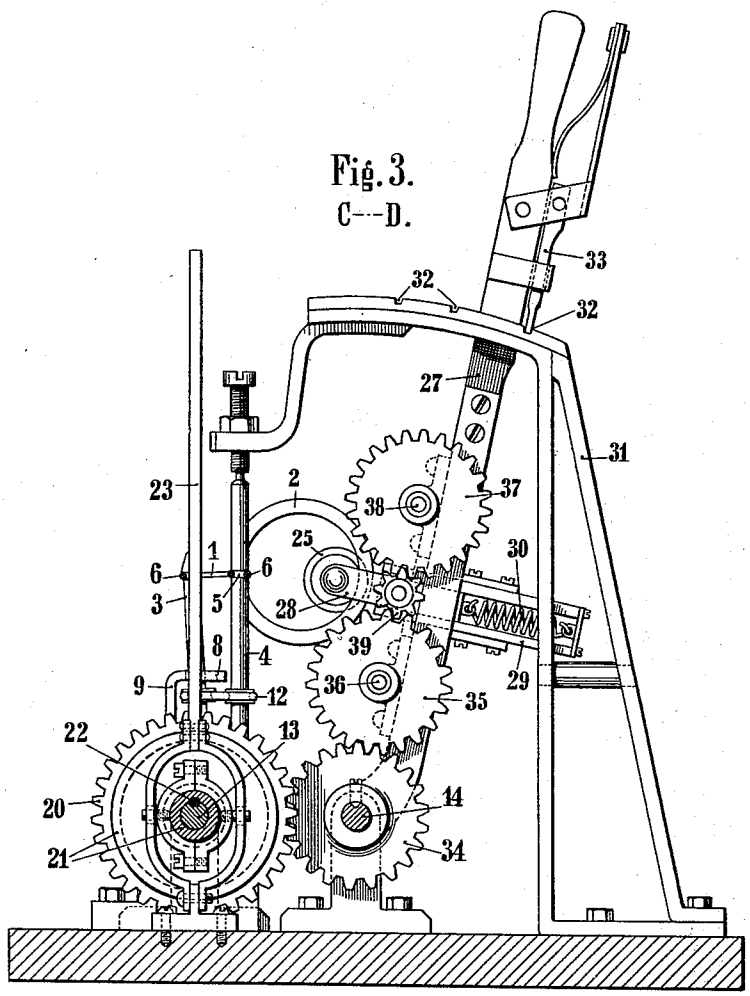
1,219,266.

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4 SHEETS—SHEET 3.

Fig. 3.

C—D.



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4 SHEETS—SHEET 4.

Fig.4.

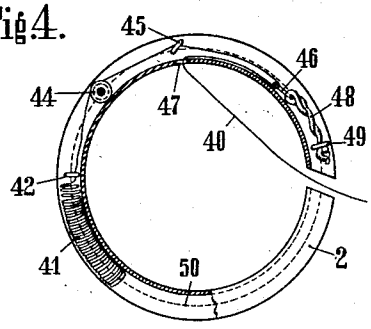


Fig.6.

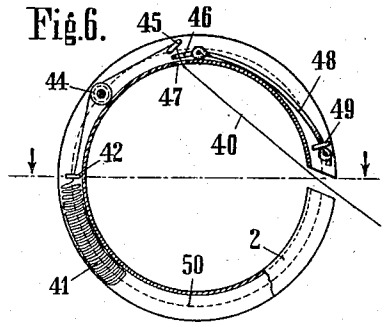


Fig.5.

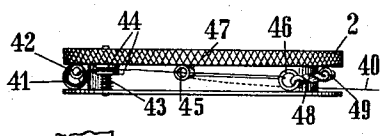


Fig.7.

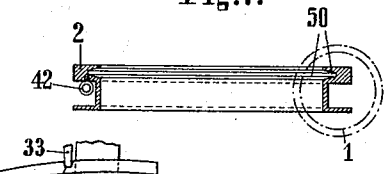


Fig.8.

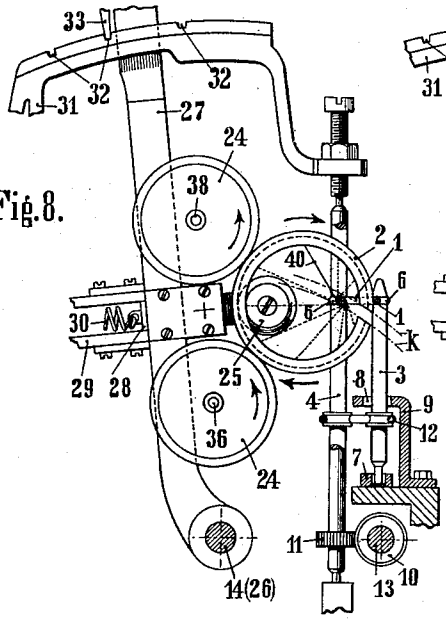


Fig.10.

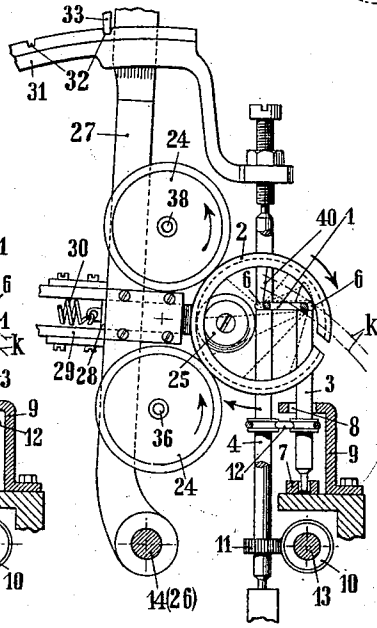


Fig.9.

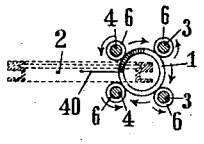


Fig.11.

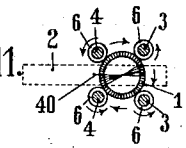


Fig.12.



Fig.13.



Fig.14.



Witnesses:
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UNITED STATES PATENT OFFICE.

HERMANN DEPPERMANN, OF NOWAWES-NEUENDORF, NEAR POTSDAM, GERMANY.

WINDING-MACHINE FOR THREAD-BUTTONS.

1,219,266. Specification of Letters Patent. Patented Mar. 13, 1917.

Application filed May 13, 1913. Serial No. 767,464.

To all whom it may concern:

Be it known that I, HERMANN DEPPERMANN, a subject of the Emperor of Germany, residing in Wilhelmstrasse 8, Nowawes-Neuendorf, near Potsdam, Germany, have invented certain new and useful Improvements of Winding-Machines for Thread-Buttons, of which the following is a specification.

This invention relates to improvements in and pertaining to the manufacture of thread buttons, these improvements being applicable also to the manufacture of other similar objects, such for example, as thread-covered rings for embroidered ornaments.

Various attempts have already been made to produce thread buttons by mechanical means, but none of these have proved satisfactory as the apparatus proposed has been both too complicated and too expensive.

According to the present invention there is employed a winding ring which is passed through the wire ring forming the framework of the button for the purpose of winding thread around it. Winding-rings of this kind have already been used for other purposes, but they have all been unsuitable for use in the manufacture of thread buttons as they have carried bobbins which were not adapted for the winding of rings of such small size as are employed in the manufacture of thread buttons. More particularly it would have been impossible to pass a winding ring of the kind heretofore usual through the ring which constitutes the framework of the button.

The wire ring having been first covered with thread by means of the winding ring, next has thread wound across it by the passing of the winding ring around it.

The winding ring employed possesses the novel feature that it carries a cop that enables a bobbin core to be dispensed with, in a groove, so that it takes up but little room, and nowhere projects beyond the external periphery of the ring. It is essential that this cop should accommodate itself to the circular shape of the ring. It is moreover characteristic of a winding ring in accordance with this invention that it is provided with an open slot to enable the button ring to be placed in position, that is to say, to be moved from the first to the second winding position.

Figures 1 to 11 of the accompanying drawings illustrate in various views a machine in accordance with this invention, while Figs. 12 to 14 illustrate the button.

Referring now to the drawings: The button ring 1 and the winding ring 2 are both shown in Fig. 1. The button is supported by four spindles 3, 3 and 4, 4 as shown also in Figs. 8 to 11. Around each of the spindles there runs a groove 5 into which there is inserted a rubber ring 6 which serves for increasing the friction whereby the button ring is carried along. The spindles besides serve to guide the winding ring laterally. The spindles 3, 3 can be turned aside to enable the button ring to be placed in position. Their lower ends rest in footstep bearings 7 while somewhat higher up they are guided in slots 8 in an arm 9. The footstep bearings 7 have sufficient play to enable the spindles to be swung out. In the arrangement shown in the drawings the spindles 4 are also mounted in bearings at their upper ends. This arrangement, however, more particularly when the buttons to be produced are small, involves difficulty in placing the ring 1 in position; and it is therefore preferable to guide the spindles 4 by means of a neck-bearing arranged below the ring 1 and to leave them entirely free at the top, in which case their form is the same as that of the spindles 3 and the ring 1 will lie completely free on its upper side.

The spindles are actuated by means of a worm 10 which meshes with worm-wheels 11 on the spindles 4 (Figs. 1 and 2). The movable spindles 3 are connected with the fixed spindles 4 by means of an elastic band 12 which actuates the former without preventing them from being turned aside. The worm 10 is mounted on a shaft 13 which is rotated from the main driving shaft 14 by means of change speed gear. The main shaft 14 carries a driving pulley 15 over which there passes a driving band 16, which is driven either by a small motor or by a pedal driving mechanism similar to that of a sewing machine. The shaft 14 in some cases may be driven from a hand-actuated crank.

The change-speed gear by means of which the shaft 13 is driven from the shaft 14 at one or other of two different speeds consists of two pairs of gear wheels 17, 18 and 19, 20 and a sliding friction clutch 21. The wheels 17 and 19 are firmly keyed to the

shaft 14. The clutch 21 is adapted to slide on the shaft 13 but is so connected with the shaft through the key 22 that the shaft rotates with it. According as the clutch 21 is connected by means of the lever 23 and a cone of the clutch with the wheel 18 or the wheel 20 the shaft 13 will rotate at a higher or at a lower speed. The transmission ratios of the speed gear are such that when the shaft 13 rotates slowly, the button ring 1 makes 1 complete revolution, while the winding ring, in the case of large rings, makes about 150 revolutions. When the shaft 13 rotates rapidly the speed ratio of these rings is about 1 to 50. It is, of course, possible to vary the speed ratio in accordance with the size of thread in use. The winding ring 2 is supported by 3 rollers 24, 24 and 25, of which the rollers 24 are rigidly mounted on an arm 27 fulcrumed on a pin 26 and are covered with leather to enable the winding ring to be more easily carried along. The roller 25 is mounted on a block 28 that slides in guides in a frame 29 attached to the lever 27 and is acted on by a spring 30 so that the roller 25 presses the winding ring 2 firmly against the rollers 24. The upper end of the lever 27 is guided in a frame 31 which is provided with three notches 32 for retaining the winding ring 2 in its different positions. The lever 27 is provided for the same purpose with a spring-pressed movable bolt 33. The reasons for the various positions in which the ring can be retained by means of the notches 22 will be hereinafter explained.

The rollers 24 are rotated by means of suitable spur gearing. On the main driving shaft 14 there is mounted a toothed wheel 34 (Fig. 3) which drives another toothed wheel 35 connected with the lower roller 24 by means of the shaft 36. A similar wheel 37 is connected with the upper roller 24 by means of the shaft 38, and is driven from the wheel 35 through an intermediate wheel 39, the provision of which is necessary since both of the rollers 24 must rotate in the same direction.

Figs. 1 and 3 show the lever 27 and the winding ring 2 in the position of rest, while Figs. 8 and 10 show it in two different working positions. As will be seen, in Fig. 8 the ring 2 runs through the button ring 1, while in Figs. 1 and 3 it is shown outside of the ring 1 in its position of rest. The curves k, shown in Fig. 8 by dotted lines, indicate the path of the slot during its swing and also indicate the correct dimensions of the slot. The thread 40 is shown in full lines in the position corresponding to that of the winding ring 2, and in other positions by dotted lines. It will be seen that the distance between the point at which the thread passes out of the ring 2 and the button ring decreases and increases as the winding ring rotates. This necessitates the provision of a thread tension-regulating device, which is illustrated in Figs. 4 to 6.

These figures show clearly the groove running around the periphery of the winding ring 2 wherein the cop 41 is located. From this cop the thread passes first through a guide eye 42, thence between a pair of disks 44 which are pressed together by means of a spring 43 to another guide-eye 45, and thence through an eye 46 to the perforation 47 below the eye 45, leaving the ring through this perforation. The eye 46 is not directly attached to the winding ring 2 but connected with it by means of an elastic cord or spring 48, the other end of which is attached to an eye 49 on the ring 2. When the end of the thread leaving the ring is subjected to a pull, the elastic cord will be the first to yield and will continue to do so until the consequent tightening of the thread has overcome the clamping action of the disks 44. Should this happen before the eye 46 has come to lie in front of the perforation 47 the thread will at once begin to unwind from the cop 41. In the position shown in Fig. 6 it has however been assumed that this occurs only when the eye 46 is located above the perforation 47 which however is really not essential to the satisfactory operation of the machine. All that is really necessary is that at the greatest distance between the eye 45 and the eye 46 the thread is still sufficiently under tension through the return of the elastic cord 48. If it is assumed that the position of the eye 46, shown in Fig. 6, occurs when the distance between the place at which the thread leaves the ring 2 and the button ring is at its maximum, the eye 46 will again assume the position shown in Fig. 4 when that distance decreases. The tension of the elastic cord will however remain and consequently also the tension of the thread.

Fig. 7 illustrates a section through the winding ring. Attention is directed to the groove 50 with which the roller 25 engages. Fig. 10 illustrates the second working position of the winding ring, in which it passes around the button ring. In this case also the thread 40 is shown in different positions, which will make it clear that in the position shown in this figure also, there occurs a variation in the distance between the point at which the thread leaves the ring 2 and the button ring, that is to say, that in this case also the thread tension-regulating device just described becomes operative.

Figs. 9 and 11 illustrate in plan the manner in which the button ring is supported by the spindles 3 and 4, and also show the ring partially covered in accordance with the method of winding taking place at the time. From the drawing it will be obvious that the button ring will be wound with thread in the

manner shown in Fig. 12 when the winding ring is in the position illustrated in Fig. 8 and in the manner shown in Fig. 13 when the winding ring is in the position illustrated in Fig. 10. Fig. 13 also shows the form in which the thread button leaves this machine and is conveyed to the tambour machine.

The preceding description renders it clear that all the work hitherto done by hand before the button is ready for the tambour machine can actually be done by means of a machine in accordance with this invention. The power required to operate this machine is small and, as already stated, it can consequently be operated by hand. If desired several single machines such as described may be arranged on a common driving shaft. In this case the speed gear and the pinions for rotating the rollers 24 need not be duplicated, as for the purpose of driving the button ring it is only necessary to duplicate the spindles 3 and 4 in accordance with the number of the single machines while all the rollers 24 required for the single machine may be mounted on common shafts 36 and 38. If desired the spur gear described may be replaced by cord, band, or friction gear.

As has been hereinbefore stated, the invention may also be employed for covering thread covered rings for embroidery ornaments.

What I claim is:—

1. Apparatus for the formation of a thread button upon a foundation ring, comprising supporting means for said ring, a winding ring furnished with a slot that can be traversed by said foundation ring, the external periphery of said winding ring being adapted to receive a thread cop, a perforation in said winding ring through which perforation thread from the cop can be conducted to the interior of said winding ring, means for adjusting said winding ring in relation to said foundation ring whereby said winding ring can be adjusted to pass around said foundation ring or to pass through said foundation ring which is then passed through aforesaid slot in said winding ring, and means for rotating said winding ring.

2. Apparatus for the formation of a thread button upon a foundation ring, comprising supporting means for said ring, a winding ring of greater interior diameter than the exterior diameter of the button to be formed furnished with a slot that can be traversed by said foundation ring, the external periphery of said winding ring being adapted to receive a thread cop, a perforation in said winding ring through which perforation thread from the cop can be conducted to the interior of said winding ring, and means for rotating said winding ring.

3. Apparatus for the formation of a thread button upon a foundation ring, comprising supporting means for said ring, a winding ring of greater interior diameter than the exterior diameter of the button to be formed furnished with a slot that can be traversed by said foundation ring, the external periphery of said winding ring being adapted to receive a thread cop, a perforation in said winding ring through which perforation thread from the cop can be conducted to the interior of said winding ring, means carried by said winding ring for adjusting the tension of said thread and for guiding it toward said perforation, and means for rotating said winding ring.

4. Apparatus for the formation of a thread button upon a foundation ring, comprising supporting means for said ring, a winding ring furnished with a slot that can be traversed by said foundation ring, means for adjusting said winding ring in relation to said foundation ring and for rotating said winding ring, comprising a pivotally mounted lever, a pair of friction rollers journaled on said lever and adapted to bear against the external periphery of said winding ring, guides carried by said lever, a block supported by and adapted to slide in said guides, a third friction roller carried by said block and adapted to bear against the inner periphery of said winding ring, and a spring device connected with said block and with said guides and adapted to cause the last-mentioned roller to bear against the inner periphery of said winding ring, and thereby to press the outer periphery of said winding ring against aforesaid pair of rollers.

5. Apparatus for the formation of a thread button upon a foundation ring, comprising supporting means for said ring, a winding ring of greater interior diameter than the exterior diameter of the button to be formed furnished with a slot that can be traversed by said foundation ring, the external periphery of said winding ring being adapted to receive a thread cop, a perforation in said winding ring through which perforation thread from the cop can be conducted to the interior of said winding ring, means carried by said winding ring for adjusting the tension of said thread and for guiding it toward said perforation, and means for adjusting said winding ring in relation to said foundation ring and for rotating said winding ring.

6. Apparatus for the formation of a thread button upon a foundation ring, comprising supporting means for said ring, a winding ring furnished with a slot that can be traversed by said foundation ring, means for adjusting said winding ring in relation to said foundation ring whereby said winding ring can be adjusted to pass around said

foundation ring or to pass through said foundation ring which is then passed through aforesaid slot in said winding ring, and means for rotating said winding ring.

7. Apparatus for the formation of a thread button upon a foundation ring, comprising a winding ring furnished with a slot that can be traversed by said foundation ring, means for supporting said foundation ring, comprising four spindles furnished with supporting grooves for said ring, two of said spindles being laterally displaceable to enable said ring to be placed in position relatively to said spindles, a main driving shaft, change speed gearing for rotating said spindles from said main driving shaft, means for adjusting said winding ring in relation to said foundation ring whereby said winding ring can be adjusted to pass around said foundation ring or to pass through said foundation ring which is then passed through aforesaid slot in said winding ring, and means for rotating said winding ring.

8. Apparatus for the formation of a thread button upon a foundation ring, comprising supporting means for said ring, a winding ring of greater interior diameter than the exterior diameter of the button to be formed furnished with an external peripheral groove, said groove being adapted to receive a thread cop, a perforation in said winding ring through which perforation thread from the cop can be conducted to the interior of said winding ring, means carried by said winding ring for adjusting the tension of said thread and for guiding it toward said perforation, and means for rotating said winding ring.

9. Apparatus for the formation of a thread button upon a foundation ring, comprising supporting means for said ring, a winding ring furnished with an external peripheral groove, said groove being adapted to receive a thread cop, a perforation in said winding ring through which perforation thread from the cop can be conducted to the interior of said winding ring, means carried by said winding ring for adjusting the tension of said thread and for guiding it toward said perforation, means for adjusting said winding ring in relation to said foundation ring whereby said winding ring can be adjusted to pass around said foundation ring or to pass through said foundation ring which is then passed through aforesaid slot in said winding ring, and means for rotating said winding ring.

10. Apparatus for the formation of a thread button upon a foundation ring, comprising supporting means for said ring, a winding ring of greater interior diameter than the exterior diameter of the button to be formed furnished with a slot that can be traversed by said foundation ring, the external periphery of said winding ring being adapted to receive a thread cop, a perforation in said winding ring through which perforation thread from said cop can be conducted to the interior of said winding ring, means carried by said winding ring for adjusting the tension of said thread and for guiding it toward said perforation, means for rotating said winding ring, and means for regulating the tension on the thread, said tension regulating means comprising spring-pressed disks adapted to clamp the thread, guiding eyes and an elastic element acting tensionally on the thread, the thread being first led from the cop to the clamping device, thence through the guiding eyes to the elastic element, and finally through aforesaid perforation to the interior of the winding ring.

11. Apparatus for the formation of a thread button upon a foundation ring, comprising supporting means for said ring, a winding ring of greater interior diameter than the exterior diameter of the button to be formed furnished with a slot that can be traversed by said foundation ring, the external periphery of said winding ring being adapted to receive a thread cop, means for rotating said winding ring, and means for regulating the tension on the thread being drawn from the thread cop, said tension regulating means comprising spring-pressed disks adapted to clamp the thread, guiding eyes and an elastic element acting tensionally on the thread, the thread being first led from the cop to the clamping device, thence through the guiding eyes to the elastic element, and finally through aforesaid perforation to the interior of the spinning ring.

12. In an apparatus for the formation of a thread-button upon an annular foundation ring or torus, a winding-ring of greater interior diameter than the exterior diameter of the button to be formed, having a slot of greater width than the thickness of the torus; the winding ring being adapted to wind (first) a covering upon the foundation ring or torus, and (second) a covering diametrically across the torus so as to cover the central opening thereof.

13. In an apparatus for the formation of a thread button upon a foundation ring, the combination of a winding-ring of greater interior diameter than the exterior diameter of the button to be formed, having a slot of greater width than the thickness of the completed button, the ring being adapted to receive a thread-cop; and a tension device carried by the ring through which the cop thread passes, comprising a longitudinally elastic member having an end loop through which the cop-thread passes to the interior of the ring through an orifice in the inner wall.

14. In an apparatus for the formation of a thread button upon a foundation ring,

the combination of a winding-ring of greater interior diameter than the exterior diameter of the button to be formed, having a slot of greater width than the thickness of the completed button and adapted to carry at its periphery a thread-cop of helical coil form; and a thread tensioning device carried by a winding-ring comprising a guide-ring or eye; tensioning disks; a second guide-ring; a lead-orifice formed in and through the inner-wall adjacent to the second guide-ring; and an elastic tensioning member secured at one end to the winding-ring, and provided at the other with an end-loop through which the cop-thread passes on its way from the second guide-ring to the lead orifice in the inner wall.

In witness whereof I have hereunto signed my name this 30th day of April 1913.

HERMANN DEPPERMANN.

Witnesses:
HENRY HASPER,
WOLDEMAR HAUPT.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."