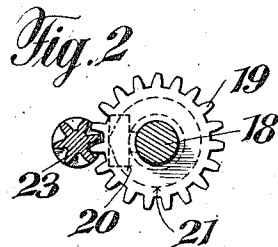
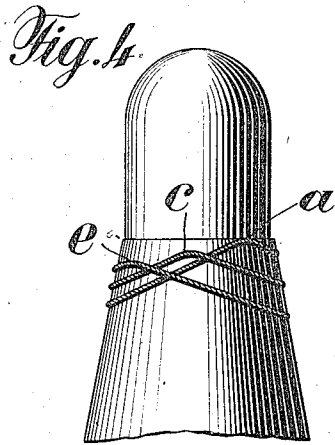
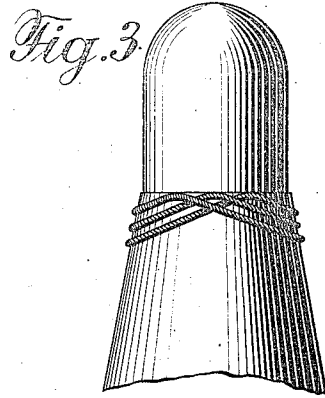
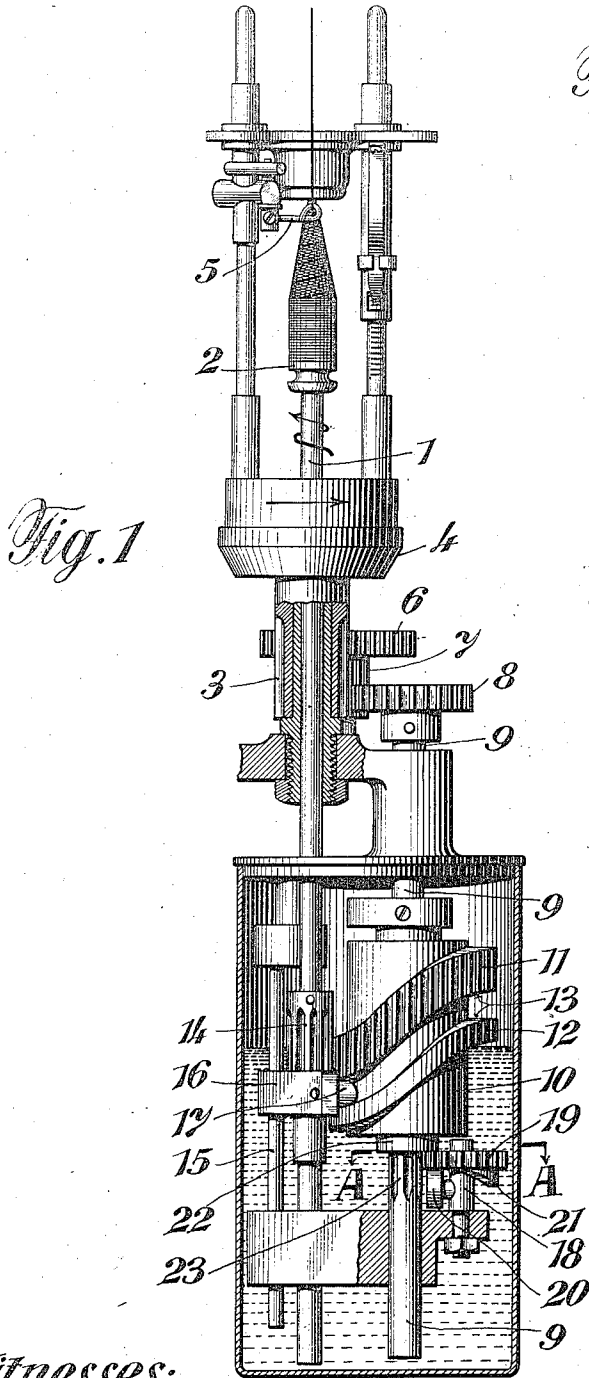


J. SCHÄRER-NUSSBAUMER.  
 WINDING MACHINE.  
 APPLICATION FILED MAY 18, 1911.

1,000,695.

Patented Aug. 15, 1911.



Witnesses:

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# UNITED STATES PATENT OFFICE.

JAKOB SCHÄRER-NUSSBAUMER, OF ERLENBACH, SWITZERLAND.

WINDING-MACHINE.

1,000,695.

Specification of Letters Patent. Patented Aug. 15, 1911.

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*To all whom it may concern:*

Be it known that I, JAKOB SCHÄRER-NUSSBAUMER, a citizen of the Republic of Switzerland, residing at Erlenbach, Switzerland, have invented new and useful Improvements in Winding-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

Machines for the parallel-winding of bobbins have already been constructed, in which, for the purpose of insuring better binding of the thread with the bobbin-body, and of attaining a more slim or pointed form, a cam is employed having the shape of a three-cornered heart. This cam causes all the bobbin-spindles to rise or fall simultaneously and the thread is coiled upon the bobbin by a rotary thread-guide. The three corners of the cam are of different heights and its recesses of different depths, the arrangement being such that the spindles are sunk to different extents, so that individual thread-layers will be beyond the preceding ones, and with that part which is nearest to the bobbin-body lying on the latter. The drawback of such winding-machines is that the bobbins do not receive the same number of turns in every thread-layer, so that the individual thread-layers lying beyond the preceding ones, do not, in the case of all the bobbins, lie on the bobbin-body with that part which is nearest to the latter. The consequence is that the winding of the bobbin is not uniform. The reason of this is that all the spindles are raised and lowered in common by a single cam, and that the thread-guides are rotated independently of the axial motion of the spindles by mechanism provided for each spindle separately.

The present invention relates to improvements in winding-machines, whereby the above mentioned defect can be overcome, and it has reference to those winding-machines in which the spindle and the thread-guide execute a rotary motion, and one of

them is revolved with positive motion by a cam, having the form of a toothed wheel, with symmetrical halves, and is at the same time slid axially.

The main feature of the invention is that a second rotary lifting-device is provided, positively actuated by the said cam, which device on rotating imparts a sliding motion to the said cam, and thus an extra sliding motion to the spindle or the thread-guide (after the same has made a certain number of revolutions). In this manner the bobbin is uniformly wound, there being the same number of turns in each thread-layer, and individual thread-layers lie beyond the preceding ones, with that part which is nearest to the bobbin-body lying on the latter, for the purpose of insuring better binding.

One embodiment of the invention is illustrated in the accompanying drawing, in which it is shown applied to a bobbin winding-machine for cross-winding.

Figure 1 is an elevation and part section, Fig. 2 shows a detail, being a cross-section on the line A—A of Fig. 1, Fig. 3 shows certain thread-layers wound by a machine of the well known construction already referred to, Fig. 4 is a similar view of thread-layers wound according to the present invention.

1 designates the spindle, carrying the cop or bobbin 2 at the top. On this spindle there is loosely mounted a toothed sleeve 3, to which there is secured a level friction disk 4, which supports the thread-guide 5, together with the device for vertical adjustment of the same. With the sleeve 3 there meshes a gear 6, to which there is rigidly secured another gear 7. This latter engages with a gear 8, on whose shaft 9 there is mounted a cam 10 presenting two parallel ribs or flanges 11 and 12, 13 being the groove between the same. This groove constitutes a cam-track, the ribs 11 and 12 at the one part lying nearer to the bottom edge of the cam, while at the part located diametrically opposite the first said part they lie nearer the upper edge of the cam. The cam 10 thus possesses symmetrical halves. The rib 11 is toothed on its periphery, and with it there meshes a toothed sleeve 14, fastly

mounted on the spindle 1. The sleeve 14 rests on a sliding-block 16, through which there pass the spindle 1 and a rod 15. From the block 16 there projects a pin 17, which 5 engages in the groove 13. Below the cam 10 the spindle 1 has teeth 23 cut in it, with which there meshes a gear 19, slidably mounted on a pin 18. Mounted on this pin there is also a roller 20, and upon the latter 10 the gear 19 rests. On its under face the gear 19 has a concentric annular cam-surface 21, which rises from the plane of the cam and descends through the same extent to the plane again. The shaft 9 has a collar or 15 shoulder 22, which rests on the gear 19, so that when through rotation of the shaft 9 the gear 19 is lifted by its cam-surface 21 contacting with the roller 20, the said shaft, together with the cam 10, is likewise raised. 20 The ratio of transmission between toothed sleeve 23 and gear 19 is 1:3+1 tooth; that is to say, if the sleeve 23 has, for instance, six teeth, the gear 19 will have nineteen teeth, so that when the sleeve 23 has made 25 three revolutions, the gear 19 will not have quite completed a single revolution.

The mechanism is driven by means of a friction-disk (not shown in the drawing), which engages with the friction-disk 4. 30 When the latter is thus rotated in the direction of the arrow, the spindle 1 will naturally be revolved in the opposite direction, and will be raised and lowered owing to the action of the cam-groove 13 and pin 17, whereby each of the thread-layers will be 35 coiled upon the bobbin 2 in several turns. During such winding the spindle 1 will at times ascend through a certain extra distance, since the shaft 9 at certain intervals will be more or less raised by the cam-faced gear 19. Through this super-ascent 40 of the spindle 1, the parts of the individual thread-layers located nearest to the bobbin-body will be so coiled upon the latter that 45 they do not all lie on it, but only the said part of each third thread-layer. Thus, for instance, if the mechanism occupies the position shown in Fig. 1, then, of the thread-layer which is just being formed, that part 50 which is located nearest to the bottom-body will come to lie at the point *a*. (Fig. 4.) If the shaft 9 is turned through one revolution, the gear 19 will make somewhat less than one third of a revolution. During such 55 period the cam-track 21 will travel over the roller 20 to somewhat less than one half of its height, and will thus raise the shaft 9 with spindle 1, so that the part in question of the next thread-layer will lie at the point 60 *c*. After the next rotation of the shaft 9 the gear 19 will again have made somewhat less than one third of a revolution, and a higher part of the cam-track 21 will now lie above the roller 20 than at the moment 65 when the part *c* was being wound on; so

that the part in question of the next thread-layer will lie at the point *e*, that is to say, somewhat lower than the point *c*. After the third rotation of the shaft 9, the roller 20 will again lie upon the face of the gear 70 19, and the said part of the next thread-layer will come to lie at the same height as that at the point *a*. The procedure now repeats itself, so that each third thread-layer, at the part which is nearest to the 75 bobbin-body, always projects above the like parts of the two other thread-layers. All the parts at the level of the point *a* lie on the bobbin-body 2.

By the above described manner of applying 80 the various thread-layers to the bobbin uniform winding is insured. Each thread-layer exhibits the same number of turns, and there is no liability to knot, such as occurs when the spindle makes no super- 85 ascent (as in the winding depicted in Fig. 3), unless the thread is sufficiently restrained. With the present invention therefore, pronounced restraint of the thread is not necessary on winding the bobbins, 90 whence soft winding results; yet the winding is tightly bound to the bobbin-body so there is no danger of its slipping unto the same in the shuttle, when the latter is struck by the picker. The invention also enables 95 the use of much thinner bobbin-bodies.

The mechanism for effecting super-ascent of the spindle can naturally be employed not only for machines for cross-winding (as above described), but also for machines in 100 which the bobbins are parallel wound. It will also be obvious that the axial sliding might be executed by the thread-guide, instead of by the spindle, without there being any departure from the spirit of the present 105 invention.

Having thus described my invention, I claim as new:

1. In a winding-machine, a rotatable bobbin-spindle, and a rotatable thread-guide, 110 an axially slidable cam positively rotating and axially sliding the one of the said members and rotary means positively actuated by the cam and imparting to the latter intermittently an axially sliding motion, 115 whereby the said member which is rotated and slid by it receives an additional axial sliding motion, substantially as and for the purposes described.

2. In a winding-machine, a rotatable bobbin-spindle, and a rotatable thread-guide, a 120 toothed shaft, an axially slidable toothed cam on said shaft, having symmetrical halves, positively rotating and axially sliding the one of the said members, a pin on 125 a stationary part, a gear slidably mounted on the said pin and meshing with the shaft of the said cam, and supporting the latter, and presenting a cam-track, and a roller mounted on the said pin and engaging with 130

the said cam-track, whereby when the cam-track coöperates with the roller the said cam is lifted and the member which is rotated and slid by it consequently receives an additional sliding motion, substantially as and for the purposes described.

5 In testimony that I claim the foregoing

as my invention, I have signed my name in presence of two subscribing witnesses.

JAKOB SCHÄRER-NUSSBAUMER.

Witnesses:

AUGUST RÜEGG,  
JULIUS P. HEINZ.

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