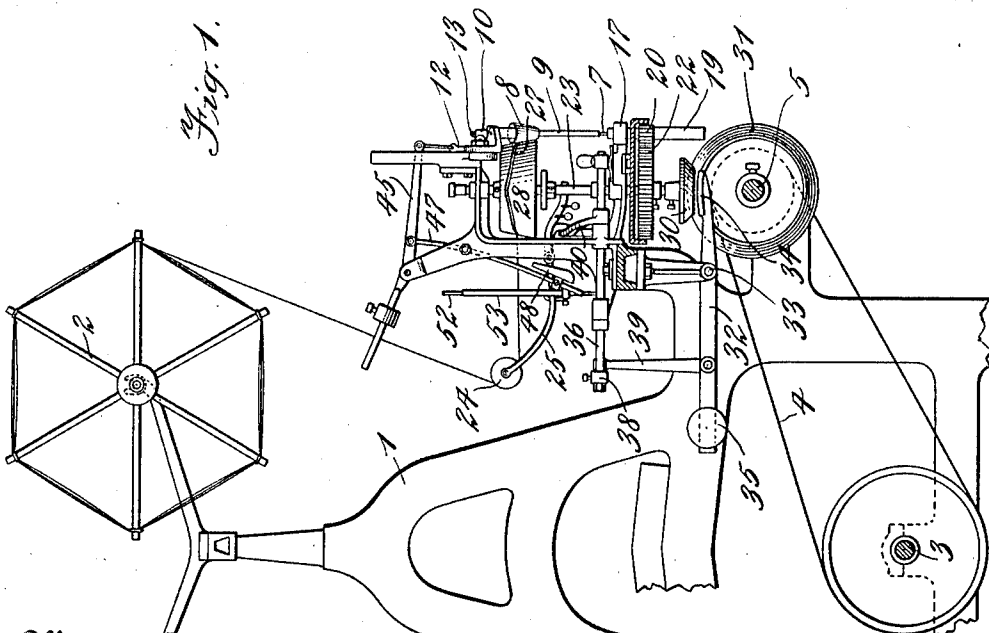
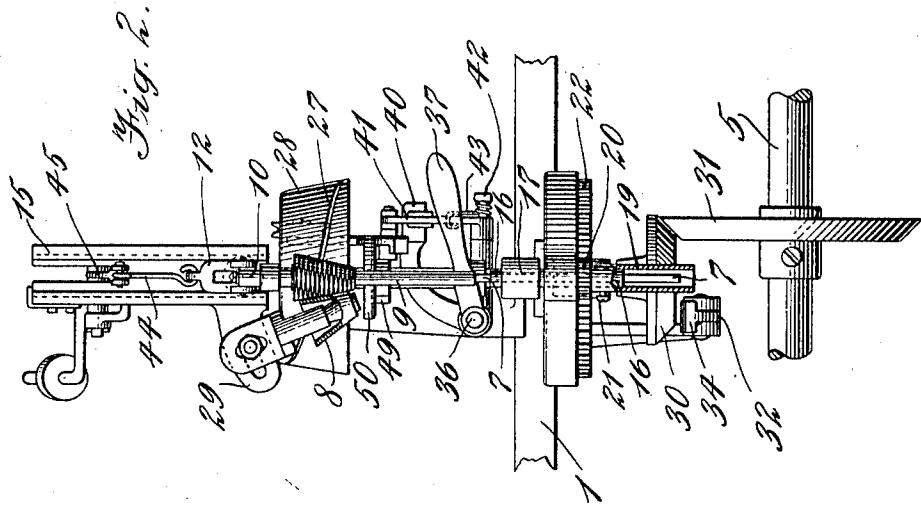


J. HUNZ.
COP WINDING MACHINE.
APPLICATION FILED DEC. 1, 1910.

1,061,542.

Patented May 13, 1913.

3 SHEETS-SHEET 1.



Witnesses:
Charles H. Jones
Charles H. Jones

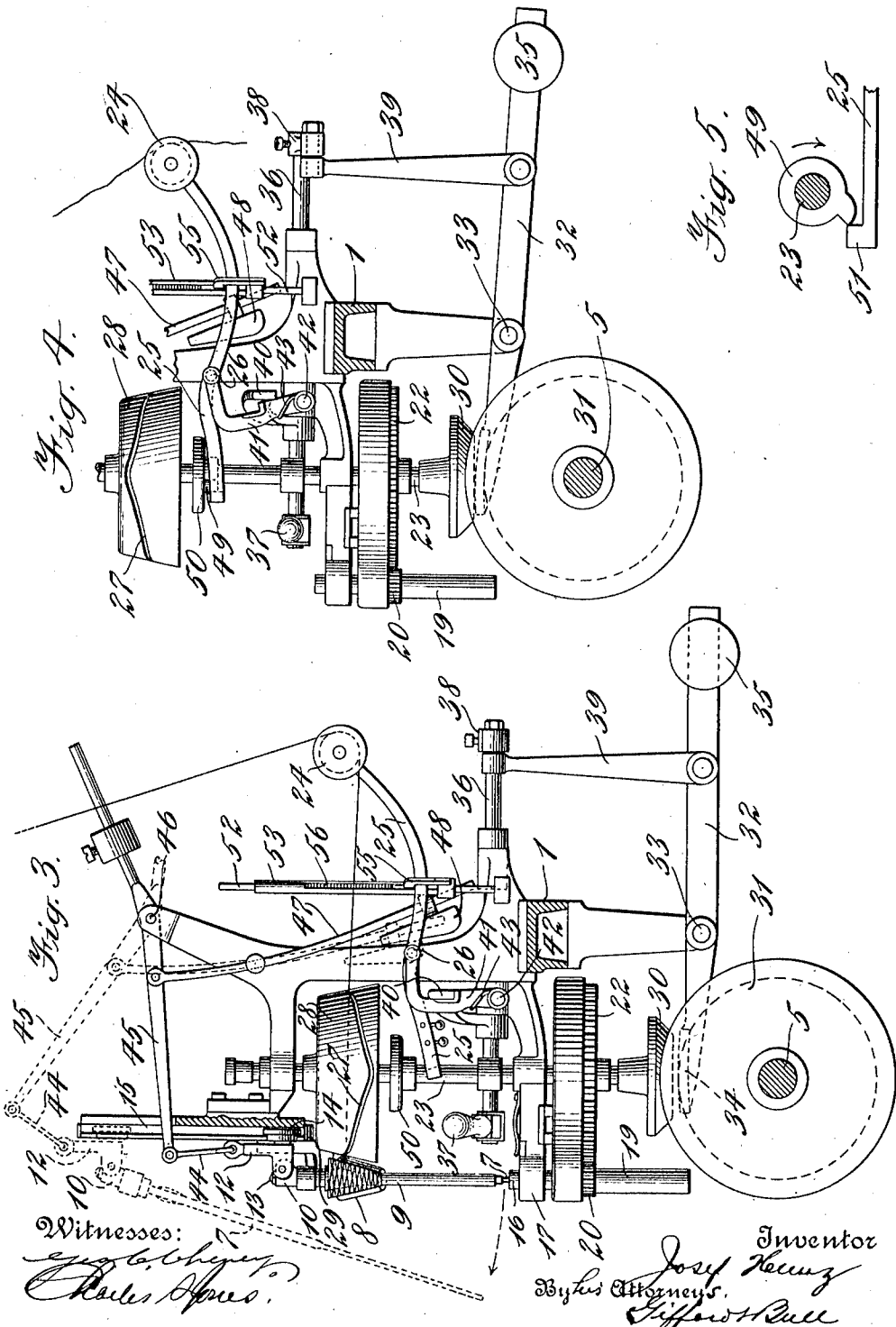
Inventor
Josef Hunz
By *his Attorney*
Gifford & Bull

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3 SHEETS-SHEET 3.

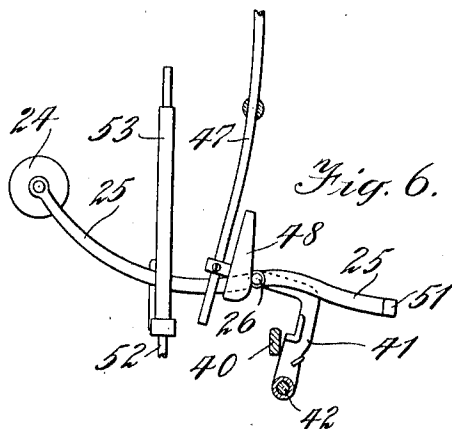


Fig. 6.

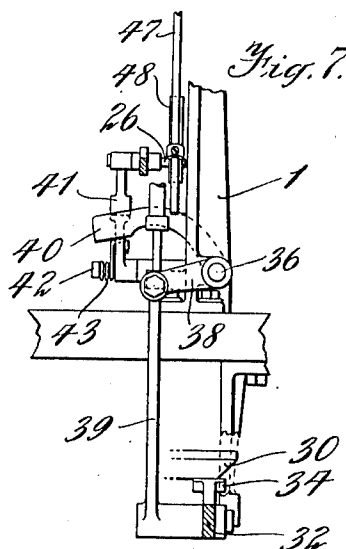


Fig. 7.

Fig. 8.

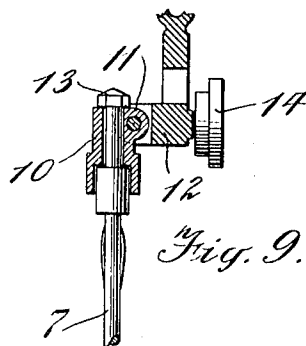
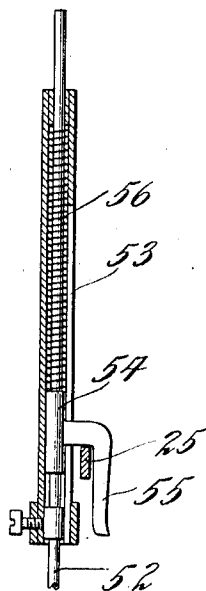


Fig. 9.

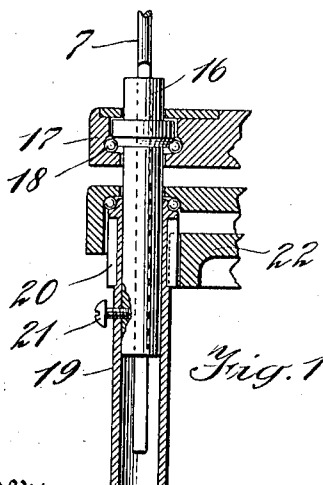
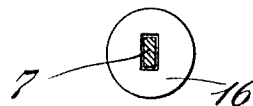


Fig. 10.

Fig. 11.



Witnesses:
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Inventor
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 By his Attorneys
Lyfth & Bull

UNITED STATES PATENT OFFICE.

JOSEF HUNZ, OF CREFELD, GERMANY, ASSIGNOR TO HERM. SCHROERS MASCHINEN-FABRIK, OF CREFELD, GERMANY.

COP-WINDING MACHINE.

1,061,542.

Specification of Letters Patent.

Patented May 13, 1913.

Application filed December 1, 1910. Serial No. 595,021.

To all whom it may concern:

Be it known that I, JOSEF HUNZ, a subject of the King of Prussia, and resident of Crefeld, in the Province of the Rhine, German Empire, have invented certain new and useful Improvements in Cop-Winding Machines, of which the following is a specification.

My invention relates to a machine designed for winding thread onto a spindle, in which a rapid to-and-fro distribution of the thread is made over the built up conical end of the cop in order to bind the coils together to prevent raveling. As this building up progresses the spindle, and its holder are moved longitudinally so that the width of the finished cop is substantially that of the diameter of the base of the cone.

Cop-winding machines, so far as known to me, are subject to various defects which cause frequent breaking of the thread, and moreover they are run at too low a speed to render them economical.

The object of the present invention is to provide a cop-winding machine which shall be simple, durable and capable of running at the highest speed with minimum wear and liability to get out of order, and which is simple as to the control of the thread and as to the operations of its parts.

Certain features of the invention relate to the driving mechanism by which all jar and shock are obviated in starting and stopping the machine.

Other features relate to an automatic knock-off for stopping the machine when a predetermined amount of thread has been wound and also when the thread breaks or is exhausted.

Other features relate to the manner of mounting the spindle by which it may be easily and readily handled for receiving and removing the cop or bobbin or cop tube.

In brief, the present invention consists in various details of construction and arrangement of parts which go to make up a high speed, durable machine, which can handle the thread quickly and effectively and without subjecting the same to shock and strain upon the reversal or traversing motion, and when starting and stopping the machine.

The invention will be understood by ref-

erence to the accompanying drawings in which—

Figure 1 is a sectional side elevation of a machine constructed in accordance with the present invention; Fig. 2 a front view of the same; Fig. 3 a view similar to Fig. 1 looking from the opposite side of the machine; Fig. 4 a view similar to Fig. 3 showing the position of the parts when the thread breaks; Figs. 5, 6, 7, 8, 9, 10 and 11 detail views of various parts.

Similar reference numerals indicate similar parts in the several views.

Referring to the drawings, 1 designates the frame of the machine, which may be of suitable form and proportions to sustain the operating parts; and 2 a swift of usual form rotatably supported on the frame and from which the thread is delivered to the winding machine. Power for driving the machine is derived from the main shaft 3. A belt 4 leading from a pulley on said shaft drives a shaft 5 mounted in suitable bearings on the frame 1.

The present machine comprises as its essential elements a thread-guide; a vertically mounted rotatable and longitudinally movable spindle; a conical rotatable member for moving the spindle and the cop mounted thereon longitudinally as the cop becomes filled with thread; a driving mechanism by means of which the machine may be started with ease, and without an abrupt motion which would be liable to break the thread; and stop motions to stop the machine when a predetermined amount of thread has been wound on the bobbin or cop, and when the thread breaks during the winding operation. I will now describe these several parts in detail.

The winding mechanism.—The thread may be wound directly on the spindle, or on a bobbin or cop tube placed on the spindle, and in the following description I use the term spindle in a generic sense to include all forms. The winding surface may be of the same diameter throughout or provided with a cone head as shown in Fig. 3. The spindle is suspended vertically in a loose collar 10 (see Fig. 9), the latter having a laterally projecting ear 11 through which passes a pivot pin carried by a slide block 12 in the form of a yoke, as shown in Fig. 2.

The spindle is prevented from falling through the collar by a nut 13 on the upper end of the spindle, the said nut resting upon the collar 10. The block 12 has mounted
 5 on its rear a roller 14 which travels in a vertical guide 15 mounted on the machine frame. The lower end of the spindle 7 is square or rectangular in section and fits loosely into a corresponding opening in a
 10 bearing sleeve 16, said sleeve being suitably supported in a bracket 17, on roller bearings 18, as shown in Fig. 11. To effect the rotation of the spindle 7, the sleeve 16 is extended downwardly and inside of the hub
 15 19 on a pinion 20, the sleeve being secured to said hub by means of a set screw 21. The pinion 20 is driven by a spur gear 22 fast on a vertical shaft 23, the latter being supported in bearings carried by the machine
 20 frame and longitudinally movable therein. By making the lower or engaging end of the spindle square or rectangular in section I prevent slipping or turning of the spindle relatively to its seat.

25 The thread as it is delivered from the swift 2 passes around a guide roll 24 mounted on a swinging arm 25 pivoted on 26 carried by a keeper 40 hereafter described. From the roll 24 the thread passes through
 30 the slot 27 of the thread-guide, said guide being in the form of a drum 28 fixed on the vertical shaft 23. The drum 28, as shown in the drawings, is in the form of a frustum of a cone and the peripheral slot 27
 35 therein is symmetrical with respect to the axis of the drum; that is, the slot extends obliquely upward from a central point, shown in Figs. 2 and 3, equally in both
 40 directions to its highest point diametrically opposite. The slot 27 is not on the path of a true spiral, the central portion of each half of the slot being substantially straight.

As the spindle is filled with thread it is moved longitudinally by the cone roller 8
 45 which is rotatably mounted on a bearing adjustably supported in a bracket 29. The adjustment provided, as shown in Fig. 2, permits the angle of inclination of the bearing surface of the cone 8 to the spindle to be
 50 varied, as well as its position longitudinally to the cop cone.

The driving mechanism.—The shaft 23 on which the drum 28 is fixed passes through suitable bearings in the machine
 55 frame, and has fixed to its lower end a bevel friction wheel 30 adapted to bear against a corresponding wheel 31 on shaft 5. The driven wheel 30 is held normally out of engagement with the driving wheel 31 by a
 60 weighted lever 32 pivoted at 33. The inner end of lever 32 carries a brake shoe 34 which bears against the under side of the driven wheel 30, the weight 35 on said lever and other parts to be described being sufficient
 65 to exert an upward pressure on wheel 30 so

as to raise it, and the shaft 23, out of frictional engagement with wheel 31. As the drum 28, spur gear 22, and wheel 30 are fast on shaft 23, it will be understood that when
 70 the parts are in their normal position, as shown in Fig. 4, all of said parts will be raised. To raise shaft 23 and parts carried thereby, I provide a rock shaft 36 which is adapted to be moved by a hand lever 37, or
 75 by automatic knock-off mechanism. On the shaft 36 is a crank arm 38 (see Figs. 4 and 7), and said arm is connected to lever 32 by a vertical link 39. When the inner end of the lever 32 is depressed to release brake shoe 34 from engagement with wheel 30, the
 80 latter and shaft 23 and drum 28 will rest by gravity on driving wheel 31. This provides an easy, smooth running drive which can be thrown into and out of action with no shock or jar to the parts or to the thread. The operator is enabled to bring the two wheels
 85 30 and 31 into engagement with each other gradually so that the drum 28 and spindle 7 attain their full speed without the shock attendant upon the use of gear drives.

Stopping mechanism.—In order to stop the machine after a predetermined length of
 90 cop has been wound, and also when the thread breaks, I have provided the following means: On the rock shaft 36 is fixed a trip-latch 40, which, in its normal position, is out of engagement with a keeper 41 fast
 95 on a pivot stud 42 extending from the machine frame, and held against the side of latch 40 by a spring 43. (Figs. 6 and 7). When shaft 36 is rocked to start the machine, the latch 40 is moved upwardly, and the keeper 41 being under spring tension, is moved under the end of said latch and holds
 100 the latter and shaft 36 locked against rotation until a predetermined amount of thread is wound on the spindle, or until the thread breaks. This locking of the latch 40 also holds the inner end of lever 32 depressed so that driven wheel 30 will be maintained in
 105 engagement with the driving wheel 31 until the machine is stopped. As the spindle is filled it is moved longitudinally, the block 12 being raised and guided in its vertical movement by roller 14 traveling in the
 110 guide-way 15. To the block 12 is secured a link 44 connected to a weighted lever 45 pivoted at 46 to the machine frame. Pivotaly connected to lever 45 is a rod 47 carrying an adjustable cam 48 (Figs. 3 and 6) which is
 120 adapted to bear against the end of the pivot stud 26 to move the same and to thereby rock keeper 41 on its bearing 42 to release latch 40. As the block 12 is moved upwardly, the link 44, lever 45, and rod 47 will be raised
 125 and the cam surface 48, secured to rod 47, will bear against the pivot stud 26 according to the adjustment of cam 48; that is, said cam may be so adjusted as to release latch 40 for a predetermined length of winding.

When keeper 41 is moved to release latch 40, the weight 35 on lever 32 effects the rocking of shaft 36 so as to bring latch 40 to the side of keeper 41. This movement also brings
 5 brake shoe 34 into engagement with wheel 30 and raises said wheel and shaft 23 out of engagement with the driving wheel 31 to suspend the rotation of the drum and spindle. As above stated, cam 48 is made ad-
 10 justable along its supporting rod 47 to determine when the cam shall act on the pivot stud 26; that is, the position of cam 48 determines the length of the cop. The thickness of the cop is determined by the position
 15 of the cone 8. I also provide means to stop the machine if the thread should break during the winding operation, or upon the exhaustion of the swift. The tension on the thread during the winding is sufficient to
 20 hold up the outer end of lever 25 which carries the guide roll 24, said lever 25 being mounted on the pivot stud 26. On shaft 23 is mounted a trip-cam 49 (see Fig. 5), and the end of lever 25 is bent at right angles
 25 thereto, as at 51. Normally the inner end of lever 25 is below and out of the path of cam 49. When, however, the thread breaks the outer end of said lever will drop and its inner end be brought into the path of cam
 30 49 and as the toe 51 of said lever is struck by the cam the keeper 41 will be rocked on its bearing 42 to thereby release latch 40 and permit the weight 35 to rock the shaft 36 and to bring the brake shoe into engage-
 35 ment with the driven wheel 30, and to raise the shaft 23, and parts carried thereby, as before described. To insure a positive movement of lever 25 when the thread breaks I provide the means illustrated in detail in
 40 Fig. 8. This comprises a vertical rod 52 stepped into a suitable bearing on the machine frame and surrounded by a casing 53. The rod 52 has secured thereto a sleeve 54 having a laterally projecting bent arm 55
 45 extending through a slot in the wall of the casing 53. The sleeve 54 and its arm 55 are pressed downwardly by a spring 56 within the casing. The arm 55 rests on lever 25 and is held upwardly so as to slightly
 50 compress the spring 56 by reason of the tension on the thread. A light spring is used so that when the thread breaks the spring pressure will be just enough to insure a positive movement of lever 25. In order to pre-
 55 vent the inner end of lever 25 rising too high, I secure a flange 50 to shaft 25 immediately above the cam 49.

If a bobbin or cop tube is used, the spindle is raised and swung outwardly, as shown by
 60 the dotted lines in Fig. 3, and after placing the bobbin or cop tube thereon the spindle is replaced in its bearing in the sleeve 16. The machine is then started by the operator turning the handle 37 so as to release the
 65 brake shoe 34 from engagement with wheel

30 and to permit said wheel to engage the driving wheel 31. The lever 32 may be lowered gradually so as to permit wheel 30 to engage wheel 31 without any shock or jar, the full speed being attained when the entire
 70 weight of wheel 30, shaft 23, gear 22 and drum 28 rests upon the driving wheel 31. If the spindle is not provided with a coned head the thread is wound thereon until its thickness is such as to contact with the conical
 75 member 8 which is in close proximity to the head or upper end of the spindle. The conical member 8 will then compel the formation of a coned head of thread on the spindle. In practice, however, I prefer to
 80 use a bobbin or cop tube with a coned head. As soon as the thread is wound sufficiently to contact with the member 8 the pressure thereon will move the spindle longitudinally relatively to the drum 28, and such move-
 85 ment will continue until the machine is stopped either by hand, or automatically when a predetermined amount is wound, or when the thread breaks or is exhausted.

It will be noted that the drum 28 is adapted to deliver the thread back and forth a
 90 predetermined distance on the spindle less than the length of the finished cop, and that the spindle is moved longitudinally relatively to the guide drum 28 while the thread
 95 is being wound thereon, and that the drum is moved relatively to the spindle when the machine is stopped from any cause. This movement of the drum, when the machine is stopped, is effected by raising the lever 32,
 100 the latter serving not only as a brake but as the means through which the driven wheel 30, and shaft 32, and the parts carried thereby, are lifted out of engagement with the driving wheel 31. When the machine is run-
 105 ning the engagement of latch 40 by keeper 41 will prevent the rotation of shaft 36 and prevent thereby the stopping of the machine either manually or automatically from any of the causes before referred to.
 110

The employment of a friction drive in the manner described is of advantage, not only in respect to ease of starting and stopping without shock or jar, but additionally in that the wear of the driven member 30 does not
 115 interfere with the proper running of the machine, and renewal thereof is not necessary until said member is wholly unfit for use.

As before stated, I may wind the thread directly on the spindle so as to produce an
 120 all-cop or I may wind on a cop, butt cop or bobbin.

What I claim and desire to secure by Letters Patent of the United States is:—

1. In a cop-winding machine the combina-
 125 tion of a spindle and means for rotating the same, a thread guide having means to traverse the thread a predetermined distance on the spindle, a shaft on which said guide is mounted, means for rotating said shaft, and
 130

means for moving said shaft longitudinally to disengage it from the driving means.

2. In a cop-winding machine the combination of a spindle and means for rotating the same, means for moving the spindle longitudinally while the thread is being wound thereon, a thread guide having means to traverse the thread a predetermined distance on the spindle, a shaft on which said guide is mounted, means for rotating said shaft, and means for moving said shaft longitudinally to disengage it from the driving means.

3. In a cop-winding machine the combination of a spindle and means for rotating the same, a thread guide having means to traverse the thread a predetermined distance on the spindle, a shaft on which said guide is mounted, supports for said shaft permitting a longitudinal movement thereof, a friction drive for said shaft, and means for moving said shaft longitudinally in its bearings to disengage it from the driving member.

4. In a cop-winding machine the combination of a spindle and means for rotating the same, a thread guide in the form of a frustum of a cone having a slot therein extending obliquely upward from a central point equally in both directions to its highest point, a shaft on which said guide is mounted, means for rotating said shaft, and means for moving said shaft longitudinally to disengage it from the driving means.

5. In a cop-winding machine the combination of a spindle, a slide block in which the spindle is vertically suspended, a guide for said block, a bearing sleeve for the lower end of said spindle, a pinion on said sleeve, a spur gear meshing with said pinion, a driven shaft on which said gear is secured, a thread guide carried by said shaft, and means for disengaging said shaft from the driving mechanism.

6. In a cop-winding machine the combination of a spindle and means for rotating the same, a thread guide having means to traverse the thread a predetermined distance on the spindle, a shaft on which said guide is mounted, supports for said shaft permitting a longitudinal movement thereof, a friction

drive for said shaft and means for moving said shaft longitudinally in its bearings to disengage it from the driving member, and means for applying a brake to the driven member when moved out of engagement with the driving member.

7. In a cop-winding machine the combination of a spindle and means for rotating the same, a thread guide having means to traverse the thread a predetermined distance on the spindle, means for rotating said guide comprising friction wheels, the driven member of which is fast on the shaft of said guide, means for moving the driven member into and out of engagement with the driving member comprising a lever, and a brake carried by said lever to engage said driven member when moved out of engagement with the driving member.

8. In a cop-winding machine the combination of a spindle and means for rotating the same, a thread guide and means for rotating the same, said guide having means to traverse the thread a predetermined distance on the spindle, means for moving said spindle longitudinally as it is filled with thread, a bearing block in which said spindle is supported, and a guide for said block.

9. In a cop-winding machine the combination of a spindle and means for rotating the same, a thread guide having means to traverse the thread a predetermined distance on a spindle, a shaft on which said guide is mounted, means for rotating said shaft, means for moving the spindle longitudinally while the thread is being wound thereon, a stop motion, a cam adapted to set said stop motion in operation, and means actuated from the spindle as it is moved longitudinally to move said cam when a predetermined amount of thread is wound.

In testimony whereof I have hereunto signed my name to this specification in the presence of two subscribing witnesses.

JOSEF HUNZ. [L. s.]

Witnesses:

ALBERT SCHAUFELBERGER,
W. W. BRUNSWICK.