Nov. 26, 1935. R. H. CARTER 2,022,338

WINDING APPARATUS

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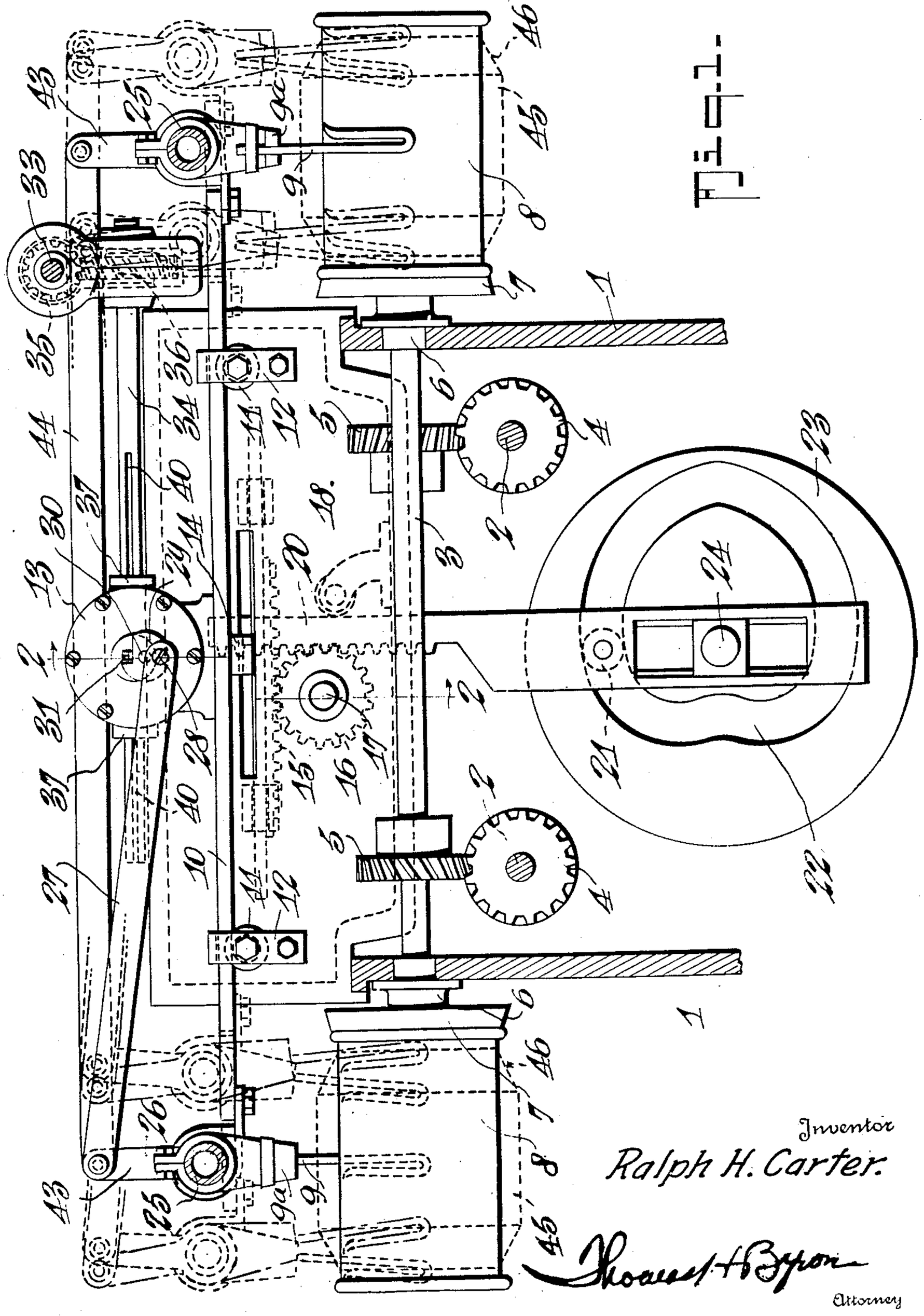

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Fig. 2.

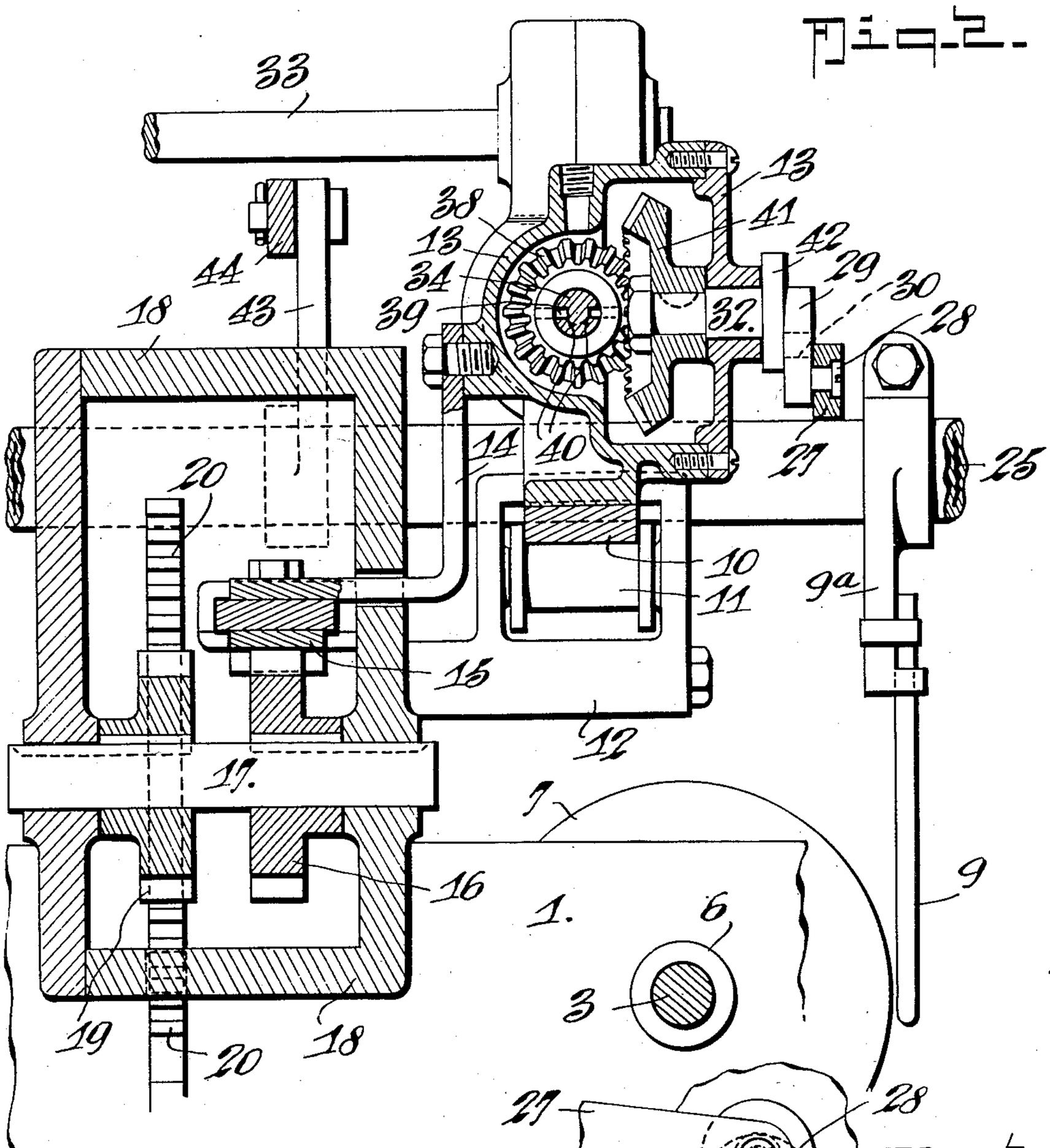


Fig. 3.

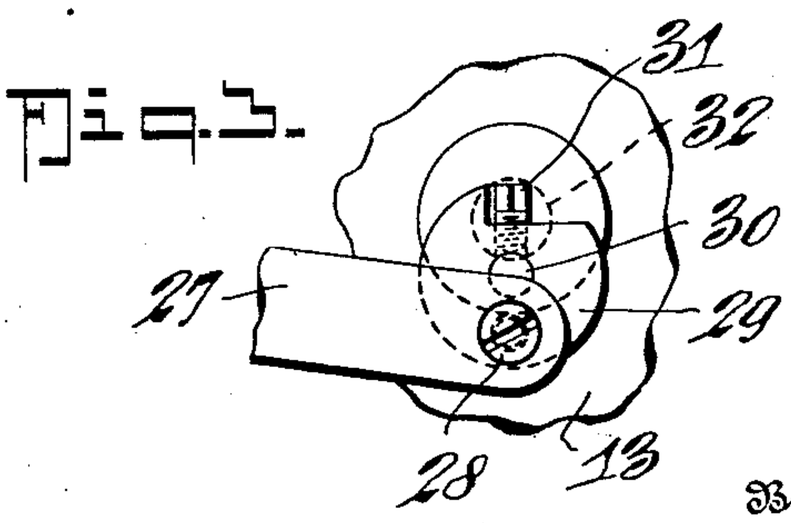
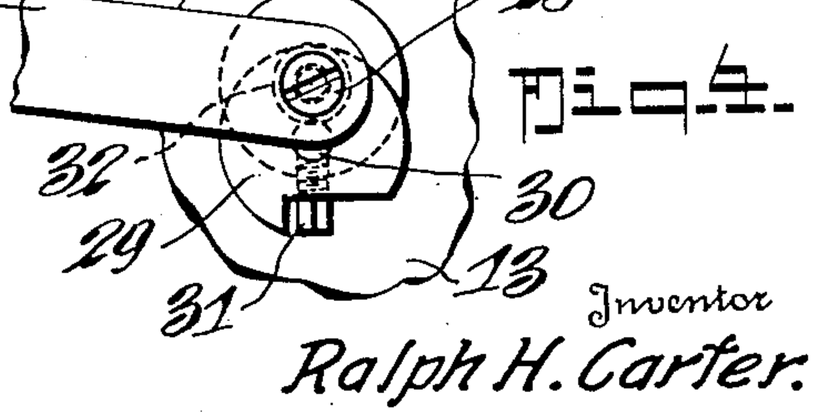


Fig. 4.



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2,022,338

WINDING APPARATUS

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10 Claims. (Cl. 242—43)

This invention relates to improvements in winding machines but particularly has for its object to devise a useful and novel apparatus for the uniform winding of artificial silk.

In the winding of threads into bobbin form it is desirable to achieve a cylindrical yarn body having tapered ends. It is also necessary in the winding of artificial threads which are freshly extruded through a coagulating bath, to wind these still plastic filaments under an almost uniform tension by insuring a smooth run of the thread, over a thread guide to which has been imparted a continuous movement.

It is therefore one object of the present invention to provide a useful and novel winding apparatus which builds up a thread body with tapered ends and whereby the outer windings form a protective layer.

Another object of the present invention is to provide a winding apparatus whereby the length of the taper of the beveled ends may be readily changed by means of a novel design of the eccentric means.

To the attainment of the aforesaid objects and ends, my invention consists in the novel features of construction and in the combination, connection and arrangement of parts, hereinafter more fully described and then pointed out in the appended claims.

In the drawings:

Fig. 1 is a side elevation of my improved winding device, parts being shown in section and only so much of a spinning machine as is necessary to illustrate my device.

Fig. 2 is a vertical cross-section taken on the line 2—2 of Fig. 1.

Fig. 3 is an enlarged detail view of my adjustable cam means shown in the position which will impart the greatest arc of movement to the thread guide on the carrier bar.

Fig. 4 is an enlarged detail view of the parts shown in Fig. 3 with the eccentric shown at the other extreme of adjustment, whereby no relative movement will take place between thread guide and carrier bar.

In the drawings in which like numerals of reference indicate like parts, 1 refers to the frame of the spinning machine which supports the winding apparatus comprising the invention.

A pair of drive shafts 2—2 run lengthwise of the spinning machine and drive cross shafts 3 through the medium of gears 4 and 5.

The cross shafts 3 are mounted in bearing 6 of the frames 1. Mounted on the shafts 3 and rotating therewith are the spool holders 7 on which are mounted the winding spools 8.

Associated with the spools 8 are thread guides 9.

In order to obtain a cylindrical body of thread, the thread guide is reciprocated longitudinally across the surface of the spool as the latter rotates.

The thread guides 9 are secured to arms 9*a* pivotally mounted on a carrier bar 10 which slides over rollers 11 mounted in brackets 12. This carrier bar 10 has rigidly mounted thereon a gear casing 13, of which more will be said later. A bracket 14 connects the casing 13 with a rack 15 which is engaged by a pinion 16 keyed on a shaft 17 which is mounted in a protective casing 18. The shaft 17 and pinion 16 are oscillated by another pinion 19 engaged by a rack 20 carrying a follower roller 21 which moves in a heart-shaped cam track 22 of the cam 23.

The cam 23 is mounted on and driven by a drive shaft 24 and it is thus readily perceived how the carrier bar 10 is reciprocated by this cam driven rack mechanism. The apparatus so far described imparts uniform stroke lengths to the thread guide.

The thread guide arms 9*a* are mounted on the pivotal shafts 25 carried by the carrier bar 10 and adapted to pivot with the said shafts 25. The thread guides 9 and shafts 25 are oscillated through the medium of a crank arm 26 rigidly mounted on the shaft 25 which is link connected at 27 to an eccentric stud 28. The stud 28 is mounted on a collar 29 which is held in position on a second stud 30 by means of a set screw 31. This second stud 30 is also eccentrically mounted and is adapted to be rotated by a shaft 32.

The eccentric drive means comprises a drive shaft 33 which drives a shaft 34 through gears 35 and 36. The driven shaft 34 extends into and through bearings 37 in the gear casing 13 and bears a slidable relation thereto.

A bevel gear 38 is slidably mounted on the shaft 34 and within the casing 13. Keys 39 are mounted in said gear 38 and extend into slots 40 of the shaft 34 so that the gear 38 may be reciprocated along said shaft and yet be rotated thereby.

The gear 38 meshes with another bevel gear 41 within the casing 13, which gear 41 is mounted on the shaft 32 and rotates the said shaft, which shaft carries the eccentric stud 30 on the enlarged shaft end 42.

The pivotal shafts 25 on either side of the spinning machine are adapted to operate in unison. One means of doing this is illustrated in

Figure 1 of the drawings where crank arms 43 are rigidly mounted on said shafts and connected by a lever 44.

In order to easily and accurately adjust the swing of the thread guides 9 a novel crank arrangement is used which is disclosed in detail in Figures 3 and 4 of the drawings.

Figure 3 discloses the eccentric means adjusted to give the greatest oscillating arc, whereas Figure 4 shows the eccentric means so positioned that no oscillation will take place. By merely loosening the set screw 31, the eccentric collar 29 may be turned on the stud 30 to the desired position decreasing or increasing the distance of stud 28 from the center of rotation of the shaft 32 and so gauging the arc of oscillation of the thread guide 9 within very accurate and well defined limits.

In operation the thread guides 9 are reciprocated longitudinally past the faces of the spools 8 by the reciprocating bar 10 and further movement is given to the thread guides 9 by the eccentric mechanism mounted on the said carrier bar 10.

In Figure 1, in full lines, the thread guides 9 are shown at the center of the spools 8. The dotted line positions show the thread guides 9 at the limit of their pivotal swing in one direction and is indicated at the end of the stroke of the carrier bar 10 in both directions. Dot and dash lines illustrate the opposite of the pivotal positions of the thread guides 9.

In Figure 1 of the drawings, the yarn bodies are outlined in dotted lines on the spools 8. The central or cylindrical portion of the yarn body is designated by the numeral 45 and the beveled ends are indicated at 46. It will be noted that thread is always being received at the central portion thereby building the cylindrical part of the yarn body, because more thread is layed thereon. The extreme ends of the yarn body only receive the thread when the thread guides are at the extreme end of their pivotal arc simultaneously with the extreme end position of the reciprocatory movement of the carrier bar 10, which position least occurs of any of the intermediate positions. In this manner it is readily seen how the beveled ends of the yarn body are built up.

From the foregoing description, taken in connection with the accompanying drawings it is thought the complete construction, operation and advantages of my invention will be clearly apparent to those skilled in the art.

What I claim is:

1. In a device of the character described, in combination, a thread guide and a rotatable spool to receive thread directed by said guide, a thread guide carrier, means to reciprocate the carrier to thereby impart the desired cross wind of said thread on the spool, and an eccentric means continuously operated at a constant speed to impart an oscillating motion to said guide on said carrier.

2. In a device of the character described, in combination, a thread guide and a rotatable spool to receive thread directed by said guide, a thread guide carrier, means to reciprocate the carrier to thereby impart the desired cross wind of said thread on the spool, and an eccentric means continuously operated at a constant speed to impart an oscillating motion to said guide on said carrier, said eccentric means comprising an eccentric adjustably mounted on a second eccentric.

3. In a device of the character described, in combination, a thread guide and a rotatable spool to receive thread directed by said guide, a thread guide carrier, means to reciprocate the carrier to thereby impart the desired cross wind of said thread on the spool, and an eccentric means continuously operated at a constant speed to impart an oscillating motion to said guide on said carrier, said eccentric means comprising a stud eccentrically mounted and collar adjustably mounted on said stud and carrying another stud eccentrically mounted thereon.

4. In a device of the character described, in combination, a thread guide and a rotatable spool to receive thread directed by said guide, a thread guide carrier, means to reciprocate the carrier to thereby impart the desired cross wind of said thread on the spool, and means continuously operated at a constant speed to impart an oscillating motion to said guide on said carrier, said last mentioned means comprising a rotating shaft, means to rotate said shaft, means carried by said carrier and adapted to be endwise slidable on said shaft and rotated thereby, eccentric means operated by said last-mentioned means, said eccentric means operatively connected to said thread guide.

5. In a device of the character described, in combination, a thread guide and a rotatable spool to receive thread directed by said guide, a thread guide carrier, means to reciprocate the carrier to thereby impart the desired cross wind of said thread on the spool, and means continuously operated at a constant speed to impart an oscillating motion to said guide on said carrier, said last-mentioned means comprising a gear casing rigidly mounted on said carrier bar, a rotatable drive shaft extending through said casing in axially slidable relation thereto, a gear within said casing slidably mounted on said shaft and adapted to rotate therewith, a driven shaft mounted in said casing, a second gear fixedly mounted on said driven shaft and meshing with said first mentioned gear, an eccentric mounted on said driven shaft and rotated thereby, and means operatively connecting said eccentric with said thread guide.

6. In a device of the character described, in combination, a thread guide and a rotatable spool to receive thread directed by said guide, a thread guide carrier, means to reciprocate the carrier to thereby impart the desired cross wind of said thread on the spool, and means continuously operated at a constant speed to impart an oscillating motion to said guide on said carrier, said last-mentioned means comprising an eccentric mounted on said carrier and operatively connected to said thread guide, a rotating shaft, and means axially slidable on said shaft and rotated thereby adapted to drive said eccentric.

7. In a device of the character described, in combination, a thread guide and a rotatable spool to receive thread directed by said guide, a thread guide carrier, means to reciprocate the carrier to thereby impart the desired cross wind of said thread on the spool, and means to impart an oscillating motion to said guide on said carrier, said last mentioned means comprising an eccentric mounted on said carrier and operatively connected to said thread guide, a rotating shaft, and means axially slidable on said shaft and rotated thereby adapted to drive said eccentric.

8. In a device of the character described, in combination, a thread guide, a rotatable spool to receive thread directed by said guide, a thread guide carrier, means to reciprocate the carrier

to thereby impart the desired cross wind of said thread on the spool, and means to impart an oscillating motion to said guide on said carrier, said last mentioned means comprising a rotating shaft, and means axially slidable on said shaft and rotated thereby adapted to oscillate said guide.

9. In a device of the character described, in combination, a thread guide, a rotatable spool to receive thread by said guide, a thread guide carrier, means to reciprocate the carrier to thereby impart the described cross wind of the thread on the spool, and means to impart an oscillating motion to said guide on said carrier, said last mentioned means comprising a rotatable shaft, means for rotating said shaft, means rotated by said shaft and adapted to oscillate said guide, said rotating shaft being fixed against longitudinal movement relative to one of said means and axially slidable relative to the other of said means.

10. A device as defined in claim 1 in which said eccentric means includes means to vary the eccentricity of said eccentric means.

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