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THREAD CUTTER FOR BOBBIN WINDERS

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2 SHEETS—SHEET 1

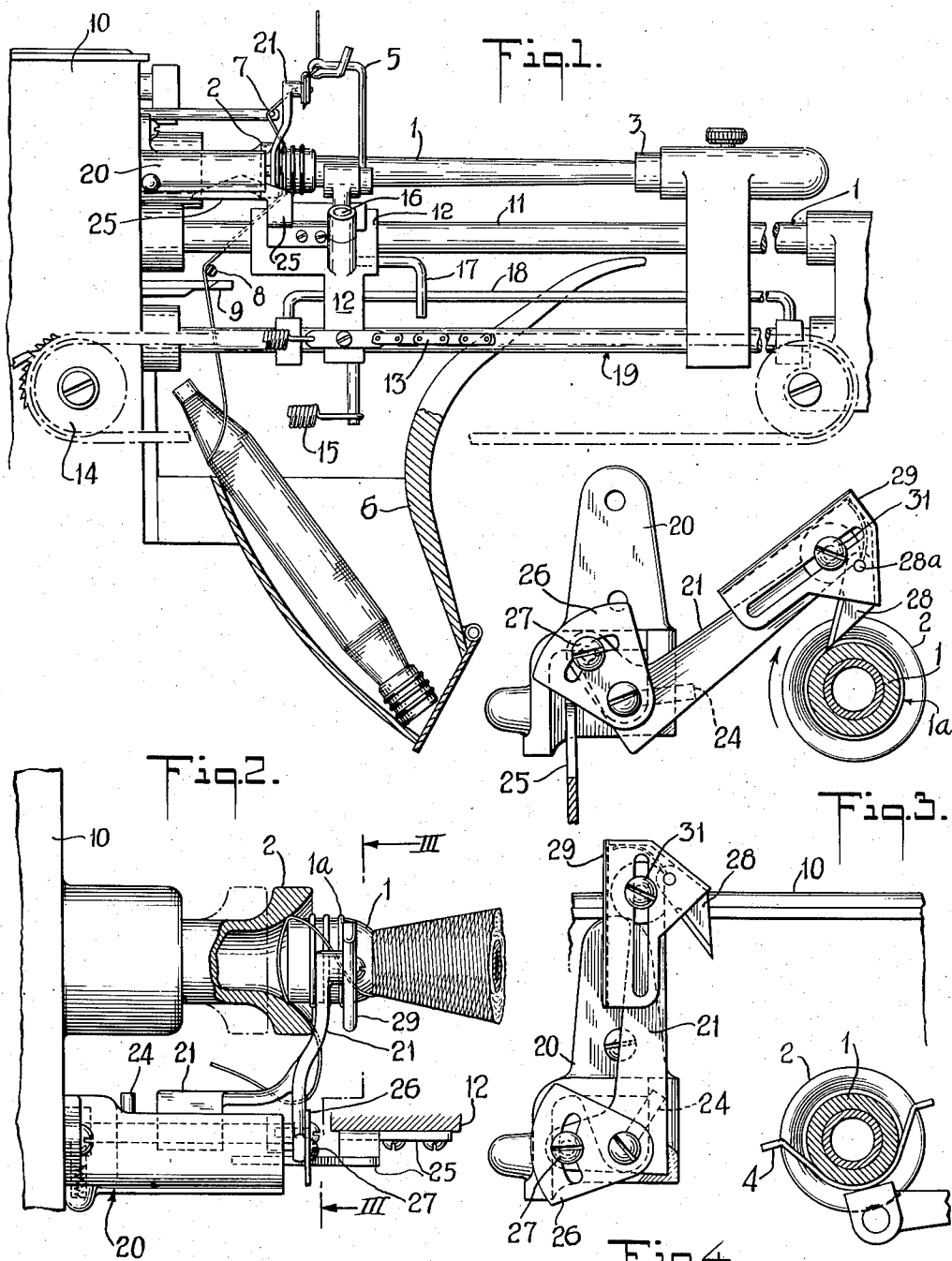


Fig. 4.

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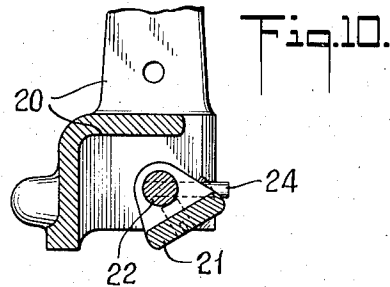
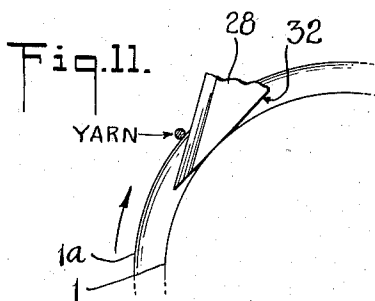
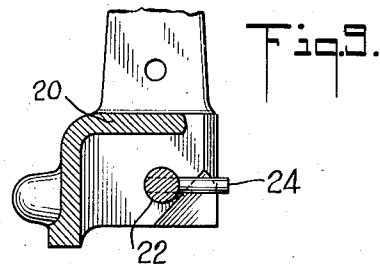
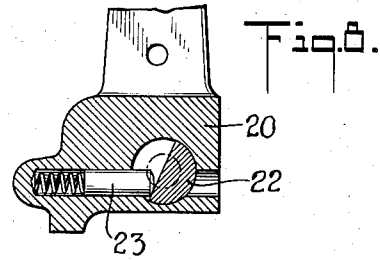
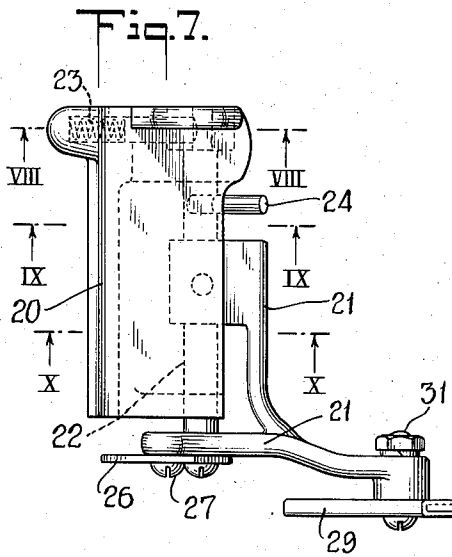
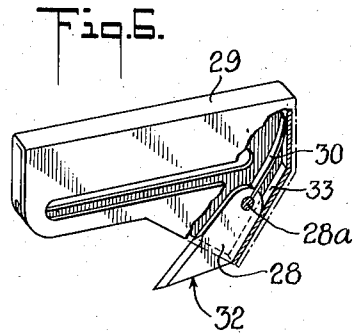
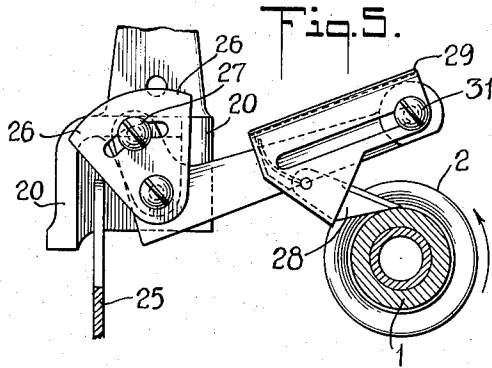
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2 SHEETS—SHEET 2



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THREAD CUTTER FOR BOBBIN WINDERS

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9 Claims. (Cl. 242—19)

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This improvement relates to the removal of the so-called scrap ends of yarn from bobbins in automatic bobbin-winders. The scrap end is the piece of yarn initially used for attaching the yarn to the bobbin in order to start the winding of it thereon. It is considered objectionable if left hanging on the discharged bobbin. The attachment of the end of yarn to the bobbin is commonly done by causing it to be pinched between the butt end of the bobbin and the chuck in which it is held and by which it is rotated, the scrap end being the length of yarn which extends more or less axially of the bobbin, as from the point of pinching, running over the butt to the beginning of the mass of yarn wound on the stem part of the bobbin. Where it crosses the butt this yarn lies over one or more ridges or shoulders thereon. Heretofore its removal has been accomplished by mechanism which advanced the point of a knife into the path of the yarn adjacent such shoulder, where the yarn stands off from the bobbin, and without touching the bobbin, thus causing the yarn to be cut by its own movement against the knife. Such method of cutting calls for an extremely close adjustment of the advancing stroke given to the knife in order that it will cut the yarn without cutting and thereby injuring the bobbin.

This invention eliminates the need for such delicate stroke adjustment and accomplishes this object by so organizing the knife and its holding means that contact of the knife with the bobbin may occur, but without any resulting injury, and the invention also offers further advantages as will appear below, including facilities whereby the knife can be quickly accommodated to use with bobbins that are wound by rotation in the opposite direction to that which is ordinary.

The accompanying drawings show a preferred form of the invention applied to a standard winding machine showing no more of the latter than is necessary to illustrate the relation of the invention to it.

Fig. 1 is a side elevation of the principal parts of such winding mechanism with the invention applied;

Fig. 2 is a plan of the knife arrangement on a larger scale;

Fig. 3 is a section of Fig. 2 on line III—III;

Fig. 4 is the same view with the knife retracted;

Fig. 5 is a view similar to Fig. 3 with the knife reversed in position;

Fig. 6 is a detail of the knife holder;

Fig. 7 is a plan of Fig. 5;

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Figs. 8, 9 and 10 are respectively sections on the correspondingly numbered lines of Fig. 7, and Fig. 11 is a diagram.

The standard machine on which the invention is shown functions as follows: The bobbin 1 is held between rotary head and tail centers or chucks, 2 and 3, of which the head chuck 2 rotates thereby to rotate the bobbin, being also retractable to release it when the winding has been completed. Empty bobbins are brought into line between head and tail chucks by a carrier 4, which recedes as soon as the head chuck has advanced so as to clamp the bobbin in position between itself and the tail chuck. As the bobbin rotates, the yarn is guided to it by the oscillating yarn-guide 5, which is slowly advanced along the length of the bobbin to lay a filling wind. When the bobbin has become fully wound the chuck 2 withdraws, thereby allowing the bobbin to drop into the chute 6 below, where it is retained momentarily while the hooks 7 and 8 grasp the yarn trailing from it and draw it into the action of the shears 9 and also over the face of the now stationary chuck 2, where it will be pinched between the chuck and the next arriving empty bobbin. When the yarn has been thus pinched, the shears 9 sever it from the bobbin in the chute and the bobbin is then allowed to escape to a place of deposit.

The means for operating all of these parts, as well as others not shown, are contained within a casing 10 and do not need to be described because they form no part of this invention and such mechanisms are quite well known in the art.

The casing 10 forms the support of the horizontal slideway rod 11 on which the carriage 12 of the thread-guide travels in the process of winding, such rod being parallel to the bobbin. The carriage is advanced by a chain 13 driven by a pawl operated sprocket wheel 14 mounted on the exterior of the casing and against the tension of a spring 15, which retracts the carriage to its starting point when the winding has been completed. The yarn-guide 5 is an arm on an upright rock-shaft 16 journaled in the carriage 12 with a crank arm 17 for engagement by a rocker arm 18 on a rock-shaft 19 extending parallel to the travel of the carriage. The rocking of the arm 18 oscillates the thread-guide, while it travels along the slideway rod, thereby producing a filling wind. This mechanism also is standard in the machine referred to.

According to this invention the means for cutting off the scrap end comprises a bracket 20, ap-

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appropriately fixed to any appropriate support such as the casing 10 and forming the journal support for a knife-supporting member such as the knife arm 21 which moves or swings thereon to and from the bobbin. In the present case this arm is fixed on an axle 22 journaled in the bracket 20 and is under the influence of a spring or a spring plunger such as 23 tending to rotate the axle and swing the knife arm away from the bobbin, its motion away from the bobbin being limited by a stop finger 24, or in any other way.

The arm is moved toward the bobbin by the action of a cam plate 25, which in this case is formed on or affixed to the thread-guide carriage 12. This cam plate rides under and engages the lower edge of an adjustable crank arm, in the form of a segment 26 adjustably fixed to the knife arm, or its axle 22, thereby swinging the free end of the arm toward the bobbin. The adjustability of the segment is for locating the stroke of the knife arm so that it will make a proper approach to the bobbin. It is accomplished by means of the arcuate slot in the segment and the set screw 27 as will be clear in the drawing.

The knife 28 is movably carried on the end of the knife arm and by means permitting its adjustment to a particular position thereon with relation to the rotating bobbin. For this purpose it is movably or pivotally mounted in a holder 29 and is therein subject to the action of a very light spring 30. The holder is made adjustable on the end of the arm by means of the slot and screw attachment 31, or in any way, and can be set so that when the knife has reached its closest point of approach to the bobbin it will, or may, encounter the bobbin but only by its smooth lower (non-cutting) edge 32, and then only very lightly, because of the slenderness of the spring 30. In this position of contact the sharp point of the knife will be spaced slightly away from the bobbin surface so that it cannot scratch or cut it, but not so far but that it can ride under the yarn passing over the adjacent bobbin shoulder (1a) and thereby sever it. The relation (and the yarn being slightly spaced from the surface of the bobbin at this point as it were, by reason of passing over the shoulder 1a) is illustrated in magnified scale in Fig. 11, wherein it will be clear that the contact of the knife against the bobbin occurs just back of the knife point, on the lower edge or sole of the blade which is non-cutting. The inner face of the sloping wall 33 of the knife holder 29 forms a back stop against which the spring 30 normally urges the knife 28 but when the non-cutting edge 32 of the knife 28 engages the bobbin, the spring 30 allows the knife 28 to be moved away from the back stop 33. The spring 30 thus holds the knife 28 in position regardless of variations in the diameters of different bobbins and permits self-adjustment of the knife 28 to irregularities or deformations in individual bobbins. The rotation of the bobbin carries the yarn against the sharp edge of the knife above its point, and the severed yarn falls away to be disposed of by simple gravity or otherwise as desired. As shown in the drawing the yarn-cutting or sharp edge of the knife faces away from the bobbin. Since the knife 28 engages the bobbin, the bobbin supports the knife 28 against the thrust of the yarn against the knife.

At the same time the construction described obviously permits an adjustment of the knife so that it will catch and cut the yarn without advancing so far as to have any contact whatever with the bobbin and as in prior devices, in which

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case the virtue of this invention is that in the event of an overthrow of the arm, from any cause, or a slightly wider or deformed bobbin, no possible injury can occur to the latter. In such case the knife touches the bobbin only with its bottom edge and is thereby caused to rock on its pivot (28a) so as to swing its point still further away from the bobbin, the pressure of contact being no more than that caused by the very light spring 30.

By the use of a knife holder which is symmetrically shaped, the invention has the further advantage that the device can be very readily accommodated to bobbins which are rotated in the reverse direction to that indicated. This is done by simply removing and reversing the position of the holder 29 on the end of the knife arm as indicated in Figs. 5 and 7.

As a matter of constructional detail, the supporting bracket 20 is shaped box-like to form a roof or closure over the axle 22 and over the knife-actuating cam 25 on the thread-guide carriage, when the latter is near the rotary chuck, thus protecting these parts against the lodgment thereon of the severed scrap end, which might interfere with the action. The particular method of mounting the knife on or in the knife holder is obviously subject to variation so long as the knife is supported so that its first contact with the bobbin, when it has such contact, is by its smooth non-cutting edge 32 and not by its sharp point, and preferably also so that it can yield and therefore cannot bear very hard on the bobbin in any event. Movement of the knife carrier toward or from the bobbin can of course be spring actuated in either direction and in the other direction by any convenient part of the mechanism, but preferably by a cam on the carriage as shown. Also, the knife can be advanced to sever the scrap end at any time after winding has started and before ejection. When it is actuated by the thread-guide carriage it makes its functioning stroke shortly after the winding begins.

I claim:

1. In an automatic bobbin winder of the kind in which the yarn is attached to the bobbin for winding by being pinched between the end of the bobbin and a chuck, means for removing the scrap end thus produced comprising a knife-carrying member provided with means for advancing the knife into contact with the bobbin after winding has commenced, a knife having a smooth non-cutting edge back of its point and mounted on said member so that any contact of it with the bobbin is by said smooth edge rather than the point, said knife being located to intercept and cut the yarn on the bobbin where it is slightly spaced from the surface thereof, and a resilient mounting for securing said knife on said carrier, said mounting permitting relative movement between said knife and said carrier when the knife is pressed to said bobbin.

2. The combination of claim 1 in which the resilient mounting includes a spring which limits the pressure which the knife can exert on the bobbin when in contact therewith.

3. The combination of claim 1 in which the resilient mounting includes a pivot for the knife and a light spring engaging the knife, said knife being arranged to rock on its pivot against such spring on any contact with the bobbin.

4. In an automatic bobbin winder of the kind in which the yarn is attached to the bobbin for winding by being pinched between the end of the bobbin and a chuck, means for removing the scrap end thus produced comprising a sup-

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port, a knife arm pivoted thereon, mechanism for swinging the arm toward the bobbin after winding has commenced and a knife yieldingly mounted on the free end of said arm adapted to be encountered by and to sever the yarn constituting said scrap end, the knife being yieldingly mounted on the free end of the arm to yield with respect thereto in a direction substantially radial to said chuck.

5. In an automatic bobbin winder of the kind in which the yarn is attached to the bobbin for winding by being pinched between the end of the bobbin and a chuck, means for removing the scrap end thus produced comprising a knife-supporting member, means for advancing such member toward and from the bobbin, a knife holder adjustably affixed to said member and a knife yieldingly mounted in said holder and having a non-cutting edge for contact with the bobbin.

6. In an automatic bobbin winder of the kind in which the yarn, at the beginning of the winding, extends substantially axially of the bobbin at the butt end of the bobbin, means for removing the scrap end thus produced comprising a knife having a yarn-cutting edge facing substantially away from the bobbin and a substantially smooth non-cutting edge facing toward the bobbin to engage the bobbin should the bobbin and knife contact each other, and means to move the knife toward and from yarn-severing position, characterized by the fact that a spring is provided between said moving means and knife to hold the knife toward the bobbin yieldingly.

7. In an automatic bobbin winder of the kind in which the yarn, at the beginning of the winding, extends substantially axially of the bobbin at the butt end of the bobbin, means for removing the scrap ends thus produced comprising a knife having a yarn-cutting edge facing substantially away from the bobbin and a substantially smooth non-cutting edge facing toward the bobbin to engage the bobbin should the bobbin and knife contact each other, and means to move the knife toward and from yarn-severing position including an oscillating arm on which the knife is

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mounted, said knife being mounted movably on said arm to yield when the knife strikes the bobbin.

8. In an automatic bobbin winder of the kind in which the yarn, at the beginning of the winding, extends substantially axially of the bobbin at the butt ends of the bobbin, means for removing the scrap end thus produced comprising a knife having a yarn-cutting edge facing substantially away from the bobbin and a substantially smooth non-cutting edge facing toward the bobbin to engage the bobbin should the bobbin and knife contact each other, and means to move the knife toward and from yarn-severing position, said means including an oscillating arm on which the knife is mounted movably for movement on the arm toward and from the bobbin, and a spring on the arm urging the knife toward the bobbin.

9. In an automatic bobbin winder of the kind in which the yarn is attached to the bobbin for winding by being pinched between the end of the bobbin and a chuck, means for removing the scrap end thus produced comprising a knife-carrying support movably mounted for movement toward and from the bobbin, a knife-holder adjustably fixed to said support and a knife mounted in said holder, characterized by the fact that said holder is reversible, end for end, on said support to face the edge of the knife in opposite directions at the holder, thereby accommodating reverse bobbin rotations.

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