April 24, 1956 W. SCHWEITER 2,743,062

DEVICE FOR UNWINDING THE THREAD WASTE FROM EXHAUSTED TUBES AND BOBBINS

Filed Feb. 9, 1951 3 Sheets-Sheet 1

Fig. 1

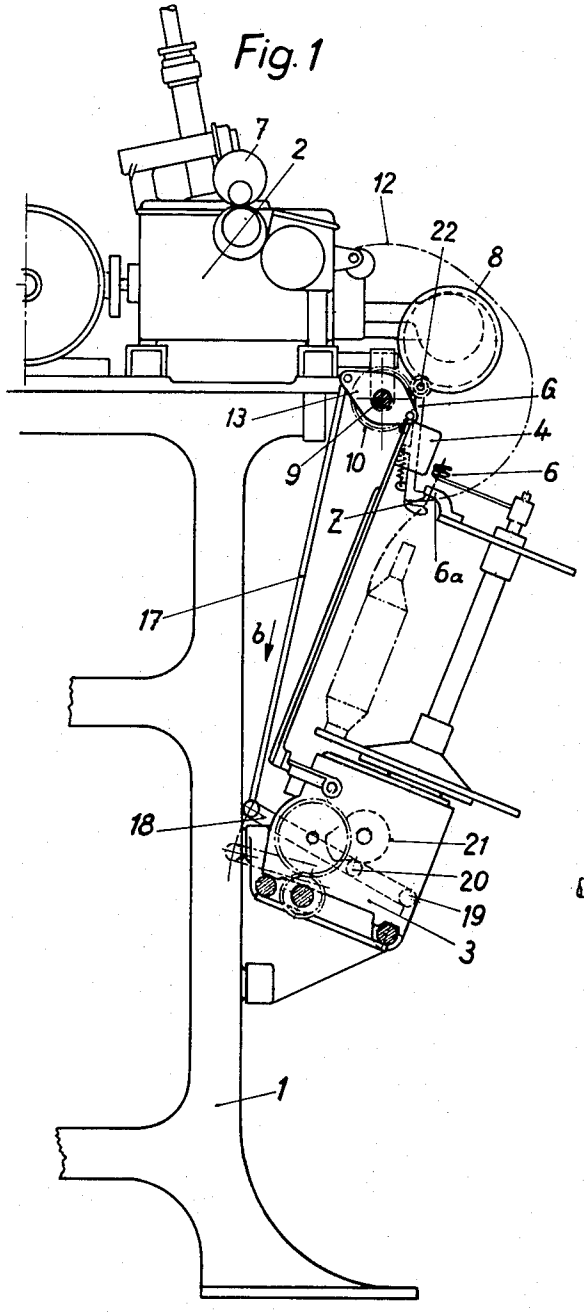
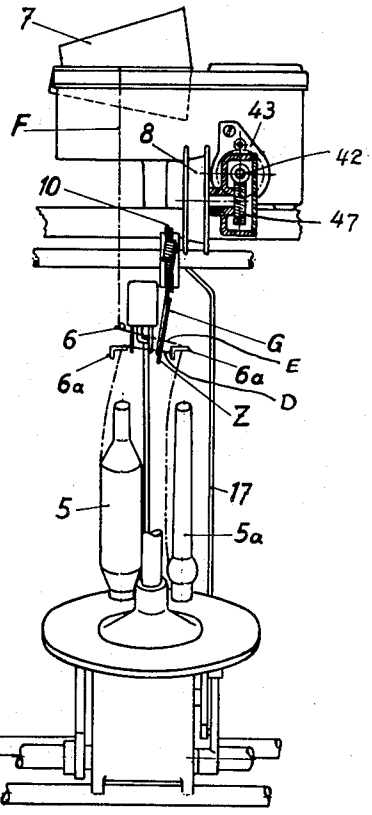


Fig. 2



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Filed Feb. 9, 1951 3 Sheets-Sheet 2

Fig. 11

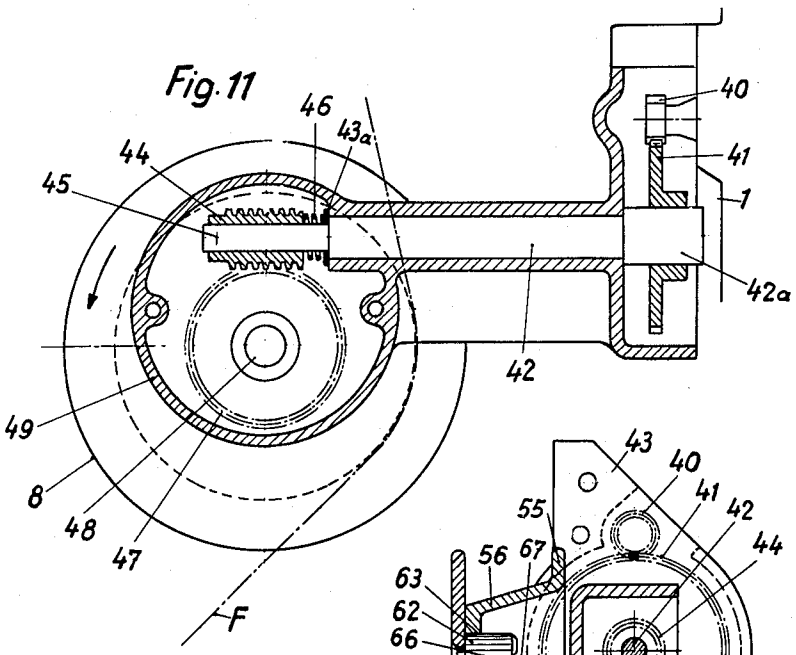
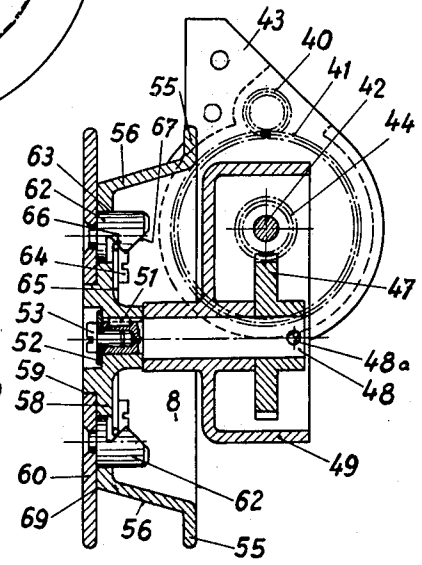


Fig. 10



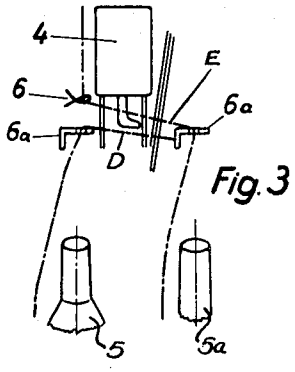


Fig. 3

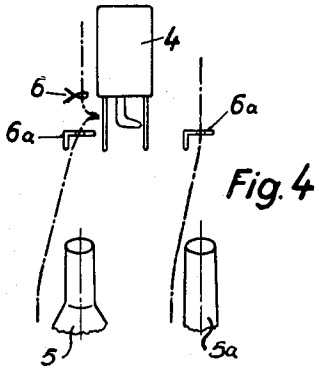


Fig. 4

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April 24, 1956 W. SCHWEITER 2,743,062

DEVICE FOR UNWINDING THE THREAD WASTE FROM EXHAUSTED TUBES AND BOBBINS

Filed Feb. 9, 1951 3 Sheets-Sheet 3

Fig. 5

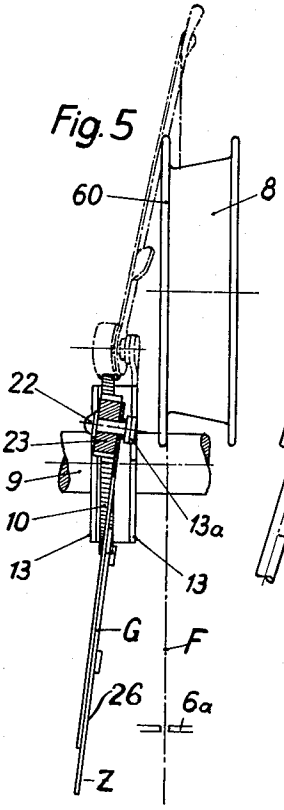


Fig. 6

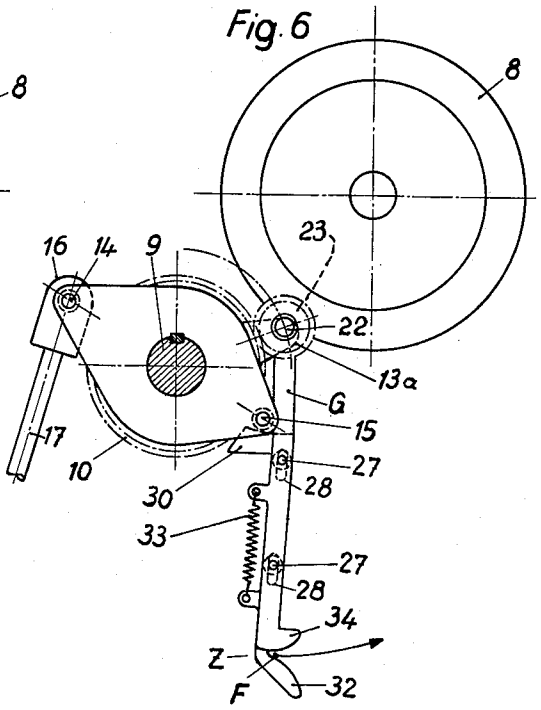


Fig. 7

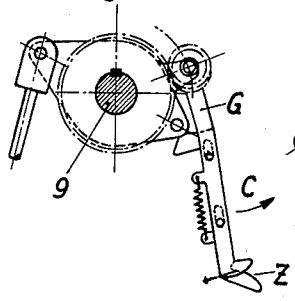


Fig. 8

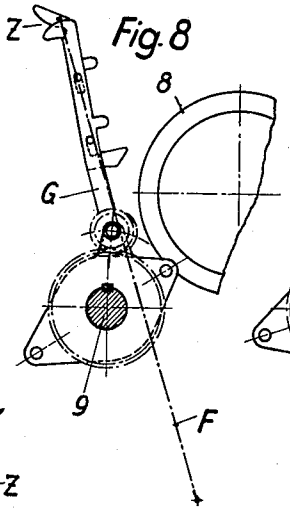
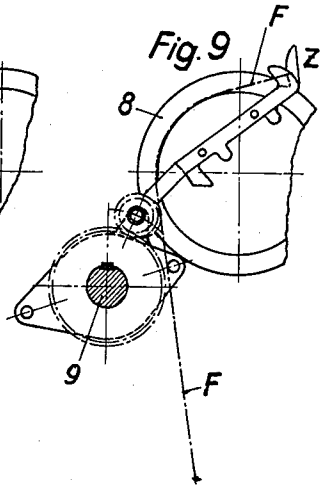


Fig. 9



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United States Patent Office 2,743,062 Patented Apr. 24, 1956

2,743,062

DEVICE FOR UNWINDING THE THREAD WASTE FROM EXHAUSTED TUBES AND BOBBINS

Walter Schweiter, Horgen, Switzerland, assignor to Schweiter Ltd., Horgen, Switzerland, a corporation of Switzerland

Application February 9, 1951, Serial No. 210,116

Claims priority, application Switzerland February 17, 1950

13 Claims. (Cl. 242—18)

The present invention relates to unwinding thread, yarn, etc. from tubes, bobbins, pirns, spindles, etc., and rewinding the thread, yarn, etc. into larger packages containing as a single length the contents of two or more of the packages that are unwound. More especially it relates to unwinding the thread waste of the exhausted or unwound tubes, bobbins, etc., i. e. remnants of initial packages (of whatever form they may be) that are left after the major parts of their contents are unwound and rewound into the larger packages (of whatever form the latter may be). For clearing spinning and doubling tubes and weft pirns of thread reserves and residual turns of thread special-purpose machines of various designs are known. The majority of these machines are so arranged that the threads are wound on to a drum having a longitudinal slit, are cut apart through said longitudinal slit, and removed. The tubes, pirns or bobbins have to be collected and conveyed to these machines, and the latter require attendance, for which work special labour is necessary.

The object of the present invention is to enable the thread waste to be automatically wound off immediately subsequent to the unwinding of the tube or bobbin. The invention resides in the fact that there is arranged on an unwinding machine, in the space between the bobbin, tube or pirn to be unwound and the bobbin, tube or pirn to be wound, a thread waste take-up drum rotating with the winding apparatus, and that means are provided to seize the leading end of the cut-off remnant of yarn of the exhausted bobbin, tube or pirn above one of the traversing thread guide eyelets and to convey it to the thread waste take-up drum.

The transfer of the leading end of the thread remnant to be unwound is preferably effected by a snatch arm operated by mechanisms appertaining to the bobbin, pirn or tube unwinding apparatus, at the moment when said apparatus operates the piecing or knotting apparatus. Other means are also possible, however, such as suctional devices or blowers, which guide the thread to the waste thread take-up drum.

The annexed drawings illustrate a typical embodiment of the invention. In the drawings:

Fig. 1 shows the device arranged on a rewinding machine, in lateral elevation,

Fig. 2 is a view of a part of the mechanism of Fig. 1, looking downwardly in the direction of the arrow *b*,

Fig. 3 shows the thread guides and the piecing apparatus before piecing up,

Fig. 4 shows the thread guides and the piecing apparatus after piecing up,

Fig. 5 is a front elevation of the thread intercepting device, and the waste take-up drum.

Fig. 6 is a lateral elevation of the mechanism of Fig. 5,

Figs. 7 to 9 show the thread interceptor in three different positions,

Fig. 10 shows the thread waste take-up drum in cross-section, and

Fig. 11 is a detail of the drive for the thread waste take-up drum.

Secured to the frame **1** are a winder **2** and an unwinding apparatus **3** with an appurtenant thread piecer, knotter or thread-tying mechanism **4**. In unwinding a bobbin, the bobbin is held at the position **5** and its thread (except for, say, the reserve or residual turns) is drawn off through an eyelet **6***a* and the fixed eyelet **6** and is wound on the receiving bobbin **7**. When, say, only the reserve or residual of the thread remains on the bobbin being unwound, this bobbin is passed from the position **5** to position **5***a*, and it is replaced at position **5** by the filled bobbin which is to be unwound next (Figs. 2 and 3). Also the free end of the thread of this second or following bobbin is tied by the piecer or knotter **4** to the thread of the preceding bobbin (Fig. 4) so that the thread of this second bobbin to deliver thread will be wound on the receiving bobbin **7** as a continuation of the thread of the bobbin first unwound. Succeeding bobbins to deliver thread, i. e. to be unwound and rewound on the bobbin **7** (and successive bobbins placed at **7**), follow in the same manner. During its unwinding operations, each of the delivering bobbins has an eyelet **6***a* allocated to it, and this eyelet passes with its bobbin from position **5** to position **5***a* (Figs. 2 and 3). Sometime before the unwinding of a fresh bobbin begins, the free end of its thread is not only passed through its eyelet **6***a*, but also is attached to the eyelet **6***a* of the bobbin ahead of it (Figs. 2 and 3), and the eyelets **6** and **6***a* are so disposed that before the unwinding of a bobbin starts the two reaches of the threads, i. e. D reaching from one eyelet **6***a* at the unwinding station **5** to the eyelet **6***a* ahead of it at the station **5***a* and E reaching from the latter eyelet **6***a* to the fixed eyelet **6**, lie somewhat side by side as it were (Fig. 3). The piecer or knotter **4** acts on these two reaches E and F to tie them together and cut at least the reach E, between the knot and the eyelet **6***a* at the position **5***a* (Fig. 4). All the foregoing will be understood from prior unwinding practices. The winder or winding head **2** and the piecer or knotter **4** may be of any one of various types as will be understood. Likewise the particular form of the unwinding apparatus is not material to the present invention. The particular unwinding apparatus partly illustrated in the drawings is shown and described more completely in my Swiss patent No. 280,139 and in my copending application for U. S. patent Serial No. 750,663 filed on or about May 27, 1947, now Patent No. 2,640,654.

In accordance with the present invention and, say, in about the space between the thread piecer or knotter **4** and the receiving bobbin **7**, a drum **8** is provided to take and wind off the thread composing the reserve or residual turns, so-called, of each bobbin at position **5***a*, i. e. the remnant of thread that is left on each bobbin after its thread has been pieced or tied at **4** to the thread of the next bobbin to be unwound behind it, and after the reach E has been cut. The drum **8** is arranged to be driven (rotated) (Figs. 2, 10 and 11) by the winder **2**. Also a snatch arm G is provided to seize the cut end of the remnant, residue or residual turns, and carry it to within reach of the drum **8**.

To this latter end a rod **9** is secured to the frame **1** and on this rod a gearwheel **10** with skew teeth is rigidly mounted. On either side of this non-rotating gearwheel **10**, plates **13**, Figs. 5–9, are pivotally mounted on the rod **9** and connected together by spacing bolts **14** and **15**. Mounted on the bolt **14** is the eye **16** of the rod **17**, which is connected to a lever **18**, Fig. 1, pivotally mounted on the pivot **19** in the unwinding apparatus **3**. The lever **18** is provided with a roller **20**, and an eccentric cam **21** is provided on the unwinding apparatus **3**, which

cam turns when the bobbins are changed i. e. when a filled bobbin is advanced to position 5 and a substantially unwound bobbin is carried to 5*a* and forces the lever 18 downwards with the result that the plates 13 are swivelled on the rod 9 by the rod 17. One of the plates 13 is provided with a lug 13*a*, Figs. 5 and 6, to which the bolt 22 is secured on which the snatch arm G swivels. This snatch arm engages each thread remnant and moves from adjacent each delivery package to adjacent the waste drum 8 to deliver the leading or free ends of the wastes or remnants to that drum. The hub 23 of the snatch arm G is provided with straight teeth which engage with the skew teeth of the gearwheel 10. The bolt 22 is accordingly secured to the lug 13*a* at an oblique angle corresponding to the angle of skew of the teeth of the gearwheel 10. When the plates 13 are swivelled in the manner described, the hub 23 of the snatch arm G rolls along the toothing of the gearwheel 10, and as a result of the oblique mounting of the snatch arm G, the nippers Z of the latter perform a helicoidal movement in the course of which is shown by the dot-dash line 12 in Fig. 1. The construction and operation of the snatch arm G and its nippers Z is illustrated in greater detail in Figs. 5 to 9. Secured to the snatch arm G by the screws 27 is a slide link 26 so that the nippers Z may be controlled; said screws 27 project through the slots 28 which permit link 26 to slide on G. The slide link 26 has a projection 30 and a nose 32. The slide link 26 is drawn by the spring 33 in the direction of the hub 23, when the spring is permitted to do so, so that the thread at E can be nipped between the nose 32 of the slide link 26 and the nose 34 of the snatch arm G. These two noses 32 and 34 together constitute the nippers Z. In the inoperative position of the snatch arm G, Figs. 2, 5 and 6, the nose 30 rests on the distance bolt 15, so that, as shown in Fig. 6, the nippers Z are open. The movement of the rod 17 takes place at the moment when the piecer 4 has pieced on the thread of a new bobbin and has cut off with the aid of cutters the thread of the exhausted bobbin, to call it such, which is standing at position 5*a*. As soon as the rod 17 begins to travel in the direction of the arrow *b*, Fig. 1, the snatch arm G swivels anticlockwise in the direction of the arrow C, Fig. 7, and the projection 30 slides off the distance bolt 15 with the result that the spring 33 becomes operative and closes the nippers Z, which grip the thread of the exhausted bobbin at E and carry it along as at F (Figs. 5 and 8). Owing to the fact that the bolt 22 on which the snatch arm G swivels stands at an oblique angle to the rod 9, the thread F gripped by the nippers slides across a face of the drum until, as shown by the dot-dash line in Fig. 5, it snaps to a position behind the rim 60 of the drum 8, so that on the return motion of the snatch arm as shown in Fig. 9 the thread is nipped between the drum 8 and its cover plate 60. As the drum 8 begins to rotate because the thread of the new, full bobbin is pieced on and the winder is set in motion again, the waste thread of the exhausted bobbin is in this way wound on to the drum 8.

Figs. 10 and 11 illustrate the drive of this take-up drum 8 and the design of said drum. The pinion 40 projects from the side of the winding apparatus 1 and as indicated above and from what follows hereafter, is rotated by the mechanism of the winding apparatus 2 as the receiving bobbin 7 is rotated. This pinion 40 engages with a gearwheel 41 mounted on the shaft 42, which is in turn mounted in the bracket 43 screwed to the side of the frame 1. Likewise secured to the shaft 42, by means of a pin 45, is a worm 44. Preferably, a helical spring 46 is arranged between the abutment face 43*a* and the worm 44, which spring forces the shaft 42 towards the left, Fig. 8, until the collar 42*a* of the shaft engages a part of the casing, Fig. 8. The wormwheel 47, which is secured to the shaft 48 by the pin 48*a*, engages with the worm 44. The shaft 48 is mounted in the casing 49 of the bracket 43 and carries the waste yarn take-up drum 8 on the end of it which projects from the casing 49 (Fig. 10). There is no bearing for this end of the shaft 48 so that the drum is supported floatingly as it were, i. e. in an overhanging manner (Figs. 2 and 5). Conveniently the drum is attached to the shaft by a key 51, washer 52 and screw 53, and is provided with a projecting rim 55 at one end of it, an intermediate conical portion 56 and an end face plate 58 at the opposite end. The end faceplate 58 is shouldered and the plate or rim 60 is centred on the shoulder 59. Riveted into the plate or rim 60 are two bolts 62 which project into the drum 8 through openings 63 in the end faceplate 58. On the inner side of the end faceplate 58, spring wires 65 are secured by screws 64, which spring wires snap into the notches 66 in the bolts 62. In front of the notch 66 of each bolt 62 is an oblique guide face 67 along which the springs 65 slide when the bolts 62 are inserted and opposite 67 is a similar oblique or inclined face along which the springs 65 slide when the bolts 62 are pulled out of the openings 63 (Fig. 10). Thus the plate 60 can be slipped onto and pulled off the end faceplate of the drum 8. The conical or tapered portion 56 of the drum 8 is markedly rounded at the point where it merges into the end faceplate 58, so that a gap is formed at 69 in which the yarn F is nipped when it slides down the taper portion. If yarn ends are already wound on the conical portion 56, the adhesion of the new yarn to the yarn already wound on is sufficient to wind on the new yarn end. When the space between the rim 55 of the drum 8 and the plate or rim 60 is filled with yarn waste, the drum 8 can be stopped by hand so as to enable the thread ends wound on it to be removed. When the drum 8 is held stationary in this way, the worm 44 screws to the right against the pressure of the spring 46, and the gearwheel 41 is brought out of engagement with the gearwheel 40, with the result that the drive of the drum 8 is interrupted. The plate 60 can now, since the drum 8 is floatingly mounted, be pulled off and the entire coil of wound waste threads removed from the conical portion 56.

In certain cases it is found advantageous to remove the threads from the drum 8 in a cut condition. For such cases the plate 60 and the drum 8 are made with a transverse slit, so that the waste threads wrapped round the drum can be cut apart with a knife in the customary manner. In this case the plate 60 need not be removed.

The snatch arm arrangement for seizing the cut-off waste thread end and transferring it to the drum is merely one of a variety of possible arrangements. It would also be possible to intercept the waste thread end and transfer it to the drum by means of a suctional device or a blower.

It is to be understood that the term "bobbins" in the claims, includes not only such articles as may be called bobbins, but tubes, pirns, spindles and cones also, and in general any device or article on which a mass of wound thread may be wound, or held during the unwinding operation.

Various changes and modifications may be made without departing from the spirit and scope of the present invention and it is intended that such obvious changes and modifications be embraced by the annexed claims.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent, is:

1. A device for unwinding packages of thread and rewinding the same, having an unwinding unit and a winding unit, characterized by the fact that a thread take-up drum for the remnant thread of unwound packages is provided and a seizing mechanism is provided to convey the leading ends of the thread remnants of packages positioned substantially at their unwinding positions to said drum.

2. The subject matter of claim 1, characterized by the fact that said drum is located between said winding unit

and said unwinding unit, and is driven by said winding unit.

3. In a device for unwinding packages of thread and rewinding the same having mechanism to support a package of thread to be unwound and a winding unit, the combination with said mechanism and unit of a thread take-up drum for the remnant thread of unwound packages and an arm to engage the remnants and movable from a thread-engaging position adjacent a position of incompletely unwound packages on said package-supporting mechanism to adjacent said drum to deliver the end portions of remnants to the drum.

4. A device as claimed in claim 3, characterized by the fact that the arm conveys the thread to a point rearward of the said drum and that on the return movement of the arm the latter draws the thread over the drum.

5. A device as claimed in claim 3, characterized by the fact that the drum is provided with an edge plate that is removable, so that the remnant thread on said drum may be removed in the form of a coil.

6. A device as claimed in claim 5, characterized by the fact that the drum is conical in shape.

7. A device as claimed in claim 5, characterized by the fact that the drum decreases in diameter in the direction of the removable edge plate and at the constricted end is provided with a thread-nipping slit between said drum and said removable edge plate.

8. The subject matter of claim 3 characterized by the fact that said drum is an overhanging drum.

9. A device as claimed in claim 3 characterized by the fact that the arm is provided with controlled nippers to engage and grasp said end portions of the remnants.

10. A device as claimed in claim 3 characterized by the fact that the arm is provided with a non-controlled thread clamp.

11. A device as claimed in claim 9 characterized by the fact that the arm is mounted at an oblique angle to the axis of the drum so that its nippers perform a helicoidal movement.

12. A device as claimed in claim 11, characterized by the fact that actuation of the arm is effected by the mutual engagement of a straight-toothed gearwheel and a skew-toothed gearwheel.

13. In a device for unwinding packages of thread and rewinding the same, a winding unit, means to unite the starting end portion of the thread of a package to be unwound to a thread of an incompletely unwound package extending from said winding unit, means to sever the thread of said incompletely unwound package, a take-up drum for the remnant of thread remaining on the incompletely unwound package, and means to carry the leading end portion of said remnant to said drum.

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