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THREAD SEVERING AND BRUSHING APPARATUS

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Fig. 1

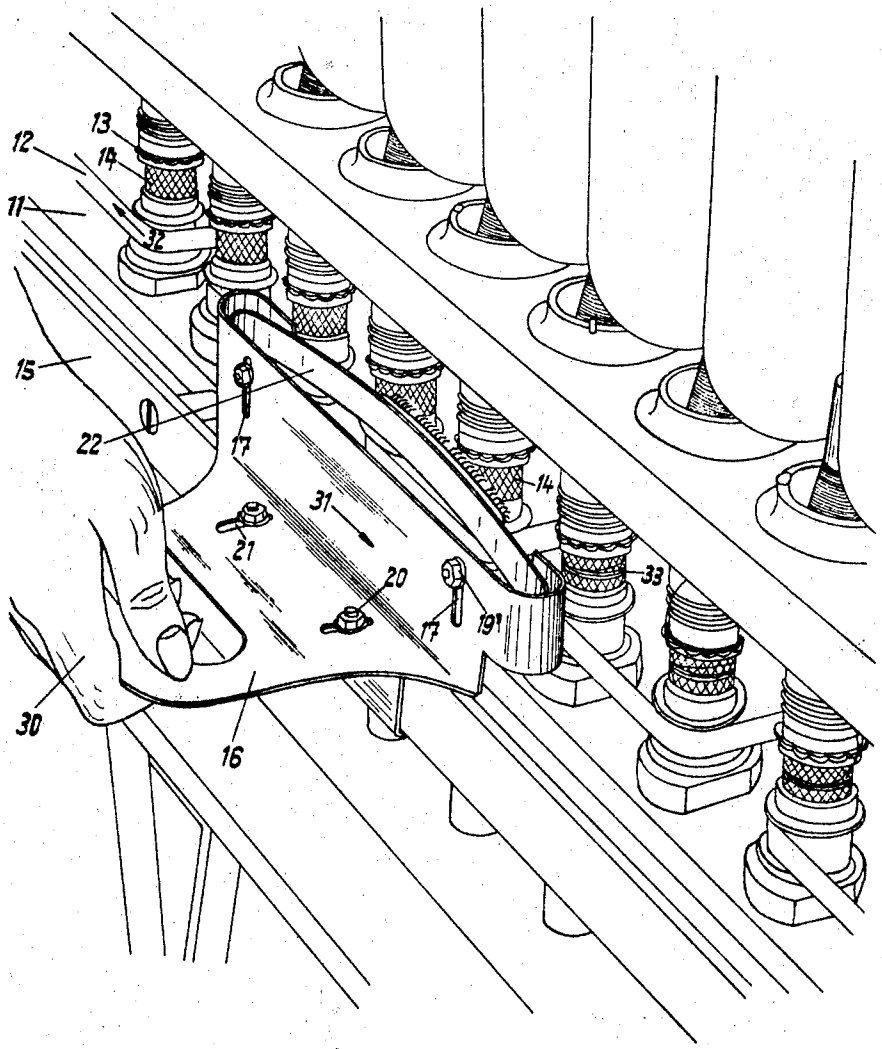

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Fig. 2

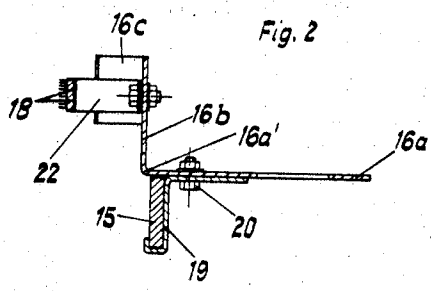


Fig. 3

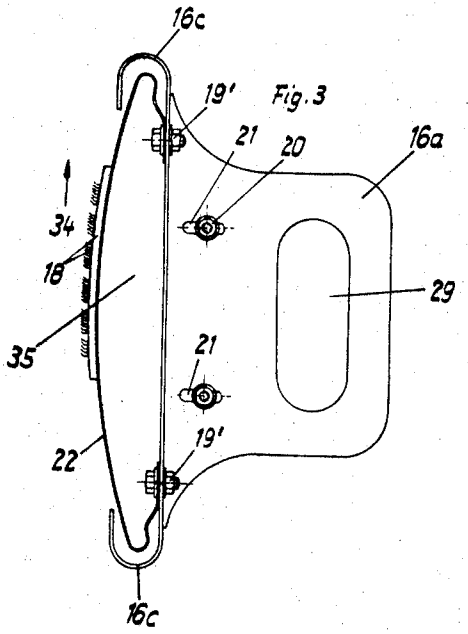


Fig. 4

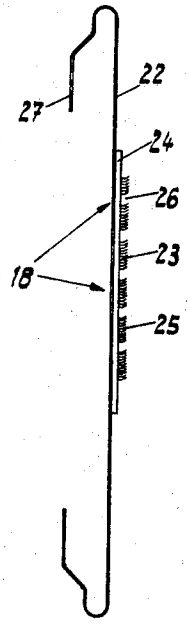
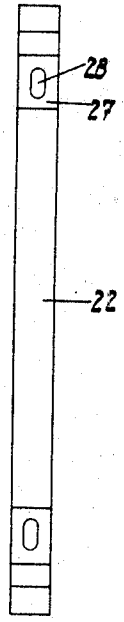


Fig. 5



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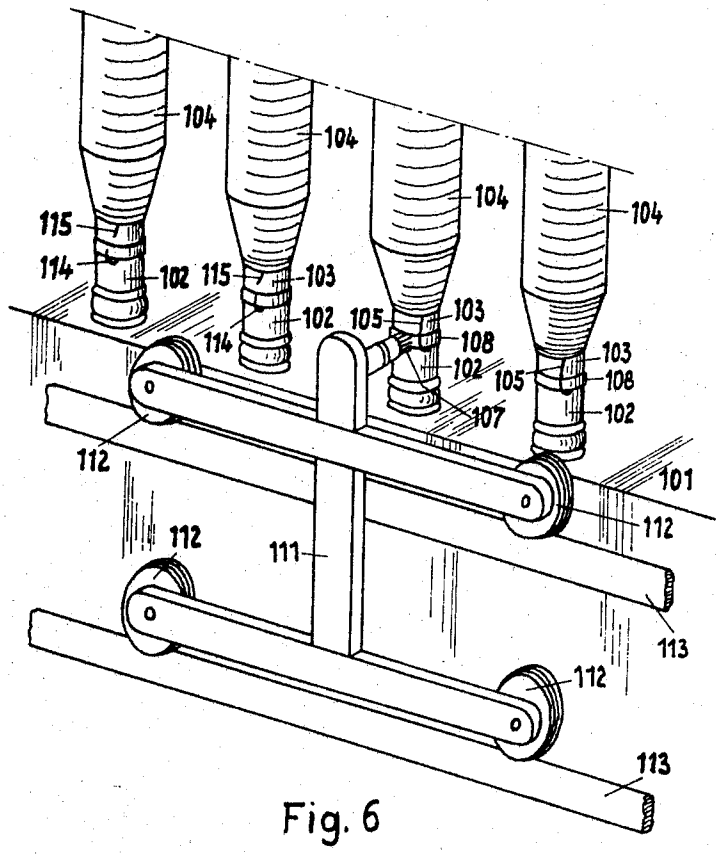

Fig. 6

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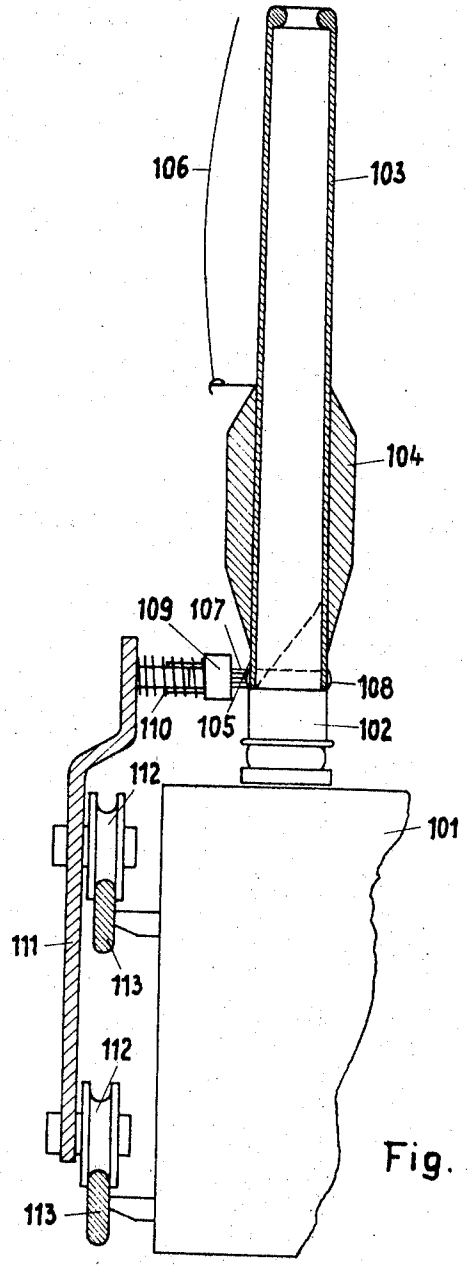

Fig. 7

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United States Patent Office 3,426,518
Patented Feb. 11, 1969

3,426,518

THREAD SEVERING AND BRUSHING APPARATUS

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Filed Aug. 24, 1964, Ser. No. 391,424
Claims priority, application Germany, Aug. 26, 1963, M 57,967
U.S. Cl. 57—34 19 Claims
Int. Cl. D01h 13/26, 9/14, 11/00

ABSTRACT OF THE DISCLOSURE

A brush is moved along a guide rail parallel to a spindle rail for severing and removing the lower thread ends of caps on the spindle which are underwound on base portions of the spindles or held on base portions of the cops.

Background of the invention

The lower thread ends of cops are underwound on tubular base portions of the spindle and the respective lower thread ends are severed when the cop is removed from the spindle while the underwound thread remains. In accordance with the prior art, the underwound thread is manually removed.

It is also known that the lower ends of cops are clamped between the bottom or base portion of the cop tube and the spindle. When the cop has been wound, it must be taken off the spindle whereby the thread end is released and may interlace with the other end of the package.

Summary of the invention

In accordance with one embodiment of the invention a carriage supporting a brush is moved along the spindle rail, and the brush severs and removes the underwinding from the base portions of the spindles. In accordance with another embodiment of the invention, a brush is moved along the spindle rail and engages successive base portions of the cop tube for severing the lower thread ends.

The base portions of the cop tubes are preferably constructed as metal rings so that the cops are not damaged by the stiff brush.

The carrier of the brush is positioned on a guide rail of the spinning machine which is generally provided for a so-called tube carriage, and extends parallel to the spindle rail. The carrier is manually moved along the guide rail. Preferably, the carrier has means for detachably supporting a brush means which is resiliently mounted and can be pressed against the cylindrical base portions of the spindles for severing and removing the underwindings. The brush is particularly effective if the surface of the base portion is roughened and knurled. When the device is used for removing underwindings, the cops are already removed from the spindles.

The spindles rotate during the removal and cleaning of the underwindings, and the carrier with the brush is moved in a direction opposite to the direction of rotation of the spindles.

It is advantages to mount the carrier of the brush in such a manner on the guide rail that it can be angularly displaced and turned into a position of rest. However, it is also possible to place the device on the guide rail only for the actual operation. This has the advantage that one brush device can be used for several machines.

The brush preferably consists of a plurality of tufts consisting of needles, and the tufts are separated from each other in the direction of the guide and spindle rails. Preferably, the needles of the brush are curved and hook-

like and have free ends bent in the direction of movement.

In the other embodiment of the invention which is used for severing the lower thread ends by engaging the base portion of the tube of the cop, a small brush having the height and width of the base portion is sufficient.

The invention will be best understood with reference to the accompanying drawings in which:

FIG. 1 is a fragmentary perspective view illustrating a first embodiment of the invention;

FIG. 2 is a vertical section of the embodiment of FIG. 1;

FIG. 3 is a plan view of the embodiment of FIG. 1;

FIG. 4 is a side elevation, and FIG. 5 is a front elevation of a brush means used in the embodiment of FIG. 1;

FIG. 6 is a fragmentary perspective view illustrating another embodiment of the invention; and

FIG. 7 is an elevation, partially in section, illustrating the embodiment of FIG. 6.

In FIGURE 1 the spindles driven by spindle tapes **12** are positioned in the usual way in a spindle rail **11**. On each spindle a yarn ripping or cutting ring **13** is provided. Underneath each ring **13** there is an underwinding base portion **14**, which is cylindrical and fluted or roughened in a similar way. The surface is hardened. The usual guide rail **15** is positioned in front of the spindle rail, said rail **15** acting as a guide for the so-called tube carriage, here, however, also operating as a guide for the apparatus of the inventor. Said rail **14** is bolted onto the spindle rail by spacing means.

The carrier **16** is, see FIGURES 2 and 3, in its basic form a metal plate bent over 90° and having a perpendicular portion **16***a* and a vertical portion **16***b*. Said vertical portion **16***b* carries at its top end a portion **16***c* that is bent over at its both ends. In said vertical portion **16***b* a brush-like member **18** is adjustable vertically e.g. by means of vertical elongated holes **17** (FIGURE 1) and fastened by means of bolts **19'**. Said brush-like member **18** will be described separately.

Underneath said horizontal portion **16***a* there is a guiding plate **19** connected thereto by bolts **20**, here also an adjustability being provided by means of elongated slots **21** (FIGURE 1).

Said guiding plate **19** has, as can be seen from FIGURE 2, several bends in such a way that said guiding rail **15** is positioned in a longitudinal guiding groove, said connecting portion **16***a'* of the portion **16***a* also being used for guiding the rail. The apparatus can be adapted very easily, e.g., by replacing said guiding plate **19** by an element **19** having different dimensions to various rail shapes or rail profiles **15**. If required, here also additional means (rollers) balls, etc. not illustrated, can be used for improving the guiding means and for decreasing the friction. In practice, however, it has been shown that such additional means generally can be omitted.

The brush-like member **18** (see particularly FIGURES 4 and 5) has been formed from a spring plate **22** onto which a brush strip **23** is attached, e.g., by means of rivets or cement. Said brush strip **23** consists of a usual linen rubber weave **24**, which carries in a known way a clothing with needles **25**. The tufts of needles **25** have intermediate spaces **26**. Said needles being constructed as hooks bent into the direction of movement of the apparatus along the rail **15**.

The ends of the spring plate **22** are curved, so that they form connecting portions **27**. Said connecting portions **27** have an elongated hole **28** at each end, said holes being provided to connect said brush-like member in a tensioned position in which it is bulged according to FIGURES 1 and 3 relative to the vertical portion **16***b* of the carrier **16**, with the aid of bolt and nut connections **19'**. The elongated holes **17** and **28** extend perpendicu-

larly to each other, thus a double possibility for adjustment is provided. The bulging of said spring plate **22** can be selected in various degrees. Also the vertical position of said spring plate **22** can be adjusted with regard to the carrier **16**.

For handling purposes a handle or the like **29** is provided in the portion **16***a*.

The novel cleaning apparatus is positioned onto the rail **15**. The positioning can be carried out by placing the guiding plate **19** at the bottom and the back side of the rail **15** and by swinging upwardly said plate upward as shown by the hand **30** of the operator (FIGURE 1).

In FIGURE 1 then the apparatus is moved from the left to the right (see arrow **31**). Hereby the needle or brush tufts **25** press resiliently against the underwinding area on the base portion **14**. Said underwinding area rotates against the direction of the arrow **31**, therefore, according to FIGURE 1 in a clock-like fashion (see arrow **32** of the driving spindle tape **12**). The tops of the needle or brush tuft **18** resp. **25** are directed to the right in FIGURE 1.

The underwound threads **33** cut from the cops and lying on the surfaces **14** before the arrival of the apparatus, are picked up during the passing of the device by the hook or needle tufts **25** and removed in a reliable way from the underwinding surfaces **14**. As soon as the cleaning operation is finished, therefore, when also the last underwinding area **14** of the spindle rail is cleaned and the underwindings severed and removed, the apparatus is tipped downwardly from the rail **15** and removed, if necessary. Then it is necessary to remove the thread parts from the needles **25** in the direction of the arrow **34** of FIGURE 3, so that the cleaning apparatus can be used again.

The size of the bolts (FIGURE 3) of the spring plate **22** permits an adaptation to the various operational conditions, e.g., to the various yarn numbers, the various distances of the rail from the spindle rail, etc.

The vertical adjustability of the member **22** permits the adaptation to various types of spinning machines.

The independent adjustability of the plate **19** and the possibility of replacement by a plate **19** having a different shape by means of the elongated holes **21** also permits an adaptation to different machine types, e.g., different rails.

The novel apparatus therefore is suitable to all kinds of spinning machines. The cleaning operation is very reliable and the time necessary for removing the underwinding threads is greatly reduced. Generally, a normal steel plate, sometimes a light metal or a light metal alloy plate having the corresponding stability, particularly bending strength, can be used. Advantageously the member **22** can be made of strip spring steel. The member **19**, e.g., can be made of sheet steel having sufficient bending strength. The hook trimming and needle tufts are preferably made in the usual way of steel hooks and consist therefore of hardened steel wire. The hook tufts can be ground.

A further characteristic of the invention, although it does not concern the cleaning apparatus, is the fact that the underwinding areas **14** are resistant to wear and tear. The spindle base portions are hardened steel bodies.

The roughening of the underwinding areas **14** is important because of two reasons. The first reason is that the underwinding thread **33** must be wound in a reliable way onto the underwinding area **14** and must not slip. The second reason is that the removal of the underwound threads **33**, is carried out much better if the needle brush contacts along a roughened surface, the tops of said hooks or needles projecting into the grooves of the underwinding area. This, however, does not exclude the use of the novel apparatus with smooth surfaces **14**, because also in this case an improvement, however small, of the present condition is provided. Also in this case the improvement mostly can be obtained without the usual severing of the underwinding threads by means of sharp brass hooks or by

using knives for the same purpose. Said usual measures are particularly detrimental, because the spindle caps can be damaged. Said dangers are avoided by the present measures.

It is also possible to replace the manual operation in the direction of the arrow **31**, by a mechanical operation. Generally, however, such a means can be omitted because it makes additional equipment of the spinning machines necessary.

Obviously it is possible to place brush tufts of various types, particularly having different widths onto one carrier **16**. Also the replacement of used brushes is very simple.

It is also possible to modify the device in such a way that as viewed in the direction of movement two or more brush tufts in series are provided, in which it is also possible to give different tensions and/or brush qualities to said brush tufts. It is also advantageous to make the length of a brush not larger than the distance between two adjacent spindles resp. two adjacent areas **14**, so that the complete force of the spring only acts on one area **14** and a complete needle brush does not contact permanently two or more adjacent underwinding areas **14** when moving.

An arbitrary determined returning movement of the device in operational condition against the direction of the arrow **31** is not detrimental, because then the hooks slip over the underwinding areas **14** because of their curves. If the operator sees that there is still a yarn rest on an area **14** already treated, then it is always possible to move the device backwardly by hand against the direction of the arrow **31** and to repeat the operation.

The good optical observation that is possible by manual operation, is very important for the functioning of the apparatus. Although it is possible to provide fixing elements, which lock the device against tipping from the rail **15**, said devices can be omitted because they are complicated and liable to troubles. The apparatus can be guided in a very reliable way by hand and can be maintained in the right position. According to FIGURE 2 it would be possible to provide in the region of the transition between the portions **16***a* and **16***b*, a nose-like fixing means or fixing means using a spring loaded ball, said means overlapping said rail **15** at the left and at the top. The tension of the spring then must be dimensioned in such a way that only a strong downward pressure onto the portion **16***a* releases the fixing means.

In the region **35** it is also possible to provide an additional spring between **16***b* and **22**, if in particular cases the tension of the spring member **22** itself is not sufficient.

When automatizing the supply of cops to the winding machine, said cops being produced by a spinning machine, it is possible that the bottom thread end of the yarn package interlaces the top thread end. Therefore, it is not possible to catch that top end by a simple operation, e.g., by suction.

If the winding machine has fixed winding stations then it is necessary to have a relatively large apparatus running around the winding machine during the automatic positioning of the cops, which is very complicated.

Another possibility is that such an apparatus is positioned at the end of the machine and that the cops are brought to the winding station by a carriage or conveying belt. Hereby the cops with its yarn end always must be transmitted in such a way that said yarn end always is applied at a particular point. Also this method is too complicated for practical use, because it is unreliable.

In order to remove the difficulties mentioned above according to the invention, the bottom thread ends of each yarn package are cut when still on the cops on the spinning machine, in which said bottom end is clamped between the tube and the spindle during the positioning onto the spindle.

The invention also relates to a device for carrying out the method mentioned above. The device can be

moved along the spindle rail of the spinning machine, and is provided with a brush means directed to the base portions of the tubes arranged at such a distance from the spindles, that the brush means base portions at the bottom end of the tubes positioned on the spindles.

According to the invention the tube of the cop is provided with a ring of hard material, e.g., metal, said ring being provided at such a level, that it can cooperate with a brush means when the tube is put onto the spindle.

In FIGURES 6 and 7, the spindle rail **101** of the spinning machine supports spindles **102** which are driven in the usual way. On each spindle **102** there is a cop with tube **103** onto which the yarn package **104** has to be wound. On positioning said empty tube **103** onto the spindle **102** the end **105** of the yarn **106** supplied by the drawing mechanism is clamped between the bottom end of the tube **103** on the spindle **102** between adjacent base portions in order to provide the necessary connection.

When the yarn package **104** is ready, it must be taken away from the spindle **102**. The end **105** of the yarn is freed thereby and then may interlace with the last spun portion of the yarn.

The device of the invention prevents this. A brush **107** having hard needles is moved along the bottom ends **105**. In order to provide for a good severing action of the brush **107** the base portion of each tube **103** is provided with a metal ring **108** along which the lower yarn end **105** is tensioned. The metal ring **108** of the base portion of the rotating tubes **103** provide a hard underground for the needles of the brush **107** moving along and contacting same.

The brush **107** is arranged in a support means **109** and is pressed close to the rings **108** by a spring **110**.

The support means **109** is arranged on a carrier **111** which can move on of wheels **112** along the rails **113** and accurately parallel to the row of spindles **101** and also parallel to the rings **108** of the tubes **103**. Carrier **111** has two horizontal beams supported by wheels **12**, and a vertical post on which brush support **109** is mounted.

In FIGURE 6 it is illustrated, that the brush **107** has passed along the yarn ends of the two rings **108** and has severed the lower thread ends. Severing has not yet taken place on the two tubes **103** at the right-hand side of FIGURE 6.

When the tubes **103** with their yarn packages **104** are removed from the spindles **102**, the severed end **114** is released and drops. The free end **115** is so short, that it cannot be interlaced with the last spun and wound portion of the yarn, so that this cut end of the yarn package can be caught later on in a very simple way, e.g. by sucking.

Obviously characteristics of the one application range of the invention can also be employed with the other application range of the invention.

What is claimed is:

1. Thread severing and brushing apparatus, comprising, in combination, a spindle rail; a row of spindles mounted on said spindle rail; a cop with a thread package on each spindle, each spindle and cop having base portions, the lower thread end of each thread package being located and held on at least one of said base portions; guide rail means extending along said spindle rail; and a brushing device including a carrier means guided on said guide rail means for movement along said row of spindles and cops, and brush means mounted on said carrier means and positioned to engage the base portions on which said lower thread ends are located for successively severing said lower thread ends of said thread packages during movement of said carrier means along said guide rail means.

2. Apparatus as claimed in claim **1** wherein said one base portion is the base portion of each spindle, wherein said base portion of each spindle has a tubular surface for holding loops of an underwound lower thread end; and wherein said brush means is positioned to engage said tubular surfaces of successive spindles for severing and removing said underwound lower thread ends.

3. Apparatus as claimed in claim **2** wherein said base portion of each of said spindle is made of metal, and wherein said tubular surface is knurled.

4. Apparatus as claimed in claim **1** wherein each cop has a tube for carrying said package; wherein said one base portion is the base portion of each tube; and wherein said brush means is positioned to engage said base portions of successive cops for severing the lower thread ends located on the same during movement of said carriage means along said guide rail.

5. Apparatus as claimed in claim **4** wherein each cop includes a metal ring on said base portion of each cop tube; and wherein said brush means engages said metal rings and severs the lower thread ends located thereon.

6. Apparatus as claimed in claim **1** wherein said brush means includes needles.

7. Apparatus as claimed in claim **1** wherein said brush means includes a resilient support and a brush on said resilient support so that said resilient support is deformed when said brush is pressed against said one base portion.

8. Apparatus as claimed in claim **7** wherein said resilient support is a leaf spring carrying said brush; and wherein said carrier means includes attaching means for detachably holding the ends of said leaf spring.

9. Apparatus as claimed in claim **8** wherein said carrier means includes means for adjusting the tension of said leaf spring; and wherein said attaching means hold said leaf spring in a tensioned curved position.

10. Apparatus as claimed in claim **1** wherein said brush means includes a support and a brush on said support; and wherein said brushing device includes adjustable means for adjustably mounting said support on said carrier means.

11. Apparatus as claimed in claim **10** wherein slots are formed in said carrier means; and wherein said adjustable means include threaded clamping means in said slots.

12. Apparatus as claimed in claim **1** wherein said spindles rotate in one direction of rotation; and wherein said brush means includes a support and hooks secured to said support and being curved so that the free ends thereof project opposite to said one direction of rotation.

13. Apparatus as claimed in claim **12** wherein said carrier means includes means for being moved along said guide rail means opposite to said direction of rotation.

14. Apparatus as claimed in claim **1** wherein said brush means includes a support, and a plurality of needle tufts secured to said support, said tufts being spaced in the direction of said guide rail means.

15. Apparatus as claimed in claim **1** wherein said brush means includes a support strip elongated in the direction of said guide rail, and a brush secured to said support strip and having in said direction a greater extension than in the direction of the axes of said spindles; each of said spindles being rotatable on said spindle rail about an axis.

16. Apparatus as claimed in claim **15** wherein the length of said brush in said direction of said guide rail means is less than the distance between two adjacent spindles on said spindle rail.

17. Apparatus as claimed in claim **1** wherein said brush means includes a support, and at least two needle tufts secured to said support following each other in the direction of said guide rail means, said tufts consisting of needles having different characteristics.

18. Apparatus as claimed in claim **1** wherein said carrier means includes an angular plate having an upright portion carrying said brush means, and a horizontal portion forming a handle, and a downward projecting guide member adjustably secured to said horizontal portion and slidably guided on said guide rail means for mounting said carrier means for movement along said guide rail means and for angular movement toward said spindles

so that said brush means engages said one base portion.

19. Apparatus as claimed in claim 1 wherein said guide rail means includes two guide rails; wherein said carrier means includes two horizontal beams, two pairs of wheels at the ends of said beams for rolling on said guide rails, and a central post having an upper end located at the level of said base portion of said cop; and wherein said brush means is spring-biased and secured to said upper end and engages said base portions of said cops for severing lower thread ends located on the same during movement of said carrier along said guide rail means.

References Cited

UNITED STATES PATENTS

1,085,662	2/1914	Brunner	57—56 XR
396,616	1/1889	Sharples	57—56
708,061	9/1902	Mock et al.	57—56
3,210,922	10/1965	Winter	57—54

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U.S. Cl. X.R.

57—54, 56