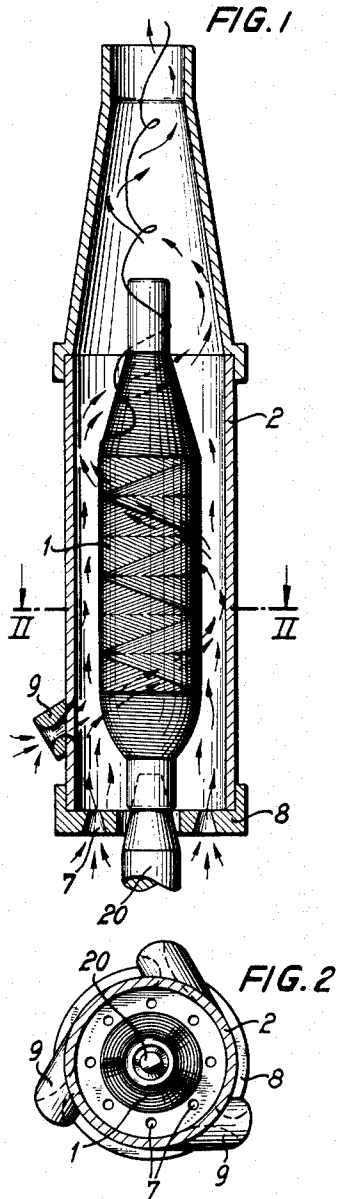


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E. WEY
DEVICE FOR REMOVING A STARTING LENGTH
OF YARN FROM A TEXTILE COIL
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INVENTOR
Edmund Wey

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DEVICE FOR REMOVING A STARTING LENGTH OF YARN FROM A TEXTILE COIL

Edmund Wey, Breyell-Schaag, Germany, assignor to
Walter Reiners, Monchen-Gladbach, Germany

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My invention relates to a pneumatic device for seeking and removing a starting length of yarn from a fully or partially filled bobbin, spinning cop or other textile coil.

Textile fabricating processes, such as spinning, re-winding or weaving operations, often require that, after breakage of the yarn coming from a supply coil or after depletion of such coil, the starting end of a still partially filled coil or take-up spool, or coming from a new and entirely filled supply coil, be sought and pulled free before the fabricating process previously in progress can be continued.

The seeking of the starting end of yarn from a fully or partially filled textile coil can be done by hand, but has also been effected by automatic means. For the latter purpose a laminar current of air acting upon the body of yarn on the coil has been employed. It has been found, however, that when thus seeking and removing the starting end of yarn by means of a laminar air current, the desired result is not always produced reliably with all kinds of yarn and may also fail if the coil is only partially filled with yarn.

It is an object of my invention, therefore, to provide an improved pneumatic device for seeking and removing the starting ends of yarn from textile coils that afford a greatly increased reliability of performance virtually independently of the particular kind of yarn being employed, and is equally well applicable to full as well as to more or less depleted yarn coils. Another object of my invention, conjoint with those mentioned, is to secure reliable yarn seeking and removing operations without necessity of using coils that are equipped with a reserve winding or tip bunch as needed for some of the known devices of this general type.

To achieve these objects, and in accordance with my invention, I subject the textile coil to a whirling, non-laminar current of air, such as a turbulent or twisting flow, which surrounds the body of yarn and progresses in its axial direction toward and beyond one axial end of the coil, thus unwinding a starting length of yarn therefrom and pulling it over and beyond the coil end, generally in the axial direction of the coil, to a location where it can readily be seized for further fabrication.

When employing a laminar and hence uniformly progressing flow, the isobaric (equal-pressure potential) planes are substantially parallel. In a whirling flow, the corresponding potential surfaces do not constitute such planes; the elemental particles of the flowing medium, or groups of these particles, rather perform irregular random motions, the geometric sum of all velocity vectors of the individual particles being equal to zero. If such a whirling flow is caused to advance, such as the flow employed according to the invention, the elemental particles or groups thereof likewise perform irregular motions, but the geometric sum of the velocity vectors results in a vectorial amount departing from zero whose direction corresponds to the direction of progressive motion and whose length corresponds to the magnitude of the flow advancing speed. This sum vector, for the purpose of the present invention, extends parallel to the coil axis.

The progressing whirling current of air can be produced in different ways. For example, it can be made effective upon the coil surface in form of a jet of air blown in a

direction parallel or predominantly parallel to the coil axis.

It has been found most advantageous, for most types of yarn commonly employed, to apply an air current of helical travel configuration. A helical flow about the coil constitutes a more or less orderly but progressing and whirling flow on a helical path coaxial with the coil.

According to another feature of my invention an annular or tubular member is placed in coaxial relation to the peg or other holder on which the coil is seated and surrounds the coil with radial clearance, the above-mentioned current of whirling air being passed through the annular interspace between the tubular member and the coil when the latter is seated on the holder. The annular member may be given a variety of designs. For example, it may be provided with radial or tangential air outlet openings directed toward the coil, the annular member forming essentially a spiral, helix or circle. If desired, the annular member may be shifted during the yarn seeking operation axially along the coil surface and/or about the coil axis. According to another feature of my invention, however, it is simpler and generally preferable to design the annular member as an elongated tubular structure which surrounds the coil and is connected with a blowing and/or suction device for passing the whirling air current through the tube.

The above-mentioned and other objects and features of my invention, said features being set forth with particularity in the claims annexed hereto, will be apparent from, and will be set forth in, the following in conjunction with the embodiment of the device according to the invention illustrated by way of example on the accompanying drawings in which:

FIG. 1 is a sectional front view of an embodiment of my invention, and FIG. 2 is a cross section along the line II-II in FIG. 1.

In the figures, there is shown a cop 1 containing a body of yarn wound upon a tubular core and serving as a yarn-supply coil from which the yarn is to be wound onto a take-up spool to produce a yarn package of a size and shape desired for further fabrication. Yarn-package winding machines in conjunction with which the illustrated devices according to the invention may thus be used are well known as such, for example from U.S. Patents No. 2,936,130, No. 3,033,478, No. 3,034,737, No. 3,059,865 and No. 3,061,216 all assigned to the assignee of the present invention.

The supply coil 1 in the accompanying drawing, is shown seated on a holder or peg 20. A tubular member 2 surrounds the supply coil 1 coaxially seated on the peg. The inner diameter of the tubular member 2 is larger than the diameter of the supply coil when completely filled with yarn so that a tubular or annular interspace always remains between the yarn body and the tubular member. However, the coil 1 need not be entirely filled with yarn but may also be partially depleted without obviating the desired performance of the device.

In the embodiment of FIGS. 1 and 2, the progressing and whirled-through current is produced by injecting into the originally laminar flow a lateral jet of additional air in the vicinity of the coil foot. The injected current becomes superimposed upon the original flow and thus produces a turbulent flow progressing on a helical path around the coil in the yarn unwinding sense.

For this purpose, the tubular member 2 is provided with one or more lateral nozzles 9 which join the tube in the vicinity of the coil foot and have respective air channels extending tangentially to the tubular member. If the nozzle axis at the outlet orifice extends perpendicularly toward or past the coil axis, the resulting current in the tubular member becomes almost completely turbulent. However, if according to the embodiment shown

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in FIGS. 1 and 2 the nozzle 9 has its orifice axis inclined in a direction toward the coil tip, a spiral or helical flow is produced similar to the one occurring in the embodiments of FIGS. 1 to 4.

It is of advantage to give the nozzle orifice a diffuser effect by widening its shape toward the interior, as also shown in FIGS. 1 and 2. In this embodiment, the lower end of the tubular member 2 is closed by a ring 8 provided with conical perforations 7 through which the longitudinal flow of air is blown or sucked into the tubular member to become subjected to the superimposed action of the air injected laterally by the nozzle or nozzles 9.

To those skilled in the art it will be obvious, upon a study of this disclosure, that my invention can be modified in various respects and can be given embodiments other than particularly illustrated and described herein, without departing from the essential features of my invention and within the scope of the claims annexed hereto.

I claim:

1. A device for removing a starting length of yarn from a textile coil, comprising coil holder means engageable with one end of the coil for holding the coil, a tubular member coaxially surrounding the coil when the latter is held on said means and extending along the length of the yarn body of said coil and beyond the coil end remote from said holder means, said tubular member forming an annular space along and about the coil held

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on said means and having an axial opening at a distance beyond said coil, means for forcing air axially through said annular space, and air-nozzle means extending laterally through said tubular member in approximately tangential direction for injecting an air jet into said annular space so as to impart a helical motion to the air forced axially through said annular space.

2. In a device according to claim 1, said air nozzle means being mounted near said holder means and having a nozzle outlet axis inclined toward said opening of said tubular member.

3. In a device according to claim 2, said air nozzle means having a nozzle orifice portion whose axis is inclined toward said opening of said tubular member, said orifice portion having a cross section widening toward the interior of said member for diffusion action.

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MERVIN STEIN, *Primary Examiner.*

RUSSELL C. MADER, JORDAN FRANKLIN,
Examiners.