May 29, 1962 L. SCAGLIA 3,036,358

METHOD AND APPARATUS FOR REMOVING YARN RESIDUE FROM SPOOLS

Filed May 23, 1960

Fig. 1

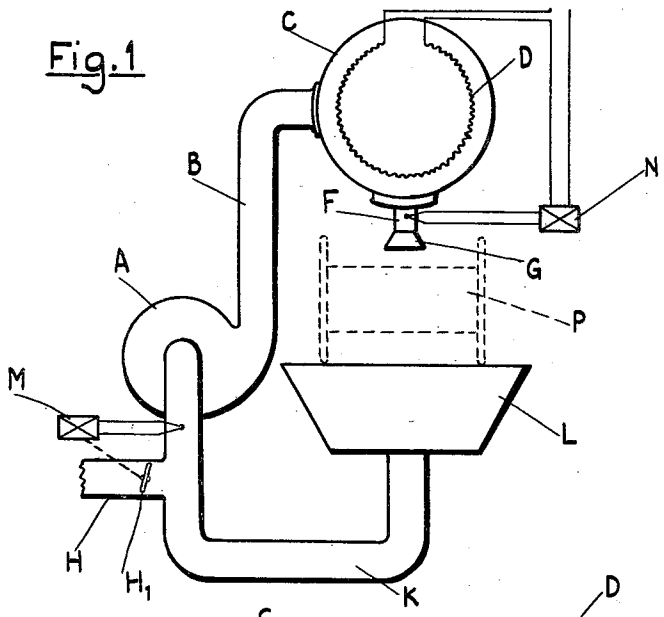


Fig. 2

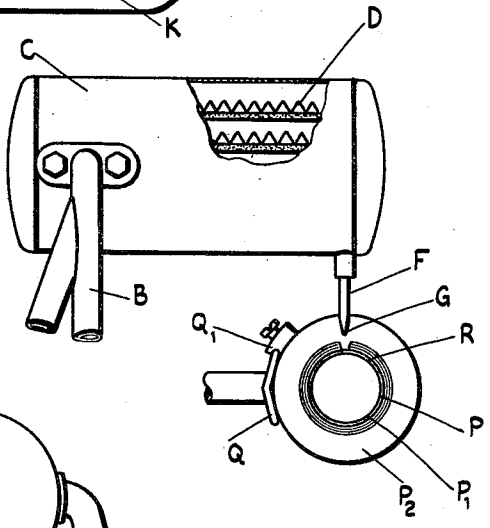
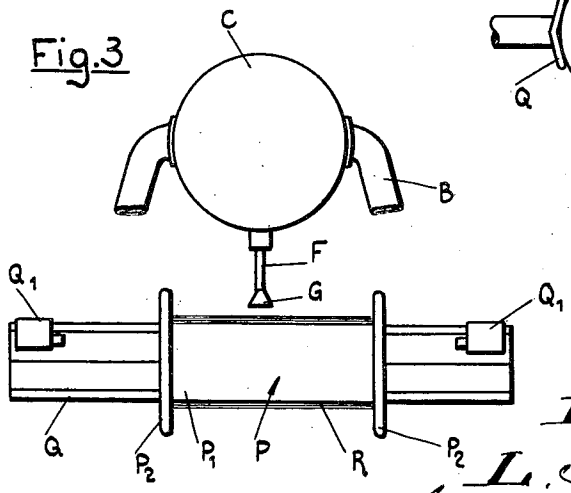


Fig. 3



Inventor
L. Scaglia
By Glascock Downing & Seebold
Attys.

United States Patent Office 3,036,358 Patented May 29, 1962

3,036,358

METHOD AND APPARATUS FOR REMOVING YARN RESIDUE FROM SPOOLS

Luigi Scaglia, Brembilla, Italy, assignor to M. Scaglia, Societa per Azioni, Brembilla, Italy, a joint-stock company of Italy

Filed May 23, 1960, Ser. No. 31,147
8 Claims. (Cl. 28—19)

This invention relates to a procedure and a related device for having residues of yarns made of synthetic material (as, for example, polyamides, cellulose acetate, and the like) removed and carried away from bobbins or similar package bodies.

In the spinning, and more generally in the processing of synthetic or man-made yarns, the necessity often arises to have residues of yarn or yarn ends removed from the packages, spools, caps or bobbins, and recovered, after which they are recycled as starting material. The term "spool" will be used to designate any such device about which yarn is wound.

The removal of said residues must obviously be performed according to given procedures, devised with the view to allow both the recovery of removed yarn, and the re-use of the spool, as the necessity exists to have the spools utilized many times. Such removal of yarn ends is usually made mechanically, that is, by means of a cutting tool, and as an unavoidable result thereof cuttings and scorings are caused on the spool bodies. Such drawback becomes particularly serious when metal spool bodies are used, as is often the case in the practical operation. This is due to the fact that sharp edges and burrs are left on such a metal body, whereby the yarn, while being rewound thereon, is cut or otherwise damaged.

Attempts have been made to obviate such drawback by the use of a tool heated to a suitable temperature, higher than the melting temperature of yarn material, for the removal of yarn residue. However, such a procedure unavoidably results in the burning or charring of yarn, which therefore cannot be recycled as starting material. Moreover, a severe fire-danger arises, due to the facility with which some yarns, for example those of cellulose acetate, can be ignited.

These and further drawbacks are now positively obviated by the present invention, which allows an easy and quick removal of yarn ends from all kinds of spool bodies without damaging or changing either the yarn structure or the spool body.

The procedure according to this invention is characterized by the use of a blast of air heated to a suitable temperature, in order to soften and to thereby remove all yarn residues present on the spool body.

The device by which the aforesaid procedure is carried into practice is characterized by a compressor or blower, means for heating the air to the required temperature, and one or more nozzles for directing the hot air jet or jets on the yarn. Such general idea may be carried into practice by many different embodiments, all of which will fall within the range of the invention; thus, for example, the hot air nozzle might be combined with a support for the spool body, whereby this latter can be longitudinally moved with respect to the nozzle, in order to cut the yarn present thereon.

It might be resorted also to a movable nozzle, provided with a grip, thereby allowing the operator to direct the hot air to the required points.

Obviously, the nozzle is to be so designed as to give a narrow, preferably cutting-blade shaped hot jet, thus allowing the yarn residues to be quickly cut and removed.

The invention will now be disclosed in the following description, taken with the accompanying drawings,

wherein an embodiment of the device according to same invention is shown as a mere example.

In the drawing:

FIG. 1 diagrammatically shows the device according to the invention.

FIG. 2 is a side elevation view of a portion of the device with a component part broken.

FIG. 3 is a view of a device for slidingly supporting the packing body with respect to the hot air nozzle.

The constructional and operational features of the device, when operated for carrying out the procedure according to the invention, will now be described with reference to the drawing.

Such device comprises a centrifugal blower, or another equivalent source of air under pressure A, the outlet B of which leads into a suitably dimensioned metal container C, within which a heating element D is fitted, such as an electrical resistance fitted on a suitable support.

The container C is fitted at one end of its lower surface with an outlet duct or hose F which terminates with a nozzle G, this nozzle being formed, in the case shown, with a narrow orifice, to give rise to a cutting blade shaped high velocity blast for the purposes which will be hereinafter set forth.

The suction duct H of blower A communicates with the room. It might be provided with a branch pipe K, leading to a vat L, fitted opposite the nozzle G, whereby the blasted hot air can be collected and recovered.

Said duct H is provided with a gate valve H_1, controlled by a thermostat M; whereby the temperature of sucked air can be adjusted, within limits, by the addition of cold air to the recovered hot air.

The device is completed by a further thermostat N, by which the temperature of hot air, blown by the nozzle G, is sensed, and the feed of electric current to the heating element D (and thus the air temperature) is correspondingly adjusted.

As shown in FIGURES 2 and 3, the device comprises two means by which the spool body P is supported and held in the required location. In the case as considered, said spool body consists of a bobbin having a metal core P_1, while the supporting means consists of a grooved V-shaped bar Q, to accommodate the flanges of bobbin P, so as to allow the bobbin to be axially moved and guided, while being kept parallel to, and equidistant from the nozzle G.

To such a purpose, the V-shaped bar Q is held in a support which can be adjusted according to shapes and sizes of different spool bodies.

Moreover, adjustable stops Q_1 are fitted on both ends of V-shaped bar Q. Such stops are set in such a manner as to discontinue the motion of bobbin P when its rear flange is in front of nozzle G.

From what is stated above, it will be understood that the procedure for the removal of yarn residues R from the bobbin P is as follows: said bobbin is laid onto the V-shaped bar Q and is axially moved thereon, whereby the yarn residue R is softened and cut by the hot blast coming from the nozzle G impinging on the yarn residue, and can be thus easily removed from said bobbin. Since the air blast is heated to a temperature above the softening temperature of the yarn, for example, in the range of 250°–500° C., the yarn material is quickly softened, without burning or charring, and the fire-danger, which might arise with some kinds of yarn, is positively avoided.

The yarn is wholly removed in a satisfactory manner, even from corners or notches possibly present on the spool body, and the surface of this latter is kept smooth and sound, thereby allowing a re-use thereof for winding another yarn thereon.

As already stated, modifications and changes might be

made in the device. Thus, for example, the nozzle might be made movable and fitted with a grip, to allow the operator to grasp it. In this latter case, said nozzle is connected with the hot air container C by means of a hose; moreover, said nozzle might be provided at its outlet edge with a spacer, the outer end thereof may be then brought to rest against the surface of yarn residue, to keep the nozzle at a constant distance from said residue.

It will be understood by those skilled in the art that the details of embodiment of the present invention may be changed without departing from the scope of same invention.

What I claim is:

1. In a method of removing synthetic yarn residue from spools, the step of directing a high velocity blast of air heated to a suitable temperature against the yarn residue, to soften and sever the said residue wound on such spools.

2. A device for removing synthetic yarn residue from a spool, comprising an air blower, means to heat said air to a temperature to soften said yarn residue, and at least one nozzle to direct the hot air blast at high velocity onto the yarn residue on said spool, whereby said yarn residue is severed by parting of said yarn under the influence of said hot air blast at high velocity.

3. A device according to claim 2, in which the hot air nozzle is provided with means to support and to hold the spool body at a predetermined spacing from the nozzle.

4. A device according to claim 3, including thermostatic means to control the air heating element to control the temperature of the air impinging on the yarn.

5. A device according to claim 2 in which the nozle is combined with a V-shaped bar to accommodate the spool body and by which the spool is guided while being moved with respect to the nozzle.

6. A device according to claim 2 in which a hose is provided to connect the nozzle with the air heater, to allow said nozzle to be moved with respect to the spool.

7. In the method of removing all yarn residue of thermoplastic synthetic material from a spool, the step of directing a high velocity blast of air in a narrow jet, said air being heated to a temperature above the softening temperature of said material, to impinge against said yarn residue to soften and sever all the yarn residue under the combined action of heat and of high velocity air impingement, whereby the yarn residue are freed of the spool.

8. A device for removing yarn residue of thermoplastic synthetic material from a spool, comprising an air blower, means to heat said air to a temperature higher than the softening temperature of yarn material, and at least one nozzle to direct the hot air blast at high velocity onto said spool to impinge on the yarn residue on a line substantially parallel to the spool axis to soften and sever the yarn wound on said spool along said line.

References Cited in the file of this patent

FOREIGN PATENTS

457,592 Great Britain ---------- Dec. 1, 1936