Oct. 28, 1941. J. E. HALIN 2,260,314

DEVICE FOR PRODUCING STAPLE FIBER YARNS FROM CONTINUOUS FILAMENTS

Filed April 12, 1940

Fig. 1.

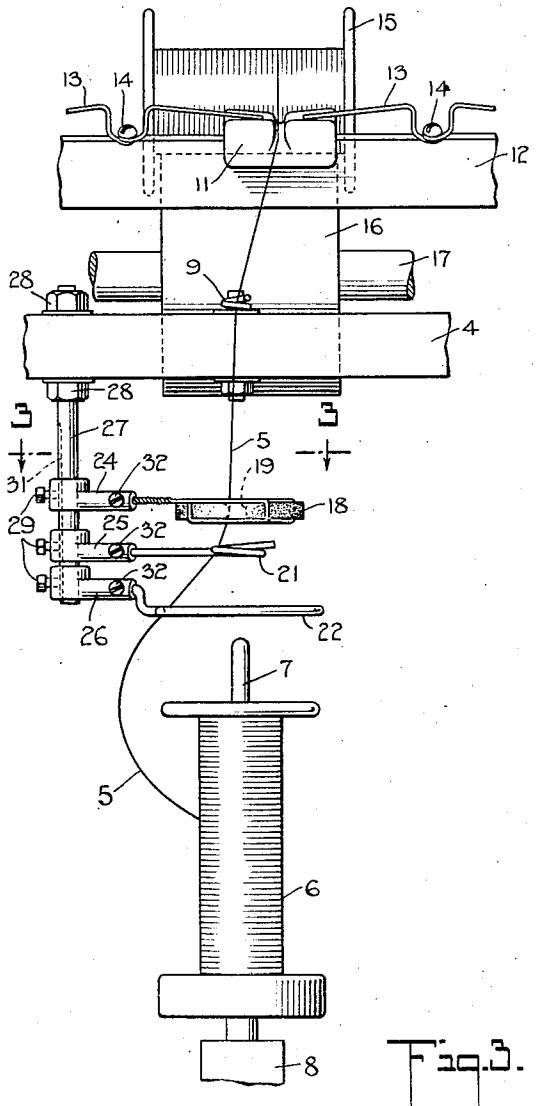


Fig. 2.

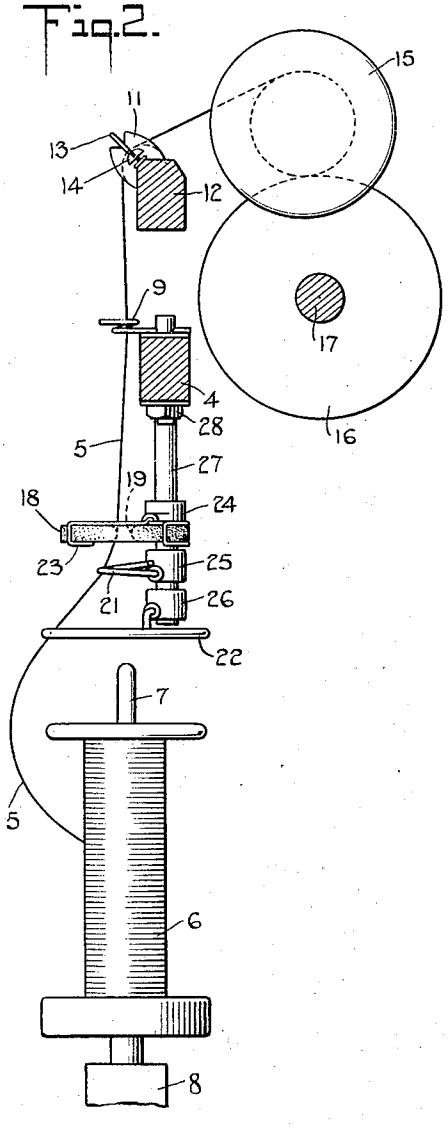
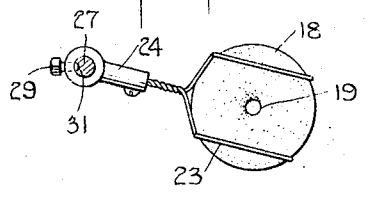


Fig. 3.



J. E. HALIN
INVENTOR

BY Bellamy & Levinson
ATTORNEYS

Patented Oct. 28, 1941 2,260,314

UNITED STATES PATENT OFFICE

2,260,314

DEVICE FOR PRODUCING STAPLE FIBER YARNS FROM CONTINUOUS FILAMENTS

Jules E. Halin, Drummondville, Quebec, Canada, assignor to Celanese Corporation of America, a corporation of Delaware

Application April 12, 1940, Serial No. 329,226

5 Claims. (Cl. 57—2)

This invention relates to the manufacture of textile yarns, and relates more particularly to a device for producing yarns having the appearance of spun yarn, i. e. yarn made from staple fiber, but having a basis of continuous filaments.

In the manufacture of spun yarn from artifical fibers, the usual practice is to cut continuous artificial filaments or waste filaments into comparatively short lengths, for example of 1½ to 2 inches or more, and then subject the staple fibers produced to a series of operations appropriate to the length of the fiber, such operations being similar to those accorded to natural fibers such as cotton or wool, including opening, carding, drawing and spinning. These operations represent considerable expense in the production of such yarns, since they involve a relatively slow transformation of the initial fibrous material to a finished yarn.

It is an object of this invention to provide an improved device for producing yarn having an appearance similar to that of yarn made from spun fiber without the necessity for cutting continuous filaments into short lengths and spinning the fibers thus produced, which device is simple in construction, inexpensive in cost and effective in operation.

Another object of this invention is the provision of means for controlling the shape of the balloon formed by the yarn drawn from the supply package whereby the degree of abrasion of the yarn may be regulated and uniform results secured under all conditions obtaining during the unwinding of the yarn from the yarn supply package.

A further object of this invention is to provide in an up-twist twisting machine relatively adjustable abrasive means and yarn guides.

Other objects of this invention, together with certain details of construction and combinations of parts, will appear from the following detailed description and the claims.

In accordance with the instant invention an up-twist twisting machine, comprising the usual twisting spindle, yarn supply package or bobbin, pig-tail guide, cork roller and takeup package or bobbin, is provided with an abrasive element and additional guide means for cutting the filaments of the yarn by abrasive action so that at any one point only one or relatively few of the filaments in the yarn are broken, or at least some of the filaments remain unbroken, whereby the continuity of the yarn is not interfered with.

The instant invention will now be described in greater detail with reference to the accompanying drawing wherein

Figure 1 is a front elevational view of an up-twisting device modified in accordance with the instant invention,

Figure 2 is a side elevational view of the same, and

Figure 3 is a detail view of the abrasive element and holder therefor taken on line 3—3 in Figure 1.

Like reference numerals indicate like parts throughout the several views of the drawing.

Referring to the drawing the reference numeral 4 indicates a cross bar on the frame of an up-twisting machine in which the yarn 5, comprising a bundle of continuous filaments having the required twist therein, is taken from a twisting bobbin 6 mounted for rotation on a spindle assembly comprising a spindle 7 mounted on a whorl 8 adapted to be rotated by a belt (not shown) as is well understood in the art.

In normal up-twisting practice, the yarn 5 is taken from rotating bobbin 6, passed through a pig-tail guide 9 suitably attached to the cross bar 4, then through yarn guide 11, which may be made of porcelain or of any other suitable material, attached to reciprocating traverse bar 12 by means of wires 13 and screws 14, and finally wound on to a take-up bobbin 15 resting on and rotated by a cork covered roller 16 fixed to and driven by a shaft 17.

In accordance with this invention, the up-twisting machine is modified by adding thereto simple and inexpensive means for efficiency and expeditiously converting a yarn of continuous filaments into a yarn having the appearance of spun yarn. This means comprises a circular disc 18 of emery or carborundum having aperture 19 of small radius in the center thereof, a pig-tal guide 21 and a ring guide 22, all disposed between the take-up means and yarn package. The abrasive disc is mounted in a suitable wire holder 23. The wire holder 23, the pig-tail guide 21 and the ring guide 22 are held in similar holders 24, 25 and 26 which are mounted for vertical adjustment on a rod 27 suitably attached, as by nuts 28, to the cross bar 4. The holders are held against movement by set screws 29 which cooperate with a vertical groove 31 in the rod 27 to prevent rotation of said holders about the rod 27. The holders 24, 25 and 26 have longitudinal openings therein for receiving the twisted ends of wire holder 23, the end of pig-tail guide 21 and of ring guide 22 and by this construction the abrasive disc, pig-tail guide and ring guide may

be adjusted in a horizontal plane relative to the yarn being operated upon. Set screws **32** hold these elements in adjusted position.

The pig-tail guide **21** and the ring guide **22** serve to govern or control the shape of the balloon immediately below the abrasive disc. By this arrangement the degree of abrasion of the yarn is regulated to requirements and uniform results secured under all varying conditions that obtain during the course of the unwinding of the yarn from a full bobbin to an empty one, conditions that would otherwise vary the shape and size of the balloon and would result in a variable abrading action.

The operation of my device is as follows. Yarn supplied by bobbin **6**, having a denier of 200, has a twist of 15 to 20 turns per inch or other suitable twist inserted therein by the rotation of said bobbin **6**. The yarn from the bobbin is passed through ring guide **22**, pig-tail guide **21** and aperture **19**, which is $\frac{3}{16}$ to $\frac{1}{4}$ of an inch in diameter, and then through pig-tail guide **9**, porcelain guide **11** and on to take-up bobbin **15**, the abrasive disc **18**, the pig-tail guide **21** and the ring guide **22** being suitably adjusted relative to each other and to the yarn being operated upon so as to effect the desired degree of abrasion on the yarn. The rotation of the bobbin **6** causes the yarn to balloon, which ballon is controlled by means of pig-tail guide **21** and ring guide **22** so as to produce the desired contact of the yarn with the abrasive disc **18**. This contact of the yarn with the abrasive disc **18**, by virtue of the ballooning thereof and the control of said ballooning, and the drawing of the yarn by the take-up bobbin **15** effects the abrasion of the yarn to the degree desired.

It is to be understood that the foregoing detailed description and drawing are given merely by way of illustration and that many variations may be made therein without departing from the spirit of my invention.

Having described my invention, what I desire to secure by Letters Patent is:

1. Apparatus for the conversion of a yarn comprising a bundle of continuous filaments into a continuous product containing staple fiber comprising, in combination with a device having means for ballooning said yarn and inserting a twist therein and means for taking-up the same at a point above the twisting means, an abrasive member adapted to be contacted by said yarn continuously during the ballooning of said yarn, and a plurality of guides disposed below said abrasive member for regulating the ballooning of said yarn so as to control the degree of abrasion of said yarn by said abrasive member.

2. Apparatus for the conversion of a yarn comprising a bundle of continuous filaments into a continuous product containing staple fiber comprising, in combination with a device having means for ballooning said yarn and inserting a twist therein and means for taking-up the same at a point above the twisting means, an abrasive member adapted to be contacted by said yarn continuously during the ballooning of said yarn, and a plurality of guides disposed below said abrasive member and adjustable relative thereto for regulating the ballooning of said yarn so as to control the degree of abrasion of said yarn by said abrasive member.

3. Apparatus for the conversion of a yarn comprising a bundle of continuous filaments into a continuous product containing staple fiber comprising, in combination with an up-twisting device having means for ballooning said yarn and inserting a twist therein and means for taking-up the same at a point above said twisting means, a rod attached to said up-twisting device, an abrasive member adapted to be contacted by said yarn and a plurality of guides for regulating the ballooning of said yarn so as to control the degree of abrasion of said yarn by said abrasive member, the construction and arrangement being such that said abrasive member and said guides are mounted for vertical adjustment on said rod.

4. Apparatus for the conversion of a yarn comprising a bundle of continuous filaments into a continuous product containing staple fiber comprising, in combination with an up-twisting device having means for ballooning said yarn and inserting a twist therein and means for taking-up the same at a point above said twisting means, a rod attached to said up-twisting device, holders mounted for vertical movement on said rod, an abrasive member and a plurality of guides carried by said holders, the construction and arrangement being such that the abrasive member is adapted to be contacted by said yarn and the guide means are adapted to regulate the ballooning of said yarn so as to control the degree of abrasion of said yarn by said abrasive member.

5. Apparatus for the conversion of a yarn comprising a bundle of continuous filaments into a continuous product containing staple fiber comprising, in combination with an up-twisting device having means for ballooning said yarn and inserting a twist therein and means for taking-up the same at a point above said twisting means, a rod attached to said up-twisting device, holders mounted for vertical movement on said rod, an abrasive member and a plurality of guides adjustably carried by said holders, the construction and arrangement being such that the abrasive member is adapted to be contacted by said yarn and the guide means are adapted to regulate the ballooning of said yarn so as to control the degree of abrasion of said yarn by said abrasive member.

JULES E. HALIN.