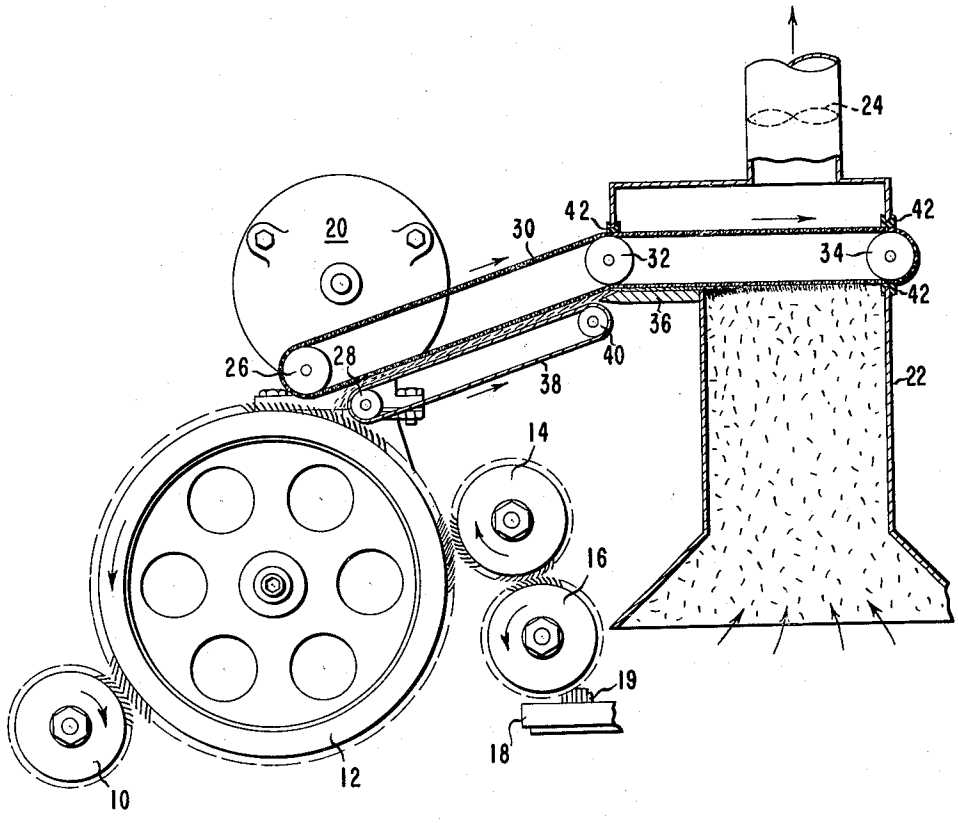
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FIBER RECOVERY UNIT FOR KNITTING MACHINE
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FIBER RECOVERY UNIT FOR KNITTING MACHINE

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This invention relates generally to the production of pile fabrics and, more particularly, to improvements in the machines which are employed in knitting such fabrics.

It is well known that, in the operation of coventional sliver knitting machines, a significant percentage of the processed fibers is lost as the fibrous mass is transferred from the carding head to the knitting needles.

The most important object of the present invention is to provide a fiber recovery unit adapted for use with otherwise conventional sliver knitting machines.

A further important object is the provision of a fiber recovery unit which includes means for returning recovered fibers directly back to the carding head of a knitting machine with the result that the need for reprocessing the recovered fibers is eliminated.

Another object of the present invention is to present a process improvement which involves the steps of collecting and redepositing free fibers continuously during the knitting process.

With these and other objects in view, a fiber recovery unit is disclosed herein which includes an exhaust stack having an inlet located adjacent a knitting machine and a fiber recovery device which has means within the stack for collecting the recovered fibers as well as conveyor means leading from the stack to a carding head for returning the collected fibers directly into the process.

Other objectives will become apparent in the following specification wherein reference is made to the accompanying drawing in which the exhaust stack and recovery unit of the present invention have been shown in combination with a sliver knitting machine.

The sliver knitting machine which has been chosen for purposes of illustration is of the type which has been disclosed by Brandt in U.S. Patent No. 2,710,525. The carding head, which has been shown only partially, includes a lickerin cylinder **10**, a main cylinder **12**, an intermediate cylinder **14** and a feed cylinder **16**. There are preferably a number of such carding heads radially spaced around a rotatable needle cylinder **18**. Each of the heads includes a frame on which a motor **20** is mounted as a prime mover for the various cylinders and for the needle cylinder. A plurality of needles **19** on cylinder **18** penetrate a proper depth into the fibrous mass on feed cylinder **16** during the knitting operation. Further details as to the formation of the pile fabric have been omitted from this specification since the actual construction and operation of any particular knitting machine are not within the scope of the present invention.

Above the cylinder **18**, there is located an exhaust stack **22** having a fan **24**. The free fibers which are normally lost at the knitting location are picked up by the air moving into stack **22**. One of the card heads surrounding the cylinder **18** has associated therewith a pair of rolls **26**, **28** which are driven by the corresponding motor **20**, all as shown in the drawing. The other card heads (not shown) may be arranged, for example, in the manner disclosed by Brandt. A perforated or foraminous continuous belt **30** is trained over roll **26** and rolls **32**, **34**, the latter being rotatably mounted in openings provided therefor in the side walls of stack **22**. The belt thus entirely traverses stack **22** as it travels therethrough. Belt **30** may be made of metal or a suitable

synthetic material. At the point where belt **30** leaves stack **32**, there is provided a tray or shell **36** which extends to a conveyor belt **38** that is trained over the driven roll **28** and a roll **40**.

In operation, stack **22** and fan **24** function to evacuate free fibers from the knitting location. The evacuated fibers may comprise as high as 35% of the total fibers processed. Within the stack, these free fibers are collected against the moving belt **30** and held thereon by suction. Belt **30** thus acts as a fiber collection device. The vacuum is maintained until such time as the belt has passed beyond roll **32**. At this point, the fibers are deposited on conveyor belt **38** and eventually on the main cylinder **12**.

It is apparent that fan **24** must have sufficient capacity to maintain a vacuum in stack **22** if the unit is to operate effectively. In this respect, it is noted that even though the belt becomes substantially matted with fibers as it traverses the stack there will always be a continuous flow in the area of the belt which is adjacent to roll **34**. As belt **30** passes over tray **36**, the free fibers are still held by the vacuum in stack **22**. Maintenance of this vacuum is enhanced by the use of solid rolls **32**, **34** and by the provision of suitable sealing strips **42** which extend through the length of rolls **32**, **34**. The matted fibers preclude the entrance of air through the passage between belt **30** and tray **36**.

The improved process includes, in addition to the conventional knitting steps, the evacuation of free fibers from a knitting location, the collection of evacuated fibers, and the immediate return of collected fibers at a suitable stage in the carding operation. When the evacuation step alone is followed, the fibers are either blown to waste or collected and completely reprocessed. By incorporating the immediate collection and return steps disclosed herein, the time and expense of reprocessing are avoided.

It is apparent that many changes and modifications may be made in the disclosed fiber recovery process and apparatus without departing from the spirit of the present invention which is therefore intended to be limited only by the scope of the appended claims.

I claim:

1. In a sliver knitting machine including a needle cylinder and at least one carding head feeding to the needle cylinder at a knitting location: an exhaust stack having an inlet located above the knitting location for the removal of free fibers; and a fiber recovery unit including conveyor means leading from the stack to the carding head and a fiber collection device within the stack, said device being coupled with the conveyor means for the distcharge of collected fibers thereto.

2. The sliver knitting machine of claim 1 wherein said fiber collection device comprises a traveling, foraminous belt traversing said stack and extending at least as far as said conveyor means.

3. The sliver knitting machine of claim 2 wherein is provided a tray beneath said belt and extending from the stack to the conveyor means.

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