

May 17, 1966

R. M. INGHAM, JR

3,251,101

SUCTION CLEARER

Filed Feb. 6, 1964

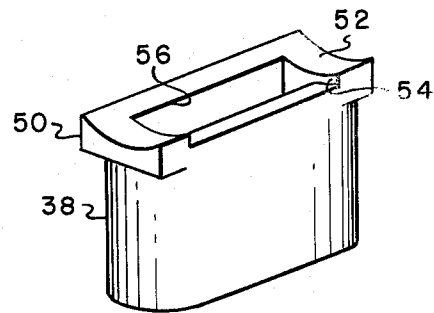
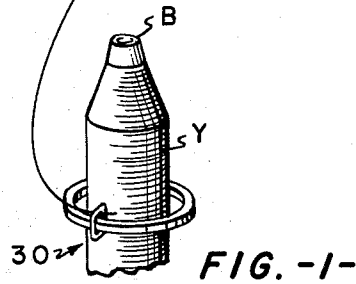
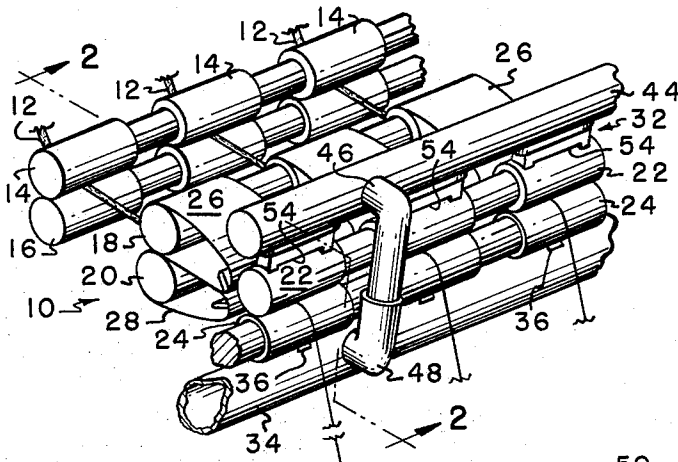


FIG.-3-

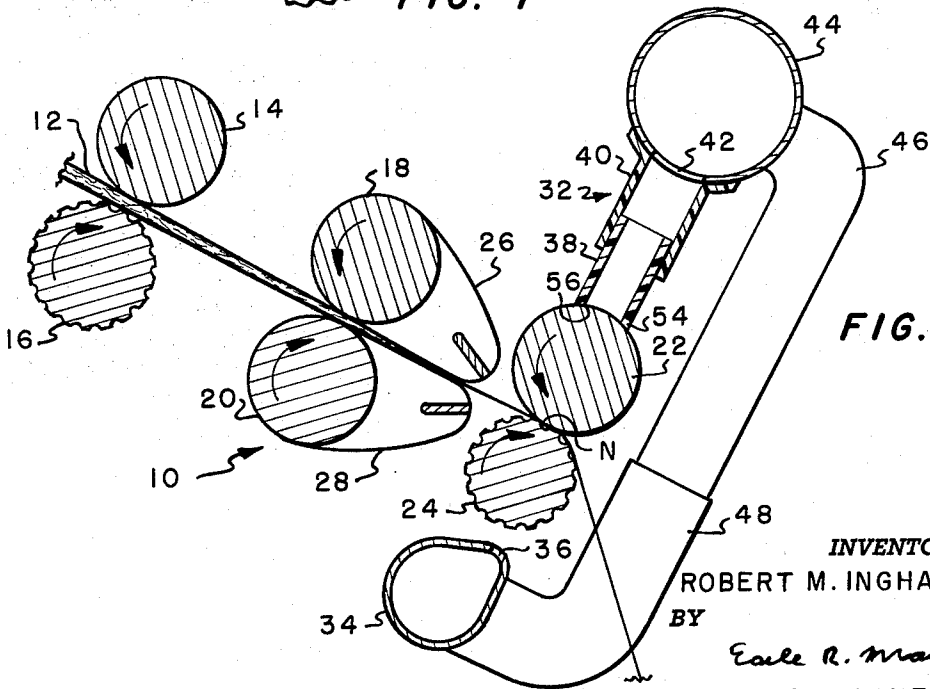


FIG.-2-

INVENTOR.
ROBERT M. INGHAM, JR.
BY

Earle R. Marden
ATTORNEY

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SUCTION CLEARER

Robert M. Ingham, Jr., Spartanburg, S.C., assignor to
Deering Milliken Research Corporation, Spartanburg,
S.C., a corporation of Delaware

Filed Feb. 6, 1964, Ser. No. 342,920

10 Claims. (Cl. 19-263)

This invention relates generally to textile handling apparatus employing drafting rolls and more particularly to vacuum clearing apparatus for clearing of lint and fiber from textile rolls such as those associated with spinning frames, roving frames, and the like.

This application is a continuation-in-part of applicant's copending patent application 314,240, filed October 7, 1963.

This invention relates generally to the handling of any textile fibers but in particular is exceptionally useful in the spinning of dyed worsted fibers. Such dyed worsted fibers are difficult to spin due to the repeated chemical processing of the fibers prior to spinning. In prior art textile drafting apparatus the top rolls frequently become coated with residues of the dyestuffs causing the fibers to wrap completely around the roll and mat thereon. Such phenomena is called a lap up and has partially been corrected in the past by the use of a clearer in contact with the roll. Such clearers are normally equipped with felted pads, sheep skin, etc., and are of either the revolving type or the stationary flat type. Such clearers perform well for a while but tend to allow fiber to accumulate behind the clearer which, if not cleared by the operator, will eventually be dragged into the roll and cause one or more ends down.

It is therefore an object of the invention to provide a top roll vacuum clearer for a drafting system which efficiently cleans the top roll and does not require constant cleaning by the operator.

Another object of the invention is to provide a top roll vacuum clearer which will pick up fibers which tend to wrap around the top roll in case of an end down and which also will prevent accumulation of short fibers or foreign matter coming through with the fibre being drafted.

A third object of the invention is to provide an efficient and economical top roll vacuum clearer which will maintain the top drafting roll in clean condition without constant surveillance of an operator.

A still further object of the invention is to provide a close fitting vacuum type top roll clearer for the top front roll of a drafting system which performs the dual function of physically wiping the peripheral surface of the top roll and by the employment of a vacuum system, removes the lint and debris dislodged by the wiping action, to a point of collection before such material can damage the fibers being drafted.

Another object of the invention is to provide a front roll vacuum clearer for a drafting system which physically wipes the roll and removes the generated lint and debris through a vacuum system.

Other objects and advantages of my invention will be clearly apparent as the specification proceeds to describe the invention with reference to the accompanying drawings in which:

FIGURE 1 is a perspective schematic view of the new and improved vacuum clearer as applied to a conventional drafting arrangement;

FIGURE 2 is a cross-sectional view taken on line 2-2 of FIGURE 1;

FIGURE 3 is a blown up perspective view of the clearer element.

Looking at the drawings the new and improved top roll vacuum clearer 32 is shown, for the purpose of illustration, on a conventional drafting arrangement 10 to which

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a linear mass of staple fibers in the form of roving 12 is fed from a supply source, (not shown) to the drafting arrangement 10. The drafting arrangement is schematically illustrated for purposes of simplicity of explanation and it will be understood by those skilled in the art that conventional refinements may be added thereto, if desired.

In the illustrated drafting arrangement 10 as shown three sets of drafting rolls are provided, namely back rolls 14 and 16, middle rolls 18 and 20, and front rolls 22 and 24. As in conventional practice, at least one of each of these sets of rolls is driven, and each succeeding set of rolls is as usual driven at a faster rate than the preceding rolls in order to give the desired degree of drafting of the fibers in the zones between the respective pairs of rolls. As is well known in the art, drafting aprons 26 and 28 are employed in conjunction with middle rolls 18 and 20, respectively, to control the flow of fibers to the front rolls 22 and 24. The fiber mass is twisted as it leaves the nip N of the front pair of rolls 22 and 24 by the twisting action of a twisting and take-up device, which in the illustrative form of the invention takes the form of a conventional ring and traveler twister 30 onto which the drafted and twisted fiber mass is then taken up as yarn Y on the bobbin B.

In the preferred form of the invention roving 12, shown in FIGURES 1 and 2, is dyed worsted fibers which are tender due to repeated chemical processing of the fibers and to the many drafting operations prior to spinning. These fibers therefore tend to deposit residues of the dyestuffs on the front top drafting roll 22. Such residue is extremely hard to remove and normally requires periodic clearing by the operator. To alleviate this situation and to prevent ends down and lap ups due to accumulation of short fibers and foreign matter in the worsted, a new and improved top roll vacuum clearer 32 is employed in combination with a conventional suction manifold 34. It is within the scope of this invention to employ a rectangular manifold and a bottom roll clearer of any desired type.

Suction manifold 34, connected to a source of negative pressure, not shown, has a plurality of slots 36 therein beneath each of the lower front rolls 24 to gather the fly and lint adjacent the lower front rolls 24. Further, if the fiber should break between the rolls 22 and 24 and the twister take-up device 30, the worsted fiber being processed thereafter and prior to the repair of the break will be directed to the collection zone (not shown) through the slots 36 in the suction manifold 34. This eliminates the generation of a lot of lint and fly in the surrounding area which will not only affect the yarn produced by the particular set of rolls but also which can have a deleterious effect on the yarn being produced in adjacent areas by other drafting arrangements.

Looking now in particular at the top roll vacuum clearer 32, shown in cross-section in FIGURE 2, it can be seen that it consists basically of an oval shaped hollow shoe member 38 which engages the top front roll 22, a collar member 40 which communicates with an opening 42 in an elongated suction manifold 44, and tubular members 46 and 48 which provide communication between suction manifolds 34 and 44. Preferably, shoe member 38 and collar member 40 are molded from Delrin but it is within the scope of the invention to use any suitable wear resistant material.

For the purpose of illustration suction manifolds 34 and 44 are interconnected so that a single vacuum source can be employed but obviously suction manifolds 34 and 44 can each be separately attached to a suction source. Also, suction manifolds 34 and 44 are shown extending across a plurality of drafting positions. Again, if desired, individual suction conduits can be used at each spindle position. These individual conduits can be interconnected or separately connected to a vacuum source.

Looking at FIGURE 3, the oval shaped hollow shoe member 38 is provided with a rectangular flanged portion 50 which has a curved surface 52 having a radius of curvature which substantively conforms to the radius of curvature of the top front roll 22. A notch 54 is cut into one of the elongated sides of the flange member 52 for the reason hereinafter set forth. The outer dimension of the shoe member is so selected that it will fit snugly into the collar member to prevent leakage of air but at the same time can readily slide up and down to conform to variations in movement of the top front roll 22.

In operation, the drafting rolls 14, 16, 18, 20, 22 and 24 rotate in the direction denoted by the arrows. If an end should come down any fiber which tends to lap around the top roll 22 will be drawn into the notch 54 and be directed to the collection zone through shoe member 38, collar 40, suction manifold 44, tubular conduits 46 and 48 and suction manifold 34, thereby preventing what is known in the trade as a top roll lap.

In normal operation, any accumulation of short fibers or foreign matter coming through with the fiber being processed and clinging to the top roll will be wiped or scraped off the periphery of the roll 22 by the elongated edge 56 on the inside of the shoe member 38 and directed to the collection zone (not shown). It should be noted that elongated edge 56 of the shoe member 38 contacts the roll 22 angularly downstream from notch 54 so that fibers scraped off the periphery of roll 22 will immediately be affected by the suction pressure in the manifold 44 and directed to the collection zone (not shown). The proximity of the notch 54 to the fiber being drafted will tend to collect any loose fibers, lint, and fly which are separated from the fiber as it enters the nip N of the drafting rolls 22 and 24.

In the preferred form of the invention disclosed the vacuum clearer is employed on the top front roll 22 only but it is within the scope of the invention to use the herein disclosed vacuum clearer on the bottom front fluted roll 24, if desired. If a bottom clearer is employed it can be employed either alone or in combination with a top roll clearer of the type described.

The herein disclosed top roll vacuum clearer has many obvious advantages. Clearer 32 is simple in design, inexpensive to manufacture, and is easily installed as original equipment or as an addition to existing frames. Clearer 32 not only prevents top roll lap up when an end comes down but serves to prevent or lessen the number of ends down by keeping the top roll clear of any fibre or trash which tends to cause an excessive number of ends down. Furthermore, the new and novel clearer is substantially automatic greatly lessening the amount of time and attention required by an operator to clean and piece up ends on prior art drafting systems.

Although I have described in detail the preferred embodiment of my invention, I contemplate that many changes may be made without departing from the scope or spirit of my invention, and I desire to be limited only by the claims.

That which is claimed is:

1. Textile drafting apparatus comprising a pair of drafting rolls in peripheral nip-forming engagement with each other, a suction manifold mounted in a predetermined position relative to said pair of drafting rolls and in communication with a source of negative pressure, suction conduit means in fluid communication with said suction manifold, means mounting said suction conduit means in frictional engagement with one roll of said pair of rolls and allowing movement of said suction means relative to both said suction manifold and said one roll of said pair of rolls upon encountering variations in the surface of said one roll of said pair of rolls, said suction conduit means having at least two spaced wall portions, one of said wall portions being in frictional engagement with said one roll of said pair of rolls to scrape lint and

debris therefrom and the other of said wall portions being spaced from said one roll of said pair of rolls to provide an opening between said other wall portion and said one roll of said pair of rolls to allow a potential lap up to be directed to the suction source.

2. The structure of claim 1 wherein said suction conduit means is substantially hollow, said one wall portion being on the opposite side of said conduit means from said other wall portion, said one wall portion contacting said one roll of said pair of rolls angularly downstream of said other wall portion.

3. Textile drafting apparatus comprising a pair of drafting rolls in peripheral nip-forming engagement with each other, a suction manifold mounted in a predetermined position relative to said pair of drafting rolls and in communication with a source of negative pressure, suction conduit means in fluid communication with said suction manifold, means mounting said suction conduit means in frictional engagement with one roll of said pair of rolls and allowing movement of said suction means relative to both said suction manifold and said one roll of said pair of rolls upon encountering variations in the surface of said one roll of said pair of rolls, said suction conduit means having at least two spaced wall portions, one of said wall portions being of wear resistant plastic like material and being in frictional engagement with said one roll of said pair of rolls to scrape lint and debris therefrom and the other of said wall portions being spaced from said one roll of said pair of rolls to provide an opening between said other wall portion and said one roll of said pair of rolls to allow a potential lap up to be directed to the suction source.

4. The structure of claim 3 wherein said suction conduit means is substantially hollow, said one wall portion being on the opposite side of said conduit means from said other wall portion, said one wall portion contacting said one roll of said pair of rolls angularly downstream of said other wall portion.

5. Textile drafting apparatus comprising: a pair of drafting rolls in peripheral nip-forming engagement with each other, a suction manifold mounted adjacent said pair of rolls in communication with a source of negative pressure, suction conduit means in frictional engagement with one roll of said pair of rolls and operably associated with said suction manifold, means in fluid communication with said suction manifold and slidably mounting said conduit means with respect to said one roll of said pair of rolls to allow said suction conduit means to slide up and down upon encountering variations in the surface of said one roll of said pair of rolls, said suction conduit means having at least two spaced apart wall portions, one of said wall portions being of a wear resistant plastic like material and being in frictional engagement with said one roll to scrape lint and debris therefrom and the other of said wall portions being spaced from said roll to provide an opening between said other wall portion and said one roll of said pair of rolls to allow a potential lap up to be directed to the suction source.

6. The structure of claim 5 wherein said means slidably mounting said conduit means is a hollow collar member secured to said suction manifold, said suction conduit means having a shape to substantially conform to the inside shape of said hollow collar member.

7. The structure of claim 6 wherein said collar member and said suction conduit means are oval shaped.

8. The structure of claim 7 wherein said wall portions of said suction conduit means form the long sides of said oval shaped suction conduit means.

9. The structure of claim 5 wherein said suction conduit means is substantially hollow, said one wall portion being on the opposite side of said conduit means from said other wall portion with the portion thereof contacting said one of said pair of rolls having a radius of curvature substantially equal to the radius of curvature of the contacted roll.

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10. The structure of claim 9 wherein said one wall portion contacts said one roll of said pair of rolls angularly downstream of said other wall portion.

References Cited by the Examiner

UNITED STATES PATENTS

3,074,121 1/1963 Barr et al. ----- 19—263

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FOREIGN PATENTS

1,023,262 12/1952 France.

872,939 7/1961 Great Britain.

5 ROBERT R. MACKEY, *Acting Primary Examiner.*
DONALD W. PARKER, *Examiner.*