May 17, 1966 R. M. INGHAM, JR 3,251,100

DRAFTING SYSTEM WITH TOP AND BOTTOM ROLL CLEANING

Filed Sept. 5, 1963 3 Sheets-Sheet 1

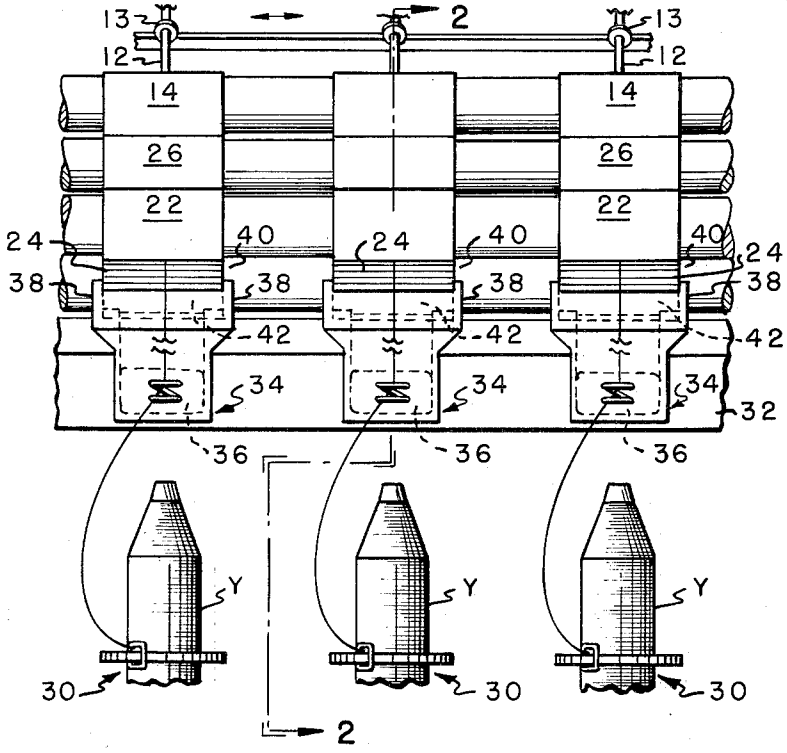

FIG. -1-

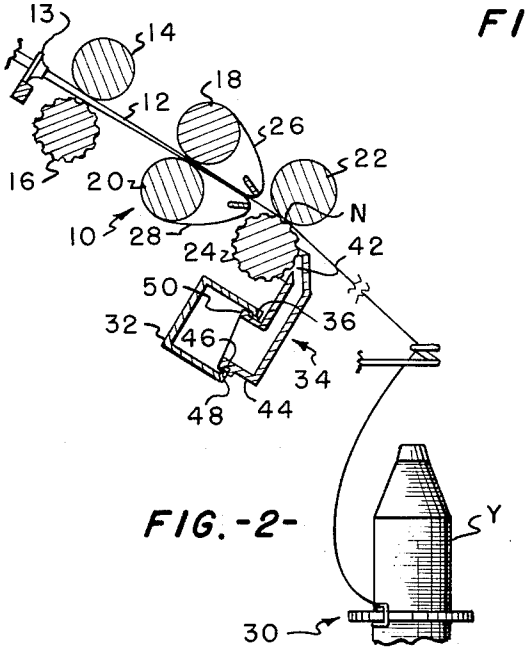

FIG. -2-

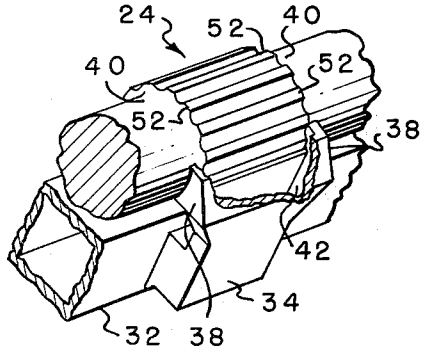

FIG. -3-

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DRAFTING SYSTEM WITH TOP AND BOTTOM ROLL CLEANING

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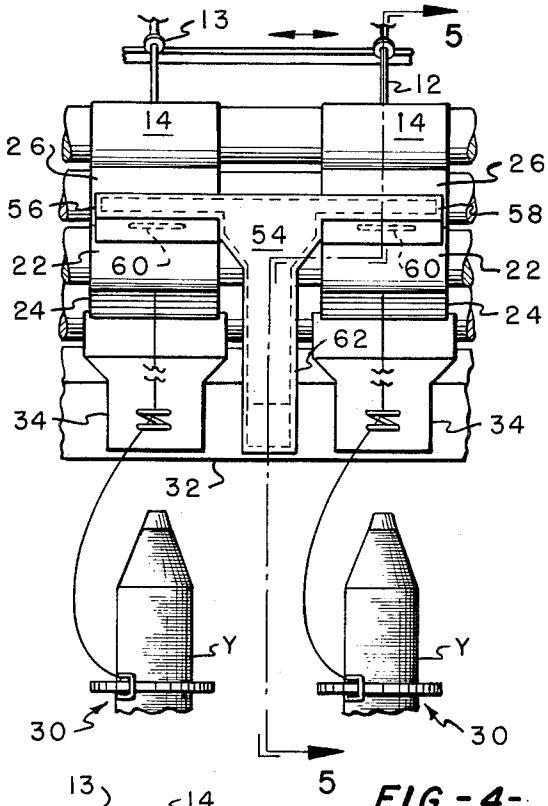

FIG.-4-

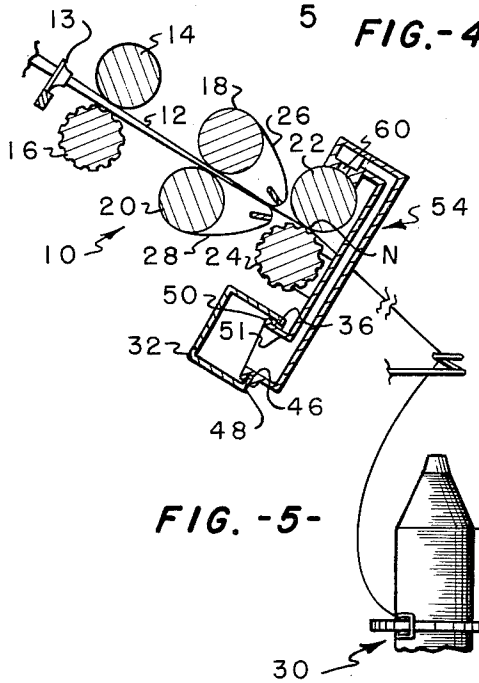

FIG.-5-

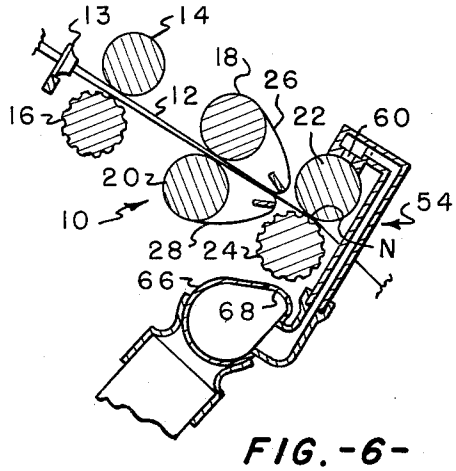

FIG.-6-

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DRAFTING SYSTEM WITH TOP AND BOTTOM ROLL CLEANING

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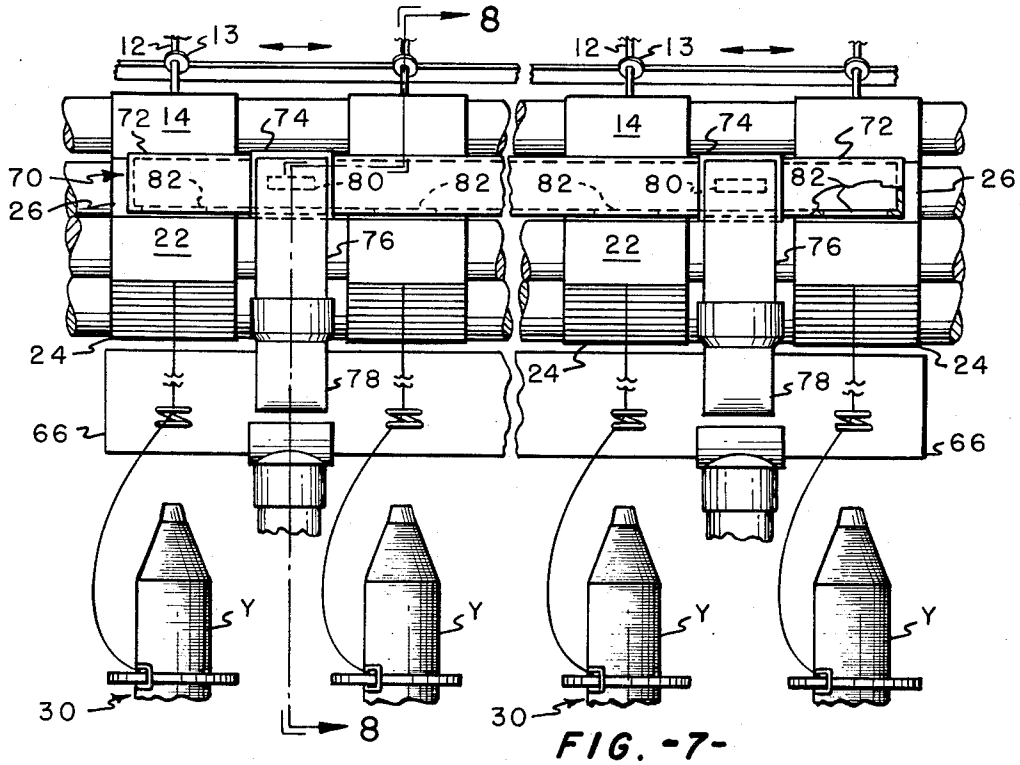

FIG. -7-

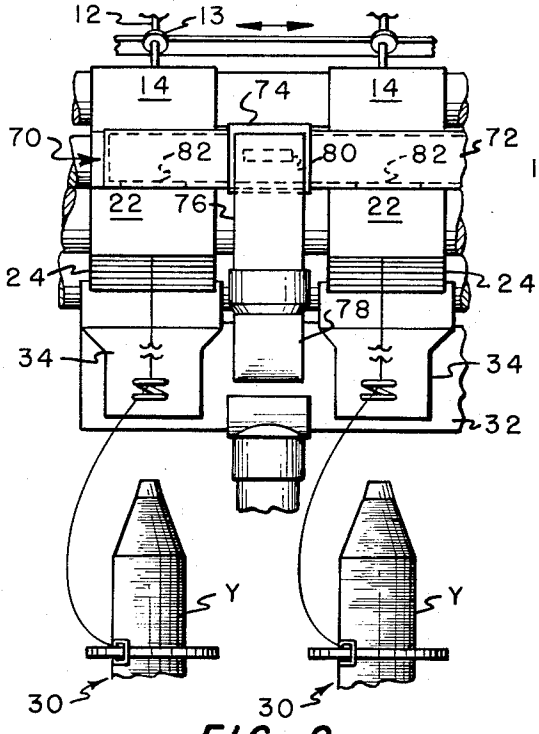

FIG. -9-

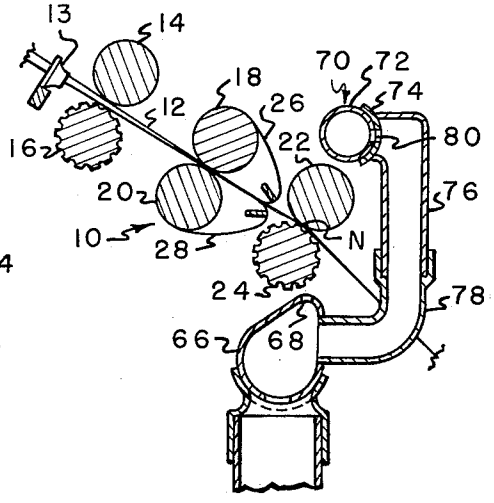

FIG. -8-

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DRAFTING SYSTEM WITH TOP AND BOTTOM ROLL CLEANING

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3 Claims. (Cl. 19—263)

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

It is well known that in the drafting of fibrous textile strands, such as performed in draw frames, roving frames, spinning frames and the like, loose fibers, lint and small particles of foreign matter ordinarily collect on the top and bottom drafting rolls to the extent that they form into bunches which are either subsequently cast off by the rolls and carried along by the strands being processed causing slubs, clots, etc., in the strands or the loose fibers, lint, etc., build up on the drafting rolls thereby changing the desired drafting characteristic of the fiber being drafted or causing the yarn to break.

Various systems have been proposed to eliminate the above problem but none appear to have been completely successful. One system in current use is the use of a freely rotating fibrous covered roll in contact with the top and bottom rolls to collect the loose fibers deposited thereon during the drafting operation. This system worked to some extent but has the basic disadvantage that the additional fiber collecting rolls had to be cleaned periodically, otherwise, the loose fibers, lint, etc., would be cast off into the strands being processed. This constant cleaning operation is not only time consuming and costly but is open to the human error that such cleaning is not always performed when needed resulting in low quality strands being produced.

Another system also in current use is to employ an elongated vacuum source below the lower roll to collect the loose fibers, ambient lint, etc. This system improved conditions considerably but still did not solve the problem since the manifold was too far removed from the top and bottom rolls to effectively remove the loose fibers, etc., which tend to lap around the respective rolls. Also, this type of suction device does not pick up the loose fibers which build up on the roll surface beyond the normal traverse of the yarn being twisted. When this build-up becomes excessive, the fiber being processed picks up a batch of these builtup fibers causing a gout or slub in the yarn resulting in a breakage of the yarn because the slub or gout formed will not pass through the traveler.

It is, therefore, an object of the invention to provide a textile cleaning system which will efficiently clear the top and bottom rolls of a drafting system.

Another object of the invention is to provide a textile vacuum cleaning system which will efficiently and automatically remove loose fibers, lint, etc., which tend to accumulate on drafting rolls.

A third object of the invention is to provide a vacuum cleaning apparatus which is positioned closely adjacent the lower front roll of a drafting system to efficiently remove and clear loose fibers, lint, etc., therefrom.

A still further object of the invention is to provide a vacuum cleaning system for the top front roll of a drafting system.

Another object of the invention is to provide a vacuum cleaning system for the top and bottom rolls of a drafting system which can be employed on existing systems as well as installed as original equipment.

Other objects and advantages of the invention will become apparent as the specification proceeds to describe the invention with reference to the accompanying drawing, in which:

FIGURE 1 is a front schematic elevation view of a conventional drafting arrangement employing a bottom roll vacuum apparatus;

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

FIGURE 3 is a perspective schematic view of the lower front drafting roll and the new and improved suction apparatus associated therewith;

FIGURE 4 is a front schematic elevation view of a drafting system employing vacuum devices on both the top and bottom drafting rolls;

FIGURE 5 is a cross-section view taken on line 5—5 of FIGURE 4;

FIGURE 6 is a cross-section similar to that of FIGURE 5 showing a modified suction conduit;

FIGURE 7 is a front elevational schematic view of a drafting system showing a modification of the top roll vacuum device shown in FIGURES 4 and 5;

FIGURE 8 is a cross-section view taken on line 8—8 of FIGURE 7; and

FIGURE 9 is a view similar to FIGURE 7 showing the additional use of a vacuum device on the lower front roll.

Looking at the drawings, all forms of the invention are shown employed, for the purpose of illustration, on a conventional drafting arrangement **10** to which 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** through a traversing trumpet member **13** which traverses a pre-determined distance across the axial length of the rolls. 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 embodiment takes the form of a conventional ring and traveler twister takeup **30** onto which the drafted and twisted fiber mass is then taken up as yarn Y.

Looking now to FIGURES 1–2, the new and improved suction apparatus is shown associated with the bottom front roll **24** of the drafting arrangement **10**. A suction manifold conduit **32**, preferably rectangular, connected to a source of negative pressure (not shown) is supported under and adjacent the lower front roll **24**. Suction nozzles **34** constructed of Delrin or other suitable high

wear resistant material located in rectangular opening 36 of the suction conduit 32 have projections 38 bearing on the roll neck 40 to position the elongated slot 42 across the full width of the roll 24 and closely adjacent thereto to provide suction cleaning of the roll as it rotates.

The bottom 44 of the suction nozzles 34 is provided with an elongated groove 46 into which the edge 48 of the opening 36 will fit to allow pivotal movement of the suction nozzle 34. A detent 50 is provided on the tip of the suction nozzle connection 51 to prevent the suction nozzle 34 from falling out of the opening when the negative pressure source is turned off.

The pivotal movement of the suction nozzle 34 is necessary to allow the nozzle 34 to be pivoted away from the lower front roll 24 to gain access thereto especially in case that the fiber breaks and has to be pieced up. Under normal operating conditions the vacuum in the suction manifold conduit 32 will hold the suction nozzles 34 in position adjacent the roll 24.

As can be seen the suction nozzle 34 will clean the entire roll surface as it rotates. Looking at FIGURE 3 the roll is shown as fluted with the elongated slot 42 adjacent the flutes 52. The air between the flutes 52 will then be drawn inwardly toward the slot 42 causing a vacuum cleaning effect thereby sweeping the roll surfaces to cause any accumulated dust, trash, or lint to be sucked into the suction nozzle 34 and through the suction manifold conduit 32 to a collection zone (not shown).

In all forms of the invention the axial length of both the top and bottom roll to be cleaned is at least equivalent to the length of axial traverse of the trumpet 13. In the case of the fluted lower front roll 24 the axial length of the roll to be cleaned is at least the equivalent axial length of the flutes 52. This flute length normally is greater than the traverse of the trumpet 13 through which the roving is being supplied to the drafting system 10.

As previously pointed out, to accomplish a complete and efficient cleaning operation, the top front roll 22 should also be cleaned. Looking at FIGURES 4 and 5, there is shown a top roll suction cleaning element 54 which is designed to suction clean a pair of top front rolls 22.

Suction cleaning element 54 is a T-shaped element of Delrin or other suitable material with arms 56 and 58 projecting over the top rolls 22 in a position so that elongated slots 60 therein are positioned adjacent the roll surface. The arms 56 and 58 are in fluid communication with the suction conduit 32 through the depending leg portion 62 pivotally secured in rectangular opening 36 in the same manner as bottom roll suction nozzles 34. It should be noted that leg portion 62 is located between the suction nozzles 34. Arms 56 and 58 are located at the top of the rolls 22 to allow the operator to gain access to the rolls 22 and 24 and the fiber being processed without having to disturb the T-shaped top roll suction clearer member 54.

If desired, the T-shaped top roll suction clearer member 54 may be used without the suction nozzles 34. Looking at FIGURE 6, such an arrangement is shown. Preferably, when it is desired to use the T-shaped top roll suction clearer 54 without the suction nozzles 34, a suction manifold conduit 66 is used. Conduit 66 has a plurality of slots 68 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 fiber being processed thereafter and prior to the repair of the break will be directed to the collection zone (not shown) through the slots 68 in the suction manifold conduit 66. 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 the surrounding area by other drafting arrangements.

In FIGURES 7 and 8 there is shown a modified top roll suction clearer 70. Top roll suction clearer 70 is generally similar to that shown in FIGURES 4–6 except it clears a multiplicity of drafting positions. Preferably, top roll suction clearer 70 is used in conjunction with a suction manifold conduit like suction manifold conduit 66 with slots 68 therein to clean the lower roll area.

Top roll suction cleaner basically consists of a tubular member 72 closed at both ends connected to suction manifold conduit 66 through a substantially semicircular plate member 74, welded or otherwise secured to pipe member 76 which is telescoped into tubular elbow member 78 attached in any suitable manner to the suction manifold conduit 66. A suitable opening 80 is made in plate member 74 to provide fluid communication between the suction manifold conduit 66 and the tubular member 72.

Tubular member 72 can be of any desired length and extend over as many drafting positions as desired. Preferably, since the conventional roll stands normally encompass six drafting arrangements, tubular member 72 will be of sufficient length to cover six drafting positions. Elongated slots 82 are provided over each top roll 22 to pick the desired lint, fly, etc., from the desired roll.

FIGURE 9 is a modification of FIGURES 7 and 8 showing the use of the top roll suction clearer 70 in combination with the bottom roll suction nozzles 34. Preferably, a suction manifold of the type shown in FIGURES 4 and 5 will be employed in conjunction with the combined top and bottom roll clearer members. This modification provides complete and efficient suction cleaning of both the front, top and bottom rolls of a drafting arrangement. Such arrangement may be employed with many types of drafting arrangements with as many drafting positions as desired.

The herein disclosed suction cleaning arrangement has many obvious advantages not present in the prior art. The cleaning arrangement disclosed provides maximum cleaning with a minimum of apparatus which does not interfere with the mechanical operation of the drafting system. Further, the cleaning arrangement prevents any buildup of lint, trash, etc., on the rolls thereby allowing the production of a better quality yarn with a minimum of labor. Also, the disclosed cleaning arrangement greatly reduces the maintenance requirements of the drafting system thereby providing a saving in equipment and personnel.

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

That which is claimed is:

1. Textile drafting apparatus comprising a plurality of drafting rolls including a pair of rolls in nip forming engagement, one roll of said pair of rolls having flutes thereon with a reduced diameter portion on each side of said flutes, means supplying fiber to be drafted between said pair of rolls, conduit means pivotally mounted in bearing position against said reduced diameter portions and spaced from said flutes between said bearing positions, and means connecting said conduit means to a source of negative pressure to apply suction pressure to said fluted roll to clean said fluted roll and to hold said conduit means in bearing position against said reduced diameter portions.

2. The structure of claim 1 wherein a second conduit means is supported adjacent said other roll of said pair of rolls and is connected to a negative pressure source to clean said other roll of said pair of rolls.

3. The structure of claim 2 wherein said one roll of said pair of rolls is below the other roll of said pair of rolls.

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