

Dec. 26, 1967

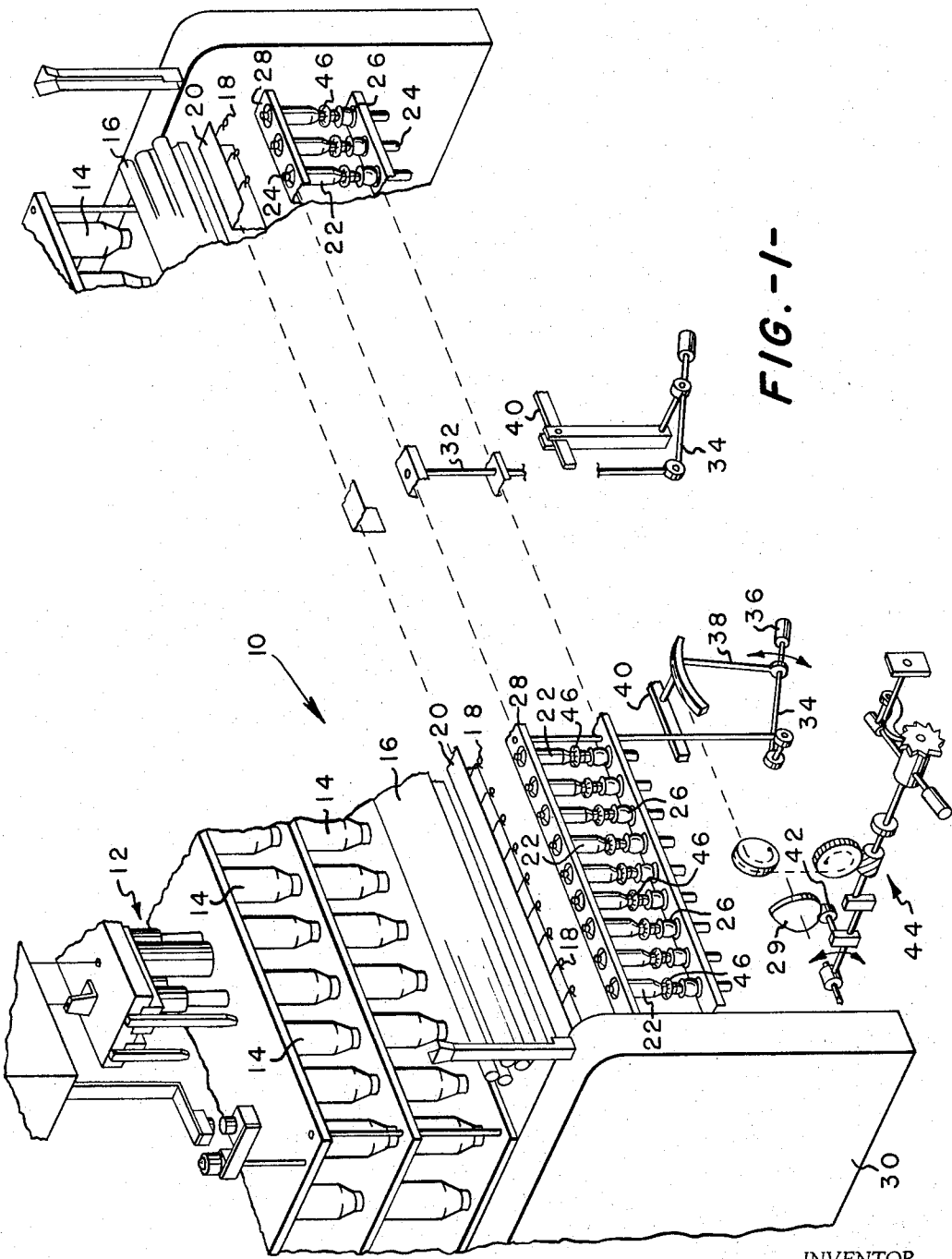
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3,359,714

YARN WASTE CLEANER

Filed May 27, 1965

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

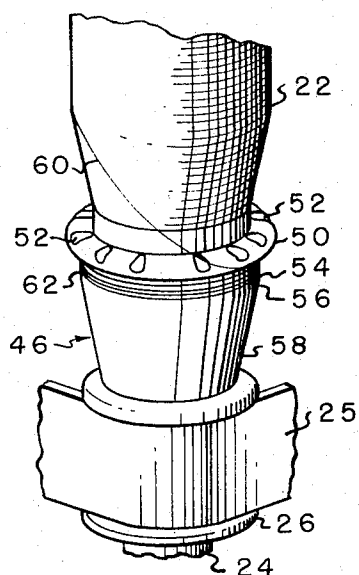


FIG. -2-

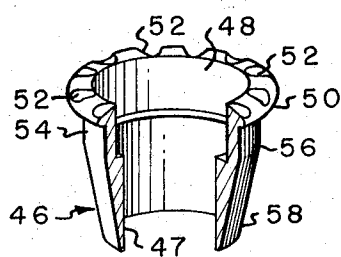


FIG. -3-

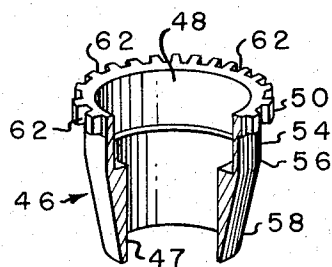


FIG. -4-

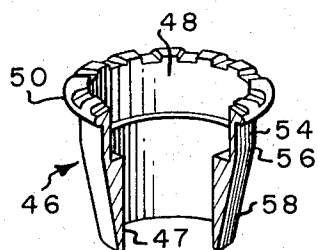


FIG. -5-

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YARN WASTE CLEANER

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12 Claims. (Cl. 57—56)

ABSTRACT OF THE DISCLOSURE

A textile processing machine which employs a cylindrical member mounted on a spindle below the bobbin to receive a few wraps of yarn when the bobbin is to be doffed to tie the yarn end down. The cylindrical member has a tapered conical surface to allow the wrapped yarn to slip down when the machine is restarted after doffing and to be thrown outward away from the spindle due to the centrifugal force generated by the rotating spindle.

This invention relates to bobbin using textile processing apparatus and more particularly to spinning, twisting, and like frames which necessitate the winding of a few wraps of yarn below the bobbin prior to doffing in order to secure the yarn end for the next cycle.

It is well known in the textile industry that prior to doffing it is advantageous to lower the frame ring rail below the bottom of the bobbin to wrap a few turns of yarn on the spindle between the bobbin and the whorl in order to secure the end of the yarn in position for the next spinning cycle so that the next cycle can be started without excessive piecing up of the yarn ends. This wrapping of the yarn on the spindle is particularly necessary when automatic doffing equipment is employed to doff the frames. The wrapping of yarn on the spindle prior to doffing solves one problem but raises another one in that the wrapped yarn on the spindle builds up to the point where it has to be manually cleaned therefrom to prevent damage to yarn being spun or twisted due to the bobbin riding high on the spindle due to the wraps of yarn on the base thereof.

It is, therefore, an object of the invention to provide a spinning, twisting, or like frame which automatically cleans off the extra wraps of yarn on the spindle.

Another object of the invention is to provide a spindle cleaner which is inexpensive to manufacture, readily installed, has a long service life, and automatically provides cleaning of the spindle.

A still further object of the invention is to provide a spindle cleaner which eliminates waste yarn on the spindle resulting in the elimination of the cost of manual cleaning.

Still another object of the invention is to provide a spindle cleaner which automatically cleans the waste yarn from the frame and allows the building of uniform bobbins so that the bobbins can be readily rewound by the winder tender.

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

FIGURE 1 is a schematic representation of a portion of a spinning frame with an automatic doffer overhead and which incorporates the novel spindle cleaner disclosed herein;

FIGURE 2 is a partial blown-up view of one spindle with the spindle cleaner shown in operative position;

FIGURE 3 is a perspective view of the spindle cleaner per se with a portion broken away to show the interior thereof;

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FIGURE 4 is a view similar to FIGURE 3 showing a modified version of the spindle cleaner and

FIGURE 5 is another view similar to FIGURE 3 showing a further modification.

Looking now to the drawings and especially to FIGURE 1 the herein disclosed invention is shown installed on a spinning frame, generally designated 10, over which is shown an automatic bobbin doffing and donning apparatus 12 awaiting the bearing down of the frame. In the illustrated form of the invention it is shown in cooperation with a conventional spinning frame but it is within the scope of the invention to apply such invention to other frames such as a twisting frame. The automatic bobbin doffing and donning apparatus 12 is not, per se, part of the invention and can be of many various types such as that illustrated in U.S. Patent No. 3,123,967.

In conventional manner roving is supplied from packages 14 through a conventional drafting system 16 wherein the fibers are aligned and compacted. From the drafting system 16 the compacted fiber strand passes through guides 18 in the threadboard 20 and are twisted and wound onto the bobbins 22 on the spindles 24. The spindles 24 are rotated in conventional manner by tapes 25 (FIGURE 2) which contact the whorls 26 of the spindles.

As in a conventional spinning frame the build of yarn on the bobbin 22 is controlled by a builder motion which basically controls the position of vertical movement of the ring rail 28. The ring rail 28, when the frame is first started up, reciprocates up and down adjacent the bottom of the bobbin 22 to wind yarn thereon. Then as the bottom portion of the bobbin is filled with yarn the ring rail is moved up automatically to wind yarn on a larger section of the bobbin. This continues until a desired portion of the bobbin is wound with yarn.

The operation of the builder motion is basically controlled by a cam 29 suitably driven by gears (not shown) within the confines of the head end housing 30 of the spinning frame. The ring rail 28 is moved by a plurality of vertical rods 32 secured to pivot rods 34 through suitable means and is counterweighted toward the up position by a weight 36 connected to the ends of pivot rods 34. To control the position of the ring rail 28 a rocker shaft 38 is provided and is connected to the draw bar 40 which interconnects all the vertical rods 32 to cause uniform motion of the ring rail.

As previously pointed out the ring rail 28 is incrementally raised as the build on the lower portions of the bobbin reaches a desired diameter. This motion of the ring rail is caused by the rotation of the cam 29 acting on the roller 42 to pivot the builder drive mechanism 44 up and down.

The operation of the builder motion 44 is conventional and can operate in the manner disclosed in co-pending U.S. patent application Ser. No. 442,911. Furthermore, the particular method of bearing down the ring rail 28 for the purpose of doffing the bobbins does not constitute part of this invention. The ring rail 28 can be beared down manually or can be beared down automatically in any suitable manner, such as that disclosed in co-pending U.S. Ser. No. 442,911, supra.

As previously discussed when the spinning frame 10 is ready to be doffed, the ring rail 28 is lowered to a position below the rotating bobbin 22 where several wraps of yarn are placed around the spindle 24 so that the yarn is anchored sufficiently enough when the full bobbin is doffed, the yarn will break between the spindle and the full bobbin leaving the yarn intact from the drafting system to the spindle. This allows an empty bobbin to be placed into operation without piecing up of the yarn end on start-up of the frame after doffing.

Prior to this invention, the above mentioned wraps of

yarn were placed directly on the base of the spindle resulting in a buildup of yarn on the spindle causing frequent cleaning of the spindle to be necessary. To eliminate this cleaning operation, a hollow spindle cleaner member 46 is telescoped over the spindle 24 with the bottom portion abutting the top of the whorl 26. The hollow spindle cleaner member 46 is preferably molded from Delrin or other suitable material and has two different internal diameters. The lower internal diameter portion 47 is so sized to snugly telescope the spindle 24 so that there is not relative motion between the cleaner member 46 and the spindle. The upper diameter portion 48 is greater than the lower diameter portion and of a size to provide a clearance space between a bobbin placed therein and the inner upper wall of the diameter portion 48.

Molded integral with the top of the spindle cleaner 46 is a flange 50 provided with notches 52 therein for reasons explained hereinafter. Below the flange 50 on the outer surface of the member is a yarn storage area 54 of substantially cylindrical shape. In the preferred form of the invention, the storage area 54 has about a 2° taper towards the bottom of the spindle cleaner. From a point 56 the outer portions 58 tapers inwardly towards the bottom portion of the cleaner member.

Looking at FIGURES 1 and 2 in particular the operation of the spindle cleaner member 46 will be explained. After the ring rail 28 has been lowered below the bottom of the bobbins the spindles will still be rotating. As the spindle rotates, one of the notches 52 in the flange 50 will catch the yarn 50 and guide it over the flange 50 onto the yarn storage area 54. The spindle will continue to rotate until the desired number of wraps 62 are placed on the spindle cleaner 46. Then the frame will be stopped, the bobbin doffed breaking the yarn between the bobbin and the spindle cleaner and an empty bobbin replaced on the spindles 24.

When the empty bobbins have been placed on the spindles, the spinning frame is started up and the ring rail is raised to start spinning yarn on the empty bobbins. At the same time, due to the centrifugal force exerted by the rotation of the spindle the wraps of yarn on the spindle cleaner member 46 loosens up and slips down onto the tapered section 58 where the yarn breaks up and disintegrates prior to the next doff cycle thereby eliminating the necessity of manual cleaning of the spindle. This loosening up, breaking up, and disintegration of the yarn is due to the decreased outer diameter of the spindle cleaner 46 and the centrifugal force and windage on the waste yarn due to the rotation of the spindle.

Looking now to FIGURES 4 and 5 modifications of the spindle cleaner 46 are shown. Basically the modifications of FIGURES 4 and 5 differ only in the type of notch employed to catch and guide the yarn 60 over the flange 50 of the spindle cleaner. In FIGURE 4 the outer edge of the flange 50 is cut or molded to form a plurality of gear like teeth 62 which provides a notch therebetween.

The modification of FIGURE 5 is very similar to that shown in FIGURES 1-3 except that the notch is formed with a rectangular cross-section rather than the semi-circular cross-section of the notches of FIGURES 1-3.

The herein disclosed yarn waste cleaner provides a spinning frame which eliminates damage to yarn being spun by automatically eliminating the wraps of waste yarn placed on the spindle during each doffing cycle. Furthermore, the disclosed invention eliminates the time and expense usually incurred in manually cleaning the spindles periodically. Also improved performance of the winders, which wind the yarn from the bobbin onto a cheese, is accomplished since the broken yarn end on each bobbin is in approximately the same position on each full bobbin allowing the winder tender to be able to find the loose yarn end and plug the bobbin much faster than usual. A still further advantage obtained is that the ring rail does not have to be lowered as far down as is currently done eliminating the problem of inadvertent interference

of the ring rail with the drive tapes. This advantage is due to the fact that the bobbin is located in the confines of the spindle cleaner so that the wraps of yarn are actually placed around the base of the bobbin on the spindle cleaner 46 while in prior art devices the wraps of yarn were placed on the spindle below the bottom of the bobbin.

Although I have described in detail the preferred embodiments of my invention, it is contemplated 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:

1. A textile processing apparatus comprising a frame, means rotatably mounting a plurality of spindles on said frame, a bobbin on each of said spindles, means supplying yarn to said bobbins, a collar member snugly telescoping said spindle, said collar member having a first portion and a second portion with a downwardly tapering diameter, whereby upon stopping said textile processing apparatus and wrapping a few wraps of yarn on said first portion and upon restarting said textile processing apparatus to rotate said spindle, said yarn wrapped on said first portion slides down on said tapered second portion and is cleaned therefrom by the centrifugal force exerted thereon by the rotation of said spindle.

2. The structure of claim 1 wherein said collar member includes an outwardly extending flange above said first portion to prevent yarn wrapped on said first portion sloughing upwardly off said first portion.

3. The structure of claim 2 wherein said collar member includes notches therein to guide yarn from said bobbin over said flange to wrap yarn on said first portion.

4. The structure of claim 3 wherein a portion of the internal diameter of said collar member is greater than the diameter of said spindle to loosely accommodate the bottom portion of said bobbin.

5. A textile processing apparatus comprising a frame, means rotatably mounting a plurality of spindles on said frame, a bobbin on each of said spindles, means supplying yarn to said bobbins, a ring rail reciprocally mounted on said frame in operative relationship with said spindles, a collar member snugly telescoping each of said spindles below said bobbins, said collar member having a first portion and a second portion with a downwardly tapering diameter, whereby upon stopping said textile processing apparatus and wrapping a few wraps of yarn on said first portion when said ring rail is in its lowest position and restarting said textile processing apparatus to rotate said spindles, said yarn wrapped on said first portion slides down on said tapered second portion and is cleaned therefrom by the centrifugal force exerted thereon by the rotation of said spindle.

6. The structure of claim 5 wherein said collar member includes an outwardly extending flange above said first portion to prevent yarn wrapped on said first portion sloughing upwardly off said first portion.

7. The structure of claim 6 wherein said collar member includes notches therein to guide yarn from said bobbin over said flange to wrap yarn on said first portion.

8. The structure of claim 7 wherein a portion of the internal diameter of said collar member is greater than the diameter of said spindle to loosely accommodate the bottom portion of said bobbin.

9. A textile processing apparatus comprising a frame, means rotatably mounting a plurality of spindles on said frame, said spindles having a whorl portion adjacent to the bottom thereof, a bobbin on each of said spindles, means supplying yarn to said bobbins, a ring rail reciprocally mounted on said frame in operative relationship with said spindles, a collar member snugly telescoping each of said spindles between said bobbin and said whorl, said collar member having a first portion and a second portion with a downwardly tapering diameter, whereby upon stopping said textile processing apparatus and wrap-

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ping a few wraps of yarn on said first portion when said ring rail is in its lowest position and upon restarting said textile processing apparatus to rotate said spindles, said yarn wrapped on said first portion slides down on said tapered second portion and is cleaned therefrom by the centrifugal force exerted thereon by the rotation of said spindle.

10. The structure of claim 9 wherein said collar member includes an outwardly extending flange above said first portion to prevent yarn wrapped on said first portion sloughing upwardly off said first portion.

11. The structure of claim 10 wherein said collar member includes notches therein to guide yarn from said bobbin over said flange to wrap yarn on said first portion.

12. The structure of claim 11 wherein a portion of the

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internal diameter of said collar member is greater than the diameter of said spindle to loosely accommodate the bottom portion of said bobbin.

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