July 27, 1965 A. C. MORROW ETAL 3,196,476

ROLL CLEARING

Filed Nov. 6, 1962 2 Sheets-Sheet 1

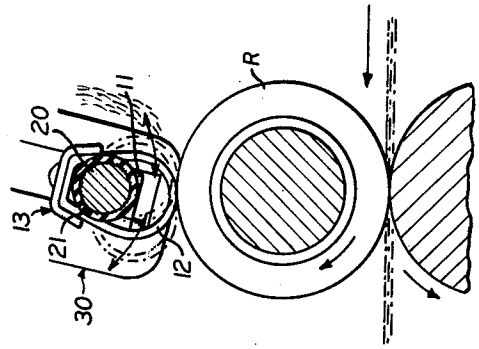

FIG. 2.

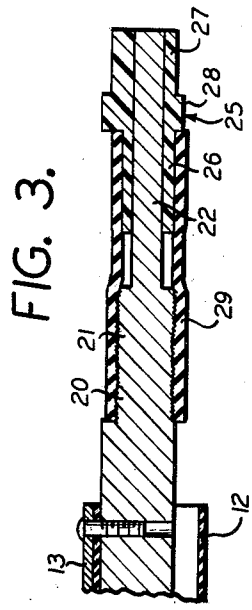

FIG. 3.

FIG. 1.

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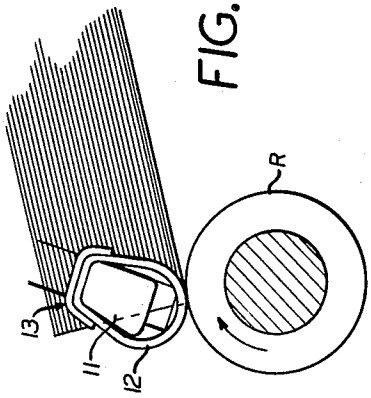

FIG. 5.

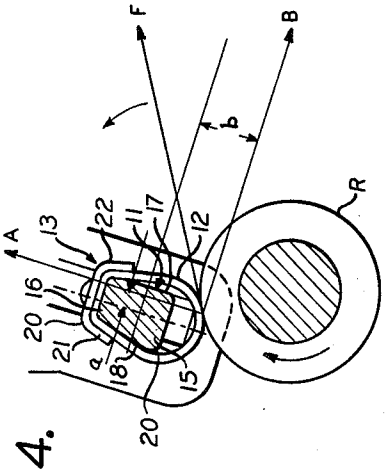

FIG. 4.

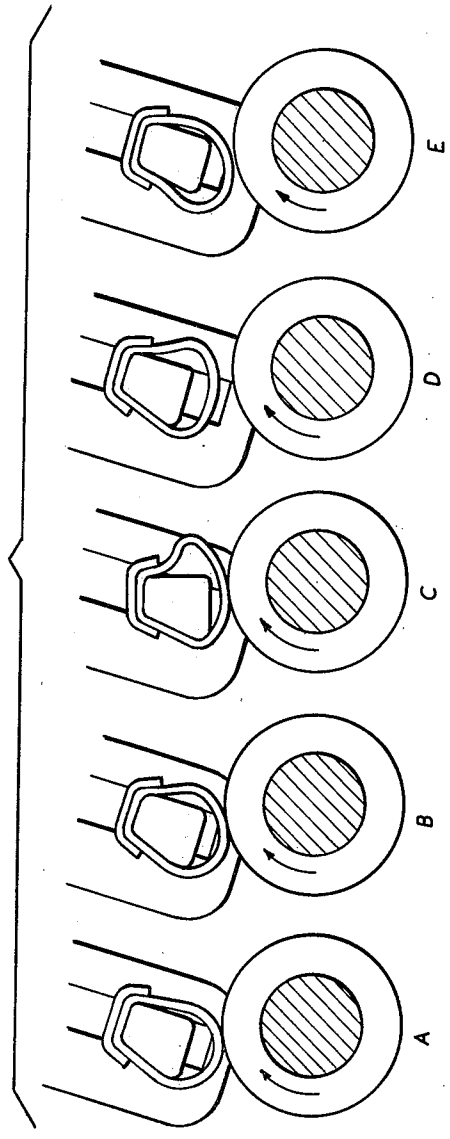

FIG. 6.

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ROLL CLEARING

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9 Claims. (Cl. 15—256.52)

This invention relates to the clearing of lint, fly and the like foreign matter from the moving components of textile machinery, and is particularly directed to means for clearing the processing rolls of drawframes, spinning frames, roving frames, and the like.

In the processing of textile materials, the textiles or textile fibers are passed between pairs of rolls serving to draw out, attenuate, or otherwise effect the relationship between the processed fibers. In the fabrication of cotton or the like yarns, the rolls of the drawing and spinning frames have a propensity for the collection of fly lint and the like material. Stationary clearers have been employed, positioned adjacent these rolls so as to wipe the material accumulating on the surface of the roll. Notwithstanding the utilization of the stationary clearers, however, a condition termed "eyebrowing" frequently occurs when waste builds up in front of a clearer. Attempts have been made to eliminate eyebrowing by positioning suction ductwork behind the roll clearer so as to pick up these eyebrows. However, even with the use of this suction ductwork, an equilibrium condition often develops in which the eyebrows are not removed by the action of the suction ductwork. As these eyebrows build up the cleaning function of the clearer pad diminishes with the result that fly and lint accumulates on the surface of the roll, interfering with their desired drafting function. Adidtionally, the eyebrows throw off bits of lint and fly into the drafted material producing slubs or other undesired irregularities in the processed yarn.

It is with the above problems and desiderata in mind that the present means, including both method and apparatus, has been evoled. The novel means implement the clearing of a roll as employed in the processing of textile fibers so as to prevent the accumulation of eyebrows between the clearer member and the roll surface, thus minimizing maintenance by an operator, and serving to improve the quality of the yarn produced.

Accordingly, it is among the primary objects of this invention to provide improved means for clearing the moving surfaces of textile machinery of lint, fly, or the like material.

Another object of the invention is to provide an improved roll clearer for textile machinery in which the formation of eyebrows is prevented.

A further object of the invention is to provide improved roll clearing means in which the clearing members are substantially self cleaning, minimizing the required care of an operator.

A further object of the invention is to provide an improved clearer for the rolls of textile processing machinery in which the clearer is substantially self adjusting with respect to the surfaces to be cleared.

These and other objects of the invention which will be made hereafter apparent are achieved by provision of an improved clearer comprising a clearer body member arranged adjacent the surface to be cleared. Surrounding this clearer body is a flexible wiping sleeve formed of a resilient walled tube of rubber, neoprene or some other synthetic having desired clearing properties. The interior dimension of the wiping tube or sleeve is such as to accommodate the body member with spacing between the interior wall of the sleeve and the body member permitting the sleeve to flex. A sleeve retainer in the form of a channel-shaped plate is arranged over

the wiping sleeve to sandwich same between the sleeve retainer and the clearer body. The sleeve retainer functions to shape the wiping sleeve to a desired contour, serving to billow same against the surface to be cleared. Means mounting the clearer body and sleeve for limited rotation are provided in the form of a rotating journal extending from each end of the clearer body into a bearing block. The bearing block in turn is slidably journaled in a bearing bracket on each end of the surface of the machine component to be cleared which in this case is a roll, thus providing sliding mounting means for the clearer permitting its displacement from the surface to be cleared. The bearing block is coupled to the clearer body by means of a flexible walled energy storing coupling member in the form of a torsion sleeve extending over a coupling shoulder on the clearer body and over the bearing block. Coupling sleeves are formed of a flexible material such as rubber or the like material. In use, the clearer is so positioned with respect to the roll surface to be cleared that the elastic sleeve acts as a torsion member. The rotation of the cleared roll displaces the clearer and winds the energy storing torsion member to a point resulting in displacement of the clearer with respect to the roll surface thereby permitting return of the clearer to its initial position, at which time torsion buildup is again reinitiated. As a result of this buildup and release of torsion, the clearer is oscillated with respect to the cleared surface so that buildups of foreign matter or "eyebrowing" are prevented.

Among the important features of the invention is the novel mounting bracket for the novel clearer member. This novel mounting bracket slidably supports the clearer member at a desired angle with respect to the surface to be cleared so as to permit torsion buildup in the clearer member to result in displacement of the clearer member from the roll surface.

Another important feature of the invention resides in the utilization of the elastic coupling sleeve to provide the desired torsion coupling.

The specific details of a preferred embodiment of the invention, and their mode of functioning, will be made most manifest and particularly pointed out in clear, concise and exact terms in conjunction with accompanying drawings, wherein:

FIG. 1 is a perspective view of the novel clearer shown as mounted for use in clearing the top roll of a roll pair of a drafting roll stand;

FIG. 2 is a cross-sectional view taken on line 2—2 of FIG. 1, through the drafting roll and the novel clearer looking in the direction of the arrows; and

FIG. 3 is a longitudinal cross-sectional view through the end of the novel clearer illustrating the details of the bearing and journal; and

FIG. 4 is a schematic cross-sectional view similar to FIG. 2, illustrating the vector forces acting on the wiping sleeve; and

FIG. 5 is a schematic illustration similar to FIG. 4 indicating the desired range of angularity through which the clearer may be positioned with respect to the roll surface to obtain the desired results; and

FIG. 6 illustrates the phases of movement of the clearer with respect to the roll surface.

Referring now more particularly to the drawings, like numerals in the various figures will be employed to designate like parts.

As best seen in FIGS. 1–4, novel clearer assembly **10** is formed with a clearer body **11** surrounded by a flexible wiping sleeve **12** of a tubelike configuration. Sleeve **12** is secured to body **11** by means of a sleeve retainer **13** which is of a channel-like configuration and is designed to sandwich a portion of the sleeve **12** between the body and the retainer **13**. Screws **14**, or the like fastening

members are employed to secure retainer **13**, sleeve **12** and body **11** in operative relationship.

Body member **12** is formed of a trapezoidal cross-section as best seen in FIGS. 4 and 5 with a relatively wide base **15**, as opposed to the relatively narrow top **16**, a substantially vertical rear wall **17** and an inclined front wall **18**. Nose **20** is formed between base **15** and front wall **18** as viewed in the drawing, for a purpose to be made hereinafter more apparent.

Sleeve retainer **13** is formed of a channel-shaped cross-section as best seen in FIGS. 4 and 5, with a top wall adjoining front wall **21** to rear wall **22**. Top wall **20** is of a dimension such as to permit it to overlie the top **16** of clearer body **11** and sandwich the wiping sleeve **12** between the sleeve retainer **13** and the clearer body **11**. The interior dimension of sleeve **12** is such as to accommodate body **11** with spacing between the interior wall of the sleeve and the base and walls of the body permitting the sleeve to flex.

Extending from each end of the clearer body **11** is a coupling shoulder **20**, as best seen in FIGS. 1 and 3. Coupling shoulder **20** is circular in cross-section and is formed with the maximum diameter encompassable within the confines of the bounds of the cross-section of the clearer body **11** as seen in FIG. 2. A major portion of the surface of coupling shoulder **20** is formed with knurl **21**, as best seen in FIG. 3. Extending from and integral with the free ends of coupling shoulder **20** is a rotating journal **22** of circular cross-section and coaxial with shoulder **20**.

Means mounting the clearer body **11** and sleeve **12** for limited rotation are provided by rotating journal **22** which is rotatably, received within bearing block **25** preferably formed of nylon or the like friction free material. Block **25** has a sleeve support **26** on one end thereof and a sliding mount for clearer body **11** and sleeve **12** in the form of sliding journal **27** on the other end thereof. The sleeve support **26** and the sliding journal **27** are separated by a bearing shoulder **28**, as best seen in FIG. 3.

Arranged over the sleeve support **26** and coupling shoulder **20** is an energy storing torsion sleeve **29** of rubber or the like elastic material, storing energy upon deflection. Torsion sleeve **29** is press fit into position and securely engages knurled portion **21** and the surface of sleeve support **26** on bearing block **25**. The surface of support **26** is preferably formed with splines or the like projections.

A clearer supporting bearing bracket **30**, as best seen in FIG. 1 is arranged on each side of a novel clearer **10** to support same with respect to the rolls to be cleared. Bearing bracket **30** is formed of a sheet material such as steel or the like bent into a right-angle configuration with a horizontally extending supporting shoulder **31**, and a vertically extending bearing plate **32**. The bearing slot **33** is formed in bearing plate **32**, receiving sliding journal **27**. The bearing plate additionally bears against bearing shoulder **28** and serves to aid in aligning the novel clearer **10** with respect to the rolls R, by limiting end play of the clearer.

Operation

In use the novel clearer **10** is arranged with respect to the surface to be cleared so that the wiping sleeve **12** bears against the moving surface.

In the illustrated embodiment of the invention as viewed in FIG. 1, the clearer **10** is shown as positioned with respect to the rolls R so as to function as a top roll clearer. This is accomplished by mounting bearing brackets **30** on each side of the roll stand with bearing slots **33** extending slightly below the top surface of the roll R. Thereafter the clearer **10** is arranged with sliding journals **27** in bearing slots **33** so that the weight of the clearer **10** will move the clearer against the roll R.

To insure vibration, the clearer **10** must be located at the proper angle with respect to the roll R. The limits of this angle as shown by the shaded area in FIG. 5, as illustrated extend between a point normal to a tangent between the clearer **10** and the roll R and a line parallel to the tangent.

It is to be noted that the vertical axis through the clearer body **11** does not necessarily extend through the point of tangency. It will also be noted that the illustrated preferred range of angular positioning of the mounting axis of the clearer **10** with respect to the roll axis is confined to the upper left quadrant (as viewed in FIGS. 4–6) with respect to rotation of the roll.

However, where it is desired to utilize spring pressure in lieu of the gravity effect of the clearer on the roll, the clearer location does not have to be limited to this range, and may in fact be utilized on a bottom section of the roll or on a bottom roll.

After mounting of the clearer with respect to the surface to be cleared, rotation of the roll with respect to the clearer sleeve **12** rotates the clearer body on its rotating journal **22** a limited distance resulting in displacement of the clearer sleeve through the phases illustrated in FIG. 6. As a result of the frictional engagement between the roll surface and the clearer sleeve, the clearer sleeve **12** is displaced causing the body **11** to be moved to a limiting position as illustrated in FIG. 6C. As a result of this clearer sleeve displacement due to rotation, the flexible walled torsion sleeve **29** is tensioned storing energy providing a potential restoring force. The displacement of the sleeve **12** to the position illustrated in FIG. 6C results in the application of a force F to the clearer body **11** as illustrated in FIG. 4. This force F may be resolved into components A and B acting at right angles to each other, as seen in FIG. 4. Force A acts in a direction parallel to the mounting axis of the clearer assembly (the axis of slot **33**) and has a lever arm designated *a*. Force B, the other component of the force F acting in a direction at right angles to the vector A has a lever arm designated *b*. Forces A and B acting through their lever arms *a* and *b* respectively, combine to form a moment which tends to rotate the clearer assembly in the counter-clockwise direction as indicated by the direction arrow applied to FIG. 4. This moment tends to wind the flexible walled coupling sleeve **29**. The force A, however, along with the momentum of the clearer components produced by the wiping action cause the clearer **10** to move away from roll R in sliding bearing slot **33** to the position shown in FIG. 6D. Gravity forces then return clearer **10** to its position adjacent the roll surface. It will be noted from FIG. 6E that wiping sleeve **12** moves slightly forward of its original starting position due to its momentum resulting from the release of stored elastic forces. This produces a buffeting action on the roll surface tending to dislodge any eyebrowing not displaced by the previously described movement of the clearer.

It is thus seen that improved clearing means have been provided serving to positively displace any foreign matter from the cleared surface in a simple, inexpensive readily fabricatable and maintainable fashion.

The above disclousre has been given by way of illustration and elucidation, and not by way of limitation, and it is desired to protect all embodiments of the herein disclosed inventive concept within the scope of the appended claims.

What is claimed is:

1. Clearing means for removing foreign matter from a surface, said means comprising: elongate wiping means flexible against the surface to be cleared; rotatable mounting means supporting said wiping means for limited rotation about a longitudinal axis of said wiping means with respect to the surface to be cleared; energy storing torsion means between each end of said wiping means and said rotatable mounting means, said torsion means rotated and tensioned upon rotation of said wiping means through its limited rotation; and slidable mounting means slidably supporting said wiping means to permit periodic displacement of said wiping means from the surface to be cleared.

2. A method for clearing foreign mattern from a sur-

face, said method comprising the steps of: flexing elongate wiping means against the surface to be cleared; rotating the wiping means about its axis through a limited distance with respect to the surface to be cleared; imparting the energy of rotation of said wiping means to energy storing means; and utilizing the stored energy to effect periodic sliding of the wiping means away from the surface.

3. Means mounting a clearer with respect to a surface to be cleared, said means comprising: rotating mounting means supporting opposed ends of the clearer for limited rotation about its axis with respect to the surface to be cleared energy storing torsion means on opposed ends of the clearer, wound upon rotation of the clearer in said rotating mounting means; and sliding mounting means supporting the clearer for movement away from the surface to be cleared after the clearer has been rotated to a limiting position in its cycle of limited rotation, whereby the surface to be cleared may be slidably wiped, and buffeted to release undesired foreign matter therefrom.

4. A roll clearer comprising: a flexible walled wiping sleeve; an elongate clearer body within said sleeve of a cross-sectional dimension less than that of the interior cross-section of said sleeve permitting said sleeve to flex; a rotating journal on opposed ends of said body supporting said body for limited rotation about its axis; means for providing a limiting position of rotation and a sliding journal on opposed ends of said body supporting said body for sliding after said body has been rotated to said limiting position.

5. A roll clearer as in claim 4 in which said means for providing a limiting position including an energy storing torsion sleeve extended between said rotating journal and said sliding journal for winding upon rotation of said body through its limited rotation.

6. A roll clearer as in claim 4 in which said body is formed with a nose at its lower end extending in a direction to oppose friction forces on said sleeve.

7. A roll clearer comprising: a flexible walled wiping sleeve; a clearer body within said sleeve of a cross-sectional dimension less than the interior cross-section of said sleeve permitting said sleeve to flex; a bearing block at the end of said clearer body; a rotating journal between said bearing block and said clearer body mounting said body for limited rotation; a bearing bracket supporting said bearing block; and a sliding journal between said block and said bracket mounting said body and said bracket for sliding.

8. A roll clearer as in claim 7 in which a flexible walled torsion sleeve is extended between said bearing block and said clearer body, said torsion sleeve being wound upon rotation of said body through its limited rotation.

9. A roll clearer comprising: a flexible walled wiping sleeve; a clearer body within said sleeve of a cross-sectional dimension less than the interior cross-section of said sleeve permitting said sleeve to flex; a bearing block at each end of said clearer body; a rotating journal between said bearing block and said clearer body mounting said body for limited rotation; a bearing bracket supporting said bearing block; a sliding journal between said block and said bracket; a coupling shoulder on said body; a sleeve support on said block; and an elastic torsion sleeve extending between and secured to said shoulder and said sleeve support.

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