Sept. 8, 1953 C. A. WIED 2,651,080

METHOD AND APPARATUS FOR CLEANING FIBER TREATING MACHINES

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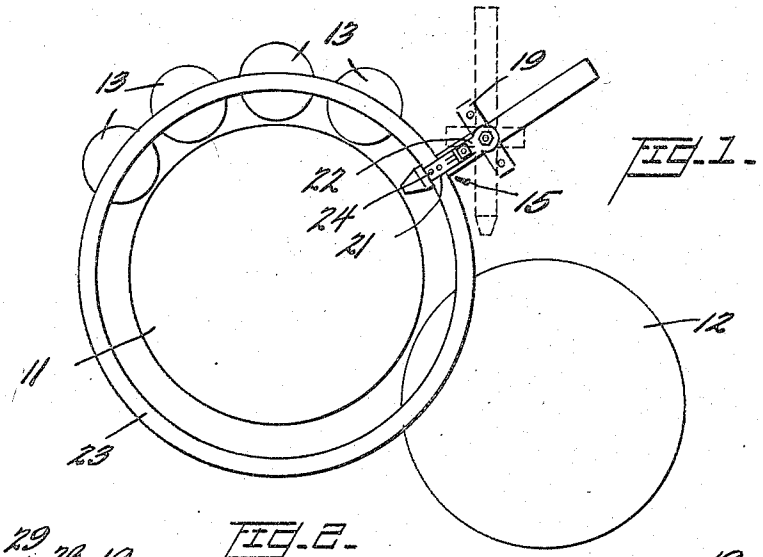


FIG. 1.

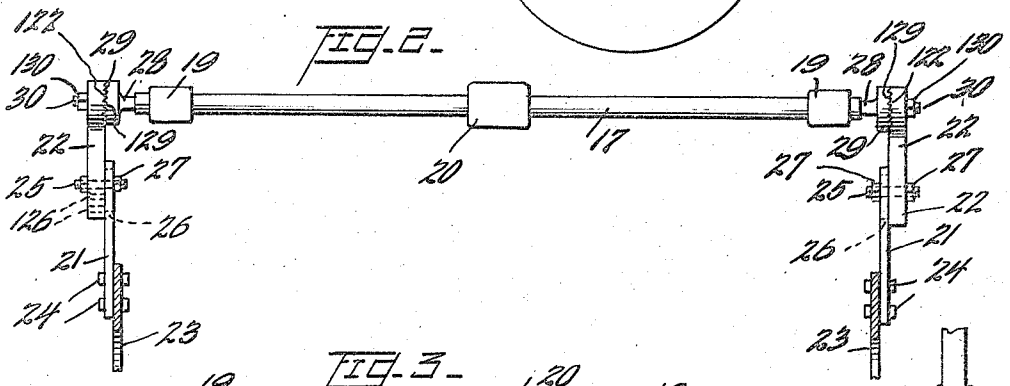


FIG. 2.

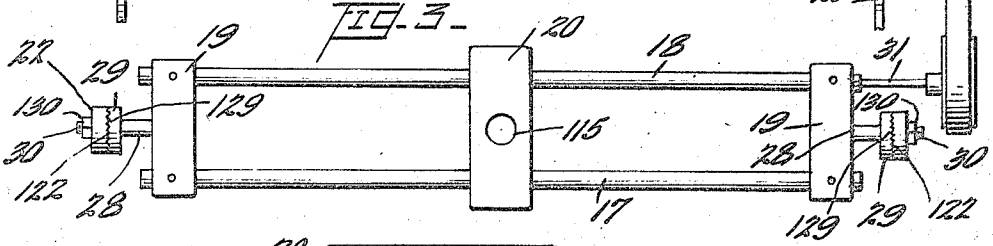


FIG. 3.

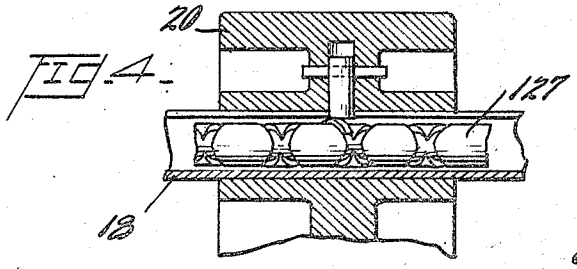


FIG. 4.

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FIG. 6.

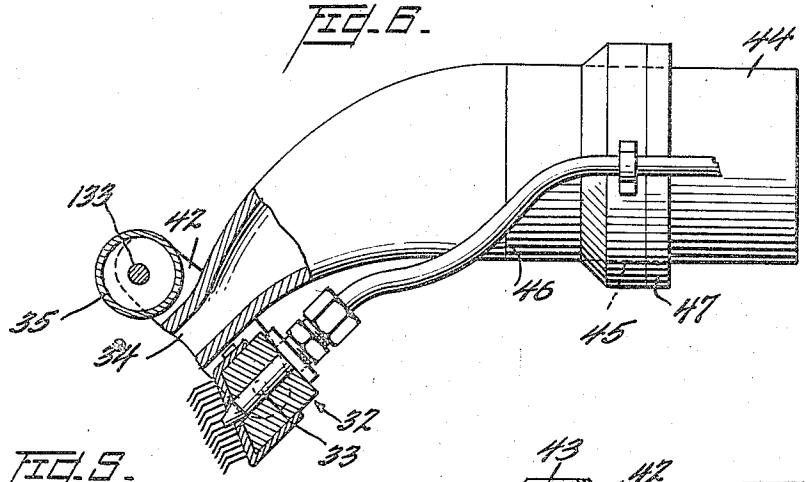


FIG. 8.

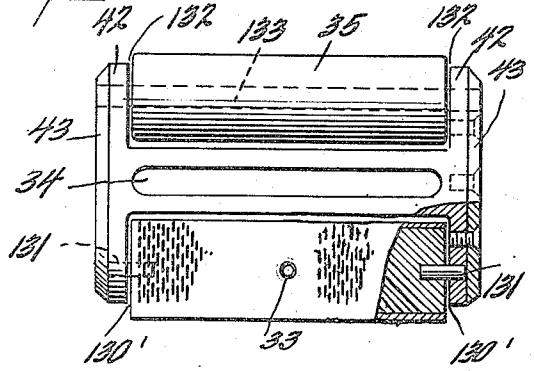


FIG. 7.

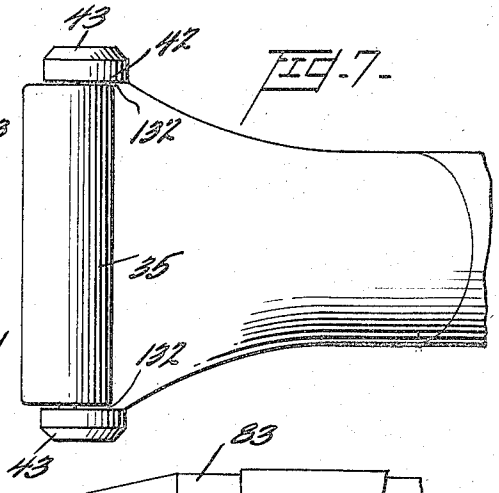


FIG. 9.

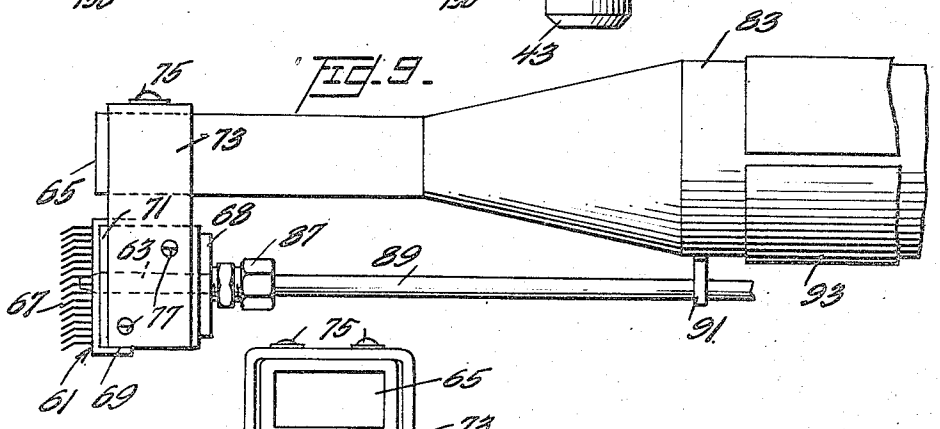
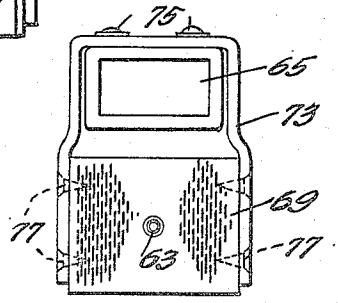


FIG. 5.



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METHOD AND APPARATUS FOR CLEANING FIBER TREATING MACHINES

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14 Claims. (Cl. 19—109)

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This invention relates to the cleaning of fiber treating machines and more particularly to apparatus for cleaning the garnett cylinder and the doffer roll of a garnett machine.

The cleaning of the garnett cylinder and the doffer roll of the conventional garnett machine as proposed by this invention is accomplished by the application of a brushing operation, a compressed air blast, and a suction to either cylinder or roll in such a manner that the dirt, grease, and fibers collected in the teeth of the cylinder or roll are loosened and brought to the surface by the brushing and air blast and then removed therefrom by suction or vacuum.

The objects of this invention are to accomplish the foregoing cleaning operation by mounting upon a conventional garnett machine a cleaning apparatus, described below, being suitably designed to perform the various operations outlined above, in place of one of the worker rolls, and this apparatus being so mounted upon the machine as to permit of the cleaning of either the garnett cylinder or the doffer roll in a manner more efficient than heretofore proposed and affording a maximum of safety to the operator.

To accomplish the foregoing objects, the worker roll located closest to the doffer roll in a conventional garnett machine is removed from its frame and an apparatus consisting of a brush, a compressed air nozzle, and a vacuum nozzle, to be more fully described below, is installed in its place. This cleaning apparatus is pivotally mounted in its support so that it may be directed to operate upon either the garnett cylinder or the doffer roll to remove the various objectionable matters therefrom.

The various objects and advantages and mechanisms of this invention will be more fully appreciated and understood from the following detailed description given in conjunction with the accompanying drawings, wherein:

Fig. 1 is a diagrammatic elevational view of a garnett machine unit showing the garnett cylinder, the doffer roll, four worker rolls, and the cleaning apparatus of this invention;

Fig. 2 is a side view of the supporting frame for the cleaning apparatus;

Fig. 3 is a top view of the supporting frame for the cleaning apparatus;

Fig. 4 is a detailed fragmentary view of the head and a traverse mechanism incorporated in the supporting frame;

Fig. 5 is a face view of the operating surface of one modification of the cleaning apparatus;

Fig. 6 is a side view of the cleaning apparatus shown in Fig. 5;

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Fig. 7 is a top view of the cleaning head shown in Fig. 5;

Fig. 8 is a face view of the operating surface of another modification of the cleaning apparatus; and

Fig. 9 is a side view of the cleaning apparatus shown in Fig. 8.

Each unit of a conventional garnett machine consists of a garnett cylinder 11, a doffer roll 12, and a series of worker rolls 13. Every one of these cylinders and rolls has on its cylindrical face small, sturdy, needle-like teeth for the purpose of working the textile raw material, such as wool or cotton, as it feeds through the machine. In the use of this machine, the crevices between the teeth become filled and clogged with dirt, grease, and loose fibers collected from the treated material rendering the machine virtually inoperative, and making it necessary to clean out these crevices periodically. It is to the cleaning operation and apparatus therefor that this invention is particularly directed.

The cleaning apparatus itself, which includes a brush, an air blast nozzle, and a suction nozzle, is diagrammatically represented in Figure 1 and indicated by number 15, but will be described in greater detail subsequently. The cleaning apparatus supporting frame is generally shown in Figures 2 and 3 and consists essentially of two parallel rod-like members 17 and 18 held in fixed relationship to one another by the end-plate ties 19. It is upon members 17 and 18 that cleaner 15, as carried by carriage 20, is directed in its travel, along the length of the cylinder being cleaned. The means for motivating carriage 20 and cleaning head 15 along 17 and 18 and the operation of this apparatus upon the cylinder or roll generally is described in detail below.

The entire cleaning mechanism, the cleaning head, its carriage and the guides, are secured to the worker roll supporting rings 23 as indicated in Figure 1 in place of a worker roll that would ordinarily occupy that position. This is accomplished by means of the supporting and securing members 21 and 22. Members 21 are affixed to worker roll supporting rings 23 by means of bolts or rivets 24, while members 22 are held in slidable adjustment with 21 by nuts 27 and bolts 25 which extend through 22 and through slots 26 in members 21. Thus, by means of slots 26, the cleaning apparatus 15 can be slid away from or to the cylinder to be cleaned. Additional slidability can be obtained, if desired, by using holes 126 in conjunction with slot 26 instead of the holes used in the drawings.

In addition to this slidable adjustability, this

cleaning apparatus supporting frame has a pivotal adjustability as indicated by the solid line and dotted line representations of Figure 1. This pivotability is attained by means of such engagement between ties 19 and members 22. Projections 28 of ties 19 each have a head 29 and threaded pin 30. Pins 30 extend through and are pivotally engaged by members 22 at each end of the cleaning apparatus supporting frame.

The engaging surfaces 122 and 129 of members 22 and 29 respectively, are serrated to most effectively secure the supporting frame and the cleaning head in its adjusted position. If nuts 130 and 27 are loosened, members 22 may be moved out of engagement with members 29 leaving the portion of the frame enclosed therebetween free to pivot about pins 30. After it is positioned as desired, the tightening of nuts 130 and 27 brings the serrated surface 122 back into engagement with serrated surfaces 129 to hold the supporting frame in its adjusted position.

Thus the support enables the cleaning head to operate either upon the garnett cylinder or upon the doffer roll. In addition, the slidable cooperation between members 22 and members 21 permits the head 15 to be brought to the cylinder or roll into operative engagement therewith, or to be withdrawn therefrom into an inoperative position.

The nozzle supporting frame when secured to rings 23 is designed to extend the length of the garnett cylinder or doffer roll. In the operation of this cleaning apparatus, the cylinder and roll are put in rotating motion while the supporting frame is intended to impart a translatory and oscillating motion to the head 15 along the length of the cylinder and direct it in its path therealong. Consequently, as the cylinder or roll rotates, the cleaning nozzle is continually traversing the length of the cylinder or roll. Hence, by the combination of these rotary and translatory motions, each portion of the cylinder is effectively exposed to the brushing, air blast, and suction action of 15.

The translatory motion of the head 15 is attained by means of a conventional double threaded worm drive traverse 127 within rod 18 as shown in Figure 4. Extension 31 of the traverse 127 carries a pulley and belt drive, powered by the same means as used to operate the various cylinders and rolls of the garnett machine itself, imparting a rotary motion to the traverse 127 which in turn imparts the desired translatory motion to the carriage 20, rod 17 acting only as a guide.

One form of the cleaning apparatus itself, as shown in Figures 8 and 9 has a cleaning head comprising a brush 61, compressed air nozzle 63, and a vacuum or suction nozzle 65.

The brush 61 is composed of relatively long bristles 67 preferably of flexible and resilient wire and slightly bent at their free ends as illustrated in Figure 9, and so designed as to enable them to penetrate into the crevices between the short sturdy teeth of a garnett cylinder or doffer roll and to dig out the dirt, grease, and other objectionable matter that collects there in the normal use of the machine. These bristles are applied in the form of staples to and carried by a strong fabric or leather backing 69. The backing itself is attached to a base block 71 made of wood or other suitable material.

The compressed air nozzle 63 is itself preferably inserted in and carried by the brush 61. It extends substantially through the center of the block and protrudes slightly at the bristle surface or operating surface of the brush, terminating in the midst of the bristles. Its rear end is supported and fixed in position by plate 68 which is also carried by the brush base 71.

This nozzle 63 is connected through coupling 87 to the compressed air lead-in line 89 which, although preferably of approximately ¼ inch copper tubing, may be of any suitable size and material. The lead-in tube 89 is supported and held in position by an eye bracket 91, affixed to the vacuum nozzle, and of a suitable size to receive the tube 89. This lead-in tube terminates in a connection to a flexible compressed air line, not shown, which connects to a compressed air source or pump.

The vacuum or suction nozzle 65 is a relatively heavy metal casting whose nozzle shape is substantially that of a relatively narrow elongated rectangle. Although described as a metal casting, the nozzle may be made of any suitable material and designed to have any desired shape suitable for applying suction. Integral with the nozzle is an enlarged cylindrical lead-in tube 83 which connects with a flexible vacuum line, not shown, leading to a vacuum source or pump.

The various parts of the cleaning head, namely the brush, air nozzle, and vacuum nozzle, constitute a unitary structural unit by virtue of the yoke 73. This U-shaped yoke substantially encompasses the head of the cleaning apparatus, holding the vacuum nozzle in position by means of screws 75 and holding the brush and air nozzle in position by screws 77.

Thus, when the apparatus is applied to either the garnett cylinder or the doffer roll of a garnett machine, the brush bristles 67 dig out and loosen the grease, dirt, loose fibers, and other objectionable material from the crevices between the cylinder needles. The combined action of the brush and air blast tends to effectively bring the objectionable materials to the surface and loosen it therefrom enabling the vacuum to most efficiently remove it.

To apply this cleaning apparatus to its frame and supporting structure, which frame and structure has been previously described, the tube 83 is supplied with a split sleeve 93 made preferably of resilient metal. This sleeve is designed to afford the clamping means whereby the cleaning apparatus can be held in the opening 115 in carrier 20 shown in Figure 3. The entire cleaning apparatus, thus described, may be inserted in the opening 115 of carriage 20, and the pressure exerted thereby upon the resilient split sleeve 93 will serve to effectively hold the apparatus as positioned. Such a device as a set screw may be employed in conjunction with the split sleeve, or by itself in the absence of the sleeve.

The slideable adjustability incorporated in the supporting frame between members 21 and 22 affords one means for bringing the cleaning head into operative engagement with the cylinder or roll or being removed therefrom into an inoperative position, as described above. However, the clamping mechanism as afforded by the split sleeve 93 also affords a degree of slidability of the cleaning head in the carriage opening 115, supplying another convenient means for sliding the head into operative or inoperative position.

The frame for and structure of this cleaning apparatus thus far described may be operated to work upon either the garnett cylinder or the doffer roll. In either case, after training the

cleaning head in the proper direction by means of the pivotal arrangement located about flanges 29 and pins 30 as shown in Figures 2 and 3, the head is brought into contact with the cylinder or roll by loosening nut 27 and sliding the supporting frame along the slots 26 until proper engagement is attained, at which time the nuts 27 are tightened. If the garnett machine is now started, and the compressed air and vacuum turned on, the cleaning head will proceed to perform its cleaning function upon the cylinder to which it has been applied.

As the surface of the cylinder rotates in contact with the head, the wire bristles 67 of the brush 61 will penetrate into the crevices of the teeth of the garnett machine digging out the various objectionable matters. This action in conjunction with the compressed air blast will tend to loosen and free those materials from the cylinder enabling the suction nozzle, which operates immediately following the brush and air nozzle, to be most effective in its operation of sucking these objectionable materials up from the machine cylinder.

It is apparent that the cleaning head does not operate upon the entire length of the cylinder at once but during a revolution of the cylinder would cover only a small segment of its length were it not for the traversing mechanism incorporated in the supporting frame and described above. The traversing mechanism consists essentially of a double threaded worm gear operating upon the truck 20 to carry the cleaning head back and forth along the entire length of the supporting frame, which is coextensive with the length of the cylinders to be cleaned. Therefore, as the garnett machine is set in motion and as the double worm gear traverse operates upon the carriage 20, the cleaning head is brought in contact with all portions of the cylinder. After one cylinder has been cleaned, the garnett cylinder or the doffer roll, the supporting frame is pivoted about pin 30 and adjusted along the slot 26 so as to bring the cleaning head into operating position with the other cylinder.

For most efficient operation of this apparatus it is best that the garnett machine be run in reverse in order that the bristles of the cleaning brush may operate in the direction of the teeth of the machine rather than against them.

After the machine has been cleaned, the cleaning apparatus can be withdrawn to an inoperative position and out of range of the machine, to permit its normal use.

A modification of the cleaning head 15 is shown in Figures 5, 6 and 7. This form consists of the same elements as in that already described, namely a brush 32, a compressed air nozzle 33, and a vacuum or suction nozzle 34, but, in addition, this modification carries a contact roller 35, of hard rubber, steel, or other unyielding substance.

The construction of the brush and the compressed air nozzle carried thereby and the compressed air lead-in line are essentially the same as described in the first modification. The vacuum or suction nozzle, however, has some changes. This nozzle 34 is located between brush 32 and contact roller 35 and may be of any desired shape that would permit of an effective and localized suction action, but is preferably of a narrow elongated shape, coextensive with the length of the brush 32, as indicated in Figures 5, 6 and 7.

The suction nozzle is connected to a vacuum source or pump by means of a suitable coupling as shown by Figures 6 and 7 wherein a metal

sleeve 44 is inserted into the opening 45 of the nozzle and engages the nozzle snugly at 46. A rubber washer 47 is carried by sleeve 44 to serve as an abutment and gasket for this joint and also for a flexible tube which is intended to be placed over coupling sleeve 44 as the main vacuum line.

The roller 35 is located adjacent the vacuum nozzle on the opposite side from the brush 32, and its function is to maintain the head of this cleaning apparatus the proper distance from the cylinder upon which it is working during that operation.

These respective parts of the head of this modification of the cleaning apparatus are held in spaced relationship to one another by means of flanges 42 of the vacuum nozzle in conjunction with cover plates 43. Brush 32 is snugly fitted in the recess 130' formed by the vacuum nozzle and its flanges 42 and there held in fixed position by means of pins 131. The roller 35, located opposite the brush, is fitted in the recess 132 formed by the vacuum nozzle and its flanges 42 and there positioned by its core 133 with rotational freedom.

The predominantly important feature of this modification over the form previously described, aside from the incorporation of roller 35, is the spacial arrangement of the parts of the head giving a substantially arcuate shape to its operating surface, as can be observed from Figure 6. Thus, when applied to a cylinder of the machine, it will conform to the curved surface upon which it is designed to operate.

This modification may be attached to the carriage 20 of the supporting frame in the same manner as the form described above, or in any other suitable manner desired, and its operation will be the same as the former.

Other modifications and changes within the spirit of this disclosure will be apparent to those skilled in the art, but I do not intend to limit the scope of this invention except as defined by the following claims.

The terms "brush," "brushing means," "comb" and "combing means," as used in the present specification and in the appended claims, are equivalent terms and describe any such device for penetrating between the teeth on the rotating working surfaces of the fiber working machine to dislodge and remove the dirt therefrom in cooperation with the jet of compressed air and suction; and the terms "combing" and "brushing" appearing in the present specification and claims are equivalent and describe the action of such devices.

What is claimed is:

1. An apparatus for the cleaning of the garnett cylinder and doffer roll of a conventional garnett machine, having a cleaning head, said head comprising a brush, a compressed air nozzle, and a suction nozzle, said brush and air nozzle cooperating to free the objectionable materials from the cylinder or roll, the suction nozzle operating to remove the objectionable material thus freed, a supporting frame for mounting said head upon said machine, means incorporated in said frame for causing said head to reciprocate along the length of the cylinder or roll, pivotal means incorporated in said supporting frame to enable the cleaning head to operate upon either the garnett cylinder or the doffer roll, and means to enable said head to be brought into or out of engagement with said cylinder or roll.

2. An apparatus for the cleaning of the garnett cylinder and doffer roll of a conventional garnett

machine, having a cleaning head, said head comprising a brush, a compressed air nozzle, and a suction nozzle, said brush and air nozzle cooperating to free the objectionable materials from the cylinder or roll, the suction nozzle operating to remove the objectionable material thus freed, a supporting frame for mounting said head upon said machine coextensive with said cylinder and roll, a traversing carriage for carrying said head upon said frame, a traverse gear incorporated in the supporting frame for cooperation with said carriage to cause the cleaning head to reciprocate along the length of said frame, pivotal means incorporated in said supporting frame to enable the cleaning head to operate upon either the garnett cylinder or the doffer roll, and means to enable said head to be brought into or out of engagement with said cylinder or roll.

3. An apparatus for the cleaning of the garnett cylinder and doffer roll of a conventional garnett machine, having a cleaning head, said head comprising a brush, a compressed air nozzle, and a suction nozzle, the compressed air nozzle cooperating with the brush to free the objectionable materials from the cylinder or roll by means of a compressed air blast, the suction nozzle being located adjacent said brush and air nozzle, a supporting frame for mounting said head upon said machine coextensive with said cylinder and roll, a traversing carriage for carrying said head upon said frame, a traverse gear incorporated in the supporting frame for cooperation with said carriage to cause the cleaning head to reciprocate along the length of said frame, pivotal means incorporated in said supporting frame to enable the cleaning head to operate upon either the garnett cylinder or the doffer roll, and means to enable said head to be brought into or out of engagement with said cylinder or roll.

4. An apparatus for the cleaning of the garnett cylinder and doffer roll of a conventional garnett machine, having a cleaning head, said head comprising a brush, a compressed air nozzle, and a suction nozzle, the brush having relatively long resilient wire bristles slightly bent at their free ends, the compressed air nozzle being seated in the brush and cooperating with same to free the objectionable materials from the cylinder or roll by means of a compressed air blast, the suction nozzle being located adjacent said brush and air nozzle, a supporting frame for mounting said head upon said machine coextensive with said cylinder and roll, a traversing carriage for carrying said head upon said frame, a traverse gear incorporated in the supporting frame for cooperating with said carriage to cause the cleaning head to reciprocate along the length of said frame, pivotal means incorporated in said supporting frame to enable the cleaning head to operate upon either the garnett cylinder or the doffer roll, and means to enable said head to be brought into or out of engagement with said cylinder or roll.

5. An apparatus for the cleaning of the cylinders of fiber treating machines, having a head, said head comprising a brush, a compressed air nozzle, a suction nozzle, and a contact roller, said brush and air nozzle cooperating to free the objectionable materials from the cylinders, the suction nozzle operating to remove the material thus freed, the suction nozzle having lateral flanges, said brush, air nozzle, and roller being carried by said flanges, a supporting frame for mounting said head upon said machine, and means incorporated in said frame for causing said head to reciprocate along the length of said cylinder.

6. In an apparatus for the cleaning of the cylinders of fiber treating machines, a unitary assembly comprising a brush, a compressed air nozzle, a suction nozzle, and a contact roller, the brush and air nozzle cooperating to free the objectionable materials from said cylinder, the suction nozzle operating to remove the material thus freed, the contact roller operating to maintain the cleaning apparatus the correct working distance from the surface of the cylinders, said suction nozzle having lateral flanges and said brush, air nozzle and roller being carried by said flanges.

7. In a device adapted for stripping a cylinder of a garnetting machine, the combination with a comb having teeth adapted to loosen the dirt on the surface of said cylinder when said cylinder is rotated in contact therewith, a nozzle positioned adjacent said comb and adapted to project a jet of compressed air against the surface of said cylinder to facilitate the loosening of dirt thereon by said comb, vacuum means for removing the dirt loosened by said comb and said jet, and traversing mechanism cooperating with said nozzle, comb, and vacuum means for moving the same back and forth in operative relation to the surface of said cylinder.

8. Those steps in the method of stripping a garnetting machine which comprise simultaneously subjecting the surface thereof to be stripped to a combing action and a jet of compressed air to loosen the dirt thereon while said machine is in operation, and continuously removing the dirt, as loosened, by means of a vacuum.

9. In an apparatus for cleaning a toothed rotating working surface of a textile fiber working machine, the combination of a unitary cleaning head and a traversing mechanism for moving the head back and forth in operative relation to the rotating surface, the head comprising combing means for penetrating between the teeth on the working surface to loosen the dirt, a nozzle positioned adjacent the comb to project a jet of compressed air against the comb and the surface operated upon by the comb for loosening dirt thereon, and a suction nozzle for removing the dirt loosened by the comb and jet.

10. An apparatus for removing objectionable material from toothed rotating working surfaces of textile fiber working machines, the apparatus comprising a unitary cleaning head having combing means for penetrating between the teeth on the working surface, a compressed air nozzle and a suction nozzle, said combing means and compressed air nozzle cooperating to free the objectionable material from the rotating working surfaces and the suction nozzle operating to remove the objectionable material thus freed, and a supporting frame for mounting said head upon the machine, said supporting frame also carrying traversing means causing said head to reciprocate lengthwise of the rotating working surfaces, said supporting frame also having means providing for the movement of the head for selective operation upon a desired rotating working surface.

11. In combination, a textile fiber working machine having a toothed rotating working surface and an apparatus mounted on the machine for cleaning the working surface, said apparatus comprising combing means for penetrating between the teeth on the working surface, a noz-

zle for delivering a jet of compressed air to the area engaged by the combing means, and a suction nozzle for removing the dirt from the area, the brush and nozzles forming a cleaning head unit, and traverse means for moving said unit as the machine rotates.

12. In combination, a textile fiber working machine having toothed rotating working surfaces and an apparatus mounted on the machine for cleaning the rotating surfaces, said apparatus comprising a combing means for penetrating between the teeth on a working surface, a nozzle for delivering a jet of compressed air to the area engaged by the combing means and a suction nozzle for removing the dirt from the area, the combing means and nozzles forming a cleaning head unit, and a supporting frame for mounting said head upon the machine, said supporting frame also carrying traversing means causing said head to reciprocate lengthwise of the rotating working surfaces, said supporting frame also having means providing for the movement of the head for selective operation upon a desired rotating working surface.

13. The method of cleaning a toothed rotating working surface of a textile fiber working machine, which comprises simultaneously subjecting the surface to a combing action and a jet of compressed air to loosen the dirt thereon while the surface is rotating and continuously removing the loosened dirt by suction.

14. The method of cleaning a toothed rotating working surface of a textile fiber working machine, which comprises simultaneously subjecting an area of the surface to a combing action, a jet of compressed air and suction, the dirt in the area being thus loosened and removed, and simultaneously causing the action area to reciprocate lengthwise of the surface from end to end as the surface rotates.

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References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
789,768	Sullivan	May 16, 1905
955,467	Moorhead	Apr. 19, 1910
1,071,035	Fauquet	Aug. 26, 1913
1,154,379	Clouette	Sept. 21, 1915
1,307,452	Penney	June 24, 1919
1,311,293	Schaefer	July 29, 1919
1,457,467	Smith	June 5, 1923
1,459,832	Kestner	June 26, 1923
1,913,016	Walsh	June 6, 1933
2,002,079	Dickie	May 21, 1935

FOREIGN PATENTS

Number	Country	Date
3,180	Great Britain	of 1901