May 10, 1960 J. F. LEHMAN 2,935,766

PNEUMATIC DOFFER AND CLEANER FOR CARD MACHINE

Filed May 31, 1957 2 Sheets-Sheet 1

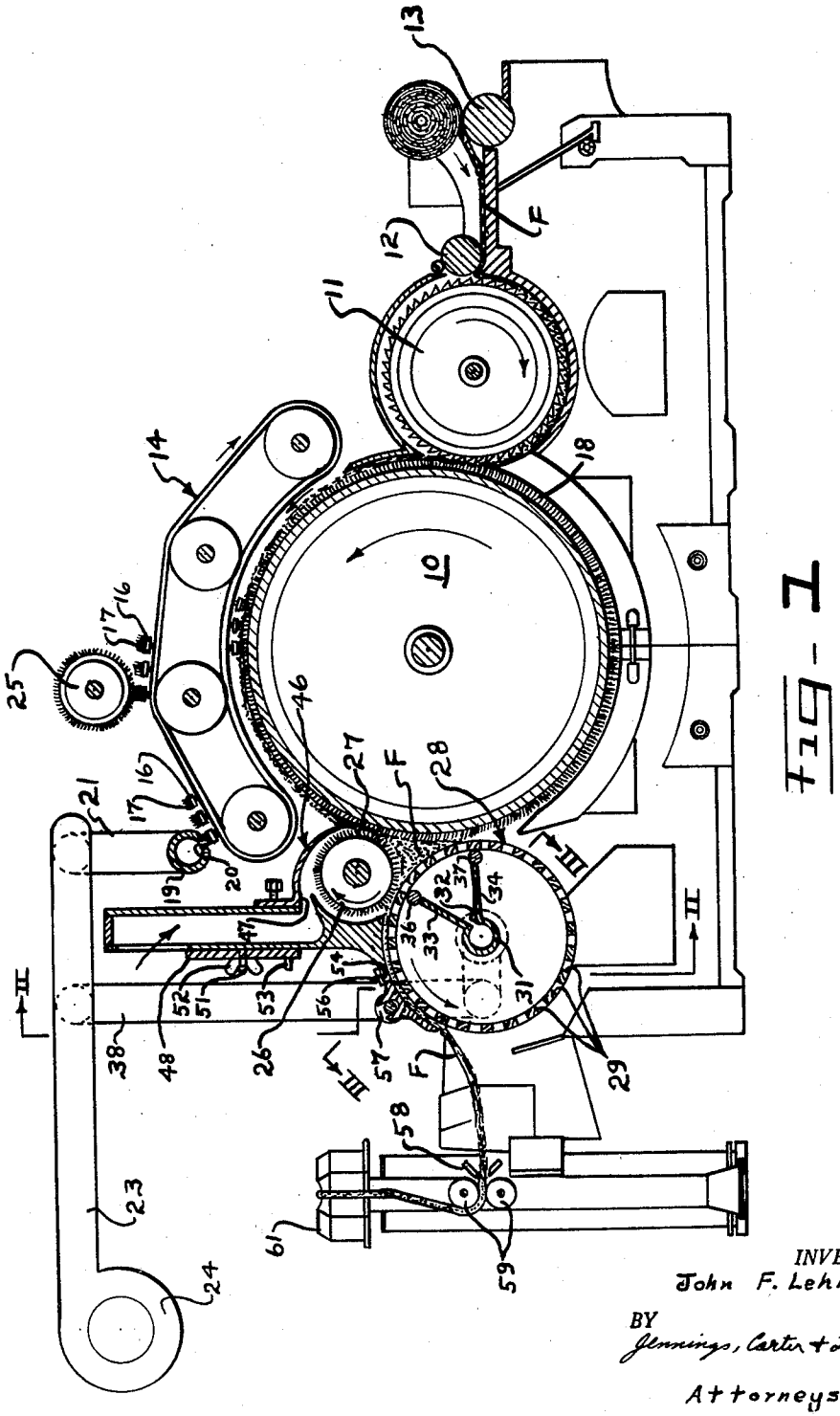


Fig. 1

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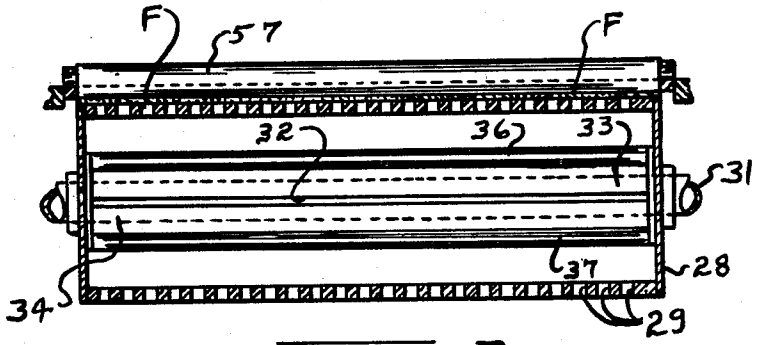



Fig. 3

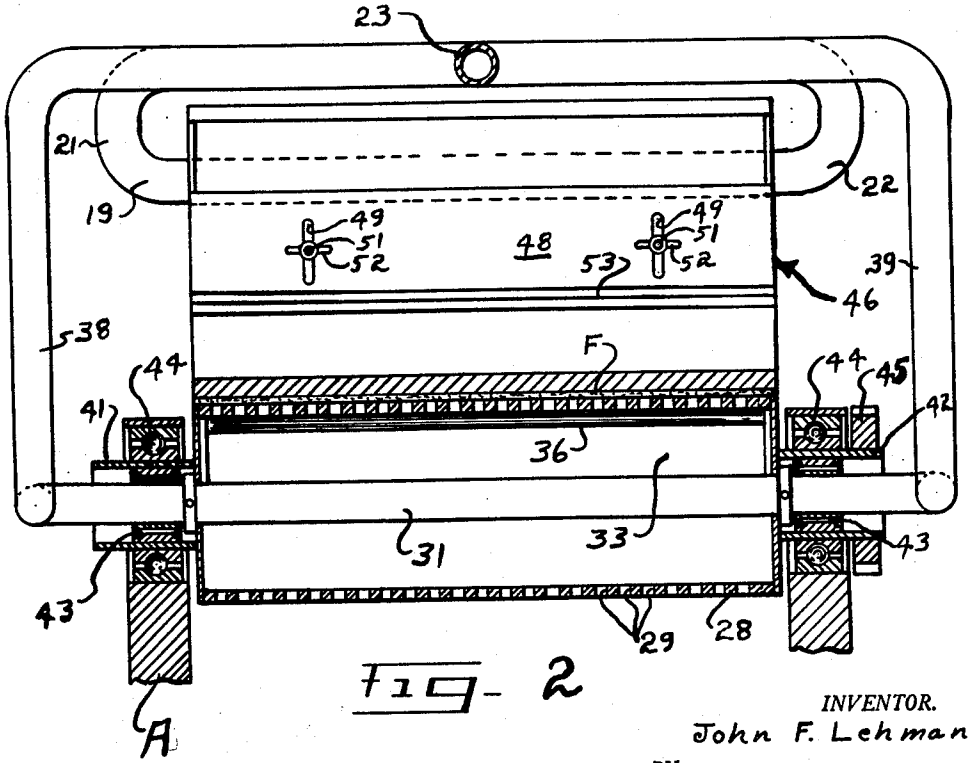



Fig. 2

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United States Patent Office 2,935,766
Patented May 10, 1960



2,935,766

# PNEUMATIC DOFFER AND CLEANER FOR CARD MACHINE

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Application May 31, 1957, Serial No. 662,634

9 Claims. (Cl. 19—106)

This invention relates to a pneumatic doffer and cleaner for card machines and has for an object the provision of such apparatus which shall continuously keep the main cylinder clean of fibers and foreign materials at all times.

Another object of my invention is to provide an improved doffer for a card machine which requires no clothing for the doffer, thus eliminating the necessity of grinding the wire teeth for the clothing.

Another object of my invention is to provide pneumatic doffing apparatus of the character designated which not only eliminates the waste of fiber but also reduces breakage of fibers to a minimum.

A further object of my invention is to provide pneumatic doffing apparatus of the character designated in which improved means is provided for keeping the flats and the apparatus associated therewith clean.

A still further object of my invention is to provide pneumatic doffing and cleaning apparatus of the character designated which shall be simple of construction, economical of manufacture and which shall require a minimum of time and labor to keep the same in satisfactory working order.

As is well known in the art to which my invention relates, fibers have heretofore been removed from the main cylinder for card machines by doffing cylinders having wire clothing thereon. In view of the fact that the surface of the doffing cylinder travels at a different speed from that of the main cylinder, excessive breakage of the fiber resulted. This not only results in a substantial loss of the fiber being processed, but the broken fibers form dust which prevents efficient operation of the apparatus.

To overcome the above and other difficulties, I provide an elongated rotary brush mounted adjacent the delivery side of the main cylinder for rotation in a direction opposite that of the main cylinder. A perforated rotary doffing cylinder is mounted subjacent the rotary brush and adjacent the main cylinder for rotation in the same direction as that of the main cylinder. Suction means is provided within the doffing cylinder whereby suction is imparted to a portion of the inner surface of the doffing cylinder as it rotates whereby the fibers are removed from the main cylinder and deposited on the outer surface of the doffing cylinder. To keep the flats and the apparatus associated therewith clean of loose fibers and foreign materials, I provide an elongated suction conduit having a longitudinally extending slot therein which is disposed adjacent the clothing of the upper flight of moving flats, which are out of contact with the main cylinder, whereby the clothing is maintained in a cleaned condition at all times.

Apparatus embodying features of my invention is illustrated in the accompanying drawings forming a part of this application, in which:

Fig. 1 is a vertical sectional view showing my improved pneumatic doffer and cleaner apparatus associated with a conventional type card machine;

Fig. 2 is a sectional view taken generally along the line II—II of Fig. 1; and



Fig. 3 is a sectional view taken generally along the line III—III of Fig. 1, the baffle members for the suction unit being shown in elevation.

Referring now to the drawings for a better understanding of my invention, I show a card machine having a main cylinder 10 which receives the fiber "F" from a conventional type licker-in 11. The fibers "F" are fed to the licker-in 11 by a feed roll 12 which in turn receives the fiber from a lap roll 13. Partially surrounding the upper portion of the main cylinder 10 is an endless chain of flats indicated generally at 14. Each flat 16 of the chain of flats is covered with the usual clothing 17 which moves adjacent the clothing 18 of the main cylinder 10 in a manner well understood in the art.

Extending transversely of the card machine and parallel to the flats 16 is an elongated conduit 19 having a longitudinally extending opening 20 therein which is positioned adjacent the clothing of the upper flight of flats 16 as they move therebeneath. Communicating with opposite ends of the elongated conduit 19 are conduits 21 and 22 which in turn communicate with a conduit 23. As shown in Fig. 1, the conduit 23 is connected to a suitable suction fan 24 whereby suction is imparted to the elongated conduit 19 thus drawing air inwardly through the elongated slot 20 to remove any lint, foreign matter and the like from the flats 16 and their asociated apparatus. Also positioned above the chain of flats 14 is a flat stripping brush 25 which revolves adjacent the clothing 17 to remove any lint, foreign matter and the like which might be left thereon after the clothing passes beneath the opening 20.

Mounted for rotation adjacent the delivery side of the main cylinder 10 is a rotary brush 26 having bristles 27 arranged spirally around the same. The brush 26 rotates in a direction opposite that of the main cylinder 10 whereby the bristles 27 and the adjacent portion of the clothing 18 of the main cylinder 10 move in the same direction.

Mounted for rotation beneath the rotary brush 26 and adjacent the main cylinder 10 is a doffing cylinder 28 having a plurality of perforations 29 therein. Extending axially through the doffing cylinder 28 is a centrally disposed conduit 31 having a longitudinally extending slot 32 in the side thereof adjacent the main cylinder 10, as shown in Fig. 1. Secured to or formed integrally with the conduit 31 at opposite sides of the longitudinally extending slot 32 are outwardly flaring baffle members 33 and 34. Preferably, the baffle members form with the conduit 31 an acute included angle, as shown in Fig. 1. Secured to the outer ends of the baffle members 33 and 34 are elongated rod-like members 36 and 37, respectively, which are disposed adjacent the inner surface of the doffing cylinder 28. If desired, suitable rollers may replace the rod-like members 36 and 37.

The conduit 31 is connected at opposite ends to branch conduits 38 and 39 which in turn are connected to the conduit 23 whereby suction is imparted to the conduit 31 thus drawing air inwardly through the longitudinally extending slot 32. As air is drawn inwardly through the longitudinally extending slot 32, air is drawn inwardly through the perforations 29 which lie between the baffle members 33 and 34, thus removing the fibers from the main cylinder 10 and depositing the same on the outer surface of the doffing cylinder 28.

Secured to opposite ends of the doffing cylinder 28 are outwardly projecting sleeve members 41 and 42, as shown in Fig. 2. Suitable needle bearing assemblies 43 are interposed between the sleeves 41 and 42 and the conduit 31 whereby the doffing cylinder 28 is adapted for rotation relative to the conduit 31. Surrounding the sleeve members 41 and 42 are bearing units 44 which are mounted on the card frame indicated generally at A, as shown in Fig.

2. The doffing cylinder 28 is propelled by a gear 45 which in turn is connected to suitable power means, not shown.

Increasing the portion of the rotary brush 26 outwardly of the main cylinder 10 and extending over the adjacent portion of the doffing cylinder 28 is a housing 46. As shown in Fig. 1, an inlet passageway 47 is provided through the housing 46 whereby air is introduced over and around the rotary brush 26 in the direction of rotation thereof. Means for regulating the flow of air through passageway 47 is provided and comprises a closure member or door 48 mounted for vertical movement at the side of the housing 46 and having vertically extending slots 49 therein for receiving bolts 51 which project outwardly of the housing. The door 48 is held in selected positions relative to the housing 46 by wing nuts 52. A suitable handle member 53 is provided for raising and lowering the door 48. The housing 46 is divided as at 54 and is provided with a hinge connection 56 between the two sections of the housing whereby the upper portion thereof may be pivoted away from the rotary brush 26.

Mounted on the housing 46 adjacent the delivery side of the doffing cylinder 28 is an elongated roller 57 which is adapted to engage the fibers "F," as shown in Fig. 3. After passing beneath the roller 57, the fibers are in the form of a web of the same width as the doffer cylinder. The fibers next pass through a conventional type guide and then through a trumpet 58 on the other side of which are two calender rolls 59. From the calender rolls 59, the fibers pass through a conventional type coiler 61 in a manner well understood in the art.

From the foregoing description, the operation of my improved pneumatic doffer and cleaner will be readily understood. As the main cylinder 10 revolves, the fibers are continuously transferred to the surface of the main cylinder where they are subjected to the carding action applied by the clothing 17 of the flats 16. As the upper flight of the endless chain of flats 16 passes beneath the elongated conduit 19, the suction of air through the longitudinally extending opening 20 causes the clothing 17 of the flats to be thoroughly cleaned. Also, the space between adjacent flats is cleaned by the suction of conduit 19. The flats then pass beneath the flat stripping brush 25 to assure that no foreign material is left on the clothing 17.

After passing beneath the flats 16, the fiber "F" passes between the rotary brush 26 and the main cylinder 10, as shown in Fig. 1. As the fiber passes beneath the point of contact between the main cylinder 10 and the rotary brush 26, it is drawn onto the outer surface of the doffing cylinder 28 by the suction applied between the baffles 33 and 34. That is, as the perforated doffing cylinder 28 revolves in the same direction as the main cylinder 10, the fiber is continuously drawn onto the smooth outer surface of the doffing cylinder. This is brought about by the fact that a suction chamber is formed between the main cylinder 10 and the doffing cylinder 28, the suction chamber being defined at one side by the point of contact between the main cylinder and the doffing cylinder and being defined at the other side by the rotary brush 26, as shown in Fig. 1. That is, the rotary brush being in contact with the main cylinder and the doffing cylinder defines the other side of the suction chamber. Also, as shown in Fig. 1, a portion of the outer surface of the main cylinder and a portion of the outer surface of the doffing cylinder are within and form portions of the suction chamber. The fiber remains on the doffing cylinder 28 as it passes beneath the roller 57. After passing beneath the roller 57, the fiber is reduced to a sliver by passing the fiber through the guide and the trumpet 58 in a manner well understood.

As the rotary brush 26 rotates and the air is continuously drawn into the opening 47 over and around the rotary brush 26, the fiber is continuously dislodged from the clothing 18 of the main cylinder 10, whereupon it is removed by the suction of air through the openings 29 as they pass the suction area between baffles 33 and 34.



In view of the foregoing, it will be seen that I have devised an improved pneumatic doffer and cleaner for card machines which strips the fiber from the main cylinder without breakage of the fiber. By providing my improved pneumatic doffer, I eliminate entirely the necessity of providing a comb. Also, the number of belts, and other driving devices are reduced to a minimum. Furthermore, by constructing the doffing cylinder 28 of a light metal having a plurality of openings therethrough for drawing the fiber onto the cylinder, not only do I eliminate the necessity of providing expensive clothing for the doffer which requires constant maintenance, but I provide a light weight doffer which is simple of construction and manufacture and which may be readily shipped at a minimum cost.

While I have shown the suction conduits as extending above the card machine, it will be apparent that they could extend through the supporting floor for the card machine to a suitable fan.

While I have shown my invention in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various changes and modifications without departing from the spirit thereof, and I desire, therefore, that only such limitations shall be placed thereupon as are specifically set forth in the appended claims.

What I claim is:

1. In a pneumatic doffer and cleaner for a card machine having a main cylinder with means imparting carding action to fibers carried by said cylinder, an elongated rotary brush mounted adjacent the delivery side of said main cylinder for rotation in a direction opposite that of said main cylinder, a housing encasing the rotary brush on the side thereof opposite the main cylinder, there being an inlet passageway through said housing whereby air is drawn over and around said brush as it revolves, an adjustable closure member provided in said inlet passageway to regulate the volume of air introduced through the passageway, a perforated rotary doffing cylinder mounted subjacent said rotary brush and directly adjacent the main cylinder for rotation in the same direction as that of said main cylinder, and means imparting suction to a portion of the inner surface of said doffing cylinder as it rotates whereby the fibers are removed from the main cylinder and deposited directly on the outer surface of the doffing cylinder from the main cylinder.

2. In a pneumatic doffer and cleaner for a card machine having a main cylinder with means imparting carding action to fibers carried by said cylinder, an elongated rotary brush mounted adjacent the delivery side of said main cylinder for rotation in a direction opposite that of said main cylinder, a perforated doffing cylinder mounted subjacent said rotary brush for rotation in the same direction as that of said main cylinder, means imparting suction to a portion of the inner surface of said doffing cylinder as it rotates whereby the fibers are removed from the main cylinder and deposited on the outer surface of the doffing cylinder, a housing incasing the uppermost portion of said rotary brush outwardly of said main cylinder and extending over the adjacent portion of said doffing cylinder, there being a passageway through said housing adjacent the upper portion of said rotary brush for introducing air over and around the rotary brush in the direction of travel thereof, and means regulating the flow of air through said passageway.

3. A pneumatic doffer and cleaner as defined in claim 2 in which the means regulating the flow of air through the passageway comprises a movable closure member disposed to move across said passageway.

4. A pneumatic doffer and cleaner as defined in claim 2 in which an elongated roller is mounted for rotation in the housing adjacent the delivery side of the doffing

cylinder in position to engage the fibers collected on the doffing cylinder.

5. In a pneumatic doffer and cleaner for a card machine having a main cylinder with means imparting carding action to fibers carried by said cylinder, a rotary brush mounted adjacent the delivery side of said main cylinder for rotation in a direction opposite that of said main cylinder, a perforated doffing cylinder mounted adjacent said rotary brush for rotation in the same direction as that of said main cylinder, means imparting suction to a portion of said doffing cylinder as it rotates whereby the fibers are removed from the main cylinder and deposited on the outer surface of said doffing cylinder, a housing encasing the uppermost portion of said rotary brush outwardly of said main cylinder and extending over the adjacent portion of said doffing cylinder there being an air passageway through said housing adjacent the upper portion of said rotary brush for introducing air over and around the rotary brush in the direction of travel thereof, and means regulating the flow of air through said passageway.

6. In a pneumatic doffer for a card machine having a main cylinder with means imparting carding action to fibers carried by said main cylinder, a perforated rotary doffing cylinder mounted for rotation in position to receive fibers from the main cylinder, means imparting suction to a longitudinally extending section of the inner surface of said doffing cylinder on the side thereof adjacent said main cylinder, means between the outer surface of said main cylinder and the outer surface of said doffing cylinder including portions of said surfaces adjacent both sides of said longitudinally extending section defining a suction chamber between said main cylinder and said doffing cylinder with a portion of said outer surface of the doffing cylinder and a portion of the outer surface of said main cylinder being within and forming portions of said suction chamber, whereby fibers are transferred from said main cylinder to said doffing cylinder.

7. In a pneumatic doffer for a card machine as defined in claim 6 in which the means imparting suction comprises a centrally disposed conduit extending longitudinally through said doffing cylinder, there being a longitudinally extending slot in the side of said conduit adjacent said main cylinder, outwardly flaring baffle members secured at their inner ends to said conduit adjacent opposite sides of said slot, the outer end of said baffle members terminating adjacent and defining said longitudinally extending section of the inner surface of the doffing cylinder to which suction is imparted.

8. In a pneumatic doffer for a card machine as defined in claim 7 in which suction conduits are connected to both ends of the conduit having a longitudinally extending slot therein.

9. In a pneumatic doffer for a card machine as defined in claim 6 in which the means between the outer surface of the main cylinder and the outer surface of the doffing cylinder at one side of said longitudinally extending section comprises an elongated rotary member mounted adjacent the delivery side of said main cylinder for rotation in a direction opposite that of said main cylinder.

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