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DOFFING PROCESS AND APPARATUS FOR THE CARD BY ACTION OF AIR

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Fig. 1

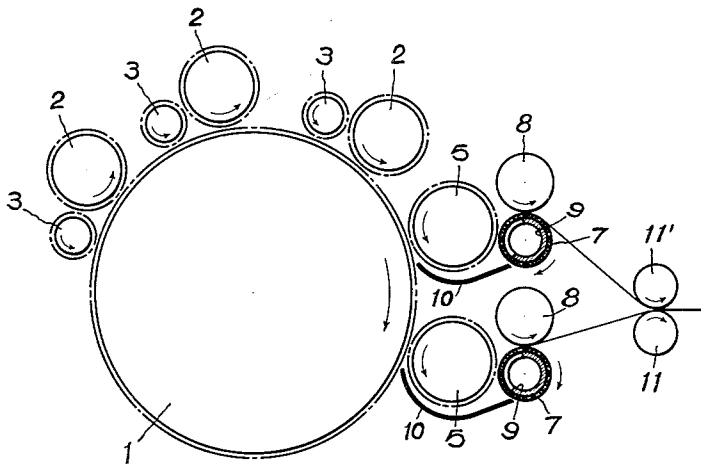
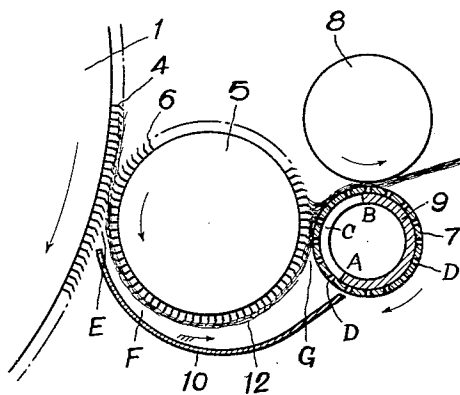


Fig. 2



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## DOFFING PROCESS AND APPARATUS FOR THE CARD BY ACTION OF AIR

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1 Claim. (Cl. 19—106)

The present invention relates to improvements in a doffing process and apparatus for a card which employs the action of air. The object of the invention is to obtain a sliver of highly parallel fibers and of minimum neps.

In ordinary cards a doffing mechanism is used whereby fiber released by the cylinder is passed to a doffer, and by vibration of a fly-comb, fiber is taken and transferred to calender rollers to be successively drawn out as a sliver. The arrangement of the fiber obtained through such doffing apparatus, however, is such that the fibers are entangled and extend in haphazard directions and are thus apt to cause neps, and operations for effecting the parallel arrangement of the fibers must be effected in succeeding steps. According to the present invention the doffing mechanism hitherto used is entirely cancelled, and a new suction roller provided with a worker and a top roller is arranged succeeding the cylinder to form an air current zone, whereby the parallel disposition of the fibers is greatly improved and a nepless sliver may be obtained.

The accompanying drawing shows an example of the doffing apparatus carrying out the present invention. FIG. 1 is a cross sectional view of the doffing apparatus as applied to a roller card, a part of which is omitted. FIG. 2 is an enlarged sectional view of the essential part of the invention.

The doffing apparatus of the present invention may be equally applied to roller cards and flat cards. The drawing shows an example as applied to a roller card. In the drawing 1 represents the cylinder covered with the wire 4. 2 represents the worker, and 3 represents the stripper. According to the present invention a doffer 5 is arranged substantially at the place of the doffer in ordinary cards. These rollers 1, 2, 3 and 5 revolve in the direction as shown with arrows in FIG. 1. The wires of these rollers, which may be either wire cloth or metallic wire, have their wire points inclined as shown in FIG. 2. Adjacent to the doffer 5, a suction roller 7 is arranged. Said suction roller is perforated with a plurality of holes D of a suitable diameter, regularly over all its surface. A top roller 8 is arranged in contact with the top of the suction roller 7. Inside the suction roller 7 is a trough-shaped tube 9 fixed on the frame and closely fitted inside the suction roller 7, having an opening C at one side, the lower side of which opens at A, on one side of the contact point of suction roller 7 with the doffer 5, and the upper side of which opens at B, just before the contact point with the top roller 8. One end of the fixed tube 9 is connected to a suitable vacuum source (not shown in the drawing) so that while suction roller 7 revolves on the fixed tube 9, air is drawn through the holes D corresponding to the opening C, between A and B facing the doffer 5. An apron 10 of arcuate shape is fixed below the doffer 5, between the cylinder 1 and the suction roller 7, one side of the apron is situated near the contact point E of the cylinder 1 and the doffer 5, and the other side of the apron is situated closely to the suction roller 7, corresponding to the lower side A of the opening C of the fixed tube 9. An air current zone F is formed between the doffer 5 and the apron 10 in the direction of rotation of the doffer 5, as shown with an

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arrow in FIG. 2, according to the inhalation of the suction roller 7.

The doffing apparatus of the present invention, as above stated, is compact in volume compared with the ordinary doffing apparatus, and may be arranged in two sets or more along the cylinder 1, in case of necessity, and by adjusting the gauge between the cylinder 1 and the doffer 5 in each set, fiber carried on the cylinder 1 may be equally distributed in the direction of each set of the doffing apparatus. The drawing shows an example provided with two sets of doffing apparatus. A set of calender rollers 11, 11' is arranged to gather the carded fiber passing through the contact point of the suction roller 7 and the top roller 8, to be drawn out as a sliver.

The present process carried out by the above described apparatus is as follows. The fiber after having been unloosed by the worker 2 and the stripper 3 several times, goes on the cylinder 1, and is caught by the doffer 5, and while advancing toward the contact point G between the suction roller 7 is drawn toward the roller 7, and when passing through the contact point G, the fiber 12 comes off the wire 6 of the doffer 5, and adheres securely to the surface of the suction roller 7. After passing through the contact point G, the opening C of the fixed tube 9 being closed at its upper side B, the sucking action of the roller 7 is stopped, and the fiber 12 may be easily separated from the suction roller 7. Thus the carded fiber rolled out from the suction roller 7 is gathered together at a pair of calender rollers 11, 11' to be drawn out as a sliver. The doffer 5 is provided at its lower side with the apron 10 to form the air current zone F, so that when the fiber 12, carried at one end by the wire of the doffer 5, passes through said zone, the other end of the fiber flows along the air current in the direction of rotation of the doffer 5, whereby the parallel disposition of the fiber is greatly improved.

The sliver obtained according to the present invention differs from those obtained by the ordinary cards as to the arrangement of fiber. In the ordinary sliver, the fibers are crossed in confused directions owing to the bend at the change of direction between the cylinders, doffer and the fly-comb. According to the present invention such bending of the fiber is entirely avoided by the action of the air current, and an unloosing action of fiber may be effected so as to form the fiber in a highly parallel arrangement. According to the present invention, therefore, those subsequent steps for correction of the fiber arrangement may be entirely omitted or such steps may be utilized for other purposes. Formation of neps may be reduced to the extent of almost complete elimination. The quantity of fiber to be treated by the doffer 5 is considerably increased in comparison with that of the ordinary doffer, and the invention is adapted for increasing the production of sliver. The apparatus of the present invention may be provided with only one set as shown in FIG. 2, by properly adjusting the gauge between the cylinder 1 and the doffer 5. As above stated, the doffing process and apparatus of the present invention is new and useful in respect to improving the nature of the sliver and increasing its production.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed I declare that what I claim is:

Doffing apparatus for a card employing the action of air comprising, in combination, a cylinder, a doffer directly adjacent said cylinder, said doffer directly cooperating with said cylinder to remove fiber therefrom upon rotation of said doffer and said cylinder in opposite directions, a suction roller disposed directly adjacent said doffer on the side opposite said cylinder, said roller having a suction surface disposed toward said doffer,

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said suction roller directly cooperating with said doffer to remove fiber therefrom upon rotation of said doffer and said suction roller in opposite directions, and an apron disposed below the doffer to form an air current channel for air drawn by the action of said suction roller, whereby the fiber removed from the cylinder by the doffer is carried in the direction of the air current directly to the suction roller, said channel being defined by said apron, said doffer and said suction roller, said suction roller being perforated over its entire surface and being provided interiorly with a closely-fitted fixed tube having an opening facing said doffer, one end of said fixed tube being adapted to be connected to a vacuum source, said apron being arcuate and extending from a point closely adjacent said cylinder to a point closely adjacent said suction roller, said arcuate apron closely conforming in curvature to the curvature of said doffer, but being further removed from the surface of said doffer

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at its end adjacent said suction roller than at its end adjacent said cylinder, whereby to define an arcuate channel gradually increasing in radial dimension with respect to said doffer in the direction from said cylinder to said suction roller.

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