Devices on spinning frames with suction nozzles arranged on the leaving side of the serrated rolls for the pneumatic exhaust of lint, dust, broken yarn and the like are already known and in commercial use. The known devices have been limited in use, especially in the spinning of long staple materials such as wool, worsted, jute and silk. The suction nozzles generally have been secured to the spinning frame or parts thereof in a fixed or stationary position, making the piecing or joining of broken yarn or threads very difficult and time consuming; thus greatly reducing the efficiency of the operating attendants.

This invention eliminates these deficiencies of such devices by providing for controlled movement or adjustment of the suction nozzles in such a manner as to make it possible and practicable to swing or move these suction nozzles from their normal operating position close to the leaving side of the serrated rolls of the draft gear to a position further away; permitting easy and quick piecing or joining of broken yarn or threads.

The attached drawing illustrates diagrammatically the right and left hand drafting or feed rolls of a conventional spinning frame, designated 1 through 8 and 18 through 22 respectively. The cops, bobbins or spools from which the entering yarn or thread 7 and 24 is unwound and the spindles on which the spun yarn or thread is rewound, as well as certain other parts of the spinning frame are not shown in the drawing since they are conventional and form no part of the invention.

The suction nozzles 8 and 25 on suction tubes 9 and 26 extend from a central collecting duct 16 to points just below serrated rolls 2 and 19. They are joined to the center collecting duct through flexible joints 11. This central collecting header or duct, to which the suction nozzles are connected, leads to suitable air exhaust apparatus which draws or sucks air through the collecting header from the tips or mouths of suction nozzles 8 and 25. The strong air suction or vacuum action so created at the tips or mouths of the suction nozzles causes lint, dust, broken yarn and the like to be drawn into suction tubes 9 and 26, and then pulled to collecting header 16 to the exhaust apparatus. The exhaust apparatus is not shown in the drawing since it forms no part of the invention.

As indicated on the drawing the nozzle tubes may be flattened at the tip or end to form an oblong or slot shape mouth. The nozzles 8 and 25 are provided with mechanisms to make them adjustable. In the normal operating position indicated by the dotted lines they are removed from these rolls. As indicated by the arrows, these nozzles are adjustable in a plane vertical to the axis of the serrated rolls. The nozzle mouths, as shown, are located at 12 and 21 in the low or “down” position. To prevent the nozzles from striking the serrated rolls, the adjustability or movement of the nozzles is limited. For this purpose, clamp 13 with bandiron extension 14 is fastened to nozzle tube 9. To this extension 14 a spring 15 is fastened. Spring 15 snaps into a formed or bent rod 17 serving as a stop member and which is fastened to the spinning frame traverse 16. The bent rod 17 and the bent spring 15 act as stops which control the normal working position of nozzle 8 and therefore also the nozzle tube 8. Movement of the nozzle tube in the direction of the arrow is limited by extension 14, which rests on machine traverse 16 as shown on dotted lines in drawing.

An alternative arrangement for limiting the swing or movement is shown on the left hand side of the drawing at nozzle 25. The nozzle tube 26 also carries clamp 34, which has a pin 35 located vertically as shown. A U-bent bandiron 30 is riveted to machine traverse 29. The U-bent bandiron has a slot extending from points 31 to 32 which controls upper and lower position of nozzle tube 26 projecting through this slot. Spring 33 is attached to the bandiron and arranged to snap into a stop member such as the pin 35 to hold nozzle tube 25 in its “up” or normal operating position. The arrangements described are so designed as to easily overcome the effect of springs 15 and 33 so that nozzle tubes 9 and 25 can be brought from the upper to the lower position without exertion. On the other hand, springs 15 and 33 are sufficiently strong to hold firmly when the nozzle tubes 8 and 25 are moved from the lower to the upper position.

The normal working position of the yarn running from the serrated rolls to the spindles is indicated by 7. Should the yarn or thread break, a position indicated by 24 results. The lower end of the broken thread, which is shown as arrow 24 on the drawing, is wound onto the spindle of the spinning frame. The upper end is sucked in by nozzle 25 and passes into nozzle tube 26. The broken thread cannot therefore tangle up with threads of adjacent spindles. The operator, after discovering the break, first swings nozzle 25 to position 21 without stopping the draft gear. The yarn continuously fed or delivered by the draft gear is sucked into the nozzle. In this position of the nozzle shown by the dotted line, the free broken thread between the serrated roll 19 and the nozzle is sufficiently long to enable the operator, in case of both short or long staple
material, to piece or join the spindle end of the broken yarn while draft gear is running and at the same time cut off the yarn end sucked into the nozzle. After this pieceing, the normal working position of the thread is again established. The nozzle tube is still in the lower position. In this lowered position, experience has shown that the suction nozzle is not able to keep the serrated rolls clean and, in case of another breakage, cannot prohibit the yarn from lapping around the roll, tangling with the other yarn or threads. Therefore, after piecing the broken yarn, the nozzle is immediately brought back to the upper position to keep the rolls clean and pick up or catch the next broken thread.

It is almost impossible to piece clean a broken worsted or silk thread during the normal upper position of the nozzle and while the spinning frame is running. The described arrangement of the suction nozzles makes possible for the first time the spinning of long staple material without troublesome interruptions. The distance which the nozzle may be swung from its normal operating position equals the width of one or two fingers, enabling the operator quickly and efficiently to piece or join broken yarn or threads together.

In order to assure continuous efficiency, the nozzle mouth of each nozzle must be well rounded and smooth. The nozzle mouth is preferably made of hard and wear-resistant material, for instance steel, glass or hard aluminum. As for the mechanical arrangement of the swing or adjustable device, other devices than those shown in the drawing may suggest themselves. Also, although it is of advantage to swing each nozzle separately, it is possible to combine adjacent nozzles into a group and swing or move them simultaneously. The nozzles of such a group may be mounted on a common connecting unit, which in turn may be coupled by a flexible joint, such as a rubber tube, to the common collecting header leading to the exhaust apparatus.

1. In combination with a spinning frame including drawing rolls, a suction nozzle placed adjacent the leaving side of the rolls for effecting exhaust and trapping of dust, lint, and broken yarn, a collecting duct, a flexible joint connecting the nozzle to the duct, and means for holding the nozzle in normal position adjacent the leaving side of the rolls, said means including a stop member and a flexible member adapted to snap into contact with the stop member to hold the nozzle in normal position adjacent the leaving side of the rolls, disengagement of the flexible member from the stop member permitting the nozzle to be moved to a point remote from the rolls whereby working room is provided for efficient piecing of a broken yarn caught by the nozzle with the spindle end of the broken yarn.

2. Apparatus according to claim 1 in which the nozzle is moved in a plane substantially perpendicular to the axis of the rolls, yarn from the rolls being fed across the mouth of the nozzle when the nozzle is in normal position.

3. In combination with a spinning frame including drawing rolls, a suction nozzle placed adjacent the leaving side of the rolls for effecting exhaust and trapping of dust, lint, and broken yarn, a collecting duct, a flexible joint connecting the nozzle to the duct and means for holding the nozzle in normal position adjacent the leaving side of the rolls, said means including a clamp secured about the nozzle, an extension member secured to the clamp, a spring carried by the extension member, a rod member supported by the frame and said spring mating with the rod member to hold the nozzle in normal position adjacent the leaving side of the rolls, disengagement of the spring from the rod member permitting the nozzle to be moved to a point remote from the rolls whereby working room is provided for efficient piecing of a broken yarn caught by the nozzle with the spindle end of the broken yarn.

4. Apparatus according to claim 3 in which the extension member contacts the frame to limit movement of the nozzle when the nozzle is moved away from the rolls.

5. In combination with a spinning frame including drawing rolls, a suction nozzle placed adjacent the leaving side of the rolls for effecting exhaust and trapping of dust, lint, and broken yarn, a collecting duct, a flexible joint connecting the nozzle to the duct, and means for holding the nozzle in normal position adjacent the leaving side of the rolls, said means including a clamp secured about the nozzle, a pin mounted on the clamp, a member having a slot therein mounted on the frame, the nozzle projecting through the slot, a spring mounted on said member adapted to snap into contact with the pin to hold the nozzle in normal position adjacent the leaving side of the rolls, disengagement of the spring from the pin permitting the nozzle to be moved to a point remote from the rolls whereby working room is provided for efficient piecing of a broken yarn caught by the nozzle with the spindle end of the broken yarn.

6. Apparatus according to claim 5 in which the wall of the slot limits movement of the nozzle away from the leaving side of the rolls when the spring is disengaged from the pin.

7. In combination with a spinning frame including a plurality of sets of drawing rolls, a plurality of suction nozzles placed adjacent the leaving sides of the sets of rolls for effecting exhaust and trapping of dust, lint and broken yarn, a collecting duct, flexible joints connecting the nozzles to the duct, and means for separately holding the nozzles in normal position adjacent the leaving sides of the rolls, said means including stop members and flexible members adapted to snap into contact with the stop members to hold the nozzles in normal position adjacent the leaving sides of the rolls, disengagement of any flexible member from its cooperating stop member permitting a nozzle to be separately moved to a point remote from the rolls whereby working room is provided for efficient piecing of a broken yarn caught by such nozzle with the spindle end of the broken yarn.

HANS CARL BECHTLER.

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