July 22, 1958 J. FURSTENBERG 2,843,995

THREAD SUCTION INSTALLATIONS FOR SPINNING MACHINES

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FIG. 1

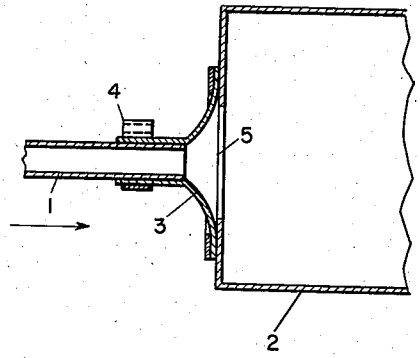


FIG. 2

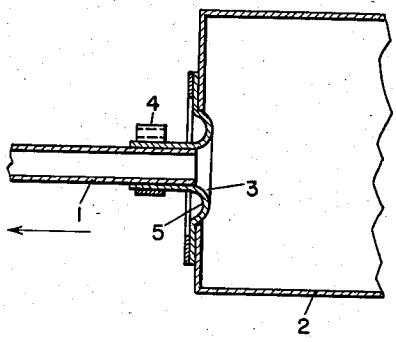


FIG. 3

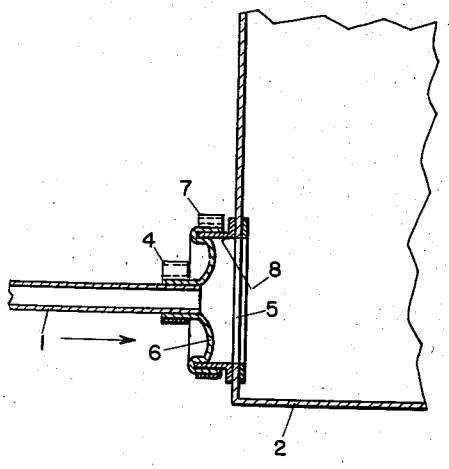
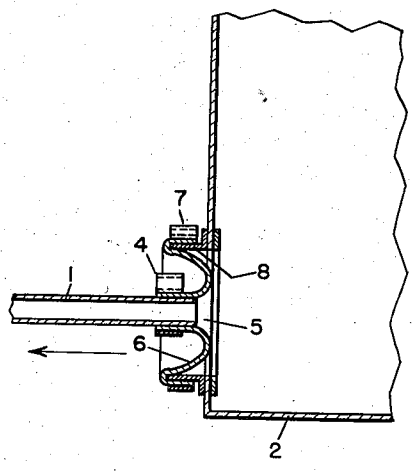


FIG. 4



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FIG.5

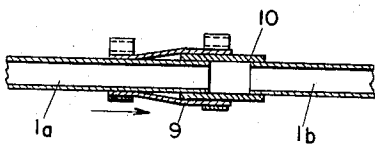


FIG.6

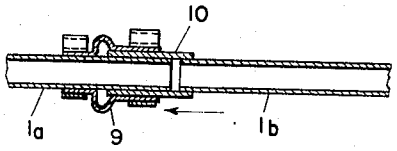


FIG.7

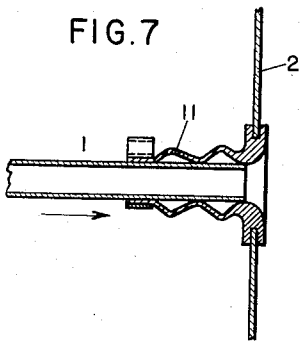


FIG.8

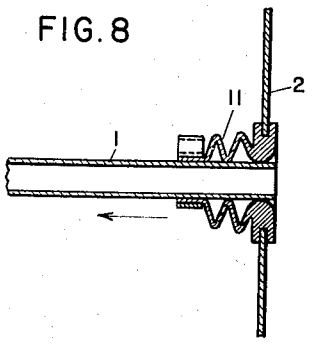


FIG.9

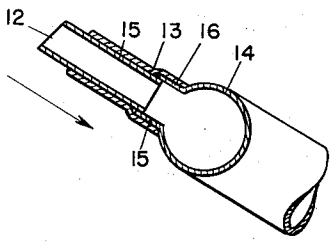
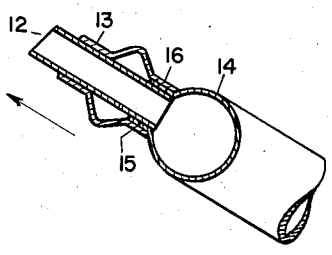


FIG.10



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THREAD SUCTION INSTALLATIONS FOR SPINNING MACHINES

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Application October 9, 1952, Serial No. 313,881

5 Claims. (Cl. 57—34.5)

This application relates to the subject matter of my copending application Serial No. 295,466 filed June 25, 1952, now Patent No. 2,782,589, which deals with the problem existing in thread suction installations for spinning machines, wherein the orifices of the suction tubes or nozzles pertaining to the individual spindles must on the one hand, for the purpose of obtaining a good suctional effect, be arranged as near as possible to the points of any thread breakages, i. e., where the yarn leaves the drafting gear, but on the other hand constitute in this position an obstruction when, after the occurrence of a broken thread, the sucked up end of the thread must be extracted from the respective tube and joined anew. In order to facilitate such manipulation on the part of the operator so that an uninterrupted spinning operation can be continued as quickly as possible, the nozzle tubes or nozzles in my said copending application are arranged so that they may be moved, when required, out of their normal operative position into a position wherein their orifices are more remote from the fluted roller; that is, displaced axially but not obstructed by the drafting rollers.

In an arrangement of this character it is necessary to provide between the shiftable and the fixed parts of the suction tube system connections to permit relative movement of the parts and at the same time seal these parts off one from the other. Also, care is required to be exercised so that the shiftable parts do not assume any undesired intermediate positions in the case of unintentional actuation or when accidentally touched.

This invention fulfills these requirements in a particularly simple manner by connecting the suction tubes, the front portions thereof containing the nozzles or the actual nozzles themselves, at their connection end in such a manner with the fixed portion of the suction system by resilient sealing elements that, upon displacement of a movable portion, a force, for example in the form of tension, is generated or released in the particular sealing element by deformation thereof, which force seeks again to produce automatically the initial position or to bring about the opposite extreme position.

Additional features of the invention and details of the advantages obtained thereby are disclosed by the following description of the embodiments of the subject matter of the invention illustrated by way of example in the accompanying drawings. In the drawings,

Figure 1 is a sectional view taken longitudinally through an axially shiftable tube which is connected to a collecting conduit, in one extreme position;

Figure 2 is a sectional view similar to Figure 1 illustrating the axially shiftable tube in its other extreme position;

Figure 3 is a sectional view similar to Figure 1 of a modification of the invention;

Figure 4 is a sectional view similar to Figure 2 of the modification shown in Figure 3;

Figure 5 is a sectional view of the axially shiftable portion of a suction tube in conjunction with a fixed part thereof;

Figure 6 is a sectional view similar to Figure 5 illustrating the tube in shifted position;

Figure 7 is a sectional view similar to Figure 1 illustrating a further modification of the invention;

Figure 8 is a sectional view similar to Figure 2 of the modification shown in Figure 7;

Figure 9 is a sectional view of an axially shiftable nozzle connected with the suction pipe, in one of its extreme positions; and

Figure 10 is a sectional view similar to Figure 9 showing the nozzle in the other extreme position.

The invention according to Figures 1 to 8 relates to thread suction installations in which suction tubes **1** or **1a**, **1b**, are provided with a nozzle orifice adjacent the drafting rollers, and which at the end opposite to the nozzle orifice are connected in airtight fashion with a common collecting conduit **2**. In the first embodiment according to Figures 1 and 2 this connection is established by means of a resilient element **3**, which is of approximately funnel-like form in its relaxed condition. The inner edge of element **3** tightly surrounds and seals, by means of a clamping device **4**, the end of the suction tube. The outer edge of element **3** is connected likewise in sealing fashion to the side wall of the collecting conduit about an aperture **5** therein.

When the suction tube **1** is moved axially towards the right, from the position shown in Figure 1 and toward the position shown in Figure 2, a tension is produced in the sealing and connecting element **3** by resiliently deforming the element between its points of connection, which tension initially offers a certain resistance to the displacement. Immediately, however, when this element commences to bend over the edge of the lateral aperture **5** in the collecting conduit **2** into this aperture, the tension suddenly takes effect in the opposite direction to bring about a further flexure, so that the suction tube is then moved automatically into the other extreme position corresponding approximately to the illustration in Figure 2. When the suction tube, after elimination of the interference in the operation, is again advanced there is at first in the reverse direction also a resistance until the tension of the resilient element changes its direction and the suction tube without further urging returns automatically into the initial position (Figure 1).

The extent of the entire axial displacement and the position of the point of reversal of the tension can be selected in accordance with the particular requirements in each instance by corresponding embodiment of the resilient connecting element **3** or by selection of the difference in diameter between the aperture **5** in the wall of the conduit **2** and the suction pipe **1**. The same applies to selection of the resiliency of the particular element as regards the force with which the suction tube is to be held in the one or the other extreme position.

The embodiment according to Figures 3 and 4 differs from that described in the above insofar as in this case a sealing member **6**, which is of approximately mushroom-like form in the relaxed condition (Figure 3), tightly surrounds in an axial direction, by means of a clamping device **7**, as in the connection with the suction tube **1**, a short socket **8** fitted into the aperture **5** in the collecting conduit **2**. With a sealing element of this type, the direction of tension is reversed after only a very short displacement of the suction tube from the extreme forward position shown in Figure 3 and an automatic additional displacement is brought about to move the tube into its extreme rearward position as shown in Figure 4.

In this case the resiliency of the connecting element

must also be in a suitable proportion to the width of the annular space available for deformation thereof between the socket 8 and the suction tube 1.

Figures 5 and 6 disclose a multi-part suction tube, the left hand portion 1*a* of which possesses the nozzle orifice at the free end (not shown) and the right hand portion 1*b* of which at its end (not shown) is firmly connected to a collecting conduit. As the connecting element between portions 1*a* and 1*b* there is employed in this case a simple tubular sleeve 9, which is tightly clamped to and surrounds the connecting end of the shiftable tube portion 1*a*, its opposite end being tightly clamped to an extension 10 of the fixed portion 1*b* of the suction tube. Portion 1*a* moves in an axial direction within extension 10, extension 10 serving to guide the shiftable portion 1*a* in the axial direction. When the left hand tube portion 1*a* is moved from the position shown in Figure 5 into the position shown in Figure 6, the sleeve is shortened by the formation of an outwardly curved corrugation. At the same time, there is produced therein a resilient tension which, when the external force ceases, is immediately eliminated automatically by the sleeve again assuming its original form (Figure 5) and thus returning the movable tube portion 1*a* into its initial position.

As disclosed by Figures 7 and 8, a resilient connecting element such as sleeve 11 connects the shiftable suction tube 1 and a fixed portion of the tubular system such as the collecting conduit 2, sleeve 11 preferably, being furnished with two corrugations in its relaxed condition. When the sleeve is shortened by moving back the suction tube from the position shown in Figure 7 into the position shown in Figure 8, as in the case of the sleeve 9 in the previous embodiment, a state of tension results which seeks to find compensation by an oppositely directed displacement of the suction tube into its original position. By this deformation of the sleeve, however, the inner diameter of its outwardly turned end secured in the radial direction against the wall of the collecting conduit is simultaneously reduced, so that at this point there is brought about to an increasing extent on the face of the suction tube a clamping effect, which finally becomes even greater than the resilient tension of the sleeve. In consequence, the suction tube is held automatically in the extreme rearward position shown in Figure 8. It is only after it has again been advanced slightly by hand that it is returned automatically into its initial position (Figure 7) by the again predominating tension of the sleeve.

In the final embodiment according to Figures 9 and 10, a nozzle member 12 is connected by means of a resilient tubular sleeve 13 with a fixed T-shaped or L-shaped suction pipe 14. The nozzle possesses for the purpose of axial guiding thereof an extension 15, which extends within the sleeve but is not connected therewith, and which in turn is guided in a short socket 16 welded to the suction pipe, which socket also serves for attachment of the rear end of the sleeve.

When the nozzle is pushed back axially into the position shown in Figure 10, the sleeve forms a corrugation, whereby a state of tension is brought about, which lasts only for such time as the external force acts upon the nozzle. In this case, therefore, as in the embodiments shown in Figures 5 and 6, provision is made for automatic holding only in the extreme forward position representing the position of operation.

Generally speaking, the extreme forward position of the movable portion, i. e., as shown in Figure 1, Figure 3, Figure 5, Figure 7 or Figure 9, will form the normal operative position. This applies above all when the part in question is retained automatically only in this position. In other cases, however, there is fundamentally no objection with regard to the use of the present invention in making the extreme position to the rear the operative position and the extreme forward position the working position for the joining up of a broken thread.

To obtain exact axial guiding of the shiftable suction tubes suitable bearings for these can be provided. For the actuation thereof clamping members can be used, which are furnished with a portion adapted to be held and can be readily moved into a suitable position. These, preferably, are so constructed that as little dust as possible deposits thereon. In place, thereof, it is also possible to employ with the part in question, i. e., in the case of an embodiment according to Figures 9 and 10, projectory holding means firmly connected with the nozzle.

While I have described certain preferred embodiments of my invention, it will be understood that my invention is not limited thereto since it may be otherwise embodied within the scope of the following claims.

I claim:

1. A thread suction arrangement for use with a textile spinning frame including spindles and drafting rollers, said arrangement comprising: a plurality of suction members adapted to be placed adjacent the spindles of the spinning machine, said suction members being freely retractable in an axial direction away from the drafting rollers of the spinning machine; a common collecting conduit extending between said suction members; and resilient hollow sealing elements connected to the suction members and the conduit, forming a connecting passageway therebetween, said sealing elements forming an overcenter connection between the suction members and the collecting conduit, wherein upon initiation of axial retraction of the suction member, the conduit is elastically deformed to aid in this retraction, and upon initiation of movement of the suction member to its operative position, the conduit aids in return of the member to its operative position.

2. Apparatus according to claim 1, in which said resilient hollow sealing elements comprise: a funnel-shaped member.

3. Apparatus as in claim 2, in which said funnel-shaped member has an apex secured to the suction member, and a base portion secured to the collecting conduit.

4. Apparatus according to claim 1, in which said resilient hollow sealing elements comprise: a mushroom-like member formed with a central opening.

5. Apparatus as in claim 4, in which said mushroom-like hollow resilient sealing elements are arranged with their central portion secured to the suction member; and the edge portions secured to the collecting conduit.

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