Aug. 18, 1970 H. LANDWEHRKAMP ET AL. 3,524,312

METHOD AND APPARATUS FOR CLEANING ROTARY SPINNING CHAMBER

Filed July 25, 1967 2 Sheets-Sheet 1

Fig.1

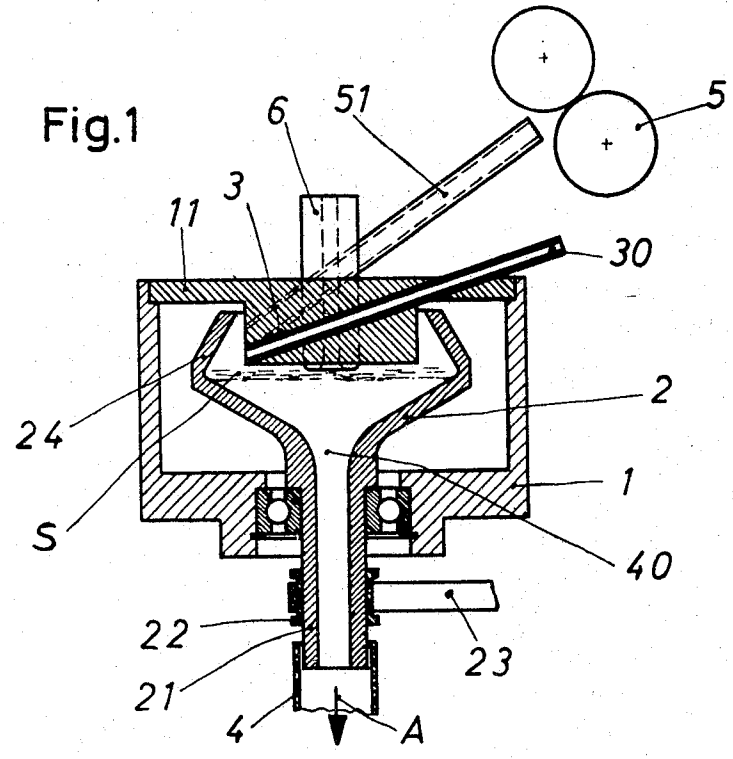


Fig.2

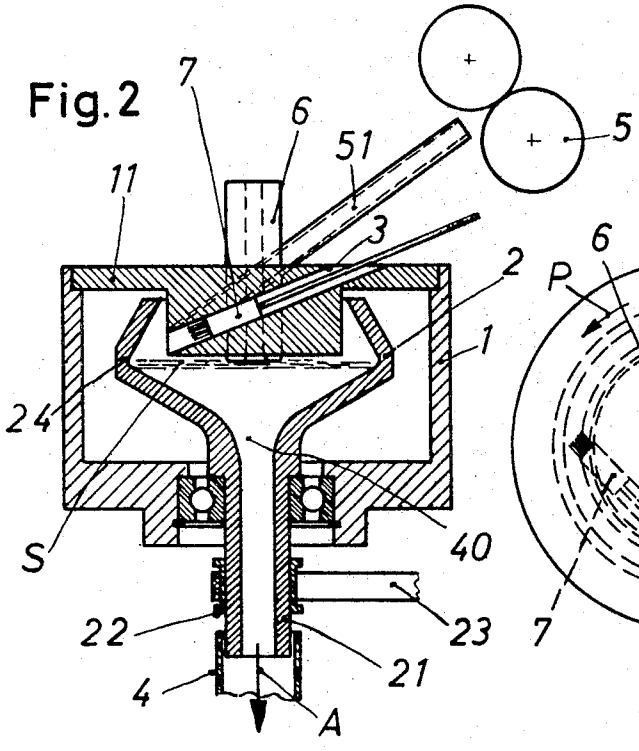
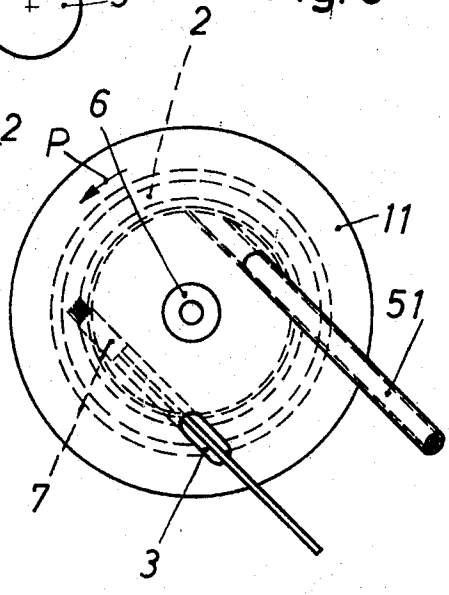


Fig. 3



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Filed July 25, 1967 2 Sheets-Sheet 2

Fig. 4

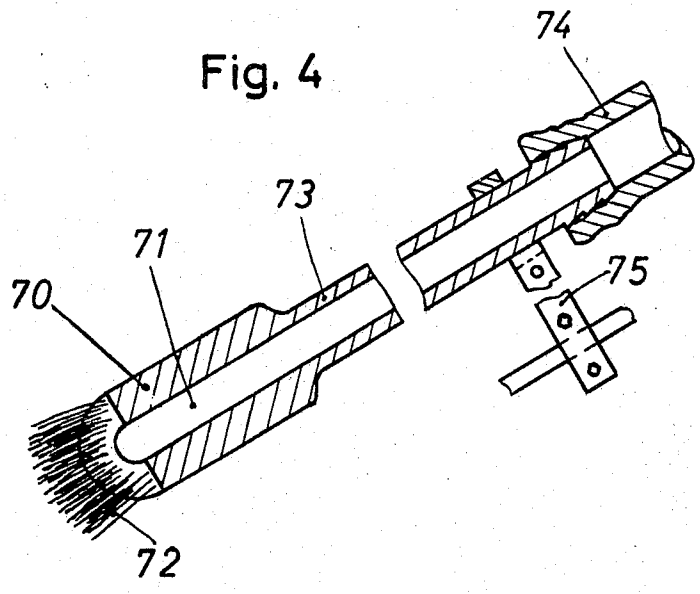
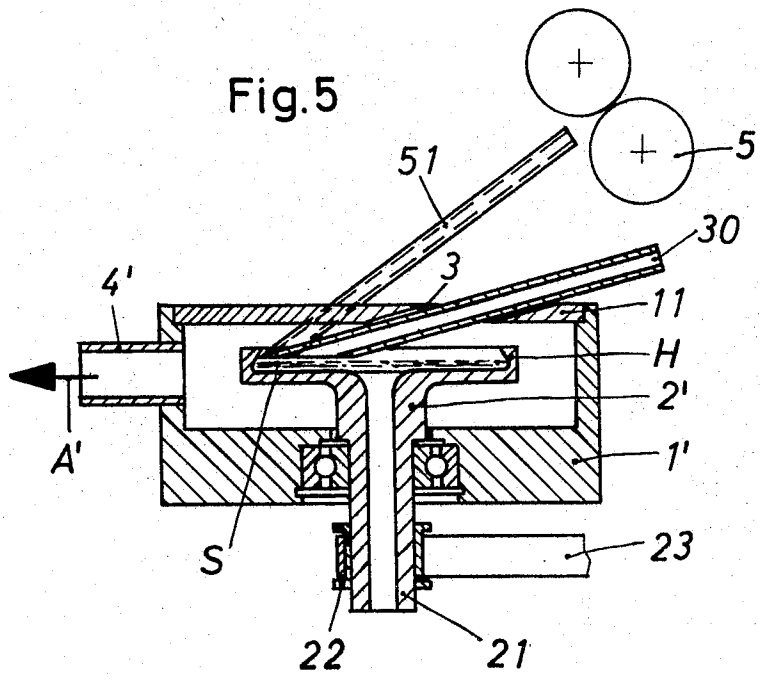


Fig.5



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METHOD AND APPARATUS FOR CLEANING ROTARY SPINNING CHAMBER

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U.S. Cl. 57—56 18 Claims

ABSTRACT OF THE DISCLOSURE

The cover for the spinning chamber and its housing has an inclined bore through it to permit injection of compressed air or cleaning fluid to the chamber, or a mechanical stripper can be slid through the bore to engage the chamber side. The stripper may have a longitudinal bore for passage of fluid through it to the chamber. Residue entrained by an air stream or by cleaning fluid can be removed through the hollow shaft supporting the chamber or through an aperture in the housing wall.

In spinning thread from a ribbon lap in a rotary chamber, residue from dust and dirt and from oils carried by the lap is deposited in the chamber. Consequently, a suction source is provided to remove such residue from the chamber, usually through its hollow shaft. However, because the residue is oily and because of the centrifugal force pressing the lap and residue onto the rotating chamber, the residue clings to the chamber wall and a suction air stream alone is not capable of removing the residue.

Consequently, it is necessary to clean the spinning chamber from time to time. In the past, such cleaning has required that the spinning chamber and housing be partially dismantled and cleaned manually, which resulted in considerable loss due to shutdown time.

It is a principal object of the present invention to provide apparatus and a method for cleaning a rotary spinning chamber which does not require opening or dismantling of the chamber and its housing.

It is a further important object to provide apparatus for cleaning spinning chambers which can be utilized to clean, simultaneously, several spinning chambers automatically.

FIG. 1 is a central vertical section through a spinning device having cleaning means of the present invention.

FIG. 2 is a similar section through a spinning device illustrating additional cleaning means and FIG. 3 is a plan of the apparatus shown in FIG. 2.

FIG. 4 is a section through a cleaning device component, with parts broken away.

FIG. 5 is a central vertical section through a different spinning device illustrating modified cleaning means.

A representative spinning device is shown in FIG. 1. A housing **1** surrounds a spinning chamber **2** mounted on the upper end of a hollow upright shaft **21**. From the upper end of the shaft the cup-shaped chamber flares upwardly and outwardly and has an inwardly and upwardly inclined rim. A cover **11** closes the upper portion of housing **1** and its central portion depends into and forms a stationary cover for the spinning chamber. A feed tube **51** extends through cover **11** to supply fiber sliver from feed rolls **5** to the spinning chamber **2** and directs such sliver into the collection channel **24** defined by the junction of the lower flared wall and inturned rim of the chamber. A tube **6** extends axially through cover **11** for removing spun yarn from chamber **2**. Shaft **21** is driven through sheave **22** by belt **23**.

The cleaning apparatus includes a bore **3** through cover **11** which, as shown best in FIG. 3, is inclined and extends substantially tangentially of channel **24**. The inner end of the bore is directed opposite to the direction of chamber rotation as shown in FIG. 3 by an arrow P so that cleaning fluid or mechanical cleaner entering the chamber through the bore will impinge against the chamber wall in a manner to effect scouring of such wall. A tube **30** shown in FIGS. 1 and 5 connected to a compressed air source may be inserted through bore **3** to blow residue from the chamber wall; a cleaning agent may be poured or sprayed through the bore; or a mechanical stripper such as **7** or **70** shown in FIGS. 2, 3 and 4 may extend through the bore. A combination of these cleaning agents may be used.

In FIG. 4 a stripper **70** is shown in detail. A longitudinal bore **71** through the stripper permits the injection of compressed air or cleaning fluid into the chamber. Bristles **72** encircle the inner end of such bore. The end portion of a flexible fluid supply conduit **74** embraces the outer end of the stripper tube **73**. The conduit and stripper tube can be moved axially through bore **3** in cover **11** into and out of the chamber. The tube **73** may be connected by a Bowden cable **75** or the like to a remote station or automatic actuating mechanism for manipulation of the stripper.

Residue stripped from the chamber walls is removed from the chamber through a passage **40** in the hollow shaft **21**. A suction tube **4** may be attached to the lower end of the shaft for creating an air stream A which may operate continuously or intermittently to draw loose residue from the chamber during spinning. Such suction may cooperate with compressed air or cleaning fluid injected through bore **3** to entrain the residue and carry it out through passage **40**.

In FIG. 5 a shallow spinning chamber **2'** is shown in which spun thread is removed through vertical hollow shaft **21** supporting such chamber. Residue scoured from the walls of such chamber is drawn over the upper edge H of the chamber and out through suction **4'** in the side wall of housing **1'** by means of an air stream A'.

When the spinning chamber **2** or **2'** is to be cleaned, the feed rolls **5** are stopped and the fiber sliver is cut between such rolls and feed tube **51**. The sliver remaining in the tube and in the collection channel **24** is removed with the spun yarn through discharge tube **6** and cut from such yarn. The speed of chamber rotation is preferably reduced substantially during the cleaning operation. If the tube **4** is continually applying suction to hollow shaft **21**, air stream A or A' will have removed loose particles in the spinning chamber so that only the residue S remains. Compressed air or other cleaning fluid is then injected through bore **3** to impinge on the side of the collection channel **24**. As discussed previously, bore **3** is disposed so that fluid supplied through the bore will have an initial velocity directed substantially opposite to the tangential direction of chamber rotation so that the momentum of such fluid will cause it to scour residue from the channel. By permitting the chamber to rotate at a reduced speed instead of being stopped completely the entire channel circumference is effectively cleaned.

Alternatively, or in addition to the stream of cleaning fluid, a stripper **7** may extend through bore **3** and may have on its channel-engaging end a small brush or a felt tip to scrape residue from the channel mechanically without eroding the chamber wall. Particularly if the residue is oily, it may be desirable to inject a cleaning solvent into the chamber and then to scrape the residue from the walls in which case a hollow stripper, such as the stripper **70** shown in FIG. 4, may be used. When the cleaning operation is completed, stripper **7** or **70** is retracted into bore **3** for storage.

We claim:

1. The method of cleaning residue from a rotary spinning chamber having a collection channel comprising the steps of interrupting the spinning operation, reducing the speed of rotation of the spinning chamber, introducing a cleaning instrumentality into the collection channel, and removing residue from the chamber by a fluid stream.

2. The method of cleaning defined in claim 1, in which the cleaning instrumentality is compressed air injected into the collection channel.

3. The method of cleaning defined in claim 1, in which the cleaning instrumentality is a stream of liquid injected into the collection channel.

4. The method of cleaning defined in claim 1, in which the cleaning instrumentality is a mechanical stripper insertable into the collection channel.

5. In a spinning device including a rotary spinning chamber having a collection channel and a housing for such spinning chamber, a stationary cover covering both the housing and the spinning chamber and having an inclined bore therethrough communicating with the spinning chamber collection channel and through which a cleaning instrumentality may pass.

6. The spinning device defined in claim 5, in which the inclined bore is directed generally tangentially toward the spinning chamber collection channel in the direction opposed to the direction of the chamber rotation.

7. The spinning device defined in claim 5, and mechanical stripping means carried in and movable longitudinally of the inclined bore into and out of engagement with the spinning chamber collection channel.

8. The spinning device defined in claim 7, in which the mechanical stripping means includes a tubular body having a bore coaxial with the cover bore.

9. A method of cleaning fiber collection surfaces in open end spinning devices comprising the step of removing deposited impurities under a brief intense automatically actuated scouring force from the fiber collection surface.

10. A method as set forth in claim 9 wherein said step includes a conveying of a flow of compressed air against the fiber collection surface.

11. A method as set forth in claim 10, wherein the fiber collector surface is rotatable in a first direction and the flow of compressed air is directed counter to said first direction.

12. A method as set forth in claim 9 wherein said step includes mechanical scraping of the fiber collection surface.

13. A method as set forth in claim 12, wherein said step further includes a simultaneous conveying of a flow of cleaning solvent against the fiber collector surface.

14. A method of cleaning a fiber collection surface in an open end spinning device which comprises the step of removing deposited impurities from the fiber collection surface by application to such surface of a brief intense scouring force.

15. In combination with an open end spinning device having a fiber collector surface; a cleaning apparatus including means for directing a flow of fluid against said fiber collector surface to remove adhered impurities therefrom.

16. The combination as set forth in claim 15, wherein said means includes a guide tube mounted above said surface, a retractably mounted cleaning element within said guide tube and means for moving said cleaning element into scraping contact with said surface.

17. The combination as set forth in claim 16, wherein said cleaning element is a brush.

18. The combination as set forth in claim 15, wherein said cleaning apparatus further includes suction means communicating with said surface for removing the fluid and removed impurities therefrom.

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U.S. Cl. X.R.

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