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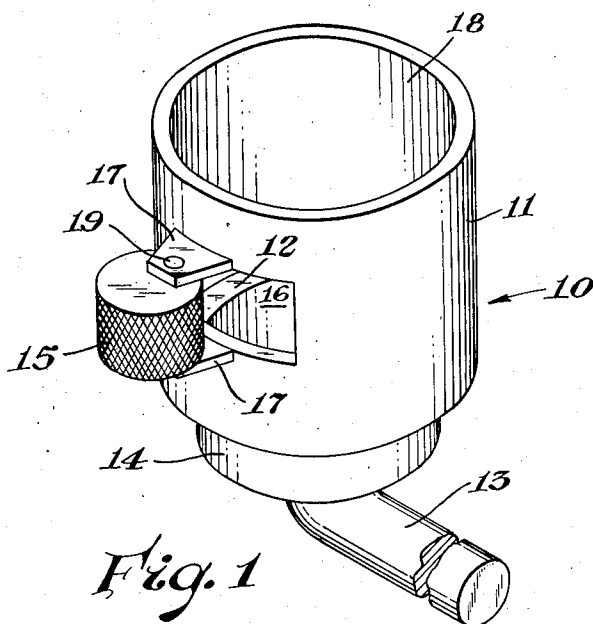
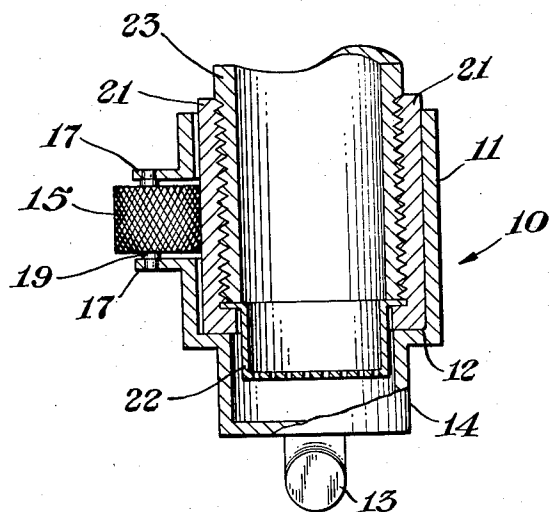


Fig. 2

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SPINNERETTE WRENCH

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6 Claims. (Cl. 81—53)

This invention relates to a device for removing and installing spinnerette heads. More particularly, it relates to a spinnerette wrench.

In the synthetic fiber industry, filaments or fibers are often prepared by extruding a viscous spinning solution or dope into a coagulant or non-solvent liquid for the material being spun into filaments. The spinnerettes employed frequently contain in their face several hundred and oftentimes more orifice openings or jet holes through which the material is extruded. These spinnerettes are of relatively delicate structure and are easily damaged.

In general, the spinnerettes are supported at the terminal portion of a spinning solution supply conduit and retained in position by means of an internally threaded collar mating with external threads of the conduit. It is customary in wet spinning operations to provide a plurality of such spinnerettes in close proximity to one another feeding into the coagulant bath. Because of the close proximity of the spinning heads to one another, it has been found relatively difficult and expensive to remove the spinnerettes when their cleaning or replacement becomes necessary. It has been customary to unscrew the threaded retaining collar by means of such instruments as conventional pipe wrenches, slip-joint or arc-joint pliers, and the like. The use of such tools has been found to be relatively inefficient and costly. The spinnerette is readily damaged by accidental contact with such tools. If this happens, the damaged units must be replaced and, ordinarily, are discarded. The close parallel arrangement of spinnerette heads in many commercial installations, particularly when wet spinning is involved, makes manipulation of such conventional tools rather difficult.

It is particularly advantageous in the construction of a spinnerette head to employ a retaining collar that is substantially circular in external section. Spinnerette retaining collars having flattened sides are particularly difficult to manipulate with wrenches adapted to grip flat surfaces. This is oftentimes aggravated by the presence of the coagulated spinning solution and the great difficulty involved in keeping such collars and tools free of the viscous material.

It would be advantageous to have available a spinnerette collar removing device which could be operated in a minimum of space.

It would also be advantageous to have available a spinnerette removing wrench which would protect the spinnerette from mechanical damage during the removal operation.

It would be further advantageous if a spinnerette removing wrench were available which could be readily cleaned and would function easily when contaminated with fiber-forming spinning solution and the like compositions.

It would also be advantageous if such a spinnerette wrench were adapted for the rapid removal of the retaining collars from the supply conduit for the spinning solution.

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These and other advantageous results and purposive benefits may be achieved by employing, in combination and cooperation with a spinnerette retaining collar, a spinnerette wrench in accordance with the present invention which comprises: a hollow cylinder having an internal shoulder toward one end, means for turning said cylinder; cylinder walls defining at least one opening; pivot supports appended to said cylinder adjacent to said opening affixed radially and outwardly extending therefrom, said supports being so constructed and arranged as to provide a pivot axis substantially parallel to the axis of said cylinder; and a pivoted cam supported by said pivot supports, said cam being adapted to pivotally move in and out of the volume encompassed by the inner surface of said cylinder.

Further features and advantages of the invention will be more apparent in the following description and specification taken in connection with the drawing wherein:

Figure 1 illustrates a perspective view of a spinnerette wrench constructed in accordance with the invention; and

Figure 2 shows a sectional view of a spinnerette wrench in accordance with the invention in combination and cooperation with a spinnerette retaining collar and spinning solution supply conduit.

In Figure 1, there is illustrated a perspective view of a spinnerette wrench constructed in accordance with the invention designated by the reference numeral 10. The spinnerette wrench comprises a cylindrical portion 11 having an internal shoulder 12 and a cylinder turning means 13, a smaller cylindrical portion 14 and opening or cam port 16, upper and lower cam pivot supports 17 and a locking collar receiving opening 18 and a cam pivot shaft 19, pivotally supporting a locking cam 15.

In Figure 2, there is illustrated a sectional view of the spinnerette wrench 10 in engagement with a spinnerette retaining collar 21. The collar 21 is supporting a spinnerette 22 which is in sealed engagement with the spinning solution conduit 23. A cylinder 11, having a lower shoulder 12, is in direct engagement with the collar 21. The lower cylindrical portion 14 provides a receiving and protective shield for the spinnerette 22. An upper pivot support 17 and a lower pivot support 17 carry a pivot shaft 19 upon which is supported a locking cam 15. The locking cam 15 is in engagement with the retaining collar 21. The rotating means or handle 13 is employed to rotate the entire wrench 10.

Operation of the wrench is apparent in Figure 1, wherein the device is illustrated with the pivotally mounted cam 15 being positioned so as to swing into the volume enclosed by the inner surface of the cylinder 11. The cam 15 is free to rotate 360° about the pivot 19. Thus, when the wrench is placed over the spinnerette 22 and the locking collar 21, as is illustrated in Figure 2, the cam 15 may be brought into engagement with the collar 21.

On rotation of the handle 13 in the same direction of rotation as the initial rotation of the cam 15, the cam is caused to grip the collar 21. As a greater force is applied to the handle 13, a tighter locking engagement will be obtained by the cam 15 and the collar 21. If it is not possible to conveniently rotate the handle 13 through an arc of 360°, a lesser rotation may be employed and the handle 13 returned to a convenient starting position with the consequent disengagement of the cam 15 when the direction of rotation is reversed. Thus, an action similar to that of the conventional ratchet is obtained by means of the present relatively simple and readily cleanable mechanism. On a further reversal of the direction of rotation of the handle 13, the cam is caused once again to come into locking engagement with the collar 21. This operation may then be repeated until the collar 21 is removed from the conduit 23. The

smaller cylindrical portion 14 acts as a protective shield over the spinnerette 22 and prevents physical contact of the spinnerette 22 with the wrench 10. This eliminates the possibility of damage to the spinnerette.

By reversing the initial position of the cam 15 and alternately reversing the rotational direction of the handle 13, the collar 21 can be driven in an opposite direction. Thus, by appropriate positioning of the cam 15, and rotating handle 13, the wrench 10 may be employed to either install or remove the retaining collar 21.

A wrench in accordance with the invention is particularly advantageous when employed in combination and cooperation with a spinnerette retaining collar made from non-metallic materials such as thermoplastic or thermosetting resins. The cam action provides a gentle but firm grip distributed over a relatively large area of the collar. In this way, there is advantageously provided the necessary operating torque for removal or installation of the spinnerette without deformation of the collar.

The simple design involved in wrenches in accordance with the present invention permits cleaning of the wrench and efficient utilization thereof, even when the wrench is fouled or contaminated with viscous spinning solutions or equivalent compositions.

In actual operation with the present wrenches, spinnerette damage from removing and replacing spinnerettes is reduced by a factor greater than 75 percent. As can be readily appreciated, this stands in sharp contrast with the extent of spinnerette damage encountered when conventional tools are used for the same purpose.

As is apparent, spinnerettes or spinning heads may advantageously be positioned in greater proximity to one another when the tool of the present invention is available for their installation and removal in place of the conventional means for handling of spinnerettes.

The apparatus of the present invention is susceptible of being embodied with various alterations and modifications from that which has been described in the preceding description and specification. For this reason, it is to be fully understood that all of the foregoing is merely intended to be illustrative and is not to be construed or interpreted as being restrictive or otherwise limiting of the present invention excepting as it is set forth and defined in the appended claims.

What is claimed is:

1. A spinnerette wrench comprising a hollow cylinder having an internal shoulder toward one end, means for turning said cylinder; the cylinder wall defining at least one opening; pivot supports appended to said cylinder

adjacent to said opening affixed radially and outwardly extending therefrom, said supports being so constructed and arranged as to provide a pivot axis substantially parallel to the axis of said cylinder; and a pivoted cam supported by said pivot supports, said cam being substantially smaller in diameter than the internal diameter of said cylinder and said cam being adapted to pivotally move in and out of the space encompassed by the inner surface of said cylinder.

2. A spinnerette wrench as in claim 1, wherein said cam is cylindrical in shape.

3. A spinnerette wrench as in claim 1, wherein said cylinder turning means is a manually operable handle coaxially affixed to said cylinder.

4. In combination, a spinnerette and a spinnerette locking collar engaged by and retained within a spinnerette wrench comprising a hollow cylinder having an internal shoulder toward one end, means for turning said cylinder; the cylinder wall defining at least one opening; pivot supports appended to said cylinder adjacent to said opening affixed radially and outwardly extending therefrom, said supports being so constructed and arranged as to provide a pivot axis substantially parallel to the axis of said cylinder; and a pivoted cam supported by said pivot supports, said cam being substantially smaller in diameter than the internal diameter of said cylinder and said cam being adapted to pivotally move in and out of the space encompassed by the inner surface of said cylinder.

5. The combination of claim 4, wherein the cam in said wrench is cylindrical in shape.

6. The combination of claim 4, wherein the cylinder turning means on said wrench is a manually operable handle coaxially affixed to said cylinder.

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