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SPINNERETTE ASSEMBLY

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1 Claim. (Cl. 18—8)

This invention relates to the spinning by extrusion of artificial filaments and relates more particularly to spinnerette assemblies by means of which filaments are formed by extrusion therethrough.

In one process for the production of artificial filaments a spinning solution comprising cellulose acetate, dissolved in acetone, is forced under pressure through a spinnerette mounted in a housing or assembly projecting into a spinning zone. The spinning zone is filled with a medium, such as a mixture of water and a minor amount of acetone, which has a setting effect on said spinning solution, so that the spinning solution emerging from the fine orifices of the spinnerette in filamentary form is coagulated by said medium. The conventional spinnerette housings or assemblies generally have not been entirely satisfactory for use in the above process since they have either tended to leak at one or more points or have been difficult to assemble, necessitating the use of either a large number of bolts or large wrenches and special vises.

It is therefore an object of this invention to provide a novel, simple and inexpensive spinnerette assembly which will be free from the foregoing and other defects.

Other objects of this invention will be apparent from the following detailed description and claim.

Preferred forms of this invention are illustrated in the accompanying drawing in which

Fig. 1 is a side view, with parts in cross-section, of a spinnerette assembly and

Fig. 2 is a side view, in cross-section, of a modified form of the invention.

Referring now to Fig. 1 of the drawing, reference numeral 6 designates a spinnerette assembly which is mounted, as by means of a flange 7, at the base of a spinning zone (not shown). A spinning solution is introduced under pressure into said assembly through an inlet pipe 8 attached to said flange 7 and, after travelling through a tubular adapter 9 and a collar 11, passes through a filtering assembly designated generally by reference numeral 12, and is extruded in filamentary form through a cup-shaped, apertured spinnerette 13.

The inlet pipe 8, the tubular adapter 9 and the collar 11 are screwed together at threaded portions 14 and 16. In order to prevent leakage of spinning solution at the joints between these members, rubber O-rings 17, 18 are mounted in annular grooves 19, 21, respectively, formed in the ends of the inlet pipe 8 and the adapter 9, respectively. The O-ring 17 abuts against and is compressed by an internal annular shoulder 22 of the adapter 9 when said adapter is screwed tightly onto the inlet pipe 8. Similarly, the O-ring 18 abuts against and is compressed by an internal annular shoulder 23 of the collar 11 when the latter is screwed tightly onto the adapter 9.

The collar 11 is provided with an aperture 27 for the passage of the spinning solution and with an annular outer flange 28 which is internally threaded for the reception of the externally threaded portion of a spinnerette holder 29. At the lower end of the holder 29 there is an annular groove 31 adapted to receive a rubber O-ring 32,

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which O-ring 32 abuts against the upper face 33 of the collar 11 when said holder 29 and collar 11 are assembled together. Adjacent to its lower end, the holder 29 has an internally threaded portion adapted to receive an externally threaded retaining ring 34. At the upper end of the holder 29 there is an inwardly directed flange 36 having a groove 37 for receiving a rubber O-ring 38.

Mounted between the O-ring 38 and the retaining ring 34 are the outwardly projecting lip 39 of the cup-shaped spinnerette 13 and the filtering assembly 12. Starting from the top the filtering assembly 12 comprises: an annular washer 41; a rigid circular filter support plate 42 having a large number of evenly spaced apertures 43 there-through, said apertures 43 being much larger than the fine apertures in the spinnerette 13; another annular washer 44; a plurality of layers 46 of filtering materials, e. g. filter paper, filter cloths, fine screens, or porous metal plates; and still another annular washer 47. The filtering assembly 12 also includes a circular filter support screen 48 mounted between the apertured filter-support plate 42 and the filtering material 46. This filter support screen 48 is fitted within the annular washer 44, the external diameter of said filter support screen 48 being equal to the internal diameter of said annular washer 44. The washers 41, 44, 47, which may be made of any suitable material, such as vulcanized fiber or polytetrafluoroethylene, do not act as sealing materials to prevent leakage but serve to prevent adjacent parts from damaging each other when the retaining ring 34 is screwed tightly into the holder 29. For example, the gasket 41 prevents any damage to the spinnerette lip 39, which might be caused by the engagement therewith of the filter support plate 42. Preferably, the internal diameter of each of the washers 41, 44, 47 is about equal to the internal diameter of the retaining ring 34, which is about equal to the internal diameter of the lip 39.

The apparatus of this invention may be assembled easily with a minimum of tools. First, the holder 29 is held with its threaded end up, the O-ring 38 is positioned in the groove 37 of said holder, the spinnerette 13 is placed in the holder 29 with its lip 39 in contact with the O-ring 38 and the washer 41 is placed on the lip 39. Following this, the filter support plate 42, the screen 48 and the washer 44, the filtering materials 46 and the washer 47 are put in place, and the retaining ring 34 is screwed into the holder 29. To assist in the latter operation the retaining ring 34 is provided with two holes 49, only one being shown, for receiving the prongs of a suitable face-spanner wrench. The retaining ring 34 should be screwed carefully into the holder 29 to make sure that no twisting and wrinkling of the filtering materials 46 occurs. Thereafter, the O-ring 32 is placed in the groove 31 of the collar 11 and the latter is screwed onto the holder 29, preferably by hand, following which the rest of the assembly is screwed together with the O-rings 17, 18 in place. The adapter 9 and collar 11 are provided with non-circular portions, such as the hexagonal portions 51, 52, respectively, to make it easier to grasp and turn said adapter and collar during the assembling or disassembling of the apparatus.

The O-rings 17, 18, 32, 38 are advantageously made of synthetic rubber resistant to acetone. Examples of suitable synthetic rubbers for this purpose are butadiene-acrylonitrile copolymer, butadiene-styrene copolymer, and olefin polysulfide polymers.

In the embodiment shown in Fig. 2 the parts are identical with those of Fig. 1 except for the construction of the holder 101 and the collar 102. Thus, the holder 101 is longer than the holder 29 of Fig. 1 and is provided with a longer internally threaded portion 103 which is adapted to receive not only the retaining ring 34 but also an externally threaded portion 104 of the collar 102. At

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the upper end of the holder 101 there is an inwardly directed flange 106 having a groove 107 for receiving the O-ring 38, while at the lower end of the holder 101 there is an annular groove 108 adapted to receive the O-ring 32. The latter O-ring 32 abuts against a shoulder 109 of the collar 102 when said holder and collar are assembled together. To reduce the weight of the collar 102 without substantially decreasing its strength the upper portion of said collar 102 is dished, as shown at 111, around the aperture 112 through which the spinning solution passes; this also provides for better flow of the spinning solution.

The spinnerette assemblies of this invention may be assembled easily without the use of heavy wrenches and when so assembled, do not have any tendency to leak. Of the two assemblies shown in the drawing, the embodiment illustrated in Fig. 2 has greater resistance to the distorting effects of high internal spinning pressures.

It is to be understood that the foregoing detailed description is given merely by way of illustration and that many variations may be made therein without departing from the spirit of our invention.

Having described our invention, what we desire to secure by Letters Patent is:

A spinnerette assembly comprising a cup-shaped spinnerette having an annular outwardly projecting lip, an annular internally threaded spinnerette holder for receiving said lip, said holder having an inwardly directed flange at one end thereof provided with a groove for receiving an O-ring, said holder having at the other end thereof a groove for receiving a second O-ring, a rubber O-ring mounted in said first-named groove between said lip and said flange, a filtering assembly mounted adjacent said lip and within said holder, an externally threaded annular

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retaining ring for pressing said filtering assembly against said lip and for pressing said lip against said rubber O-ring, said retaining ring being screwed into said holder with the external threads of said retaining ring engaging the internal threads of said holder, a second rubber O-ring mounted in said second-named groove between said holder and one end of a collar having a central aperture for the passage of spinning solution therethrough, having an annular shoulder and being internally threaded at said one end to receive said holder, and internally threaded at its opposite end in an opening of lesser diameter than said holder to receive an externally threaded tubular member which is in communication with a source of spinning solution, a third rubber O-ring mounted between one end of said tubular member and said shoulder of said collar and compressed therebetween when said tubular member is threaded in said collar.

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