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SPINNERET

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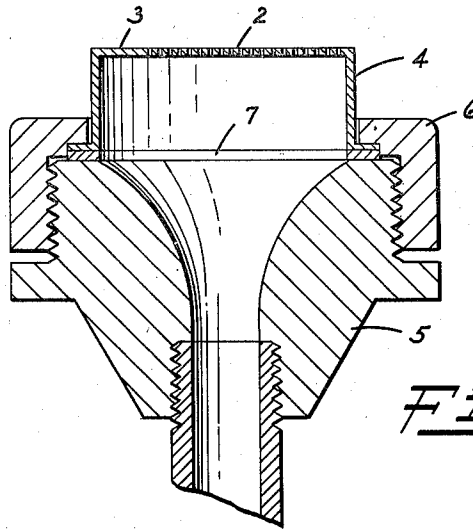
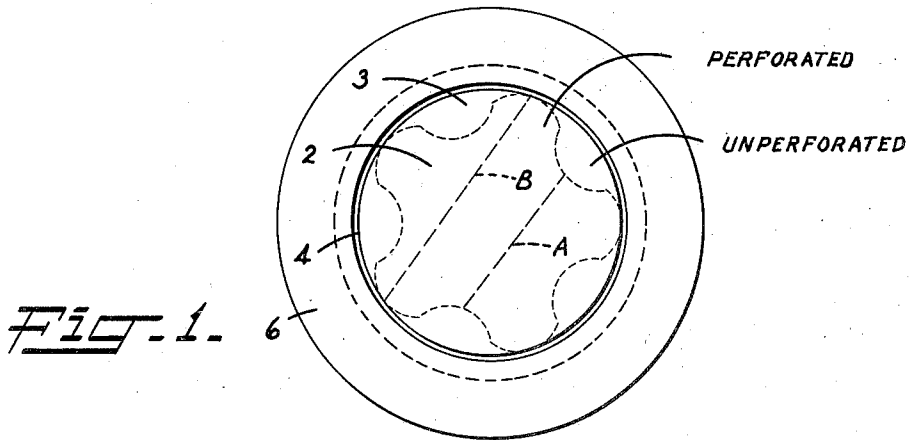
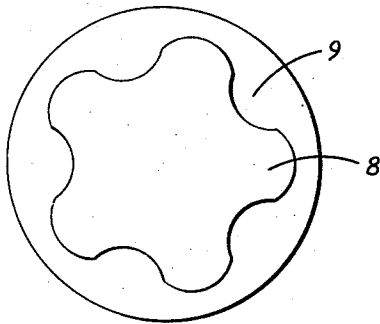


*Fig. 3.*



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## SPINNERET

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4 Claims. (Cl. 18-8)

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This invention relates to spinnerets.

In the manufacture of artificial fibers by the viscose process, in accordance with which the viscose is extruded through the orifices of a spinneret into an acid coagulating and regenerating bath, the spinneret, which is supported on the end of a pivotally mounted rounder or connection leading to the viscose supply pump, is brought, at the start of operations, from an upright, non-spinning position above the bath, to a horizontal spinning position below the level of the bath. When filaments are not withdrawn from the spinneret, the viscose emerges through the orifices and collects on the face of the spinneret in the form of a lump or blob extending to the spinneret edge. The mass thus formed must be removed to permit the viscose to emerge as a plurality of individual streams. In removing the mass, the operator has to grasp it with his hand and pull it away from the spinneret just before or after the latter is lowered into spinning position in the bath.

If the spinneret has a circular orifice area the diameter of which is 4 inches or less, no great difficulty is experienced in removing the viscose mass from the spinneret because the orifice area in such cases is easily spanned by the normal human hand. However, it is desirable in some cases to provide the spinnerets with a very large number of orifices of the order of 5000 or more as where it is desired to spin a large number of filaments from a single end, or relatively few ends, for example, where it is desired to spin a tow, as in the manufacture of staple fibers. The conventional spinnerets having a circular orifice area the diameter of which is 4 inches or less, and which is spannable by the normal human hand cannot be provided with 5000 orifices or more without encountering the difficulty that, due to the high orifice density, the tendency of gas bubbles to adhere to the face of the spinneret is greatly aggravated. The gas bubbles, which adhere tenaciously to the spinneret face, prevent access of the spinning bath to all of the streams of viscose issuing from the orifices, with the result that splinters, that is cemented fibers, and slubs of non-filamentary character are formed throughout the filamentary bundle.

It is not feasible to increase the diameter of the circular orifice area above 4 inches to permit increase in the number of orifices which may be disposed therein while avoiding impractically high orifice density, because in that case the orifice area is not readily spanned by the normal human hand and cannot be "picked" in a single move-

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ment, which is a serious drawback, especially in plants operating on a large scale.

The object of this invention is to provide a spinneret having a non-circular orifice area which is readily spannable by the normal human hand and in which 5000 or more orifices can be disposed with comparatively low orifice density.

In accordance with the invention, spinnerets are provided having a non-circular orifice area, one dimension of which is less than about 4.5 inches, and spannable by the normal human hand, while the other dimension is at least 3 inches, the latter dimension being variable from 3 inches to considerably greater than 3 inches, depending upon the total number of orifices, whether 5000 or much higher than 5000, which it is desired to dispose in the orifice area.

In the accompanying drawing, illustrative of a preferred embodiment of the invention, Fig. 1 is a front face view of a spinneret in accordance with the invention; Fig. 2 is a cross-section of the spinneret of Fig. 1, shown in assembly with a supply system, and Fig. 3 is a front face view of a modified spinneret in accordance with the invention.

The periphery defining the orifice area 2 of the spinneret illustrated in Fig. 1 is crenated, being formed of a continuous series of alternately inwardly and outwardly extending circular segments, angular projections or the like, the surface of the inwardly extending portions of the crenated periphery providing a plurality of spaced finger-receptive areas 3 for accommodating the fingers of the operator to assist him in grasping the mass of viscose which accumulates on the spinneret. The dimension of the orifice area which has a minimum value, that is, the space between the innermost point of opposed inwardly projecting portions of the crenated periphery, indicated by dotted line A, is about 4 inches, the other dimension, that is the space between the outermost points of opposed outwardly projecting portions of the periphery, indicated by dotted line B, is, in the specific case illustrated, about 5 inches.

The dimension indicated by line B may have any value within practical limits and may be much greater than 5 inches, and is always at least 3 inches, while the dimension indicated by line A which may be the minimum dimension is always less than 4.5 inches. Thus, the spinneret, regardless of the value of the dimension indicated by line B, always has one dimension which is spannable by the normal human hand so that, in every case, viscose masses which collect on the spinneret can be pulled away by a single motion of the

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operator's hand. The unperforated finger-receptive areas constituted by the intermediately-spaced inwardly projecting portions of the spinneret face facilitate "picking" of the spinneret by preventing accumulation of the viscose on these areas, thereby enabling the operator to place his fingers in these indentations in the periphery of the blob to secure a firm grip on the mass clinging to the spinneret.

As shown in Fig. 2, the spinneret 4 is attached to a supply head 5 for the spinning material or solution by a coupling 6, a gasket 7 being positioned between the flange of the spinneret and the supply head to assure a tight seal.

Referring now to Fig. 3, the periphery of the face of the spinneret 8 defines the orifice area and is crenated, being formed of a continuous series of alternately inwardly and outwardly extending circular segments, the spaces 9 between the outwardly extending segments providing accommodation for the operator's fingers to assist him in grasping and removing viscose accumulated on the spinneret.

The spinnerets of the invention may be provided with any number of orifices, but are of special advantage where it is desired to provide the spinneret with a large number of orifices, from 5000 up to 100,000 or more, since the configuration of the orifice area is such that although one dimension is always less than 4.5 inches, the other dimension may be much greater than 4.5 inches to provide an orifice area in which a large number of orifices may be disposed while maintaining the orifice density relatively low. As shown in Figure 2, the orifices are disposed in the orifice area in uniformly spaced-apart relation, as is usual in the case of spinnerets for use in the manufacture of artificial filaments or fibers. That is, a large number of orifices may be spaced from one another a sufficient distance to permit continuous extrusion of the viscose without encountering difficulty due to gas bubble adhesion to the spinneret face. Spinnerets constructed in accordance with the invention may be used over long periods of service without the occurrence of any appreciable number of splinters or slubs in the filamentary bundles.

Spinnerets in accordance with the invention may be constructed of any suitable hard metal, such as nickel or nickel alloys, stainless steel, tantalum, platinum, chromium alloys, etc. The bottom of the spinneret may be of any thickness to enable it to withstand the pressure necessary to effect smooth extrusion of the viscous spinning solution without unduly weakening the spinneret. The walls defining the orifices may have any desired configuration, such as straight, countersunk, parabolic, hyperbolic, or the like shapes, and the orifices may be arranged in various patterns.

When spinnerets of the type described are employed in the manufacture of artificial fibers from viscose, it is possible to spin a large number of fibers from a single end, or from only a few ends over a prolonged period, which is of special advantage in the formation of tows such as are used in the manufacture of staple fibers.

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The invention also makes possible considerable savings in labor and space requirements for the spinning apparatus.

Various modifications may be made without departing from the spirit and scope of the invention as defined in the appended claims.

I claim:

1. A spinneret for use in the production of artificial filaments, said spinneret having a total orifice area throughout which the orifices are disposed in uniformly spaced-apart relation and which is defined by a crenated periphery, the dimension of the orifice area between opposed inwardly extending portions of the periphery being less than 4.5 inches, and the dimension between opposed outwardly extending portions of the periphery being at least 3 inches.

2. A spinneret for use in the production of artificial filaments, said spinneret having a total orifice area throughout which the orifices are disposed in uniformly spaced-apart relation and which is defined by a crenated periphery, the dimension of the orifice area between opposed inwardly extending portions of the periphery being less than 4.5 inches, and the dimension between opposed outwardly extending portions of the periphery being greater than 4.5 inches.

3. A spinneret for use in the production of artificial filaments, said spinneret having a total orifice area throughout which the orifices are disposed in uniformly spaced-apart relation and which is defined by a periphery formed of a continuous series of circular segments, alternate segments extending inwardly and being separated by outwardly extending segments, the dimension of the orifice area between opposed inwardly extending segments being less than 4.5 inches, and the dimension between opposed outwardly extending segments being at least 3 inches.

4. A spinneret for use in the production of artificial filaments, said spinneret having a total orifice area throughout which the orifices are disposed in uniformly spaced-apart relation and which is defined by a periphery formed of a continuous series of circular segments, alternate segments extending inwardly and being separated by outwardly extending segments, the dimension of the orifice area between opposed inwardly extending segments being less than 4.5 inches, and the dimension between opposed outwardly extending segments being greater than 4.5 inches.

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