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SPINNING HEAD FOR SPINNING SYNTHETIC THREADS

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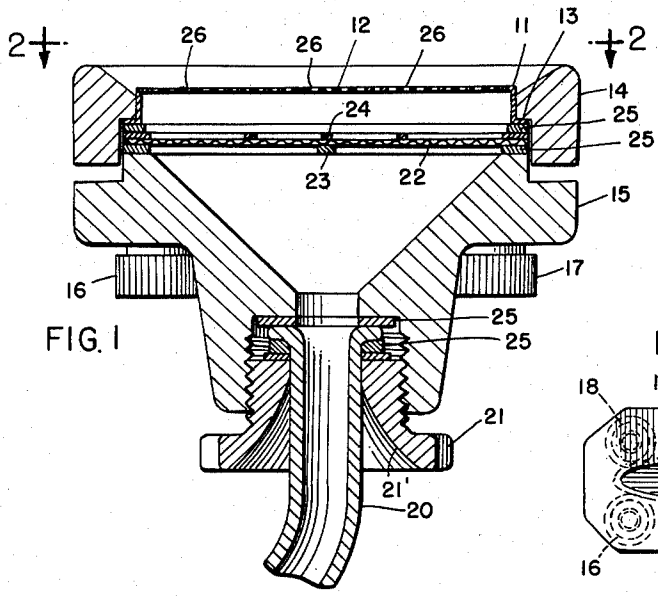


FIG. 1

FIG. 2

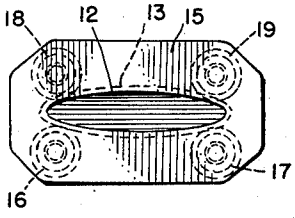


FIG. 3

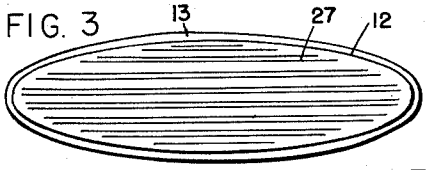


FIG. 4

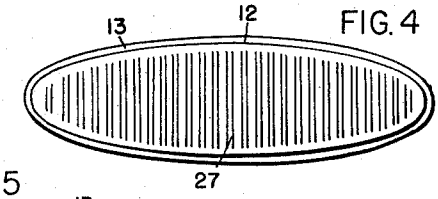


FIG. 5

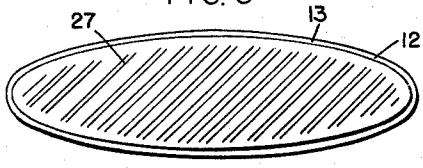


FIG. 6

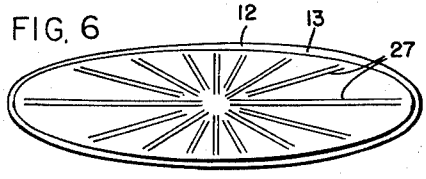


FIG. 7

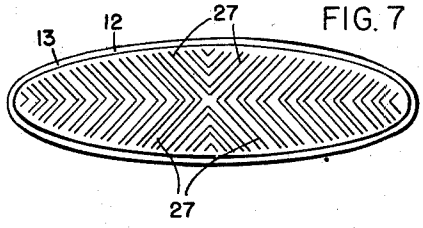
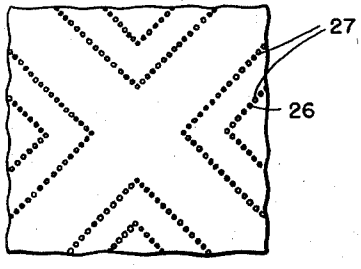


FIG. 8



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SPINNING HEAD FOR SPINNING SYNTHETIC THREADS

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5 Claims. (Cl. 18—8)

This invention relates to an improved spinning head for spinning threads from a synthetic material.

Spinning heads employed in the manufacture of artificial thread, such as rayon thread, are often provided with spinnerettes having a large number of apertures in order to produce a correspondingly large number of filaments at one time. Since the apertures in such spinnerettes are customarily disposed over a circular area, the filaments produced from the innermost apertures are often defective due to an insufficient bathing with the coagulating bath solution in which the filaments are formed. As a result, threads produced with such spinning heads often fail to meet standards established for stretchability, strength, crimping tendency, and color.

Attempts have been made to remedy this situation by employing spinnerettes in which the apertures are disposed radially over the circular area. However, such design has not been satisfactory for spinnerettes having a large number of apertures particularly when the apertures must be of a relatively large diameter in order to produce heavy threads.

One of the objects of this invention is to provide an improved spinning head for the simultaneous spinning of a plurality of threads.

Another object of the invention is to provide an apertured spinnerette having a spinning nozzle which permits an adequate bathing of all of the filaments extruded from the spinnerette even though the number of apertures may be large.

The invention is illustrated in the accompanying drawings in which like numbers are used throughout to indicate like parts and wherein:

Fig. 1 is a cross-sectioned elevational view of the spinning head;

Fig. 2 is a plan view on a smaller scale of the spinning head taken on the line 2—2 of Fig. 1;

Fig. 3 is a schematic plan view of the spinnerette forming a part of the spinning head illustrated in Fig. 1;

Figs. 4 to 7 are schematic plan views of additional embodiments of the spinnerette employed in the spinning head of Fig. 1; and

Fig. 8 is an enlarged detailed fragmentary view of a central portion of the spinnerette illustrated in Fig. 7.

The aforementioned objects are accomplished in accordance with the invention by a spinning head in which the spinnerette or plate member has a plurality of apertures disposed in a plurality of rows over a generally elliptical areas having a minor axis which is materially shorter than the major axis. Means are provided for hermetically securing the plate member to a conduit supplying a spinning solution of a synthetic material.

Referring to the drawing which illustrates specific embodiments of the invention, Figs. 1 and 2 show a spinning head including a cup-like spinnerette **11** of generally elliptical form having an apertured face **12** and a rim or flange **13** of the same generally elliptical form. The spinnerette is supported by an oblong framing means of metal or the like including an upper frame **14** and a

lower frame **15**. Threaded bolts **16**, **17**, **18**, and **19** clamp the frames **14** and **15** on the flange **13**. A flanged conduit **20** for the spinning solution is threadedly coupled to the lower opening of the frame **15** by a bolt collar **21** having a conical opening **21'** which permits curvature of the conduit. A filter element **22** having supporting grids **23** and **24** may be inserted between the spinnerette flange **13** and the frame **15** to filter the spinning solution prior to extrusion. Gaskets **25** of rubber or synthetic material provide hermetic seals between the various attached parts.

The face **12** of the spinnerette **11** has apertures **26** disposed over substantially its entire elliptical area in spaced pairs of parallel rows **27**, the pairs of rows being parallel to the major axis of the elliptical area (Fig. 3). The result of this arrangement is that the bath solution has ready access to all of the filaments produced by the apertures **26**. Thus, the present invention is primarily concerned with spinnerettes with a large number of apertures such that the filaments extruded from the apertures in the center of the spinnerette are subject to defective qualities due to inadequate access of the spinning bath to the filaments in said center portion.

Fig. 4 shows another embodiment of the invention in which the pairs of parallel rows **27** are parallel to the minor axis of the generally elliptical area **12**.

Fig. 5 shows a further embodiment in which the pairs of parallel rows **27** are parallel to each other and intersect the major axis of the generally elliptical area at an angle of 45°.

Fig. 6 shows another embodiment in which the pairs of parallel rows **27** are disposed radially a spaced distance from the center of the generally elliptical area **12**.

Fig. 7 shows another embodiment in which the pairs of parallel rows **27** in each of the quadrants defined by the major and minor axes of the generally elliptical area **12** are parallel to each other and meet one of said axes at an angle of 45°, the pairs of parallel rows in adjacent quadrants meeting at an angle of 90°.

The above-described embodiments of the invention are particularly suitable when a large number of apertures (such as 10,000) are required. However, when a smaller number of apertures (such as 1000) are required, the above-described spinnerettes may be modified for use in conventional, circular holders. In this case, the spinnerettes are provided with a circular flange rather than an elliptical one, and the elliptical apertured face occupies a smaller area within the circular flange area.

The invention provides a spinning head which is particularly suitable for spinning a large number of threads simultaneously in the form of a cable. The entire aperture face is readily accessible to the bath solution so as to insure sufficient bathing of the formed filaments. This not only assures effective coagulation in the forming of the filaments but also assures complete stripping of the formed threads on removal from the bath solution.

The invention is hereby claimed as follows:

1. A spinning head for spinning filaments in the form of a cable in a spinning bath comprising a spinning head having a spinnerette with spinning apertures numbering in the range of about 1,000 to 10,000, the apertures in said spinnerette being disposed in a plurality of straight rows, the apertures covering an area on said spinnerette defining an ellipse having a minor axis which is materially shorter than the major axis.

2. The spinning head of claim 1 wherein said rows are parallel to the minor axis of the ellipse.

3. The spinning head of claim 1 wherein said rows are parallel to the major axis of the ellipse.

4. The spinning head of claim 1 wherein the rows cross the major axis at an angle of about 45°.

5. The spinning head of claim 1 wherein the rows are

parallel in each quadrant of the ellipse and meet the axes at an angle of about 45°, the rows in adjacent quadrants meeting at the axes at an angle of about 90°.

References Cited in the file of this patent

UNITED STATES PATENTS

2,244,281 Alibert ---------- June 3, 1941

FOREIGN PATENTS

319,444	Germany	Apr. 26, 1919
239,195	Switzerland	Dec. 17, 1945
820,948	Germany	Nov. 15, 1951
1,044,741	France	Nov. 20, 1953