April 11, 1950 C. HATFIELD 2,503,821

SPINNING FUNNEL

Filed June 4, 1946

Fig. 2.

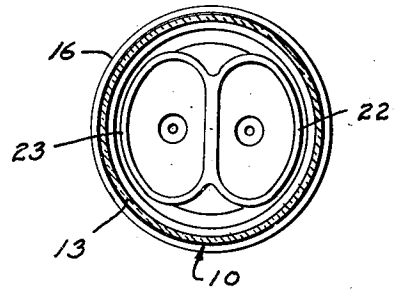


Fig. 3.

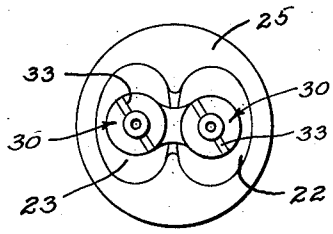


Fig. 1.

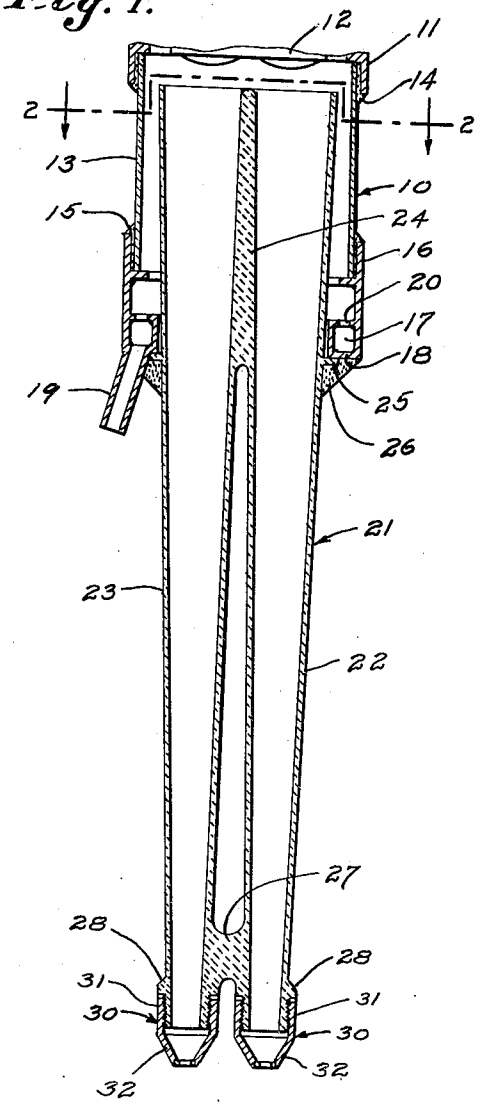
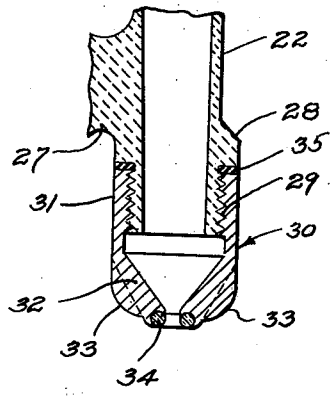


Fig. 4.



INVENTOR.
CORTLAND HATFIELD
BY Rudolph L. Bleyl
ATTORNEY

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SPINNING FUNNEL

Cortland Hatfield, Elizabethton, Tenn., assignor, by mesne assignments, to Beaunit Mills, Inc., New York, N. Y., a corporation of New York

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3 Claims. (Cl. 18—8)

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This invention relates to spinning funnels such as are used in the manufacture of rayon and the like.

In certain rayon spinning systems such as that commonly employed in the production of rayon from a cuprammonium cellulose spinning solution, etc., the solution is extruded downwardly through a spinnerette or spinnerettes into a chamber containing a coagulating liquid and into a spinning funnel having its larger end disposed near the upper end of the chamber and its smaller end disposed below the lower end of the chamber.

Through improved structural and functional design, it has been rendered feasible to employ two or more spinning funnels in the same chamber, as disclosed, for example, in U. S. Patent No. 1,682,797 to Otto et al., and thus to multiply the volume of production without increasing the amount of space occupied by the spinning machines. Such spinning funnels, because of their transparency, chemical resistance and hardness characteristics, have been heretofore made of glass. This material, while serving the purpose admirably, is subject to certain limitations, such as its fragility and liability to breakage during assembly in the spinning head and in service. Another drawback to the use of glass is the difficulty experienced in its fabrication into suitable shapes.

With the recent improvements in plastics, it has been found that certain of them possess the desirable qualities, such as transparency and chemical resistance, though none so far have exhibited the hardness characteristics of glass. They do, however, possess other attributes, such as moldability and resistance to breakage, which render them highly satisfactory for the purposes to which glass funnels have heretofore been applied.

The object of the present invention is to employ the attributes of transparent plastic funnels in the manufacture of rayon.

Another object is to facilitate the mounting of a plastic funnel in a spinning head of the type now in common use.

A further object is to enable the spinning of different kinds or denier of thread without changing the spinning funnels or removing them from the spinning heads.

The above and other objects may be attained by employing this invention, which embodies among its features a transparent plastic spinning funnel comprising a pair of tapered tubular members joined together adjacent their upper enlarged ends by a web or partition wall by which

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the spinning solution extruded into the spinning chamber is kept in its respective tubular member, a mounting flange encircling the tubular members, removably secured to a discharge nozzle at the lower smaller end of each tubular member, each carrying a wear-resisting insert at its lower end through which the coagulated filaments emerge and a reinforcing and stiffening bridge joining the tubular members adjacent their lower ends.

In the drawings:

Fig. 1 is a longitudinal sectional view through a spinning funnel constructed in accordance with this invention,

Fig. 2 is a horizontal sectional view taken on the line 2—2 of Fig. 1,

Fig. 3 is a bottom plan view of a spinning funnel constructed in accordance with this invention, and

Fig. 4 is an enlarged fragmentary sectional view through the lower end of one of the tubular members and the funnel tip carried thereby.

Referring to the drawings in detail, a spinning head designated generally 10 comprises a head piece 11 which encloses a multiple spinnerette 12. As shown, the headpiece 11 is provided with a depending flange into which the upper end of a glass cylinder 13 is cemented as at 14. Cemented as at 15 to the lower end of the cylinder 13 is a bottom member 16 having at its lower end an annular liquid receiving and distributing passage 17, the bottom wall 18 of which forms a seat for the funnel encircling flange to be more fully hereinafter described. A coagulating liquid inlet 19 opening into the passage 17 serves continuously to supply the spinning head 10 with fresh coagulant which is distributed through openings 20 and flows upwardly adjacent the inner face of the cylinder 13 until it overflows into a spinning funnel designated generally 21 and which will be more fully hereinafter set forth.

The spinning funnel 21 comprises a pair of tapering tubular members 22 and 23 which are joined together adjacent their upper enlarged ends by a web or partition 24. Formed integral with and encircling the tubular members adjacent the lower end of the web 24 is a flange 25 which seats against the under side of the wall 18 and serves to locate the upper end of the funnel the proper distance below the spinnerette 12. The flange 25 is held against the wall 18 and the joint rendered fluid tight by means of a suitable cement 26. Joining the tubular members

22 and 23 near their lower ends is a reinforcing and stiffening bridge member 27.

Formed integral with and spaced a short distance above the lower end of each tubular member 22 and 23 is an outwardly extending annular flange 28, and the portion of each such member which extends below the flange is externally screw-threaded as at 29 to receive a funnel tip designated generally 30.

The funnel tip 30 comprises an internally screw-threaded barrel 31 carrying at its lower end a hollow inverted frustro-conical portion 32 upon the outer surface of which is cast a pair of diametrically spaced wings 33. The funnel tip may be formed of any suitable material, such as a plastic, and has embedded in its lower end a ring 34 of a harder and more wear-resistant material, such as glass, glazed porcelain or the like. In order to secure a fluid tight joint between the funnel tip 30 and its respective shoulder 28 it has been found desirable to interpose a gasket 35 between the bottom face of the shoulder and the upper end of the barrel 31.

In assembling the funnel 21 in the head 10 the upper part of the funnel, i. e., that portion projecting above the flange 25 is introduced into the head 10 through the open bottom thereof, it being understood that the external diameter of the upper end of the funnel is of a diameter small enough to enter the opening defined by the walls of the passage 17. The funnel is thrust into the spinning head until the flange seats against the wall 18 and the cement 26 is then applied. Thus it will be seen that accurate location of the upper end of the funnel 21 with relation to the spinnerette 12 may be obtained without the use of jigs or fixtures of any kind.

Thus assembled, the unit is ready for use, and the spinning head 10 is mounted on the spinning machine in the conventional manner with the inlet 19 connected to the source of supply of the coagulating liquid. The liquid flows into the head in sufficient volume to cause it to overflow into the funnel and completely fill the tubular members 22 and 23 and keep them filled against the discharge through the bottom openings in the funnel tips 30. Spinning solution being extruded from the spinnerette 12 enters the coagulating liquid and by reason of the flow of liquid out through the funnel tips 30 the partially coagulated filaments are drawn downwardly and discharged through the rings 34 from whence they are directed to a suitable collecting device (not shown). By reason of the screw-threaded connections between the funnel tips 30 and their respective tubular members, it is obvious that such tips are readily exchangeable and replaceable to compensate for wear or facilitate the use of tips having larger or smaller outlet openings. Although it is preferred to use polystyrene and polyvinyl polymers in the manufacture of these funnels, they may be formed from any other organic plastic materials resistant to spin bath chemicals, etc.

What is claimed is:

1. A spinning funnel of organic plastic matetrial comprising a pair of tapering tubular members, a web joining the tubular members near their larger ends, a flange encompassing the tubular members near the lower end of the web and a bridge joining the tubular members near their smaller ends.

2. A spinning funnel of organic plastic material comprising a plurality of tapering tubular members integrally molded together, a web joining said members near their larger ends, a flange encompassing said members near the lower end of the web, a bridge joining the tubular members near their smaller ends, shoulders on the tubular members adjacent the bridge, the tubular members between the shoulders and their smaller ends being externally screw-threaded and funnel tips on the screw-threaded ends of the tubular members, each such funnel tip comprising a barrel and a hollow inverted frustro-conical part.

3. A spinning funnel of organic plastic material comprising a pair of tapering tubular members, a web joining the tubular members near their larger ends, a flange encompassing the tubular members near the lower end of the web and integrally molded out of the material of said funnel and extending peripherally about and radially from said funnel, and a bridge joining the tubular members near their smaller ends.

CORTLAND HATFIELD.

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