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B. WEMPE
SPINNING NOZZLE
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2 Sheets-Sheet 1

Fig. 1

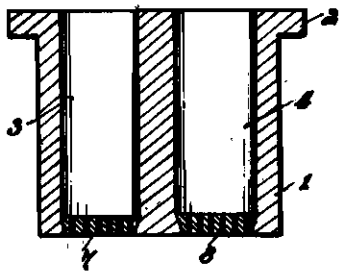


Fig. 2

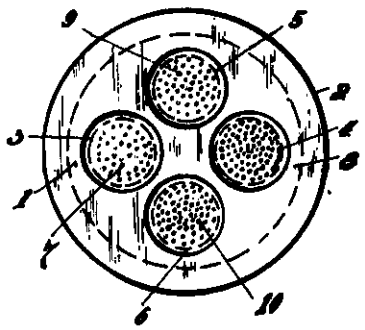


Fig. 7

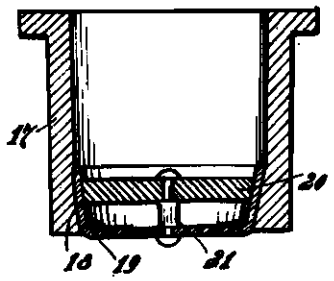


Fig. 3

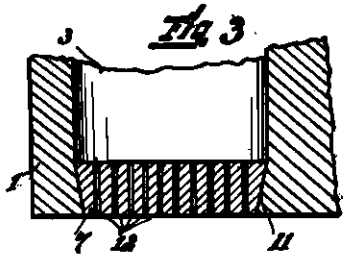


Fig. 4

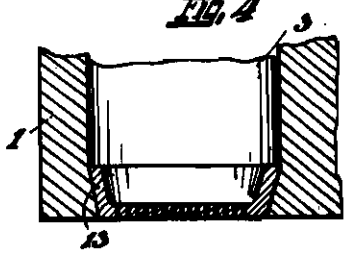


Fig. 5

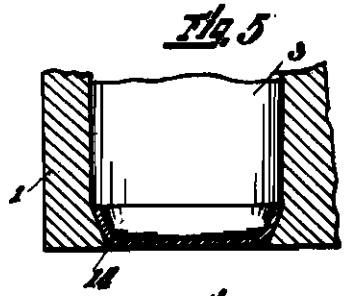


Fig. 6

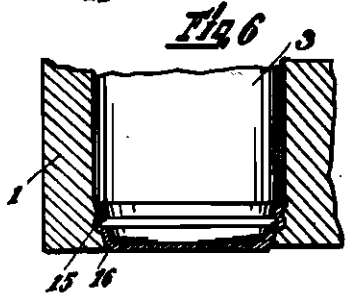


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Fig. 8

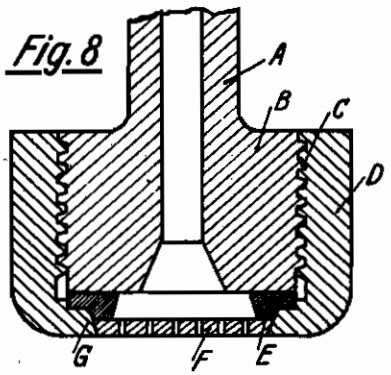



Fig. 9.

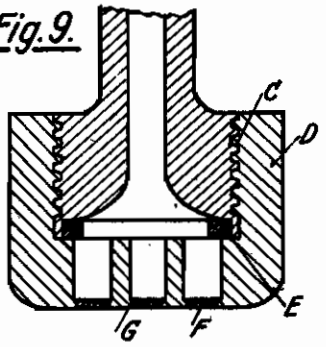



Fig. 10

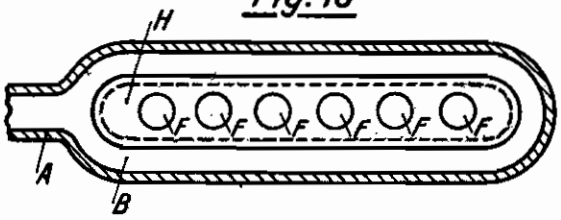



Fig. 11

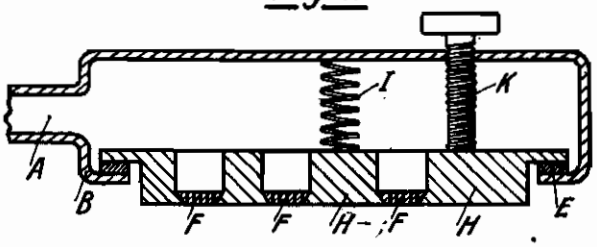
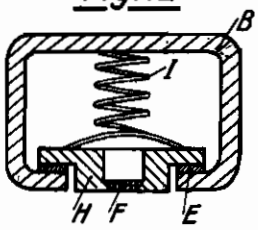



Fig. 12

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# ALIEN PROPERTY CUSTODIAN

## SPINNING NOZZLE

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This invention relates to spinning nozzles for use in spinning filaments such as artificial silk and the like.

Spinning nozzles have been made of various kinds of materials, and it has not only been proposed to make the nozzle body and the perforated nozzle plate of separate parts held together, but it has also been proposed to make them of two different materials.

The principal object of the present invention is to improve that type of nozzle in which the nozzle body and nozzle plate are made of separate parts, and particularly where they are made of two different materials, by increasing the resistivity of the nozzle plate. This renders it possible to make the nozzle plate quite thin even when relatively high spinning pressures are used. High spinning pressures are desirable as they reduce the tendency of the nozzle openings to clog, and if clogging does take place the high pressure makes it possible to more readily clear the openings.

The invention is of particular importance in cases where non-metallic nozzle plates are required as, for instance, in spinning unripened viscose, casein solutions and the like. The invention is also of particular value, and has a wide field of application, in cases where the nozzle plates are required to have a large number of apertures in order to permit the spinning to take place in as small a space as possible with a minimum number of operators.

In accordance with the invention the nozzle plate is given the shape of a truncated cone. In other words, the edge portion of the nozzle plate is tapered so that the diameter of the plate at the inner face is greater than its diameter at the outer face. The holder in which the nozzle plate is mounted has a correspondingly tapered seat to receive the nozzle plate. The angle which the tapered edge forms with the base is kept quite large, for example, 60°. If this angle is made too large the resistance of the nozzle plate to pressure is reduced, a point which is of special importance when the plate is made of ceramic material, glass, or some artificial substance such as hard rubber or the like.

In cases where the nozzle plate is quite thin, the edge portion of the plate may be flanged toward the inside of the nozzle and the flange itself may be given the conical shape. This form of construction is particularly desirable when the nozzle plate is made of thin metal but where a nozzle plate of more than 2 mm. thickness is employed the flange may be omitted, if desired.

The insertion of the perforated nozzle plate may be effected in various ways according to the material used, for example, by grinding in, pressing in, or rolling in. If the nozzle plate is of particularly thin material and has a conical shaped flange at its edge portion, as described above, the plate may be further strengthened and its resistivity increased by the use of a cross element suitably connected to the perforated portion of the plate.

A number of embodiments of the invention are illustrated in the accompanying drawings, in which:

Figure 1 is a vertical section through a nozzle body having the nozzle plates mounted therein in accordance with the invention;

Fig. 2 is a plan view of Fig. 1;

Fig. 3 represents a portion of Fig. 1 drawn to a larger scale;

Fig. 4 is a view corresponding to Fig. 3 showing a nozzle plate whose edge portion is formed into a conical flange;

Fig. 5 is a view corresponding with Fig. 3 showing a sheet metal nozzle plate which is pressed in place and whose edge portion is formed into a conical flange;

Fig. 6 is a view corresponding to Fig. 3 showing a sheet metal nozzle plate which is rolled in place and whose edge portion is formed into a conical flange;

Fig. 7 is a vertical section of a nozzle body having a thin nozzle plate whose edge portion is formed into a conical flange and which is strengthened and reinforced by a cross element connected to the perforated portion of the nozzle plate;

Fig. 8 is a vertical section of a nozzle illustrating the improved manner of mounting the nozzle plate when the nozzle body is in the form of a cap screw threaded on to the spinning pipe;

Fig. 9 is a vertical section of a nozzle illustrating the manner in which several of the improved nozzle plates may be mounted in the capnut type of nozzle shown in Fig. 8;

Fig. 10 is a horizontal section of a nozzle showing the manner in which a large number of perforated nozzle plates may be mounted in a common holder-plate and supplied by a common feed line;

Fig. 11 is a vertical section through a similar nozzle illustrating the manner in which the common holder-plate may be maintained seated; and

Fig. 12 is a transverse section through a similar nozzle illustrating a detail of the means for maintaining the common holder-plate seated.

Referring to Figs. 1, 2 and 3, the nozzle body 1

may be provided with a flange 2 to enable it to be attached to the spinning pipe in the usual way. The nozzle body is provided with any required number of cylindrical bores represented at 3, 4, 5 and 6. The lower end of each bore is tapered to provide a conical seat for a nozzle plate. The perforated nozzle plates are indicated at 7, 8, 9 and 10. As best shown in Fig. 3 the edge portion of each nozzle plate is tapered as indicated at 11. In other words, the nozzle plate has the form of a truncated cone. The taper on the nozzle plate corresponds with the taper at the lower end of the bore so that the nozzle plate seats snugly and firmly in the conical seat which receives it. Each nozzle plate is provided with a number of holes 12 varying according to the size of the plate.

In the case of thinner nozzle plates the edge portion of the plate is formed into a conical shaped flange shown at 13 in Fig. 4. The conical or tapered flange fits snugly and firmly in the conical seat on the nozzle body. When the nozzle plate is made of thin sheet metal with a peripheral tapered flange it may be pressed in as shown at 14 in Fig. 5, or may be rolled in as shown at 18 in Fig. 6. In the latter case the peripheral flange on the nozzle plate has a bead 15 rolled into a corresponding annular groove in the conical wall of the seat on the nozzle body.

In Fig. 7 the nozzle body 17 is provided with a single large bore having at its lower end a conical seat into which a comparatively thin nozzle plate is rolled, the plate having a peripheral tapered flange 18. To enable the nozzle plate to withstand the spinning pressure, it is provided with a cross element 20 which is connected by means of a stay bolt 21 to the perforated portion of the nozzle plate. Thus the nozzle plate is firmly held not only at its edge portion but is also held at the center of the perforated portion.

The member in which the nozzle plate is mounted need not be a nozzle body of the kind shown in the figures so far described but may be in the form of cap-nut D shown in Fig. 8. In this case the feed pipe A terminates in a spinning head B which is threaded at C so that the cap-nut may be screwed onto it. The cap-nut D is provided with a conical seat G to receive the tapered edge of the perforated nozzle plate F. A specially formed packing ring E is inserted between the spinning head B on the one hand, and the lower portion of the cap-nut and the nozzle plate on the other hand. This packing ring has a flat peripheral portion and a conical projection which fits as exactly as possible in the conical seat on the cap-nut.

In Figure 9 the arrangement is quite similar to that shown in Figure 8, but in this case the cap-nut carries a number of perforated nozzle plates F instead of one. The lower portion of the cap-nut has a tapered seat G for each of the nozzle plates. In this case the packing ring E is shaped and positioned as indicated in the drawing.

Particularly appropriate for the large scale manufacturer of artificial spinning filaments is an arrangement in which a large number of nozzle plates are mounted in a common holder-plate which in turn is suitably mounted in a spinning head connected directly with the feed pipe. Such an arrangement is shown in Figures 10, 11 and 12. In Figure 10 a number of nozzle plates F are mounted in a common holder-plate H. Each nozzle plate is tapered at its edge as previously described and the holder H is provided with tapered seats for receiving the nozzle plates. The feed pipe is shown at A, and B indicates the enlarged spinning head into which the holder plate H is suitably mounted. Each plate may have a great many apertures, for example, 1500 or more. A nozzle of this type may be used not only for producing artificial spinning filaments in large quantities but may also be used for making artificial silk in which case the individual perforated nozzle plates may be provided with a smaller number of holes corresponding to the number of artificial silk filaments.

Figure 11 shows one way in which the holder-plate H may be mounted in the spinning head. The plate H may be made tight by the packing E against which this plate is pressed by a spring I or a screw K, or both. During operation of the nozzle the seating of the plate H on the packing E is effected by the spinning pressure within the nozzle. Figure 12 illustrates how the pressure of the spring I may be distributed to the side portions of the plate H and further shows that the lower face of the plate H may be made flush with the bottom of the spinning head B, if so desired.

In all forms of the nozzle herein described, the pressure of the spinning solution within the nozzle forces the nozzle plates firmly against their seats and no additional fastening means is ordinarily required. However, if desired each perforated nozzle plate may be cemented in place. As an example of a cement suitable for the purpose may be mentioned one having a lamp black base which is acid and alkali resistant and which melts at about 80–120° C. Any other suitable cement may, of course, be used such as rubber cement.

It will be noted that in Figs. 1 to 9 inclusive the individual perforated nozzle plates are mounted directly in the nozzle body or in the cap-nut whereas in Figs. 10 to 12 inclusive, they are mounted in a common plate which in turn is mounted in the spinning head. In any case the member in which the individual perforated nozzle plates are mounted constitutes a holder for the plates.

BERNHARD WEMPE.