Nov. 17, 1936. G. J. WIDER 2,060,964

FUNNEL FOR USE IN SPINNING RAYON AND OTHER SYNTHETIC THREADS

Filed July 20, 1935

Fig. 1.

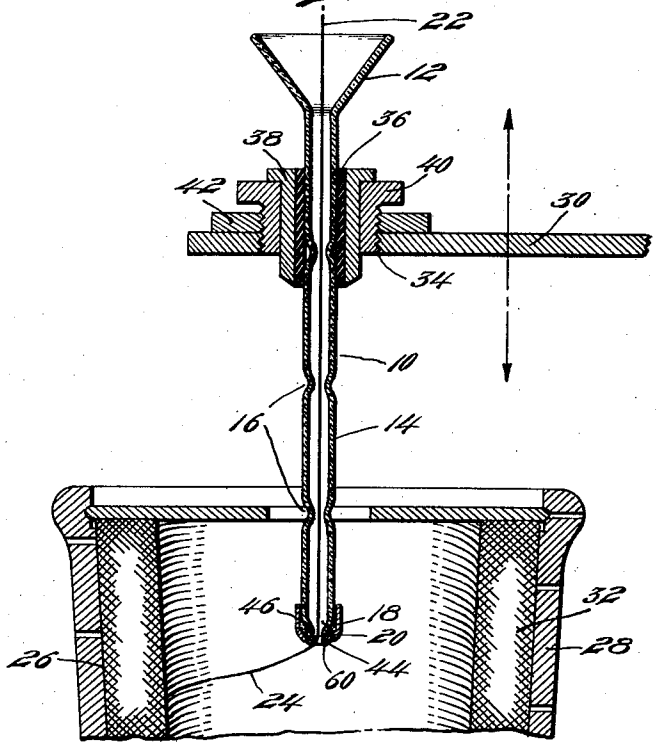


Fig. 2.

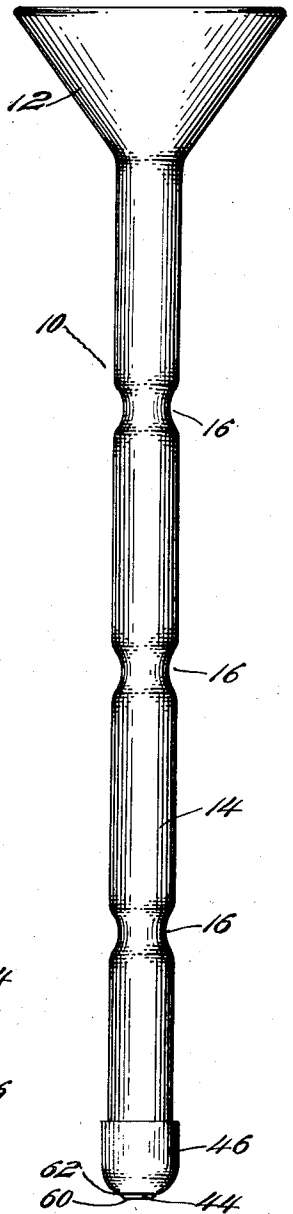


Fig. 3.

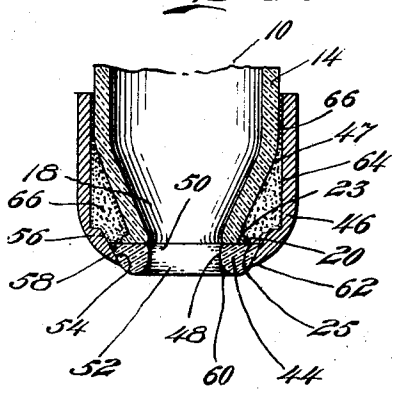
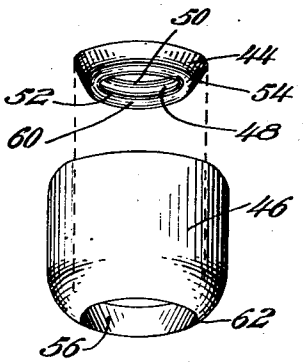


Fig. 4.



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Patented Nov. 17, 1936 2,060,964

UNITED STATES PATENT OFFICE

2,060,964

FUNNEL FOR USE IN SPINNING RAYON AND OTHER SYNTHETIC THREADS

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Application July 20, 1935, Serial No. 32,411

17 Claims. (Cl. 117—27.5)

My invention relates to improvements in funnels for use in spinning rayon and like artificial filaments and component parts thereof. After the artificial filament has been extruded in the spinnerette or other suitable apparatus, it is then passed through a spinning funnel which is traversed up and down and fed radially from the lower end of said spinning funnel to form a cheese on the inner surface of a cylindrical rotating spinning pot, the funnel being traversed substantially the height of the spinning pot to form a cheese of artificial filament on the inner surface thereof. In the prior art these spinning funnels have been provided with a conical mouth and an elongated spout. The spout has usually been provided with spaced constrictions to give added strength and serve as guide means for the filament passing through and with a constricted lower end usually terminating in a glass bead. These funnels in the prior art have been constructed of glass or like, preferably transparent plastic material to be resistant to the acid or alkali soaked filament as it is passing therethrough but as glass has not been of a sufficient degree of hardness to withstand the action of the thread as it is being twisted against the inner surface of the bead these glass funnels have tended to wear through rapidly in use. As a conservative estimate one of the larger manufacturers of viscose has to replace over 600,000 of these glass spinning pot funnels a year.

My invention relates to certain improvements which extend the life of these glass spinning pot funnels over a much greater period of time. For this purpose I provide the usual glass funnel with a hollow substantially cylindrical tip to abut all portions of the filament as it is being bent from traveling downwardly in the funnel spout to be fed substantially at right angles radially from the lower end thereof to the inner surface of the rotating spinning pot of such a degree of hardness that the tightly spun acid or alkali soaked filament will not wear it through over a long period of time and I provide suitable means, preferably constructed also of acid and/or alkali resistant material to rigidly secure said tip to the lower end of the spinning pot funnel spout, preferably compressed against the usual glass bead thereof. I also preferably construct my substantially cylindrical tip of such a shape as to at all times contact the filament fed therethrough and provide the upper and lower ends of the inner surface of said tip with a rounded preferably highly polished surface so as to substantially lessen the friction against the spun filament passing thereover. I have found for my purposes that a hard substance, such as a reconstructed ruby, otherwise called a scientific ruby or a synthetic ruby having a hardness of 9 points in Moh's scale, the hardest substance known next to a diamond is best suited for my purpose, although other hard substances such as Norbide, purified boron carbide (B_6C), agate, or other materials preferably having a hardness of about 7 or over in Moh's scale may be employed.

Other features of my invention relate to the specific construction of tip I preferably employ including the use of the hard material from which it is fabricated and the improved type of preferably acid and/or alkali resistant composition material I employ for holding the tip on to the lower end of the funnel and the detailed cooperating features of construction of said cap and tip so that it may be readily held to the lower end of said funnel spout.

These and such other objects of my invention as may hereinafter appear will be best understood from a description thereof such as is shown in the accompanying drawing.

Fig. 1 is a diagrammatic sectional view illustrating the upper portion of a rotating spinning pot having my funnel reciprocatingly mounted therein to feed the filament therethrough and radially outwardly at the lower end thereof thereby building up the cheese in the spinning pot, a portion of the holding and traversing means for the funnel being shown in section.

Fig. 2 is a side elevation of my improved spinning pot funnel.

Fig. 3 is a vertical sectional view taken through the lower end of said spinning funnel showing in section my improved tip and improved cap for holding it thereon.

Fig. 4 is a disassembled perspective view of my improved tip about to be inserted in my improved cap.

In the drawing, wherein like characters of reference indicate like parts throughout, 10 generally indicates an improved spinning pot funnel constructed in accordance with my invention for use in spinning rayon or other synthetic filament. Said funnel comprises a tube preferably constructed of glass or like preferably transparent plastic material having a conical mouth 12, an extended spout 14 having constrictions 16 at spaced intervals therein and a constricted lower end 18 terminating in the embodiment shown in the glass bead 20 at the lower end thereof. As illustrated in Fig. 1 the filament 22 after being extruded in the spinnerette or otherwise

initially formed is led downwardly through the funnel 10 and fed substantially at right angles radially from the constricted lower end 18 of said funnel as at 24 to the side wall 26 of a hollow cylindrical rotating spinning pot 28. I have shown at 30 suitable means for vertically reciprocating or traversing said funnel 10 substantially the height of the spinning pot so that the cheese 32 may be formed as said filament is fed against the rotating inner surface 26 of said spinning pot. While any suitable type of vertically movable traversing means for said funnel may be employed, I have shown a standard type including the reciprocatable arm 30 having the internally threaded hole 34 near the end thereof, the cylindrical preferably rubber tube 36 surrounding the upper end of the spout 14, the loose metal sleeve 38 surrounding said rubber tube 36, the nut 40 having the threaded lower end adjustably secured within said threaded hole around said tube 36 and sleeve 38 and the adjustable lock nut 42 also threaded over the lower end of said nut 40 to lock said funnel to said arm 30 at the desired adjustable height thereon.

As stated previously, the standard type of spinning pot funnel hitherto described constructed of glass or other preferably transparent plastic material has not been very hard and the acid or alkali soaked filament passing vertically downwardly therethrough and changing its course substantially at right angles after passage through the lower constricted end 18 thereof, thereby feeding radially outwardly as at 24, has tended to wear through the bead 20 and lower end 18 of said funnel spout 14, and my invention relates to the provision of a supplemental lower end for said funnel normally in contact with the spun acid or alkali soaked filament passing thereover, preferably acid and/or alkali-proof and having an outer surface so hard that the spun filament will not wear it through over a long period of time. To this end I provide a hollow annular tip 44 for the lower end of said funnel spout 14 and suitable means 46 to secure said hollow tip 44 to the lower end of said funnel to at all times contact the filament passing through, in my preferred embodiment said means 46 comprising the preferably substantially acid and/or alkali proof composition hollow cylindrical cap 46 constructed to compress said tip 44 against the lower end 18 of said funnel and be rigidly secured to the outer wall 47 of said spout 14.

While my improved annular tip may be constructed of any suitable hard material and be replaceable if desired, such as agate, etc., I preferably construct it of a material having a hardness of 7 or over in Moh's scale, such as topaz, sapphire, garnet, fused zirconia, fused alumina, silicon carbide or purified boron carbide B_6C sold under the name Norbide. In the preferred embodiment shown I preferably construct it of reconstructed ruby or as often called scientific ruby or synthetic ruby having a hardness of substantially 9 in Moh's scale as against 10 for diamond. In my preferred embodiment the inner cylindrical surface 48 as shown in Fig. 3, preferably has an internal diameter of a size to at all times contact the acid and/or alkali soaked filament as it is fed therethrough and in my preferred embodiment to lessen friction said inner surface 48 is preferably provided with highly polished rounded upper and lower ends 50 and 52 respectively, the lower end 52 being particularly highly polished and rounded to substantially lessen the friction against the filament as it takes the substantially right angle turn to be fed radially outwardly to the inner surface of the rotating spinning pot. In order that my improved tip 44 may be conveniently held within the cap 46 against the lower end 18 of said funnel spout 14 I preferably taper the outer wall of said tip downwardly as at 54.

As stated hitherto, as my improved type of means 46 to secure the hollow tip 44 to the lower end of said funnel, I provide the preferably substantially acid and/or alkali proof composition, hollow substantially cylindrical cap 46. While any suitable type of material may be employed, I preferably employ a plasticized composition material preferably of an insoluble phenol formaldehyde condensation product, such as bakelite constructed in accordance with the Bakeland Patents Nos. 942,699, 942,700, 1,038,745, etc. and additionally rendered acid or alkali proof as may be obtained on the market today, such as by the methods described in Patents 1,209,333, 1,218,146, or otherwise. Alternately I may employ an insoluble urea formaldehyde intermediate condensation product, such as plaskon, or other types on the market today, or other resistant plasticized composition material, such as celluloid, rubber, cellulose acetate, cellulose nitrate, etc. The inner surface 56 of said cap is cooperatingly tapered downwardly at the lower end thereof to abut the upper portion 58 of the tapered surface 54 of the outer wall of said tip to compress said tip against the funnel spout lower end 18, against the bead 20 thereof where employed, to permit the lower portion 60 of said tip to project beyond the lower end 62 of said cap 46 as at 60 to insure that the hard material of said tip 44 will project below said cap 46 to receive all the wear of the filament thereon. The remainder 64 of the inner surface of said cap 46 is shaped to substantially abut the outer wall of the lower end of said spout and is rigidly secured thereto along said abutting surfaces by the cement 66 or in any other suitable manner. While I preferably employ my improved construction of cap to secure said hollow tip 44 to the lower end 18 of the funnel spout, it is apparent that any other suitable type of means may be employed for this purpose. In the embodiment shown the usual round glass bead 20 is filed down substantially half way through to provide the flat surface 23 for the upper surface 25 of said tip to flatly abut. It is obvious, however, that the funnel may be initially made with the flat surface 23 on the lower end for this purpose.

It is apparent therefore that by employing my improved tip 44 and improved cap 46, or other means for securing said tip to the lower end of said funnel spout 14 that I am able to provide a hard surface to continuously at all times contact the filament 22 as it is passed downwardly through said spout 14 and outwardly as at 24 to the spinning pot 28, said tip being preferably constructed of a material of such a hardness that it will last over a long period of time.

It is apparent therefore that I have provided not only a novel type of spinning pot funnel for use in spinning rayon or other synthetic filament, but also novel structural features in the construction of my improved tip for the funnel and improved means for securing it to the funnel with the advantages explained above.

It is understood that my invention is not limited to the specific embodiment shown and that various deviations may be made therefrom with-

out departing from the spirit and scope of the appended claims.

What I claim is:

1. A funnel for use in spinning rayon or other synthetic filament, comprising a tube having a conical mouth and an extended spout and a constricted lower end terminating in a head having a flattened lower end and adapted to receive the filament through the conical mouth thereof and feed it substantially at right angles radially from the constricted lower end thereof to the inner surface of the side wall of a hollow cylindrical rotating spinning pot, a hollow annular tip for said funnel having an inner surface shaped to at all times contact the filament fed therethrough and rounded upper and lower ends and an outer wall tapering downwardly, said tip being constructed of a material having a hard wear-resistant surface and a substantially chemical proof composition hollow cylindrical cap having the inner surface cooperatingly tapered downwardly at the lower end thereof to abut the upper portion of the tapered surface of the outer wall of said tip to compress said tip against the flattened lower end of said bead on the funnel lower end to permit the lower portion thereof to project below the lower end of said cap and the remainder of the inner surface thereof shaped to substantially abut the outer wall of the lower end of said spout rigidly secured to said spout outer wall.

2. Apparatus according to claim 1 in which said tip is constructed of a material having a hardness of over 6 in Moh's scale.

3. Apparatus according to claim 1 in which said tip is constructed of synthetic ruby.

4. A funnel for use in spinning rayon or other synthetic filament, comprising a tube having a conical mouth and an extended spout having a lower end and adapted to receive the filament through the conical mouth thereof and feed it substantially at right angles radially from the lower end thereof to the inner surface of the side wall of a hollow cylindrical rotating spinning pot, a hollow tip for said funnel constructed of a material having a hard wear resistant surface and a hollow cylindrical cap to compress said tip against said funnel lower end rigidly secured to said spout outer wall.

5. Apparatus according to claim 4 in which said tip is constructed of a material having a hardness of over 6 in Moh's scale.

6. Apparatus according to claim 4 in which said tip is constructed of synthetic ruby.

7. A funnel for use in spinning rayon or other synthetic filaments, comprising a tube having a conical mouth and an extended spout having a lower end and adapted to receive the filament through the conical mouth thereof and feed it substantially at right angles radially from the lower end thereof to the inner surface of the side wall of a hollow cylindrical rotating spinning pot, a hollow annular tip for said funnel having an inner surface shaped to at all times contact the filament fed therethrough and rounded upper and lower ends, said tip being constructed of a material having a hard wear resistant surface and a hollow cylindrical cap to compress said tip against said funnel lower end rigidly secured to said spout outer wall.

8. A funnel for use in spinning rayon or other synthetic filament, comprising a tube having a conical mouth and an extended spout having a lower end and adapted to receive the filament through the conical mouth thereof and feed it substantially at right angles radially from the lower end thereof to the inner surface of the side wall of a hollow cylindrical rotating spinning pot, a hollow annular tip for said funnel having an outer wall tapering downwardly, said tip being constructed of a material having a hard wear resistant surface and a hollow cylindrical cap having the inner surface cooperatingly tapered downwardly at the lower end thereof to abut the tapered surface of the outer wall of said tip to compress said tip against said funnel lower end and the remainder of the inner surface thereof shaped to substantially abut the outer wall of the lower end of said spout rigidly secured to said spout outer wall.

9. A funnel for use in spinning rayon or other synthetic filament, comprising a tube having a conical mouth and an extended spout having a lower end and adapted to receive the filament through the conical mouth thereof and feed it substantially at right angles radially from the lower end thereof to the inner surface of the side wall of a hollow cylindrical rotating spinning pot, a hollow annular tip for said funnel having an inner surface having rounded upper and lower ends and an outer wall tapering downwardly, said tip being constructed of a material having a hard wear resistant surface and a hollow cylindrical cap having the inner surface cooperatingly tapered downwardly at the lower end thereof to abut the upper portion of the tapered surface of the outer wall of said tip to compress said tip against said funnel lower end to permit the lower portion thereof to project beyond the lower end of said cap and the remainder of the inner surface thereof shaped to substantially abut the outer wall of the lower end of said spout rigidly secured to said spout outer wall.

10. A funnel for use in spinning rayon or other synthetic filament, comprising a tube having a conical mouth and an extended spout having a lower end and adapted to receive the filament through the conical mouth thereof and feed it substantially at right angles radially from the lower end thereof to the inner surface of the side wall of a hollow cylindrical rotating spinning pot, a hollow annular tip for said funnel having an inner surface shaped to at all times contact the filament fed therethrough and rounded upper and lower ends, said tip being constructed of a material having a hard wear resistant surface and means to secure said hollow tip to the lower end of said funnel to at all times contact the thread passing therethrough.

11. A funnel for use in spinning rayon or other synthetic filament comprising a tube having a conical mouth and an extended spout having a lower end and adapted to receive the filament through the conical mouth thereof and feed it substantially at right angles radially from the lower end thereof to the inner surface of the side wall of a hollow cylindrical rotating spinning pot, a hollow annular tip for said funnel constructed of a material having a hard wear resistant surface and means to secure said hollow tip to the lower end of said funnel to at all times contact the thread passing therethrough.

12. A hollow annular tip for spinning pot funnels having a substantially cylindrical inner surface having rounded upper and lower ends and an outer wall tapering downwardly, said tip being constructed of a material having a hardness of over eight in Moh's scale.

13. A hollow cylindrical cap for use in attaching an annular tip having a downwardly tapered

outer wall to the lower constricted end of a spinning pot funnel spout having the inner surface thereof cooperatingly tapered downwardly at the lower end thereof to abut the upper portion of the tapered surface of the outer wall of said tip to compress said tip against said funnel lower end to permit the lower portion thereof to project below the lower end of said cap and the remainder of the inner surface thereof shaped to substantially abut the outer wall of the lower end of said spout and adapted to be rigidly secured to said spout outer wall.

14. A cap for use in attaching an annular tip having a downwardly tapered outer wall to the lower constricted end of a spinning pot funnel spout having the inner surface cooperatingly tapered downwardly at the lower end thereof to abut the tapered surface of the outer wall of said tip to compress said tip against said funnel lower end and the remainder of the inner surface thereof shaped to substantially abut the outer wall of the lower end of said spout anu adapted to be rigidly secured to said spout outer wall.

15. A substantially chemical proof composition hollow cylindrical cap for use in attaching an annular tip to the lower constricted end of a spinning pot funnel spout to compress said tip against said funnel lower end and adapted to be rigidly secured to said spout outer wall.

16. A hollow cylindrical cap for use in attaching an annular tip to the lower end of a spinning pot funnel spout to compress said tip against said funnel lower end and adapted to be rigidly secured to said spout outer wall.

17. A hollow annular tip for spinning pot funnels, having a substantially cylindrical inner surface, having rounded upper and lower ends, and an outer wall tapering downwardly, said tapering wall being constructed of synthetic ruby.

GEORGE J. WIDER.