

Dec. 2, 1947.

P. T. JONES

2,431,695

THREAD GUIDE

Filed July 3, 1944

2 Sheets-Sheet 1

Fig. 2.

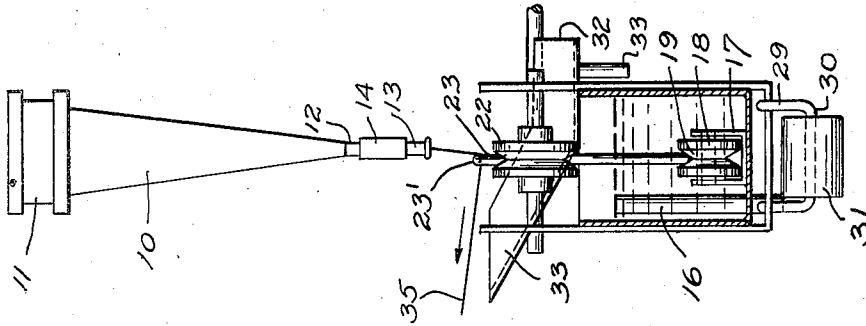
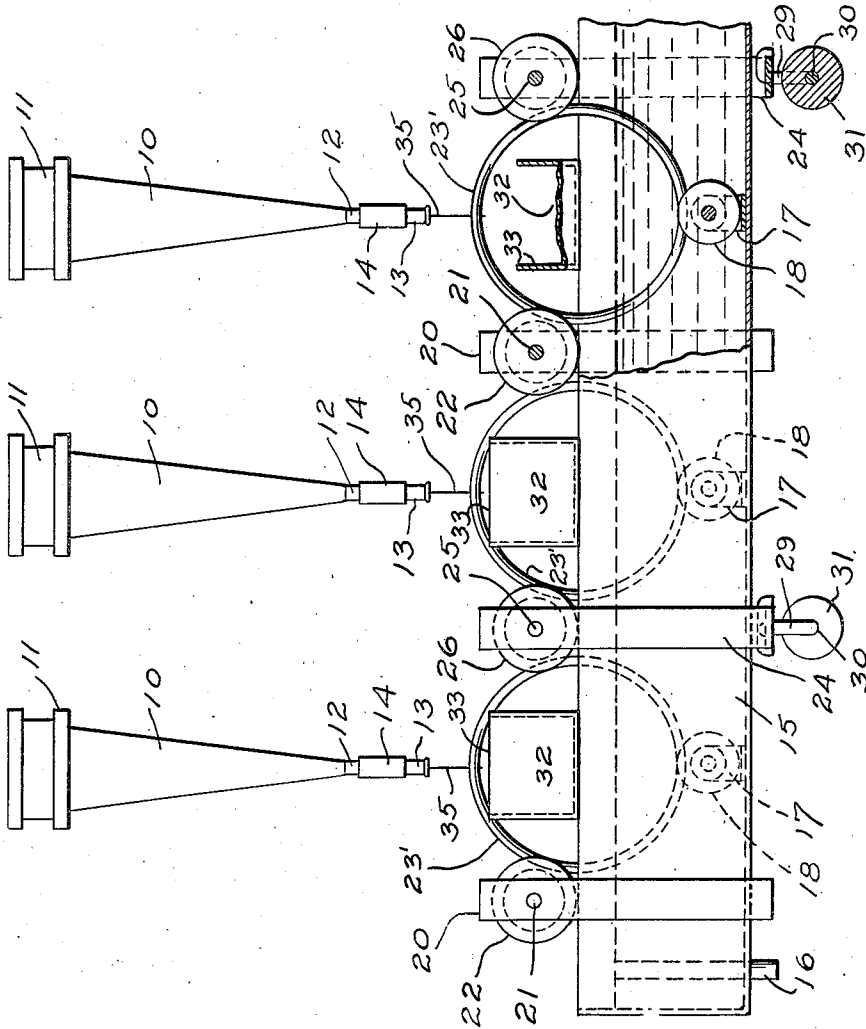


Fig. 1.



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2 Sheets-Sheet 2

Fig. 4.

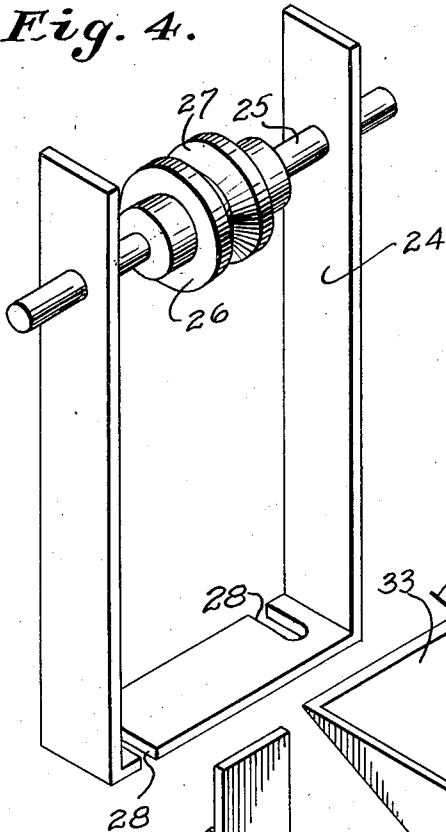


Fig. 5.

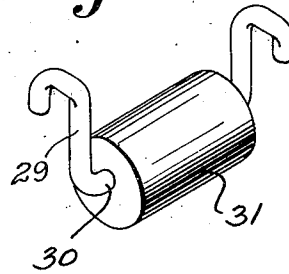
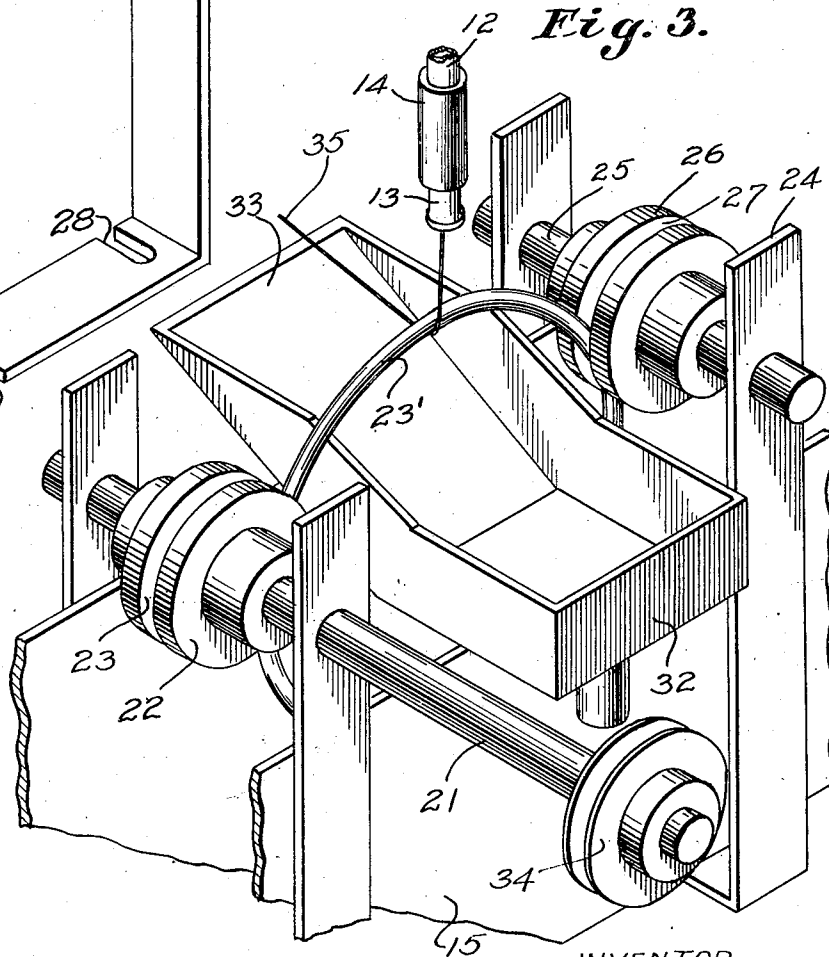


Fig. 3.



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THREAD GUIDE

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1

This invention relates to improvements in handling thread and more particularly to the production of thread by the wet spinning process.

In wet spinning thread, one system commonly employed embodies introducing a spinning solution into a coagulant through a spinnerette mounted in the upper end of a spinning funnel. The filaments thus formed descend through a coagulating liquid to the bottom of the funnel, from which they are withdrawn in the form of a continuous thread. In order to facilitate the handling of the thread thus formed, it is ordinarily directed beneath a guide rod, preferably composed of a non-corrosive substance such as stainless steel, and from thence through the usual guides and acid bath to a reel, upon which it is wound. Because of the character of the chemicals employed, deposits occur upon the guide rods with the result that they must be periodically removed and fresh clean rods substituted in order to maintain satisfactory production of thread. Such a procedure of necessity demands that the threads during the period of interchange of the guide rods must be drawn directly from the funnels, which results in non-uniformity of final product. Moreover, in a large commercial installation, such interchange of guide rods involves a vast amount of attention on the part of operators whose duty it is to see that clean guide rods are periodically substituted for those in use so as to insure uninterrupted thread production. In fact, it is common commercial practice to change guide rods every thirty minutes.

An object of the present invention is to improve the uniformity of thread production.

Another object is to reduce to a minimum the attention required to the spinning machines.

The above and other objects may be attained by employing this invention, which embodies among its features a guide which constantly changes position with relation to the thread being drawn and the continuous treating of the guide with a solution suitable for preventing the deposit of chemical substances on its surface.

Another object is to preserve the integrity of the guide-treating liquid and prevent its contamination by the coagulant which emerges from the lower end of the spinning funnel as the thread is withdrawn therefrom.

Further features embody a novel drive, by means of which the guides are constantly kept in motion so that clean, innocuous surfaces are presented to the thread at all times.

In the drawings:

Figure 1 is a fragmentary front view, partially

2

in section, of this invention, showing its relation to the spinning funnels of a conventional spinning machine.

Figure 2 is a transverse sectional view through Figure 1.

Figure 3 is a fragmentary perspective view on an enlarged scale showing the relation of one of the spinning funnels to its respective guide.

Figure 4 is a perspective view of a yoke and guide wheel employed in connection with this invention.

Figure 5 is a perspective view of the interchangeable weight for use in connection with the yoke illustrated in Figure 4.

The invention is herein illustrated as applied to the flow stretch spinning system commonly employed in the production of cuprammonium rayon thread in which a plurality of spinning funnels 10 are provided with the usual heads 11 in which the conventional spinnerettes and coagulating liquid inlets and outlets are housed. The funnels terminate at their lower ends in funnel tips 12 to which the conventional spinning nozzles 13 are attached in the usual way by rubber sleeves 14. Mounted directly below the row of funnels is an elongated trough 15 adapted to contain the solution employed for cleaning the guides. A drain pipe 16 is arranged near one end of the trough with its upper end projecting well above the lower surface of the trough in order to maintain the liquid content thereof at a uniform level. Mounted on the bottom of the trough directly below each spinning nozzle 10 is a bracket 17 and rotatably mounted in each of these is a guide roller 18 having a V-shaped groove 19 for a purpose to be more fully hereinafter described. Attached at spaced intervals to and extending above the upper edges of the side walls of the trough 15 are brackets 20 in which shafts 21 are rotatably mounted. Mounted on the shafts 21 intermediate their ends are guide rollers 22 having V-shaped grooves 23 which lie in the same vertical plane as the grooves 19 of the rollers 18.

Rotatably mounted to ride in the grooves 19 and 23 of the guide rollers 18 and 22 respectively are rings or ring-shaped guides 23' which are formed of a suitable corrosion-resistant substance such as stainless steel. The lower portions of these rings rest in the grooves 19 of the rollers 18 and extend beneath the upper surface of the liquid contained within the trough 15, so that they are at all times in liquid-wetted condition by being subjected to the action of this liquid.

3

Loosely fitting around the trough 15 alternately between the brackets 20 are U-shaped yokes 24 carrying near their upper ends shafts 25 supporting guide rollers 26. Each of these rollers is provided with a V-shaped groove 23 for engagement with adjacent ring-shaped guides 23'. In order to establish frictional contact between the walls of the V-shaped grooves 19, 23 and 27 of the rollers 18, 22 and 26 respectively, the bight portion of each U-shaped yoke is provided with slots 28 for the reception of the arms 29 of a bracket 30 which carries a weight 31. Thus it will be seen that the rollers 26 are constantly urged downwardly into wedging contact between adjacent guides 23' and the entire system is thus kept under compression so that the driving surfaces are held in close frictional contact.

Secured to the upper edge of the rear side wall of the trough 15 and extending rearwardly beyond the confines of the trough are troughs 32, each of which is arranged in axial alignment with a nozzle 13. Each trough 32 is provided with an angular extension 33 in such a manner that liquid discharged from the nozzles 13 will be received in the troughs 32 and discharged through drain pipes 33 so as to avoid contamination of the liquid contained in the trough 15.

One of the shafts 21 is extended in a direction toward the spinning machine and is provided with a grooved pulley 34. By connecting the grooved pulley 34 by means of a belt with any suitable driven element of the machine, the shaft 21 and its respective grooved roller 22 may be driven, and motion thus imparted to this shaft will be transmitted through the adjacent guides 23' to the rest of the entire mechanism.

In operation, thread 35 issuing from the spinning nozzles 13 is directed downwardly and beneath the upper portion of the ring-shaped guides 23' from which it is directed to a suitable collecting device (not shown). Upon setting the mechanism in motion by means of the pulley 34, the guide roller 22 attached to shaft 21 upon which the pulley 34 is mounted will be rotated. This will cause the adjacent ring-shaped guides 23' contacting the roller 22 to be driven. Such motion of the ring-shaped guides 23' causes the rollers 26 contacting the opposite sides thereof to rotate and thus drive the next adjacent ring-shaped guides and so on. In this manner, rotation of as many guides as there are spinning places is effected. Rotation of the guides presents constantly new thread-contacting surfaces directly beneath the nozzles 13 so that before each a fresh surface is presented for thread contact. The rotation of the guides simultaneously causes those portions thereof which have been exposed to the action of the spinning fluids to be dipped in the fluid contained in the trough 15 where they are cleansed of any deposits and rendered innocuous. By the use of weighted yokes 24, adequate frictional contact of each guide 23' with its respective rollers is assured, and a positive drive is obtained. As stated before, liquid flowing from the lower ends of the spinning nozzles 13 is received in the troughs 32 and discharged without contacting the liquid contained in the trough 15 so that the integrity of the respective liquids is preserved.

The invention is especially valuable in the funnel spinning of cuprammonium cellulose, cuprammonium cellulose-protein, viscose and other solutions which tend to form deposits on the guide rod located below the funnel. Since the aforesaid deposits increase with the number of

4

filaments simultaneously extruded, the novel spinning machine attachment is especially important in the spinning of high denier yarn to be used in the manufacture of cords and staple fibers.

However, the invention is not limited to the production of synthetic thread, as it is obvious that it can be applied to any process of yarn manufacture in which a constantly changing guiding surface is desirable.

While in the foregoing there has been shown and described the preferred embodiment of this invention, it is to be understood that minor changes in the details of construction, combination and arrangement of parts may be resorted to without departing from the spirit and scope of the invention as claimed.

What is claimed is:

1. Apparatus for the funnel spinning of synthetic thread from a spinning solution wherein guide means are disposed adjacent the point of formation of said thread and used for directing said thread to treating stages and wherein such guide means are liable to become encrusted with deposits detrimental to uninterrupted formation of said thread, said apparatus including a spinning funnel and a guide means adjacent thereto, said guide means comprising a smooth hollow ring-like member of substantial internal diameter through which the thread is passed and against successive portions of the internal periphery of which the thread bears during its passage therethrough, drive means engaging with the external periphery of said member and adapted to rotate said member without hindering the passage of thread therethrough, the rotation of said member serving constantly to present fresh contact surface to said thread during its passage, said drive means at the external periphery being so disposed that the axis of rotation of said member always remains at the theoretical center thereof and means disposed at a point remote from the thread contacting portion of said member for removing encrusted deposits therefrom as said member rotates.

2. Apparatus for the funnel spinning of synthetic thread from a spinning solution wherein guide means are disposed adjacent the point of formation of said thread and used for directing said thread to treating stages and wherein such guide means are liable to become encrusted with deposits detrimental to uninterrupted formation of said thread, said apparatus including a spinning funnel and a guide means adjacent thereto, said guide means comprising a substantially vertically supported smooth hollow ring-like member of substantial internal diameter through which the thread is passed and against successive portions of the internal periphery of which the thread bears during its passage therethrough, drive means engaging with the external periphery of said member and adapted to rotate said member without hindering the passage of thread therethrough, the rotation of said member serving constantly to present fresh contact surface to said thread during its passage, said drive means at the external periphery being so disposed that the axis of rotation of said member always remains at the theoretical center thereof and means disposed at a point remote from the thread contacting portion of said member for removing encrusted deposits therefrom as said member rotates.

3. Apparatus for the funnel spinning of synthetic thread from a spinning solution wherein

5

guide means are disposed adjacent the point of formation of said thread and used for directing said thread to treating stages and wherein such guide means are liable to become encrusted with deposits detrimental to uninterrupted formation of said thread, said apparatus including a spinning funnel and a guide means adjacent thereto, said guide means comprising a substantially vertically supported smooth hollow ring-like member of substantial internal diameter through which the thread is passed and against successive portions of the internal periphery of which the thread bears during its passage therethrough, peripherally grooved independently journaled rollers for supporting said member at at least three points about its external periphery at least one of said rollers being driven to impart rotation to said member, said rollers being so disposed about the periphery that the axis of rotation of said member always remains at the theoretical center thereof and means disposed at a point remote from the thread contacting portion of said member for removing encrusted deposits therefrom as said member rotates.

4. Apparatus for the funnel spinning of a plurality of synthetic threads from a spinning solution wherein guide means are disposed adjacent the points of formation of said threads and used for directing said threads to treating stages and wherein such guide means are liable to become encrusted with deposits detrimental to uninterrupted formation of said threads, said apparatus including a plurality of spinning funnels and guide means adjacent each funnel, said guide means comprising substantially vertically supported smooth hollow ring-like members of substantial internal diameter through which the threads are passed and against successive portions of the internal peripheries of which the threads bear during their passage therethrough, peripherally grooved independently journaled rollers for supporting each of said members at at least three points about their external peripheries and adapted to rotate said members without hindering the passage of thread therethrough, drive means for driving all of said members in unison, said rollers being so disposed about the peripheries of said members that the axis of rotation of each of said members always remains at the theoretical center thereof and means disposed at points remote from the thread contacting portions of said members for removing encrusted deposits from said members as they rotate.

5. Apparatus for the funnel spinning of a plurality of synthetic threads from a spinning solution wherein guide means are disposed adjacent the point of formation of said threads and used for directing said threads to treating stages and wherein such guide means are liable to become encrusted with deposits detrimental to uninterrupted formation of said threads, said apparatus including a plurality of spinning funnels and guide means adjacent each funnel, said guide means comprising substantially vertically supported smooth hollow ring-like members of substantial internal diameter through which the threads are passed and against successive portions of the internal peripheries of which the threads bear during their passage therethrough, peripherally grooved independently journaled rollers for supporting each of said members at at least three points about their external peripheries the external peripheries of some of said

6

members engaging with said rollers which serve to support other members, at least one of said rollers being driven and adapted to impart rotation to the member supported by it and through rotation of said member to other members of the apparatus, all of the rollers at the peripheries of the various members being so disposed about said peripheries that the axis of rotation of each of said members always remains at the theoretical center thereof and means disposed at points remote from the thread contacting portions of said members for removing encrusted deposits from said members as they rotate.

6. Apparatus for the funnel spinning of a plurality of synthetic threads from a spinning solution wherein guide means are disposed adjacent the point of formation of said threads and used for directing said threads to treating stages and wherein such guide means are liable to become encrusted with deposits detrimental to uninterrupted formation of said threads, said apparatus including a plurality of spinning funnels and guide means adjacent each funnel, said guide means comprising substantially vertically supported smooth hollow ring-like members of substantial internal diameter through which the threads are passed and against successive portions of the internal peripheries of which the threads bear during their passage therethrough, peripherally grooved independently journaled rollers for supporting each of said members at at least three points about their external peripheries the external peripheries of some of said members engaging with said rollers which serve to support other members, at least one of said rollers being driven and adapted to impart rotation to the member supported by it and through rotation of said member to other members of the apparatus, all of the rollers at the peripheries of the various members being so disposed about said peripheries that the axis of rotation of each of said members always remains at the theoretical center thereof and means disposed at points remote from the thread contacting portions of said members for removing encrusted deposits from said members as they rotate, said means comprising a trough containing incrustation removing liquid through which the thread contacting portions of the members pass after having contacted the threads.

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