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APPARATUS FOR THE PRODUCTION OF ARTIFICIAL THREADS

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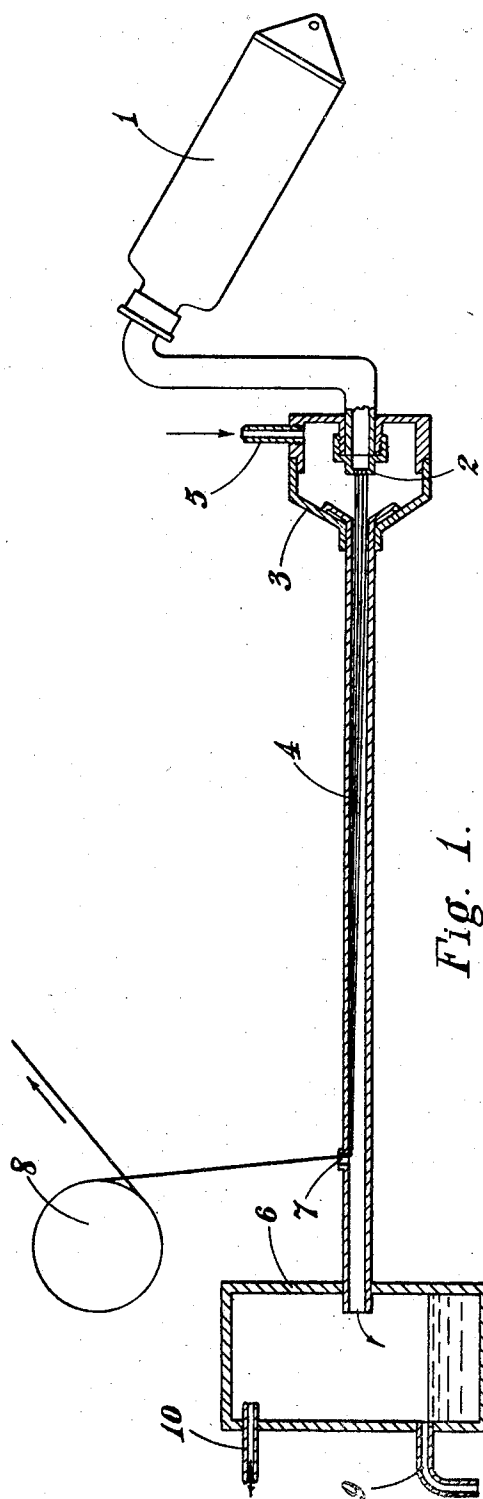


Fig. 1.

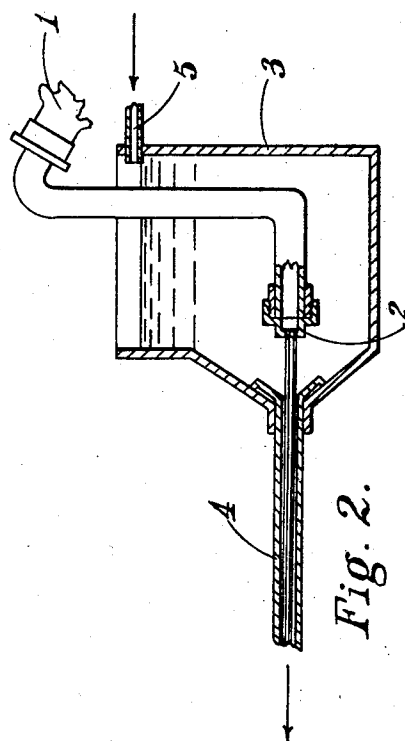


Fig. 2.

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APPARATUS FOR THE PRODUCTION OF
ARTIFICIAL THREADS

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3 Claims. (Cl. 18—8)

This invention relates to improvements in the manufacture and production of artificial threads from viscose by the wet-spinning process. It is particularly concerned with the collection and removal of the gases evolved during the formation of such threads.

It has been customary in the past in the production of artificial threads from viscose on a manufacturing scale to extrude viscose through a large number of jets placed at intervals in long open baths of coagulating liquid. The thread from each jet is led up from the liquid round guides over a godet into a centrifugal box or onto a bobbin, or, in the production of staple fibre, to a cutting device either directly or with intermediate treatment. In the chemical reactions resulting in the formation of cellulose hydrate threads from the sodium cellulose xanthate or viscose solution, gases are evolved the greater proportion of which are dissolved in, and/or given off from the surface of, the coagulating bath. The most objectionable of these gases is hydrogen sulphide, and to dispose conveniently of such gases is a problem of much importance in the industry. Hitherto it has been usual to erect large ventilating systems by which the evolved gases are constantly removed from the vicinity of the machines and replaced by incoming air. This, however, results in great dilution of the evolved gases which renders the subsequent removal of the objectionable constituents much more difficult. It has also been proposed to enclose the spinning machines as far as possible by means of glass frames. While this reduces the volume of diluted gas which has to be treated, it is still very large.

The object of the present invention is to provide an improved process for the collection and removal of the gases evolved in the formation of filaments by the extrusion of viscose into a coagulating liquid.

According to the present invention the said improved process comprises extruding the viscose through a jet situated at or near one end of a tube or pipe through which coagulating liquid is caused to flow so that both the thread and the liquid travel in the same direction through the tube or pipe towards the other end thereof, removing the thread at or near the other end of the tube, causing the liquid and gases to flow from the said other end of the tube into an enclosed container and passing the gases which collect therein above the liquid to a destructor, absorbing means or other means of disposal. The thread is led away over a suitable guide or guides

to a collecting or cutting device. The coagulating liquid flowing into the container is not allowed to fill it completely but is continually withdrawn, for example, by means of an overflow pipe and recirculated, if desired, after having been made to give up more or less of the dissolved gases by suitable means such as agitation by cascading or blowing air through, or by vacuum treatment.

The end of the tube remote from the jet may be situated just outside the container, in which case the coagulant emerging from the end of the tube is either led by suitable means such as a small trough into the container, or is merely allowed to fall therein through a hole in the wall thereof. The suction caused by the ventilators drawing off the gas to the plant for absorption or other treatment is sufficient to prevent any considerable escape of the gases through the holes through which the coagulant is entering the container. If the tube or pipe be so arranged that the end thereof be situated inside the container a small hole may be provided in a part of the wall of the tube outside the container and the thread led away through this hole. The hole itself may be circular or it may take the form of a slot from the end of the tube, so that the end of the slot is outside the container.

The tube itself may be made of any material capable of resisting sufficiently the action of the coagulating bath, for example acid-resisting metal, glass, porcelain, ebonite or artificial resin. If it be made of glass the rim of the hole or slot through which the thread leaves or the rim of the end of the tube if the latter is outside the container may be made of a stronger, more resistant material such as porcelain.

If the thread is removed through a hole in the wall of the tube, a branch tube can be fitted over the hole to form a T-piece and by adjusting the inclination of the tube to the horizontal, the length of the branch tube, which is generally short compared with the main tube, and the pressure of the supply of the coagulating liquid, the coagulating liquid can be maintained at a level within the branch tube so that it will not overflow from the end thereof. The tube surrounding the jet and the thread may be provided with a suitable enlarged end to fit round the jet holder and with a side tube leading into the end through which the coagulating liquid is passed so as to fill the space around the jet and the tube itself.

The enlarged end may totally enclose the jet and jet holder or it may be open at the top, like a deep trough. In the latter case the jet holder

can readily be lowered into and removed from the trough. The coagulating liquid is fed into the trough which is of sufficient depth to produce a head of coagulant capable of maintaining a steady flow along the tube.

When starting extrusion, the flow of the coagulating liquid will generally carry the viscose thread along the tube as it emerges from the holes in the jet, and the thread can be made to emerge through the desired hole or slot by momentarily closing the end of the tube so that both liquid and thread have to pass through the hole. Then, when the thread has been secured and led to the thread guide, the coagulating liquid can be allowed to pass out of the end of the tube into the enclosed container.

If desired a number of tubes through each of which coagulant and thread is being passed can terminate in or near the same container. The container may for example take the form of a tank or a long tube of greater diameter than the tubes surrounding the threads, extending the whole length of a thread-making machine, the tubes surrounding the various nozzles and ends of thread being led in at intervals along its length.

The accompanying drawing illustrates diagrammatically apparatus suitable for carrying out the process according to the present invention although the invention is not limited to the use of this apparatus. Figure 1 shows the apparatus with the enlarged end of the tube totally enclosing the jet, and Figure 2 shows the enlarged end open at the top like a trough. When using either of these apparatus viscose is supplied at a constant rate by means of a pump (not shewn) through a candle filter 1 to a jet 2. The jet 2 is placed inside the enlarged end 3 of a tube 4. Coagulating liquid is supplied to the space around the jet and into the tube 4 through a branch tube 5. When using the apparatus shewn in Figure 2 a head of liquid is maintained in the trough 3 sufficient to give the required speed of flow along the tube 4. In both Figure 1 and Figure 2 viscose is extruded through the jet 2 and the formed filaments are carried along the tube 4 by means of the coagulating liquid flowing along the tube. The end of the tube 4 remote from the jet 2 is situated inside a tank 6 and the coagulating liquid falls into the tank after flowing along the tube 4. A small hole 7 is provided in the upper surface of the tube 4 near to the tank 6. At the commencement of the thread-forming operation the thread is caused to issue through the hole 7 by temporarily closing the end of the tube 4 inside the tank 6. The thread issuing from the hole 7 is led around

a guide roller 8 to collection and/or further treatment, and continuous to leave the tube 4 through the hole 7 while the coagulant flows into the tank 6 after the temporary closing of the tube 4 is discontinued. The tank 6 is provided with an overflow pipe 9 for drawing off the coagulating liquid and with a vent 10 for leading away the gases which collect in the space above the liquid.

What we claim is:

1. Apparatus of the character described comprising in combination a jet for extruding viscose, a tube having an end surrounding said jet, means for supplying coagulating liquid to said surrounding end, means for removing the thread from said tube at a point remote from said jet, an inclosed container receiving the other end of said tube, means at a lower level for taking off from said container coagulating liquid from said tube, and means at a higher level for taking off from said container gases evolved in said tube.

2. Apparatus for the collection of substantially all the gases given off during the production of filaments, threads and the like of viscose by the wet process in which a solution is extruded through a jet into coagulating liquid, which comprises a jet, a tube and an enclosed container, one end of said tube surrounding the jet and the other end being in the said enclosed container, means for impelling the coagulating liquid, the extruded viscose and the evolved gases in the same direction through the said tube and means for removing the thread at a point near the end of the said tube remote from the jet, while the coagulating liquid and evolved gases continue their flow into the enclosed container.

3. Apparatus for the collection of substantially all the gases given off during the production of filaments, threads and the like by the extrusion of viscose through a jet into a coagulating liquid, said apparatus comprising a jet, a tube one end of which is in close proximity to the jet, and along which tube the formed thread and the coagulating liquid pass, and an enclosed container into which the other end of the said tube opens, the said enclosed container being provided with an outlet for gases in its upper part and an outlet for coagulating liquid in its lower part and the said tube being provided towards the end opening into the enclosed container with an opening through which the formed thread can be withdrawn away from the coagulating liquid.

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