Aug. 31, 1937. R. PICARD 2,091,612

APPARATUS FOR THE PRODUCTION OF ARTIFICIAL THREAD

Filed Oct. 31, 1935

FIG. 1.

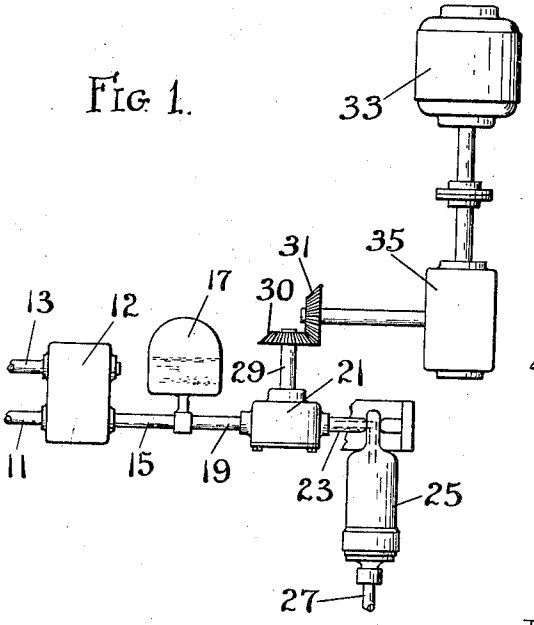


FIG. 2.

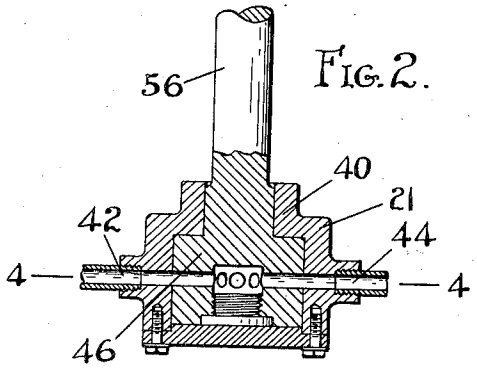


FIG. 4

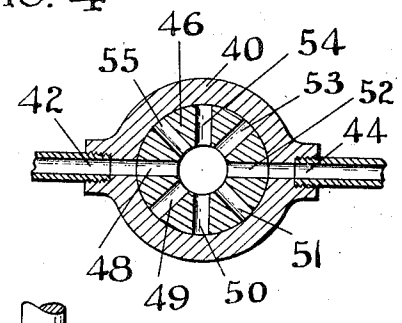


FIG. 3.

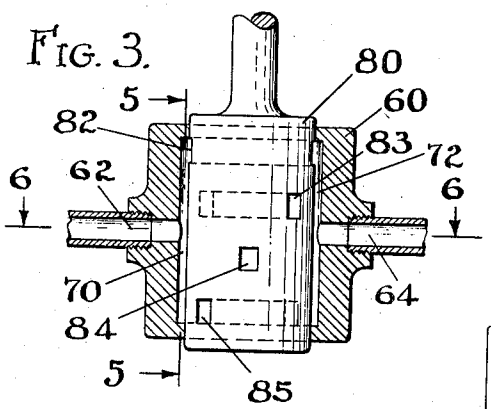


FIG. 5

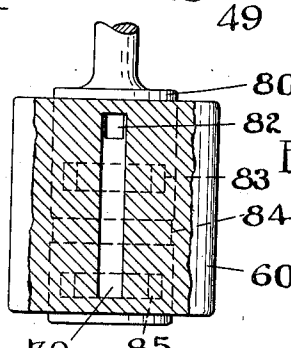
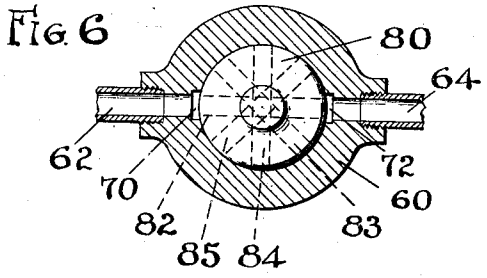


FIG. 6



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2,091,612

APPARATUS FOR THE PRODUCTION OF ARTIFICIAL THREAD

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Application October 31, 1935, Serial No. 47,641

1 Claim. (Cl. 18—8)

This invention relates to the production of artificial thread, and more particularly it relates to the production of artificial thread having an uneven or irregular denier. This invention will be described with particular reference to the production of artificial threads produced from viscose, nevertheless, the invention is applicable to the production of artificial threads composed of coagulable solutions broadly, that is, the invention may be applied to the production of artificial threads from cellulose derivative compositions in an organic solvent which will be coagulable in the presence of heated gases or it may be applicable to the production of regenerated cellulose or cellulose derivative threads from solutions coagulable in a liquid coagulating bath.

In the production of artificial threads having a varying denier it is often desirable to form such threads with frequent and sharp variations in the denier so as to simulate certain materials, for example, pongee silk. In certain methods and apparatus proposed heretofore for the production of uneven denier yarns, the variation in denier was so slight and gradual that fabrics produced therefrom did not have the desired appearance.

It is therefore an object of the present invention to provide means for the production of artificial threads having an uneven denier in which the unevenness or irregularity of denier varies frequently and sharply.

It is a further object of the present invention to provide means for the production of uneven denier yarns which can be attached to conventional artificial yarn production mechanism without extensive change or modification of such mechanism.

It is another object of the present invention to provide a means for the production of uneven denier yarns by passing a coagulable thread-forming solution through a conduit to a spinning nozzle and intermittently interrupting the flow of said solution to said conduit.

Other objects of the invention will appear hereinafter.

The objects of the invention are achieved in general by placing a liquid flow regulating device in the pipeline between a liquid pressure pump and a spinning nozzle. This regulating device is comprised essentially of a body member having an inlet and an outlet opening therein, and having a movable liquid-obstructing member disposed within said body member and adapted to periodically shut off and turn on the flow of liquid to said body member between said inlet and outlet openings. This regulating device is preferably in the form of a large throttling valve having a plurality of openings through a rotatable valve plug.

The invention will be more clearly apparent by reference to the following detailed description taken in connection with the accompanying drawing, in which:

Fig. 1 is a diagrammatic elevational view of a regulating device interposed between a liquid pump and candle filter, with means for operating said regulating device;

Fig. 2 is a vertical sectional view through one form of regulating device constructed in accordance with the present invention;

Fig. 3 is a vertical sectional view through a modified form of regulating device;

Fig. 4 is a sectional plan view taken along the line 4—4 of Fig. 2;

Fig. 5 is an elevational view of the device shown in Fig. 3 with the body partially broken away along the line 5—5 of Fig. 3;

Fig. 6 is a sectional plan view along the line 6—6 of Fig. 3.

Referring to Fig. 1 of the drawing, reference numeral 11 designates a pipeline for the passing of a coagulable thread-forming solution to a liquid pressure pump 12. This pressure pump may be driven in any desired manner by means of pump drive shaft 13. The coagulable solution passing from the pump 12 is led through pipeline 15, pressure dome 17, pipeline 19, regulating device 21, pipeline 23, candle filter 25, pipeline 27 and thence to a spinning nozzle (not shown). The regulating device 21 having inlet and outlet openings connecting pipelines 19 and 23 respectively is provided with a revolving plug having a stem 29 which may be driven by means of bevel gears 30 and 31, which in turn may be driven by means of a motor 33 and gear-reduction mechanism 35. If desired, the stem 29 may be driven by the same driving means which is connected for driving the pump 12.

The regulating device indicated generally by reference character 21 and illustrated in Fig. 2 of the drawing, comprises a body member 40 having an inlet opening 42 and an outlet opening 44. Rotatably positioned within the body member 40 is a plug 46 which is provided with a plurality of radially extending openings 48, 49, 50, 51, 52, 53, 54 and 55. The plug may be rotated by means of the plug stem 56 in the manner described above. As the plug rotates, the various radially extending openings are consecutively placed in align-

ment with the inlet opening **42**. When one of the radially extending openings **48** to **55** is in alignment with the inlet opening **42** the cooperating oppositely radially extending opening will be in alignment with the outlet opening **44**. As will be noted by reference to Fig. 4 of the drawing, when opening **48** is in alignment with inlet opening **42**, opening **52** will be in alignment with outlet opening **44**, thus forming a continuous passage from the inlet to the outlet opening through the valve plug. The size and number of openings may be varied in any desired manner to produce the desired spacing between variations in denier and to provide any desired abruptness in the variation of denier.

In the modification shown in Fig. 3 of the drawing, the valve body **60** is provided with inlet opening **62** and outlet opening **64** in the same manner as above described with reference to Figs. 2 and 4 of the drawing. Body **60** is further provided with inlet and outlet grooves or chambers **70** and **72** respectively. Rotatably positioned within the interior of the body **60** is a plug **80** containing openings **82**, **83**, **84** and **85**, adapted to successively connect the inlet chamber **70** with the outlet chamber **72**. The plug **80** is adapted to be rotated in the same manner as above set forth with reference to plug **46** of Fig. 2.

In the production of artificial threads or filaments having a variation in denier by means of the above described mechanism, the viscose, or other coagulable thread-forming liquid is forced under pressure through pipe lines **15** and **19** and into the regulating device by means of the liquid pump **12**. As the plug (**46** or **80**) of the regulating device is rotated the inlet and outlet openings of the regulating device will be alternately connected and disconnected. When the inlet and outlet openings of the regulating device are connected the pressure from the pump **12** will force the thread-forming liquid through the regulating device and when the said openings are disconnected the flow will temporarily cease. The pressure dome **17** positioned between pipelines **15** and **19** will function to prevent the building up of an excessive pressure in the pipeline during the period when the flow of liquid through the regulating device is stopped. The flow of liquid through the candle filter and spinneret will consequently be of a pulsating, although of an alternating, nature. Obviously care must be taken in adjusting the timing of the regulating device to provide a constant although varying supply of viscose at the spinneret openings so as to obtain a continuous filament or thread. The thread is preferably drawn from the spinneret at a constant rate of speed. The thread or filament thus formed may vary greatly in denier along its length and may be made to contain nubs or lumps at intervals along the length of the thread. Alternatively, the thread may consist of alternate extended sections having a fine denier and a large denier, the junction between said sections consisting of comparatively abrupt variations.

The motor, or other means, for rotating the plug of the regulating device may be of the variable speed type so as to obtain variation in denier at irregular intervals along the length of the thread. Furthermore, the liquid pressure pump may be driven at a variable speed or the openings through the plug may be spaced irregularly, if desired, so as to further vary the irregularity in denier of the thread. The variation in denier of the thread and the spacing of the variations in denier along the length of the thread can be still further varied by varying the speed at which the thread or filament is drawn from the spinneret.

It will be obvious that many changes and modifications in the procedure and structure can be made in the specific details as described and illustrated. It will therefore be understood that the invention is not to be limited by the details of the above description except as set forth in the appended claim.

I claim:

In an apparatus for the production of artificial thread having an uneven denier, a liquid conduit, a liquid pump for passing a coagulable thread-forming solution through said conduit to a spinning nozzle, a regulating device in said conduit, said regulating device comprising a body member having inlet and outlet openings and cooperating inlet and outlet chambers, a plug member rotatably positioned in said body member between said inlet and outlet chambers, a plurality of openings spaced axially along said plug member, said openings in said plug member adapted to alternately connect said inlet and outlet chambers to form a continuous passage through said device, and means for rotating said plug member whereby to intermittently connect and disconnect said inlet and outlet openings.

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