

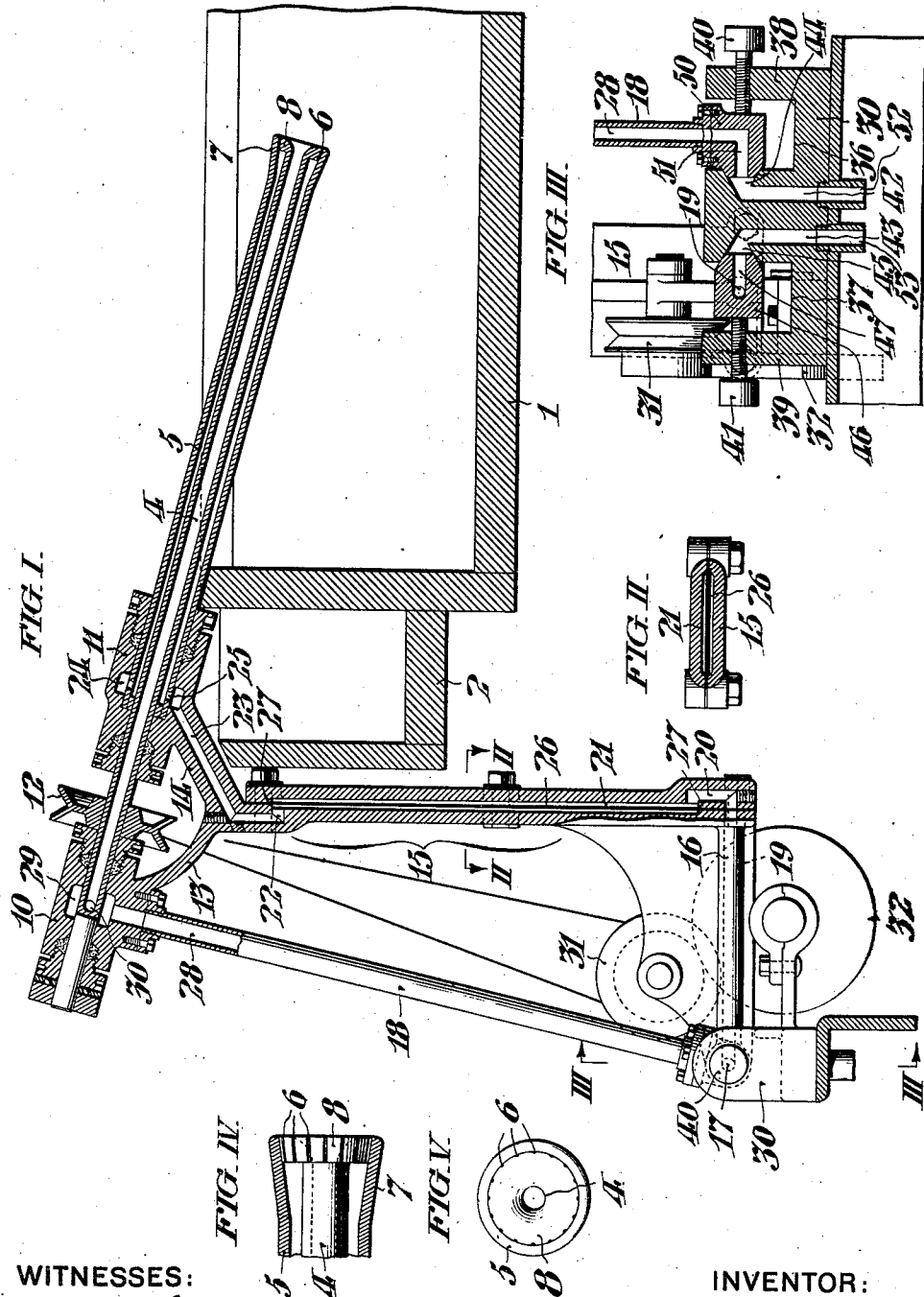
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M. WADDELL.

APPARATUS FOR FORMING FILAMENTS.

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UNITED STATES PATENT OFFICE.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, MONTGOMERY WADDELL, of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Apparatus for Forming Filaments, whereof the following is a specification, reference being had to the accompanying drawings.

My invention relates primarily to apparatus for the formation of filaments from viscose, and in describing it I shall refer to that material as the typical one for treatment.

In the drawings, Figure I represents a vertical longitudinal section through the spinning-tube and its standard, showing the adjacent end of the trough into which the filaments are delivered from the spinneret. Fig. II is a horizontal section through the standard, taken on the line II II in Fig. I. Fig. III is a fragmentary vertical section taken on the line III III of Fig. I. Figs. IV and V are detail views of the spinneret.

My improvements relate to an apparatus in which the spinneret is rotated during the discharge of the viscose into the coagulating or so-called "setting" solution, and in which the spinning-tube is also arranged to deliver the setting solution itself simultaneously with the discharge of the viscose filaments.

Referring to the drawings, 1 represents the setting-trough, which is provided with a drip-box 2 at the end adjacent to the spinning-tube, so as to receive any waste viscose which may exude when the spinneret is thrown out of its operating position. The spinning-tube is a double member formed of the inner tubular portion 4, which extends throughout the entire length, and the shorter concentric tubular portion 5 of larger diameter, a tight joint being formed between the outer surface of the tube 4 and the inner surface of the tube 5 at the rear extremity of the latter.

The tube 4 is the conduit for the setting solution, and the annular passage surrounding said tube and within the inner wall of the tube 5 is the conduit for the viscose.

The spinneret or discharging device for the viscose is preferably formed as follows: The orifice at the front end of the tube 5 is flared conically, as indicated at 7, and the inner tube 4 has an enlarged head 8, with a similarly-

coned periphery, which fits tightly within the flared opening of the tube 5. Fine longitudinal channels 6 are formed in the exterior of the coned portion of the inner tube 8, so that when the two tubes are fitted together the channels constitute passages for the discharge of the viscose. The spinneret thus comprises an annular series of minute apertures arranged about the orifice of the inner tube.

The rear extremity of the inner tube 4 is rotatively mounted in a bearing 10, and both the inner tube 4 and the exterior tube 5 at the region adjacent to the rear end of the latter are rotatively mounted in a bearing 11. The bearings 10 and 11 are supported on arms 13 and 14, which unite at the top of the vertical standard 15. Said standard is mounted at its lower end upon a base-piece 16, which is pivotally mounted upon a bracket 30 in a manner which will be hereafter explained. The base-piece 16, standard 15, and arm 14 are hollow and form a conduit for the admission of the viscose to the spinning-tube. The tubular channel 19 of the base-piece 16 communicates with a short vertical channel 20 in the lower extremity of the standard 15, and said channel 20 leads by a transverse offset into the elongated channel 21, which is of flattened and relatively wide cross-section, as shown in Fig. II, so as to afford a large interior area. Near the upper end of the standard 15 a return transverse offset 22 leads to a short vertical channel, which in turn communicates with the channel 23, formed in the arm 14. The channel 23 terminates in an annular duct 24, surrounding the outer tube 5, and holes 25 are formed in said tube at the region of the duct 24, so as to permit the viscose to flow into the annular passage formed by the tube 5.

A vertical diaphragm 26, of any suitable material such as is employed in the filtration of viscose, divides the vertical channel 21 longitudinally, said diaphragm being conveniently secured in position by passing through the shoulders 27, formed at the offsets, as shown clearly in Fig. I.

A supply-tube 18 for the setting solution extends from the bearing-piece 10 to a point opposite to the rear end of the base-piece 16. The interior channel 28 of said tube 18 leads to an annular duct 29, formed in the interior

of the bearing 10, and an orifice 30 is formed through the wall of the tube 4 in the region surrounded by said duct 29, so as to permit the ingress of the setting fluid supplied through the channel 28. Said channel 28 communicates with the source of supply for the setting solution, and the channel 19 of the base-piece 16 communicates with the source of supply of viscose.

The details of the respective connections are shown in Fig. III. The bracket 30 is deeply recessed in two places, as shown at 36 and 37, the outer walls 38 and 39 on the respective sides forming bearings for set-screws 40 and 41. Vertical channels 42 and 43 extend upwardly through the bottom of the bracket 30 and terminate in two lateral cone-shaped openings 44 and 45, leading into the respective recesses 36 and 37 opposite to the axes of the set-screws 40 and 41.

The rear extremity of the base-piece 16 is provided with a cylindrical plug 46, having a coned end, which fits snugly but freely in the correspondingly-coned orifice 45, and said plug has an axial channel 47 which communicates with the channel 19 of the base-piece 16.

The lateral extent of the recess 37 permits the insertion of the plug 46, so that it can be seated within the coned orifice 45, and the set-screw 41 being then adjusted the plug is maintained in position. The lower end of the pipe 18 is provided with a similar plug 50, whose coned end fits within the orifice 44, said plug having an axial channel 51, which communicates with the channel 28 of the pipe 18. Said plug is of the proper dimensions to permit of its insertion within the recess 36, and it is maintained in position by means of the set-screw 40. The plugs are coaxial, and their coned portions serve as bearings, so that the structure as a whole can oscillate about the axis 17. (See Fig. I.) Pipes 52 and 53 communicate, respectively, with the vertical channels 42 and 43, the pipe 52 leading from the source of supply of viscose and the pipe 53 leading from the source of supply of setting solution, neither of which sources is shown in the drawings.

A pulley 12 is mounted upon the exterior of the tube 4, and power is applied thereto from the driving-pulley 31, which is actuated by means of a frictional pulley 32. When the spinneret is in the position shown in Fig. I, (which corresponds with that of its operative discharge,) the driven member on the shaft of the pulley 32 is in frictional engagement with the driving member on the shaft of the pulley 31, so that the spinneret is continuously rotated. When, however, the standard is tilted backward about the axis 17, the frictional member is removed from contact with the pulley 32 and rotation ceases.

The conduits for the inner tube 4 and outer

tube 5 being respectively supplied with setting solutions and viscose, the latter is filtered and discharged in a plurality of fine filaments around the outer periphery of the spinneret, while the setting solution is also discharged within the annular group of filaments thus formed, so as to bring fresh solution into direct contact therewith on all sides, and thus insure a rapid setting action. The filaments issuing from the spinneret are twisted together as they pass through the setting-bath and then wound or coiled in the usual manner.

Having thus described my invention, I claim—

1. The combination of a rotatable inner delivery-tube; an outer delivery-tube surrounding the same and isolated therefrom but rotatable therewith; bearings for said tubes; actuating devices for rotating said tubes; a conduit communicating with the interior of the inner delivery-tube; a conduit of extended interior area communicating with the outer delivery-tube; and a filtering-diaphragm disposed in said extended conduit, substantially as set forth.

2. The combination of a rotatable inner delivery-tube; an outer delivery-tube surrounding the same and isolated therefrom but rotatable therewith; bearings for said tubes; actuating devices for rotating said tubes; a conduit communicating with the interior of the inner delivery-tube; a conduit of extended interior area communicating with the outer delivery-tube; said conduits leading to said tubes from a common region of pivotal attachment, substantially as set forth.

3. The combination of a rotatable inner delivery-tube; an outer delivery-tube surrounding the same and isolated therefrom but rotatable therewith; bearings for said tubes; actuating devices for rotating said tubes; a conduit communicating with the interior of the inner delivery-tube; a conduit of extended interior area communicating with the outer delivery-tube; said conduits leading to said tubes from a common region of pivotal attachment; frictional driving mechanisms arranged substantially as set forth, whereby the spinneret is rotated only in a position corresponding with its delivery of viscose to the setting solution, but is withdrawn from operative engagement with the mechanism when tilted away from said operative position.

4. In a spinneret, the combination of an outer delivery-tube having an internally-coned end portion; and an inner delivery-tube having a correspondingly-coned external end portion, provided with longitudinal channels, substantially as and for the purposes set forth.

5. The combination with a rotatable inner delivery-tube; of an outer delivery-tube sur-

rounding the same and isolated therefrom but rotatable therewith; bearings for said tubes; actuating devices for rotating said tubes; conduits communicating respectively with the interiors of said tubes; means whereby liquefied cellulose is supplied to the outer tube; and, means whereby a setting solution is supplied to the inner tube, substantially as set forth.

10 6. The combination with a rotatable inner delivery-tube; of an outer delivery-tube surrounding the same and isolated therefrom but rotatable therewith; bearings for said tubes; actuating devices for rotating said tubes; conduits communicating respectively with the interiors of said tubes; means whereby viscose is supplied to the outer tube; and, means whereby viscose setting solution is supplied to the inner tube, substantially as set forth.

20 7. The combination with an inner delivery-tube; of an outer delivery-tube surrounding the same but isolated therefrom;

conduits communicating respectively with the interiors of said tubes; and, liquid means 25 excluding the delivery ends of said tubes from the atmosphere, substantially as set forth.

8. The combination with a rotatable delivery-tube; of an outer delivery-tube surrounding the same and isolated therefrom, but rotatable therewith; bearings for said tubes; actuating devices for rotating said tubes; conduits communicating respectively with the interiors of said tubes; and, means 35 whereby the delivery ends of said tubes are submerged in a liquid, substantially as set forth.

In witness whereof I have hereunto signed my name, at Philadelphia, in the State of Pennsylvania, this 17th day of April, 1905. 40

MONTGOMERY WADDELL.

Witnesses:

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CLIFTON C. HALLOWELL.