

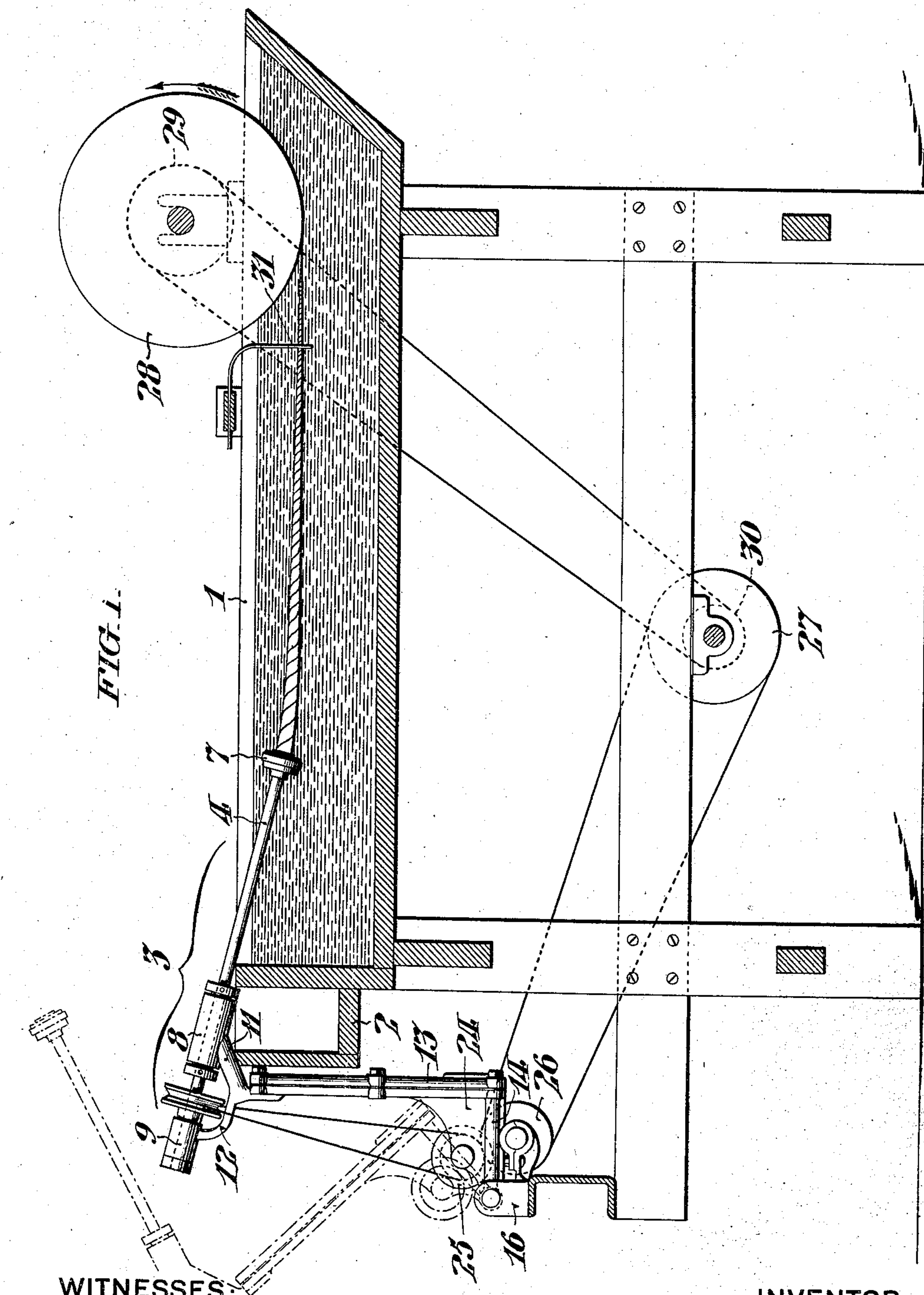
No. 849,870.

PATENTED APR. 9, 1907.

M. WADDELL.
APPARATUS FOR FORMING FILAMENTS.

APPLICATION FILED APR. 19, 1905.

3 SHEETS—SHEET 1.



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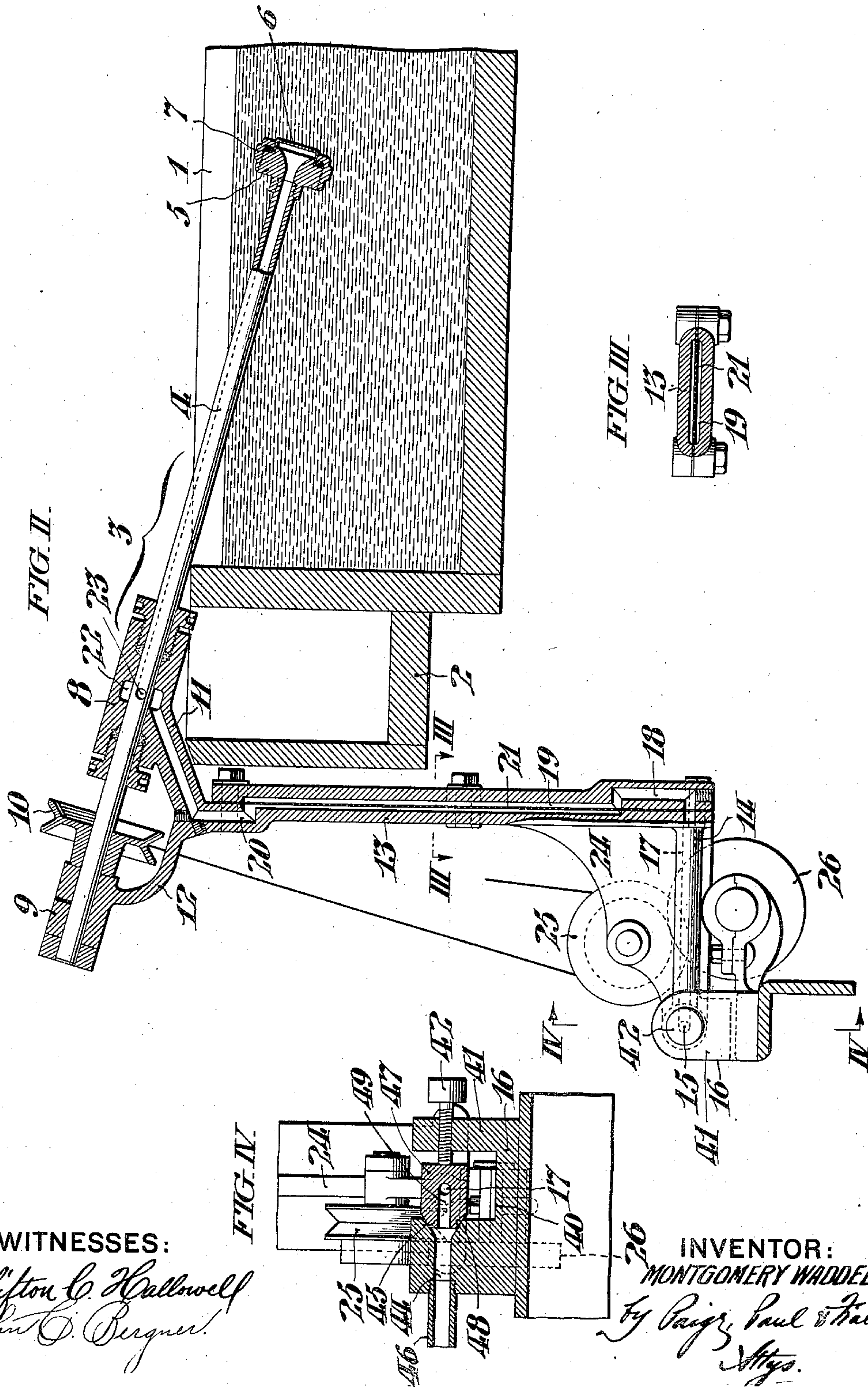
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3 SHEETS—SHEET 2.



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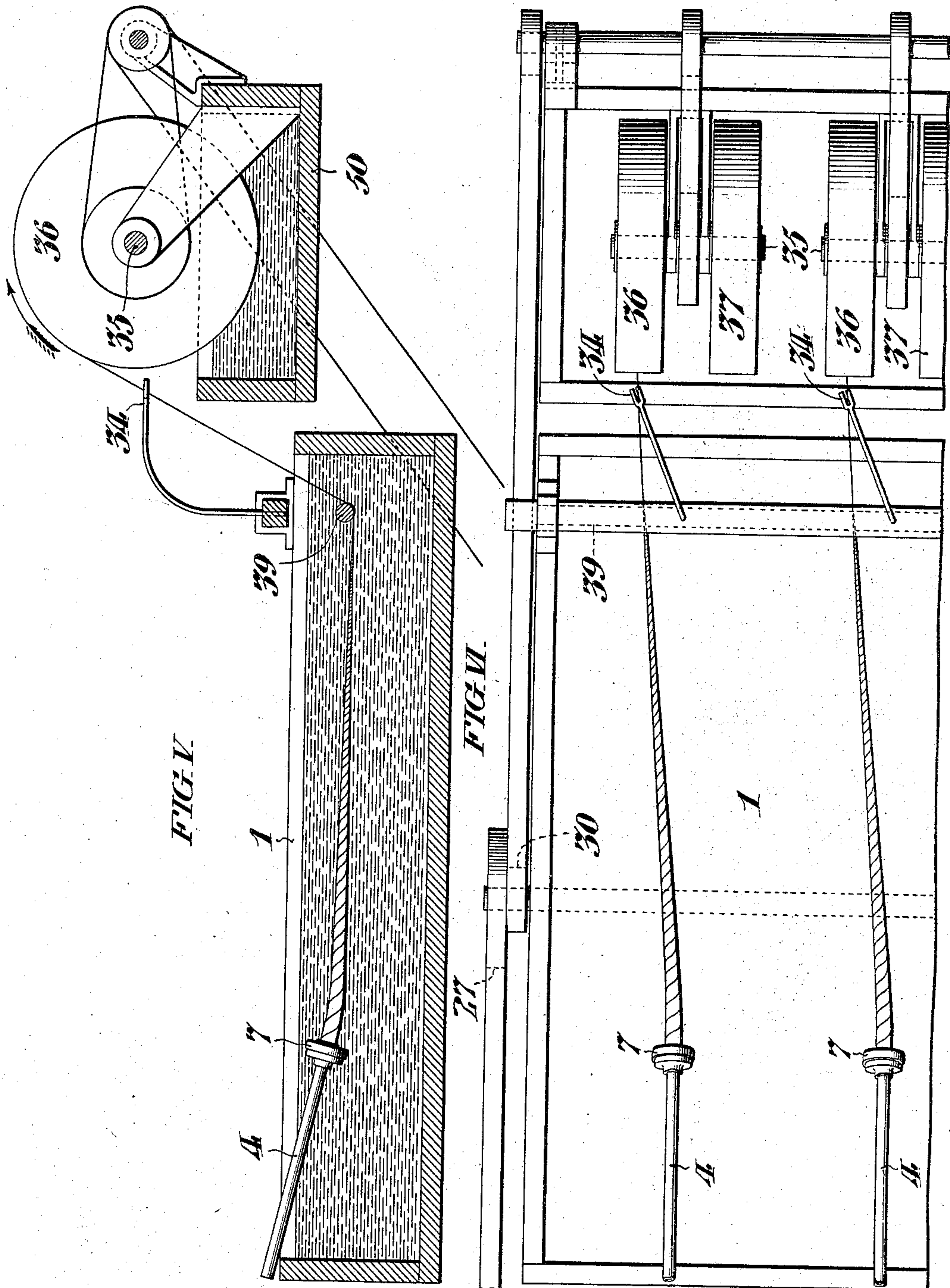
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UNITED STATES PATENT OFFICE.

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APPARATUS FOR FORMING FILAMENTS.

No. 849,870.

Specification of Letters Patent.

Patented April 9, 1907.

Application filed April 19, 1905. Serial No. 256,368.

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 forming 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 view, partly in longitudinal section through the spinning-trough and partly in side elevation of the spinning-tube and its standard, of an apparatus embodying my invention in one of its simpler forms where only a single trough is employed. Fig. II is an enlarged vertical longitudinal section through the spinning-tube and standard, showing in section the adjacent end of the trough. Fig. III is a transverse section through the standard on the line III III of Fig. II. Fig. IV is a fragmentary vertical section taken on the line IV IV of Fig. II. Fig. V is a longitudinal section through the spinning-troughs, in an amplified form, of apparatus where two troughs are employed, certain features, however, being equally applicable in the case of a single trough. Fig. VI is a plan view of the apparatus shown in Fig. V.

Most of the features of improvement relate to an apparatus in which the spinneret is rotated as it delivers the viscose to the coagulating or so-called "setting" solution in order to twist the individual filaments spirally together as they pass through the setting-bath and are coiled upon the winding spool or roller.

Referring to the simple type shown in Figs. I and II of the drawings, 1 represents the trough adapted to contain the setting solution, said trough being preferably provided with a drip-box 2 at the end adjacent to the spinning device 3, in which any escaping viscose can be received when the spinneret is turned out of its operative position. The spinning devices comprise an elongated tube 4, adapted to be projected in an inclined position into one end of the spinning-trough, said tube having an enlarged forward or discharge end 5, upon which the spinneret 6, containing numerous fine orifices, is secured

by means of a screw-cap 7. The tube 4 has secured to it a pulley 10 and is rotatively mounted in bearings 8 9, which are respectively supported by arms 11 and 12, which converge to a vertical standard 13. This standard 13, which constitutes both the support for the spinning-tube and the duct for supplying viscose thereto, is secured at its lower extremity to a horizontal base-piece 14, which is pivotally mounted at 15 upon the bracket 16. Both the base-piece 14 and the standard 13 are hollow, the standard being of flattened cross-section, as indicated in Fig. III. The channel 17 in the base-piece 14 leads to a vertical channel 18 in the lower portion of the standard 13; but at a short distance from the lower end thereof the channel has a transverse offset leading to an elongated vertical channel 19, which extends near the top of the standard 13. This channel 19 has a flat and relatively wide cross-section, as shown in the sectional view of Fig. III, so as to afford an extended interior surface. At the upper extremity of the channel 19 a second lateral offset leads to the channel 20, which continues upwardly through the arm 11 to an annular duct 22; formed in the bearings 8 and surrounding the exterior of the spinning-tube 4. An orifice 23 is formed in said tube at the region surrounded by the duct, so that the interior of the tube is in constant communication with the annular channel 22.

A filtering-diaphragm 21 of any material ordinarily employed for the filtration of viscose or similar substances is arranged vertically within the elongated flat channel 19 of the upright 13, being secured by passing through the shoulders formed by the offsets near the top and bottom, as clearly shown in Fig. II. It will be noted that by this disposition of the filtering-diaphragm in a relatively long and wide channel sufficient area is afforded to minimize the resistance due to filtration, thus permitting the travel of the viscose through the filtering-diaphragm without requiring excessive pressure. A web 24, which unites the standard 13 and horizontal base-piece 14, affords bearing for the flanged pulley 25, having a band which drives the pulley 10. The shaft of said pulley 25 is actuated by means of a friction-pulley 26, which in turn is driven from the main driving-pulley 27. (See Fig. I.) The winding

roller or spool 28, mounted above the setting-trough, is driven by means of a pulley 29 from a small pulley 30, axially connected with the driving-pulley 27. The horizontal channel 5 17 of the piece 14 communicates with the source of supply of viscose (not shown in the drawings) at a region coincident with the axis 15 of oscillatory movement of the standard 13 and its base-piece 14.

10 The details of the connections are shown in vertical section in Fig. IV. The bracket 16 is provided with a deep vertical slot 40, the wall 41 of which at one side affords bearing for a set-screw 42. The opposite wall 43 is 15 perforated with a channel 44, whose end adjacent to the slot is coned, as shown at 45. The other end of said channel is provided with a screw-threaded connection to receive the supply-tube 46, leading from the reservoir of 20 viscose. At the end of the base-piece 14 is a cylindrical plug 47, having a coned end 48, adapted to fit snugly and move freely in the correspondingly-coned orifice 45. An axial channel 49 is formed in the coned end of the 25 plug and extends upward to a point somewhat beyond the longitudinal center thereof, where it communicates with the channel 17 of the base-piece 14. The width of the slot 40 is such as to permit the plug 47 to be inserted therein and then slipped laterally into 30 position in the coned orifice 45, the parts being held in place by means of the set-screw 42. The arrangement permits the standard to be tilted back into the position indicated by the dotted lines in Fig. I, and when thus 35 tilted or drawn back the nozzle will be vertically above the drip-box 2, while of course the friction-disk by which the pulley 25 is driven will be removed from contact with its 40 driving-disk 26, so that the spinning-tube will cease to revolve. In the instance shown the necessary friction is afforded by the weight of the spinning-tube and its standard, but obviously modifications of this method 45 may be employed. The viscose supplied through the base-piece and standard after being filtered through the diaphragm 21 is led into the annular duct 22 and thence through the orifice 23 into the inclined tube 4, being 50 finally discharged through the spinneret 6 into the setting-bath, where it forms a group of fibers twisted together, which are led below the surface of the bath through the guide-fingers 31 to the take-up surface of the 55 spool 28. The spool 28 is of such diameter and so mounted with relation to the trough 1 as to at all times maintain some portion of the take-up surface beneath the level of the liquid in the trough, thus continually moistening the wound filament with the solution and protracting the action thereof as far as possible. This arrangement enhances uniformity and homogeneousness of the product.

In the arrangement shown in Figs. V and

VI it will be noted that two spinnerets are arranged to deliver into the same trough and also that a supplemental trough 50 is employed, which may contain a solution of 70 different character from the initial setting solution in the delivery-trough. In this instance the filaments are conducted beneath the guide-rod 39 and thence upward through the adjustably-mounted guide-fingers 34 to the periphery of the take-up spools 36 and 75 37. Two pairs of said spools are shown in Fig. VI, each spool being removably mounted upon the horizontal shaft 35, which is so arranged with reference to the trough 50 as to insure that some portion of the periphery of 80 the winding-spool shall at all times be below the level of the liquid in said trough. The guides 34 can be turned so as to deliver filaments to either the spool 36 or the spool 37, and this transfer can be made while the 85 spools are actually running, so that as soon as one spool is filled it can be removed independently of its fellow and an empty one substituted in its place. The process of spinning and winding may thus proceed continuously. 90

It will be noted that the inclined position of the spinning-tube permits the delivery of the filaments in a direction nearly horizontal, so that they can be drawn for a relatively long distance through the spinning-trough 95 without abrupt change of direction. This nearly horizontal direction of travel also affords opportunity for inspection of the filaments as they pass to the spool. Where, as in some instances, the filaments are delivered 100 vertically downward into the spinning solution these advantages are lacking, and hence one feature of my improvements consists in the described arrangement of the tube in an inclined position as distinguished 105 from a vertical one.

Having thus described my invention, I claim—

1. The combination of a rotatable spinning-tube and spinneret; an oscillatory 110 standard therefor; a main spinning-trough; and a drip-box adjacent to said main spinning-trough; whereby when the standard is oscillated to throw the spinneret out of its operative position, said spinneret will be 115 supported above said drip-box, substantially as set forth.

2. The combination with the rotatable spinning-tube and spinneret, and its oscillatory standard; of driving mechanism for 120 said spinning-tube, adapted to engage operatively when said standard is in one extreme position and to disengage when said standard is oscillated away from said position, substantially as set forth. 125

3. The combination with a spinning-trough; of a rotatable winding-spool, the radial projection of whose take-up surface extends below the top of the trough, within the latter; whereby, during rotation of said spool the 130

wound filaments are subjected to protracted exposure to the setting solution, substantially as set forth.

4. The combination with a spinning-trough; 5 of a rotatable spinning-tube having a spinneret adapted to be projected within said trough, the axis of said tube when in its operative position being inclined with relation to said trough, in combination with means 10 for maintaining the filament extending from said spinneret in a substantially horizontal position in said trough, substantially as set forth.

5. The combination of a rotatable spinning-tube and spinneret; a hollow standard 15 for said tube communicating with the interior of said tube; a filter arranged within said standard; and means for rotating the spinning-tube, mounted to oscillate with said 20 tube, substantially as set forth.

6. The combination of a rotatable spinning-tube and spinneret; an oscillatory standard arranged to support said tube; and 25 means for rotating said tube carried by said standard, substantially as set forth.

7. The combination with a spinning device and spinning-trough containing liquid; of a pair of independently removable winding-spools mounted upon a common shaft; means maintaining said spools with their 30 lower edges submerged in said liquid; and means for rotating said shaft, substantially as set forth.

8. The combination with a spinning device and spinning-trough containing liquid; of a 35 pair of independently-removable winding-spools mounted upon a common shaft; means maintaining said spools with their lower edges submerged in said liquid; and an adjustable guide adapted to deliver the fila- 40 ment to either of said spools, 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.

MONTGOMERY WADDELL.

Witnesses:

JAMES H. BELL,

CLIFTON C. HALLOWELL.