

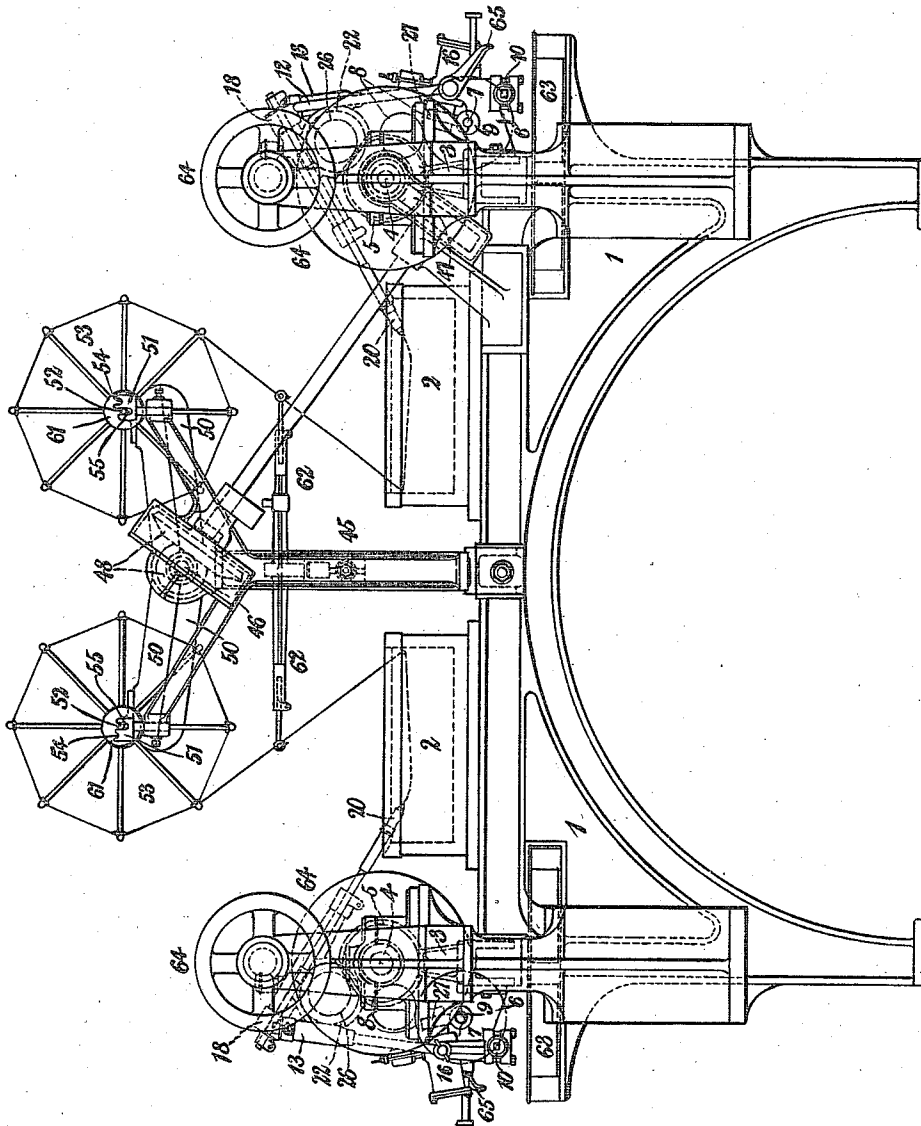
J. CLAYTON.
 APPARATUS FOR USE IN THE MANUFACTURE OF ARTIFICIAL SILK AND LIKE THREADS.
 APPLICATION FILED JUNE 7, 1909.

979,434.

Patented Dec. 27, 1910.

5 SHEETS—SHEET 1.

Fig. 1.



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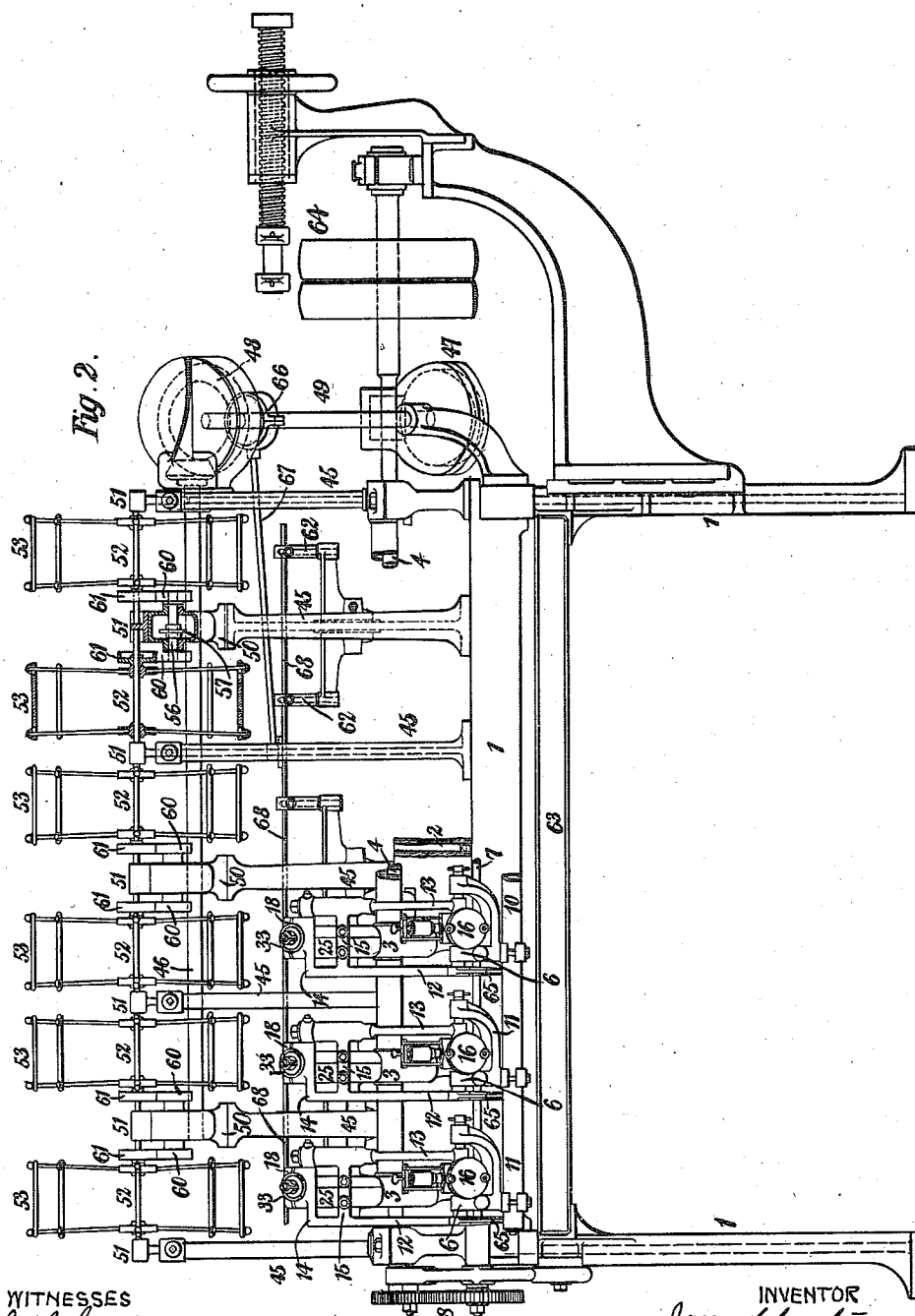


Fig. 2.

WITNESSES

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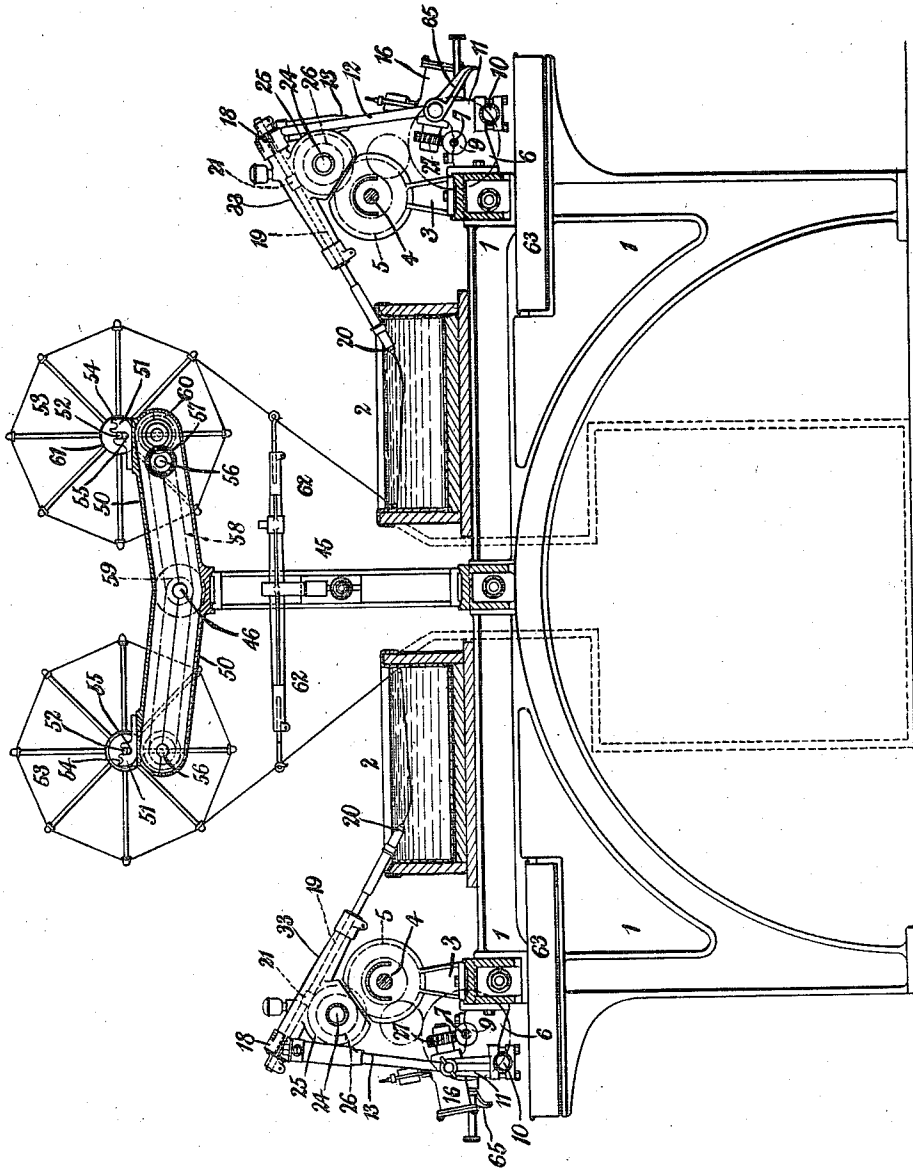
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5 SHEETS-SHEET 3.

Fig. 3.



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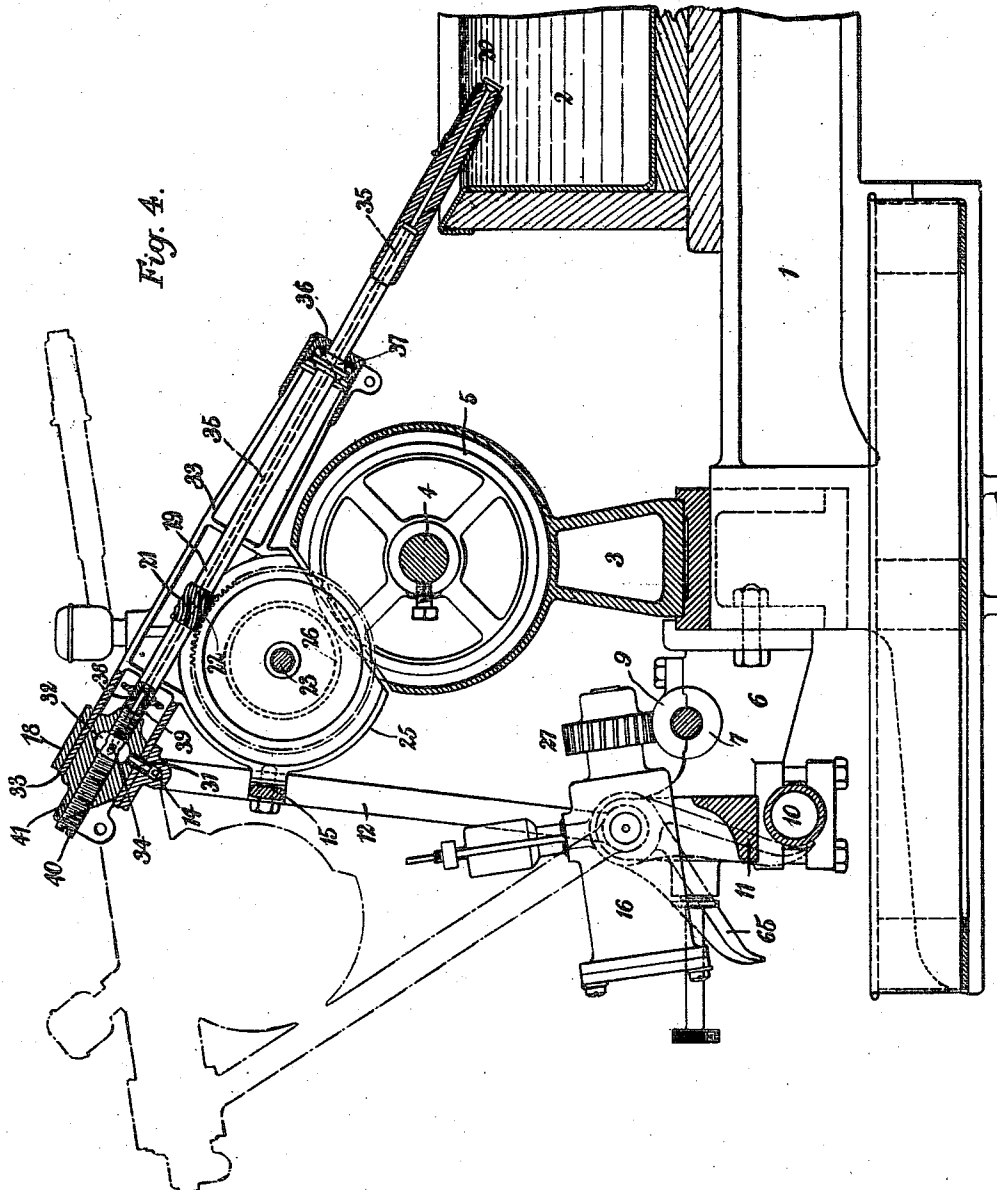
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5 SHEETS-SHEET 4.



WITNESSES

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5 SHEETS—SHEET 5.

Fig. 7.

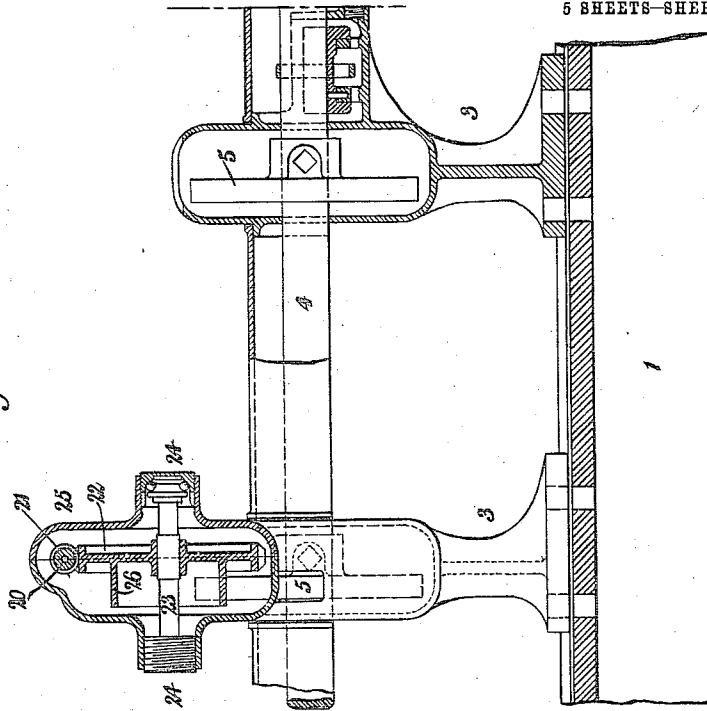


Fig. 6.

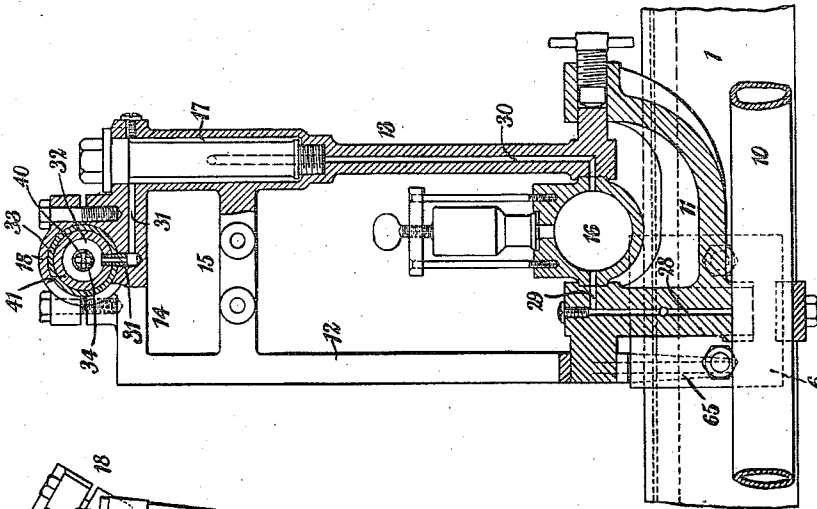
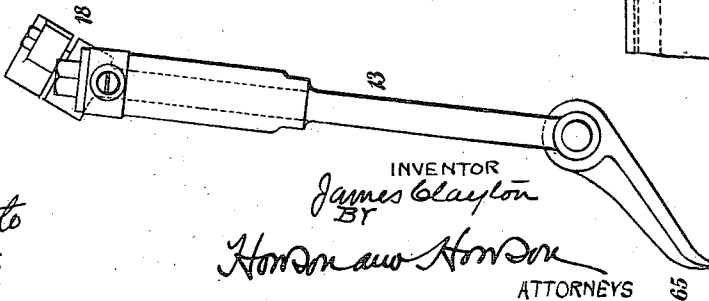


Fig. 5.



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UNITED STATES PATENT OFFICE.

JAMES CLAYTON, OF COVENTRY, ENGLAND, ASSIGNOR TO SAMUEL COURTAULD AND CO., LIMITED, OF LONDON, ENGLAND.

APPARATUS FOR USE IN THE MANUFACTURE OF ARTIFICIAL-SILK AND LIKE THREADS.

979,434.

Specification of Letters Patent.

Patented Dec. 27, 1910.

Application filed June 7, 1909. Serial No. 500,762.

To all whom it may concern:

Be it known that I, JAMES CLAYTON, of 12 Middleborough road, Coventry, in the county of Warwick, England, have invented new and useful Improvements in Apparatus for Use in the Manufacture of Artificial-Silk and Like Threads, of which the following is a specification.

This invention relates principally to apparatus whereby artificial silk, and like threads, are produced by precipitating matter, such as a viscous preparation of cellulose, such as viscose, (we will, for the purpose of description, refer to it as viscose), into a setting medium, or bath, through perforations in a nozzle to form a number of filaments which are twisted together to form a thread, and the object of this invention is to provide apparatus whereby the manufacture is effected in a more efficient, economical, and convenient, manner than hitherto and whereby the spinning, or twisting, of the filaments into thread is efficiently effected as the filaments issue from the orifices in the forming nozzle into the setting medium, or bath. Attempts have before been made to effect the spinning, or twisting, of filaments of viscose as they issue from the forming nozzle, but the means hitherto devised for the purpose have not been suitable for practical application and have not been successful. It is necessary, in the apparatus to which this invention relates, that rapid rotation shall be imparted to the hollow stem, or spindle, carrying the nozzle by positive gearing driving the hollow stem, or spindle, at some portion of its length between the two ends, and that the viscose shall be supplied at the end opposite to that at which the nozzle is fixed.

According to this invention, the stem, or spindle, is carried on a swinging frame, capable of being turned in a bracket secured to the viscose supply pipe, so as to bring the nozzle into convenient position for inspection, or other purpose, and at the same time put out of gear the wheels which transmit motion to drive the stem, or spindle. The pump is also so mounted on the said frame that it can be swung thereon to disengage the gear which drives it and so stop the action of the pump when desired independently of the swinging of the said frame, so that, while the frame can be swung to

put the stem, or spindle, in and out of gear without affecting the driving of the pump, when desired both can be put into and out of gear simultaneously. The said frame carries the filter and the various parts are perforated for the passage of the viscose from the viscose pipe to the pump and from the pump through the filter and frame to the stem, or spindle, and thence to the nozzle. The thread which is formed by the spinning, or twisting, of the filaments, by the rotation of the stem, or spindle, and nozzle, is led over suitable guides to a winding reel, or the equivalent, provided with means for driving it and preferably also with means for laying the thread as it is wound, and the said reel, or the equivalent, is mounted so that it can, by any suitable device, be put out of gear with the driving means and removed and replaced by another reel, or the equivalent, as required. The driving means for the pump, the stem, or spindle, and the reel, are geared together so that they have the required relative speeds, which can be altered if desired by change wheels. The arrangement is preferably such as to include a number of devices as described, arranged in two rows back to back.

The following is a description (with reference to the accompanying drawings) of a construction and arrangement of apparatus in accordance with this invention, but the invention is not limited to the precise details hereinafter described.

Figure 1 is an end elevation, Fig. 2 a side elevation (with some of the pumps and adjuncts removed), and Fig. 3 a transverse section, of the apparatus. Fig. 4 is a section of one of the rotatable nozzles and its stem, or spindle, and means for supplying viscose thereto, and of one of the pumps and the driving gear in connection with the said pump and stem, or spindle. This and the following figures are drawn to a larger scale. Fig. 5 is an end view of the frame carrying the pump and stem, or spindle, and Fig. 6 is a section showing a pump and stem, or spindle, in position in such frame and the supporting bracket. Fig. 7 is a longitudinal section showing the gear by which the stems, or spindles, are driven.

The arrangement illustrated shows two baths with six arrangements of nozzles and pumps in connection with each. but it is

to be understood that one bath, or any number of baths, and one pump and nozzle, or any number of pumps and nozzles, can be used with each bath.

5 On a suitable framework 1, are carried two setting baths 2, parallel with each other, and outward of these baths are standards 3, for a driving shaft 4, each shaft 4 carrying friction wheels 5, one for driving each stem, 10 or spindle, of the squirting nozzles, as hereinafter described. Below this shaft 4 and its standards project brackets 6 carrying a pump-driving shaft 7, geared at the end, preferably by change gear 8 (see Fig. 1) to 15 the driving shaft 4. On this pump-driving shaft 7 are worms 9, one for each pump. A pipe 10 for the supply of viscose runs along each side of the machine, and to each of these pipes 10, opposite each of the worms 9, 20 on the pump-driving shaft 7, are fixed continuations 11 of the bracket 6, these continuations having bearings by which a frame is carried, as shown clearly in Fig. 6, the said frame preferably consisting of two 25 arms, 12 and 13, and two cross-pieces 14 and 15. The said frame can be swung on, or in, the said bearings as centers. In bearings, respectively in one of the said arms (that marked 13) and in the bracket 11, secured 30 to the viscose supply pipe 10, is carried the pump 16, so that it can be swung in these bearings as centers. The arms 13 each carry a filter 17. The upper cross-piece 14, between the arms 12 and 13, carries, in a 35 clamp 18, one end of the casing 33, with a bearing for one end of the stem, or spindle, 19, terminating in the nozzle 20, through which the viscose is squirted into the bath. The stem, or spindle, 19 of the nozzle 20 40 carries around it, preferably near the mid-part of its length, a quick-threaded worm 21, which engages with a worm-wheel 22, carried on a spindle 23, mounted in bearings 24 (preferably ball bearings) carried by a 45 casing 25, which is secured to the lower cross-piece between the aforesaid arms 12 and 13. The said worm-wheel 22 has formed on, or fixed to, it a friction wheel 26 which, when the frame is swung toward 50 the bath, bears against the corresponding friction wheel 5, carried by the driving shaft 4. When the pump 16 is swung toward the bath, the worm-wheel 27 of the pump engages with one of the worms 9 carried by the pump-driving shaft 7, and then 55 viscose is pumped from the viscose pipe 10, through a perforation in the said pipe and through a perforation 28 (Fig. 6) in the bracket 11, which carries the aforesaid 60 frame, through the perforations 29, to the pump 16, and therefrom through a perforation 30 in one of the arms and through the filter 17, and therefrom through a perforation 31 in the upper cross-piece 14 of 65 the frame into a chamber 32 in a piece 41

in the casing 33 which piece carries the adjustable bearing for one end of the stem, or spindle, of the nozzle, and thence by the lateral perforations 34, in the said bearing of the stem, or spindle, into the longitudinal 70 perforation 35 in the stem, or spindle, which thus communicates at one end with the said chamber 32, and, at the other end, with the nozzle 20. The stem, or spindle, 19 which carries the nozzle may be carried in bearings 75 in its casing in any suitable way, for example, as shown in Fig. 4, the end of the casing nearest the nozzle 20 may have a ball-seating 36, secured to it, and another ball-seating 37 secured to the stem, or spindle, 19, antifriction balls being interposed 80 between these seatings, and the end of the stem, or spindle, 19, at which the viscose enters may be made with a conical seating 38, into which enters a correspondingly 85 coned end 39 of a screw 40, perforated to a sufficient extent to form a continuation of the perforation 35, in the stem, or spindle, to the chamber 32, through the transverse perforations 34, the said screw 40 being screwed 90 through the piece 41 in the end of the casing 33 of the stem, or spindle, so that the bearing can be readily adjusted.

Between, and above, the baths 2 the framework of the machine carries standards 45 95 with bearings in which a reel-driving shaft 46 is mounted, this shaft 46 being driven by gearing 47 and 48 (connected by the inclined shaft 49) from one of the driving shafts 4 from which one series of the rotary 100 nozzles and stems, or spindles, and pumps derive motion as aforesaid. Extending outward from each side of the upper end of each of the standards 45, which support the reel-driving shaft 46, is a transverse extension 105 50, the outer end of each extension carrying open-topped bearings 51, for the axes 52 of the reels 53, there being preferably two sets of bearings for each reel, one set (54) at a higher level than the other set 110 (55) so that, when the axes 52 of the reel 53 are in the lower bearings 55, the reels are driven, and when the said axes are in the upper bearings 54, the reels are out of driving connection with the driving gear, and 115 remain stationary. The driving is effected by making the extensions from alternate standards 45 in the form of hollow casings, as shown in Fig. 3, and carrying a short spindle 16 at the outer end of each such 120 casing. Secured to this spindle 56, inside the casing, is a chain-wheel 57, driven by a chain 58 from a chain-wheel 59 of a series of such wheels on the shaft carried by the standards as aforesaid. The ends of the 125 said short spindle which project from the casing each carry a friction, or gear, wheel 60 driving two adjacent reels by contact, or engagement, with friction, or gear, wheels 130 61 on the axes of the said reels. The driving

of the reels at one side is effected through an intermediate wheel so that the reels on the respective sides rotate in opposite directions.

5 Any suitable thread-layers (such as those shown at 62) may be operated in proximity with each reel for properly laying the thread being wound thereon. The thread layers 62 are shown as being caused to swing
10 by means of an eccentric 66 on the inclined shaft 49, the said eccentric being connected by a strap and rod 67 to a bar 68 to which the said thread-layers 62 are connected in any suitable manner.

15 The arrangement described for winding directly onto reels may be varied, for instance the thread may be wound onto bobbins driven as described with regard to the reels, or the thread may be coiled in suitable
20 receptacles, by a coiling arrangement, or be otherwise dealt with to prepare it for subsequent treatment.

The various parts which it is desirable to protect from acid and to shield so as to
25 avoid danger of accident to operatives may be inclosed in any suitable casings, either as indicated in the drawings, or in any other suitable manner, and open where necessary to allow gearing to engage.

30 Trays may be arranged in any suitable position (as at 63 for instance) to catch any viscose which may drop from the nozzles, or be expelled therefrom, when they are out of the bath, and in getting the
35 devices into working order before the nozzles are introduced into the bath.

At 64 are shown the fast and loose pulleys and band-shifting arrangements for starting and stopping the apparatus at each side.

40 65 are stops for preventing the frames turning too far and for supporting them when the nozzles are raised from the baths.

The invention may be applied to one, or any required number, of squirting nozzles,
45 baths, pumps, and reels, in series, arranged in any convenient positions.

What I claim is:—

1. In apparatus for the purpose described, a frame having a pivoted upright
50 channelled to convey the solution of viscose or the like, a hollow stem carried by said frame, a perforated bearing piece opening into said hollow stem through a coned end bearing, a carrier for said bearing piece
55 mounted on said frame and through which said bearing piece is threaded and having a channel communicating with said upright at one end and with the passage through said bearing piece at the other end,
60 in combination with means for rapidly rotating said stem, the operation of said means being determined by the position of said pivoted frame, substantially as described.

2. In apparatus for use in the manu-
65 facture of artificial silk and like threads

by projecting matter through perforations in a rotatable nozzle carried by a hollow stem, or spindle, provided with means whereby it is driven at some portions
70 of its length between its ends, and means for introducing the said matter at the end of the said stem, or spindle, opposite to that at which the nozzle is fixed, mounting the
75 rotatable hollow stem, or spindle, on a swinging frame and arranging the gearing by which the stem, or spindle, is rotated, so that the nozzle can be swung into position for use, or into convenient position for
80 inspection, or other purpose, while at the same time the said gearing is engaged and disengaged by the movement of the swinging frame, in combination with a pump
85 driven by gear in connection with the gear which drives the rotatable hollow stem, or spindle, of the nozzle, the said pump being
85 mounted on centers within the frame carrying the said rotatable hollow stem, or spindle, and coincident with the centers on which the said frame turns, and the gear-
90 ing being arranged so that the said frame can be swung to bring the stem, or spindle, into and out of connection with the driving gear independently of the pump, sub-
stantially as hereinbefore described.

3. In apparatus for the purpose described
95 for use in the manufacture of artificial silk and like threads by projecting matter through perforations in a rotatable nozzle carried by a hollow stem, or spindle, provided with
100 means whereby it is driven at some portions of its length between its ends, and means for introducing the said matter at the end of the said stem, or spindle, oppo-
105 site to that at which the nozzle, is fixed; mounting the rotatable hollow stem, or spindle, on a swinging frame and arranging the gearing by which the stem or spindle is rotated, so that the nozzle can be swung
110 into position for use, or into convenient position for inspection, or other purpose, while at the same time the said gearing is engaged and disengaged by the movement
115 of the swinging frame, in combination with a pump carried by said frame for supplying viscose to said hollow stem and means for driving the said pump.

4. For the aforesaid purpose, the combination of a hollow stem, or spindle,
120 mounted on a swinging frame, gearing, by which the said stem, or spindle, is rotated, so arranged that the said gear is put into and out of operating connection by turning the swinging frame on its axis, a pump
125 driven by gear in connection with the gear which drives the aforesaid hollow stem, or spindle, so that the frame can be turned to put the stem, or spindle, out of, and into, driving engagement independently of the pump, and a winding reel, or the equivalent,
130 and means for driving it at a speed in

proper relation to the speed of the stem, or spindle, and pump, and for stopping it when required, substantially as hereinbefore described.

- 5 5. For the aforesaid purpose, the combination of a precipitating vessel, or precipitating vessels, series of swinging frames and driving means running along in proximity thereto, each frame carrying a rotatable
10 stem, or spindle, provided with gear and arranged so that it can be engaged with, and disengaged from, the driving means by swinging the said frame, a pump carried on the same center line as that of each
15 swinging frame and provided with gear arranged so that the stems, or spindles, and pumps can be swung into and out of gear

with the driving means independently of each other, and series of reels arranged in double line and driven in pairs by gear 20 which will drive the reels at the proper speed relatively to the speeds of the stems, or spindles, and pumps, and allow of the driving of either reel being discontinued when desired, all substantially as hereinbe- 25 fore described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES CLAYTON.

Witnesses:

FREDERICK THOMAS WOOD,
GEORGE KELMAN.