

No. 702,382.

Patented June 10, 1902.

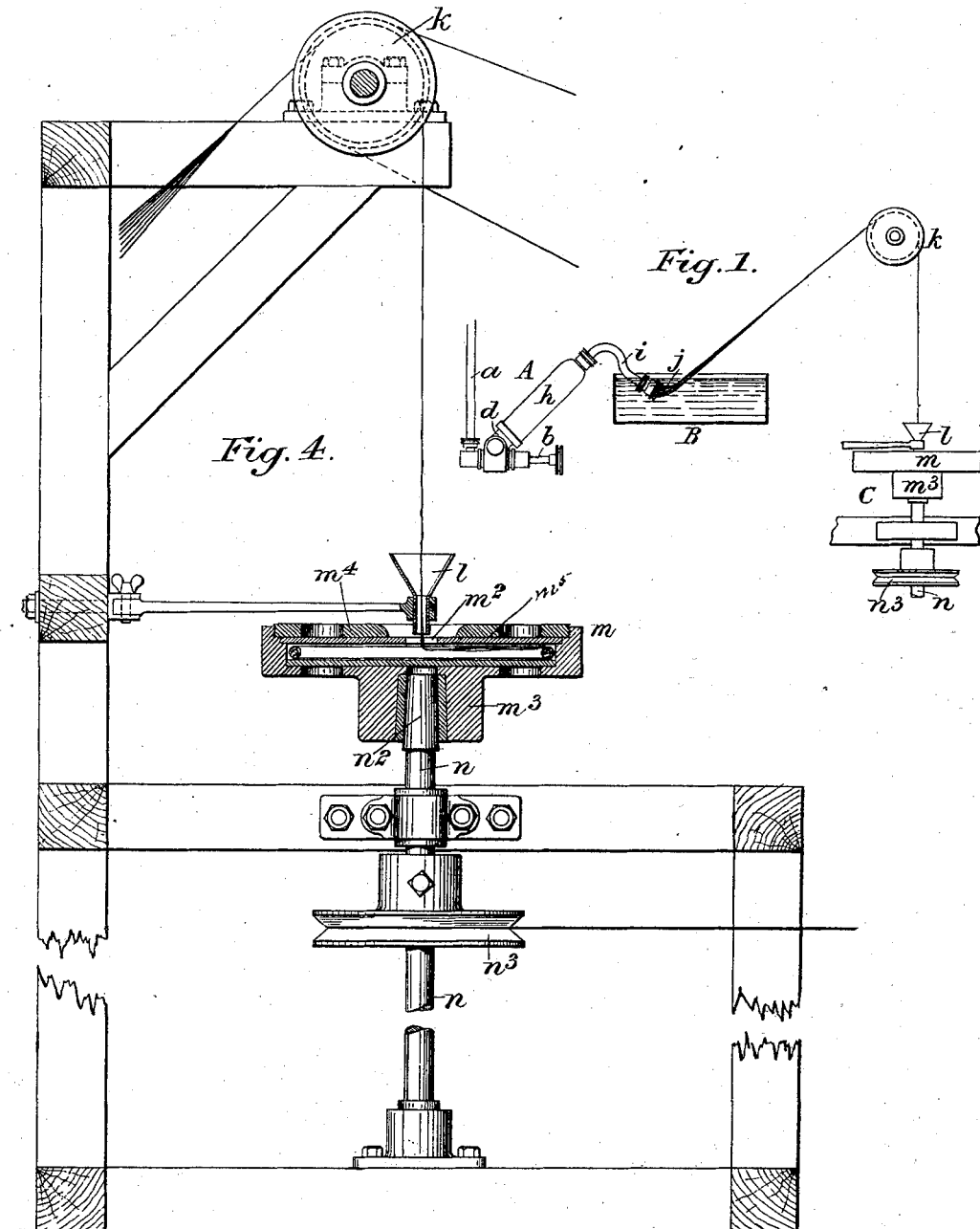
C. F. TOPHAM.

APPARATUS FOR USE IN THE PRODUCTION OF TEXTILE FIBERS OR FILAMENTS FROM SOLUTIONS OF CELLULOSE, OR OF OTHER MATERIAL FROM WHICH FIBERS OR FILAMENTS CAN BE FORMED, AND FOR TWISTING AND PUTTING INTO COIL FORM SUCH OR OTHER FIBERS OR FILAMENTS.

(Application filed Jan. 15, 1901.)

(No Model.)

2 Sheets—Sheet 1.



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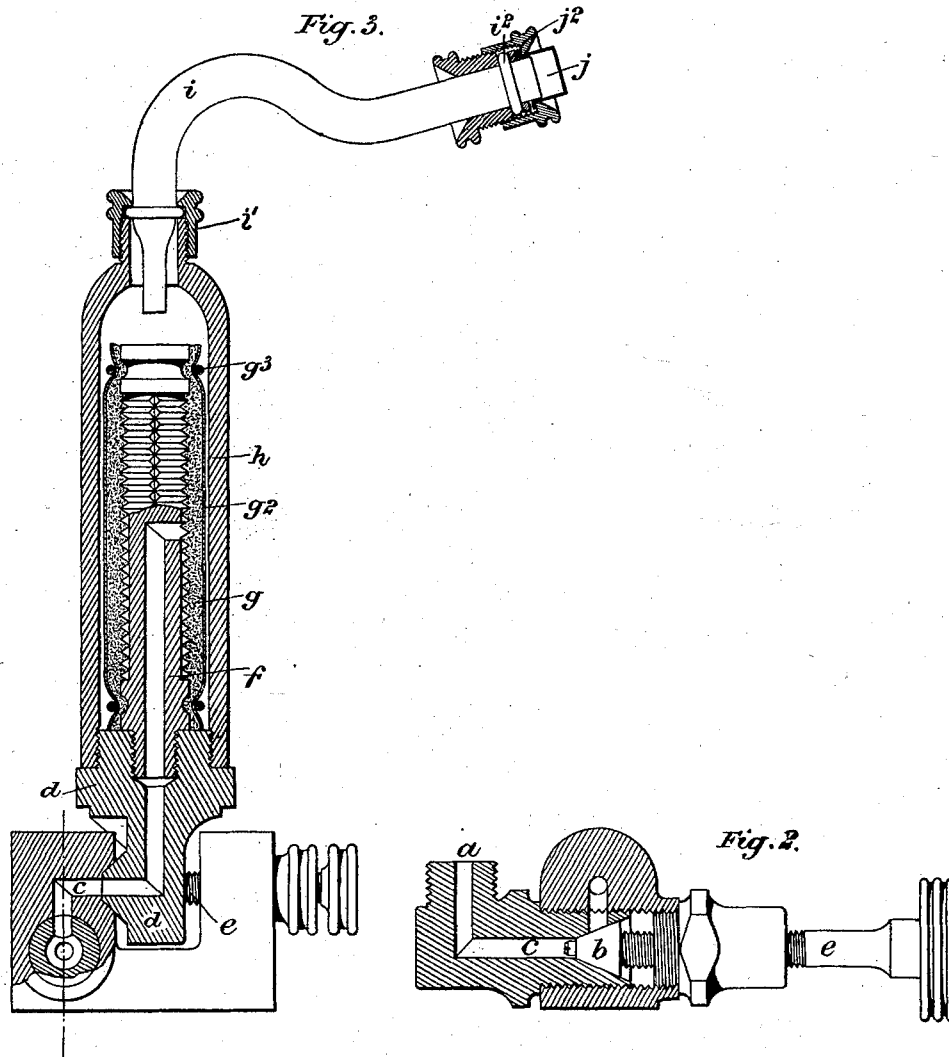
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(Application filed Jan. 15, 1901.)

(No Model.)

2 Sheets—Sheet 2.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR USE IN THE PRODUCTION OF TEXTILE FIBERS OR FILAMENTS FROM SOLUTIONS OF CELLULOSE, OR OF OTHER MATERIAL FROM WHICH FIBERS OR FILAMENTS CAN BE FORMED, AND FOR TWISTING AND PUTTING INTO COIL FORM SUCH OR OTHER FIBERS OR FILAMENTS.

SPECIFICATION forming part of Letters Patent No. 702,382, dated June 10, 1902.

Application filed January 15, 1901. Serial No. 43,419. (No model.)

To all whom it may concern:

Be it known that I, CHARLES FRED TOPHAM, a subject of the Queen of Great Britain and Ireland, and a resident of Sandycombe Road, Kew Gardens, in the county of Surrey, England, have invented certain new and useful Improvements in Apparatus for Use in the Production of Textile Fibers or Filaments from Solutions of Cellulose or of other Material from which Fibers or Filaments can be Formed and for Twisting and Putting into Coil Form such or other Fibers or Filaments, which invention is fully set forth in the following specification.

This invention relates to apparatus whereby fibers or filaments are formed from solutions of cellulose or of other material by forcing the solution through small orifices and in means whereby the said fibers or filaments are twisted and formed into compact coils.

Figure 1 of the accompanying drawings represents the general arrangement of the complete apparatus. The apparatus whereby the fibers or filaments are formed from the solution is illustrated in detail in sections at right angles to each other in Figs. 2 and 3, the nozzle-tube in Fig. 3 being shown turned around at about right angles to its normal position, so as to enable its section to be shown in the same figure with the other parts.

The apparatus whereby fibers or filaments are twisted and formed into compact coils is illustrated in sectional elevation in Fig. 4.

Referring to Fig. 1, A is the apparatus shown in Figs. 2 and 3. B is the vessel containing the setting solution, from which the fibers or filaments pass to the apparatus C, which is that shown in detail in Fig. 4.

Referring to Figs. 2 and 3, the solution is fed from the source of supply (not shown) through the passage *a*, controlled by the valve *b* by the opening *c* in the pivot of the plug *d*, which can be turned upon the said pivot, which is pressed to its seat by a screw *e*. The opening *c* communicates with a passage through the plug *d*, which in turn communicates with a longitudinal passage extending partly through a plug *f*, from which longi-

tudinal passage a side passage or side passages opens or opens at the exterior of the plug *f*, which is grooved, preferably with longitudinal and transverse grooves, and is covered by a filtering medium, which may consist of cotton-wool *g*, bound around with a fabric *g*² and secured by cords at *g*³. The plug *f* is inclosed in the outer cap or cover *h*, which is screwed at one end onto the plug *d* and at the other end carries a tube *i*, whose inner reduced end projects to some little distance into the outer cap *h*, so as to form an air space or chamber around this inwardly-projecting reduced end. The other end of the tube *i* carries the forming-nozzle *j*, having in it the orifices through which the solution is forced into the setting solution. The forming-nozzle *j* is preferably made of platinum or the like and is secured by a screw-cap which forces the flange *j*² of the part *j* against a packing-ring, which bears against a bead *i*³ on the tube *i*. The solution is very efficiently filtered by the very extended filtering-surface provided outside the plug *f* and enters the outer part *h* in a thoroughly filtered condition, any air which may be present being prevented from finding its way to the nozzle (and thus form bubbles in the solution) by reason of the said air being received in the air space or chamber formed around the inwardly-projecting reduced end of the tube *i*, from which chamber the said air can be allowed to escape by unscrewing the cap *i* by which the tube *i* is secured in place or otherwise opening the said chamber. The fibers or filaments which have passed through the setting solution in the vessel B and to be twisted together are united by adhesion or by passing through a guide, and thence are passed over a wheel or roller, as indicated at *k*, and the ends are introduced through the funnel *l* and central opening *m*² of plate *m*⁵ into a box *m*, which is rotated at a high speed, and the fibers or filaments as they are fed thereinto by the roller *k* are twisted together and then by the action of centrifugal force inside the box *m* are caused to form a compact coil around the interior of the box, which coil can be removed from the box and

be formed into hanks or skeins or be otherwise manipulated, as may be desired. A centrally-apertured cover m^4 , screw-threaded into the upper end of box m over plate m^5 , 5 holds the latter in place. The rapid rotation of the box m necessary to produce the proper centrifugal action also produces a strong upward air-current, whirling out at the top of the box. Unless means were provided for 10 preventing it the strands of cellulose laid around the inner periphery of the box by centrifugal action would be carried upwardly by this air-blast and the coiling-operation seriously disturbed and impaired. In the apparatus herein shown and described this difficulty is avoided and upward movement and 15 disturbance of the cellulose strands prevented by the plate m^5 , (which may properly be regarded as a part of the cover;) but any suitable form and length of projection or projections, flange, cover, or overhang, extending inwardly toward the central opening or space through which the fibers or filaments pass into the box and located above the space in 25 which the coils are laid by the centrifugal action, may be employed. The box m is mounted so that it can be easily removed and replaced, for which purpose its hollow boss m^8 may be carried by the coned top n^2 of a shaft n , provided with the pulley n^3 , by which it is driven. Cover m^4 and plate m^5 can be removed for the withdrawal of the coil of fibers or filaments when formed, an empty box being meantime put in its place on the 35 machine. Of course a number of such boxes and adjuncts and filament or fiber forming devices can be used in one apparatus, and the twisting and coil-forming parts be geared together, so as to be all operated simultaneously. 40

The roller k is preferably driven by gear provided with a two-speed clutch arrangement, so that it can be driven slowly at first, when the ends of the fibers or filaments are first introduced into the box, and then afterward, 45 during normal work, be driven at a higher speed. The relative speeds of the roller k and box m will determine the amount of twist which is given to the fibers or filaments.

50 The method of giving twist to fibers or filaments and of forming them into compact coils may of course be applied to other fibers or filaments than those described and whether natural or artificial.

55 The herein-disclosed process of forming filaments from cellulose, twisting a plurality of such filaments together into a strand by rotation, and forming said strand into coils by centrifugal force due to rotation is claimed 60 in my divisional application, filed April 5, 1902, Serial No. 101,500.

Having now particularly described and ascertained the nature of this invention and in what manner the same is to be performed, I declare that what I claim is— 65

1. In apparatus for forming fibers, or filaments, from solutions of cellulose, or other material, a plug having a passage extending therethrough communicating with grooves in its external surface, a filtering medium covering 70 the plug, a cap or inclosing casing for the plug, and a forming-nozzle connected to the discharge-opening of said casing.

2. In apparatus of the kind described, a nozzle-pipe, a perforated cup-like forming-nozzle having a flange for removably connecting it to the nozzle-pipe. 75

3. In apparatus of the kind described, a filter and its inclosing cap or casing, a nozzle-tube projecting into said cap or casing so as 80 to leave an air-space about its inwardly-projecting end, and a forming-nozzle on the nozzle-tube.

4. In apparatus of the kind described, a filter, an inclosing casing therefor adapted to be 85 turned about a center, a supply-passage leading into the casing, a nozzle-pipe projecting at one end into the casing, the dimensions of said inwardly-projecting end being less than 90 the internal dimensions of the casing so as to form an air-space about the same, means for allowing the air to be expelled from said space, and a perforated cap-piece or nozzle at the discharge end of the nozzle-pipe.

5. In apparatus for coiling filaments, the 95 combination with a rotatable box having an inwardly-extending projection or overhang about an opening through which the filaments are introduced at the top of the box, means for rotating the box, and means for introducing 100 the filaments through said opening.

6. In an apparatus for coiling filaments, the combination of a filter, a perforated nozzle arranged in close proximity to said filter, a 105 rotatable box provided with a cover having a central aperture therein, means for rotating said box, and means for introducing the filaments through said aperture, substantially as described.

7. In an apparatus for coiling filaments, the 110 combination of a rotatable vessel having a reduced opening in its upper portion, means for rotating said vessel, and means for introducing the filaments through said opening, 115 substantially as described.

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

CHARLES FRED TOPHAM.

Witnesses:

PERCY READ. GOLDRING.

JOHN EDWARD NEWTON.