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H. E. A. VITTENET.

APPARATUS FOR THE MANUFACTURE OF ARTIFICIAL SILK.

APPLICATION FILED JULY 7, 1906.

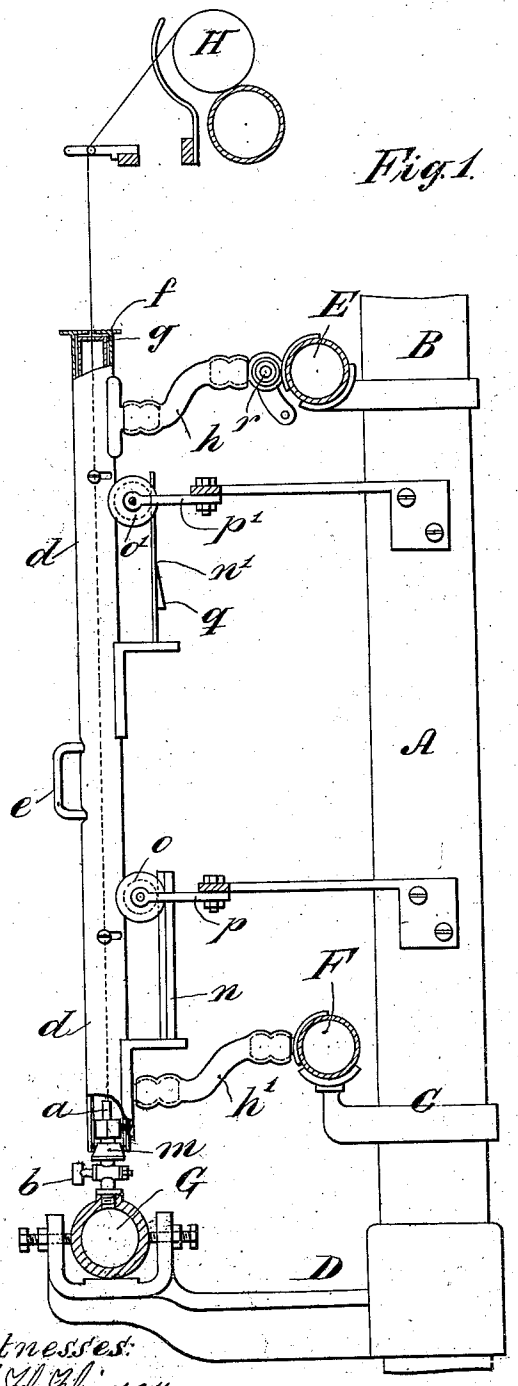


Fig. 1.

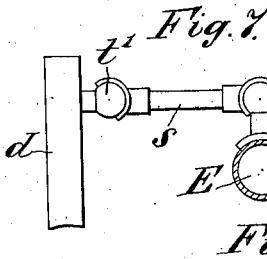


Fig. 7.

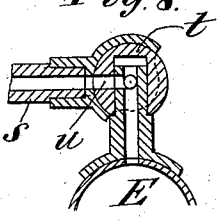


Fig. 8.

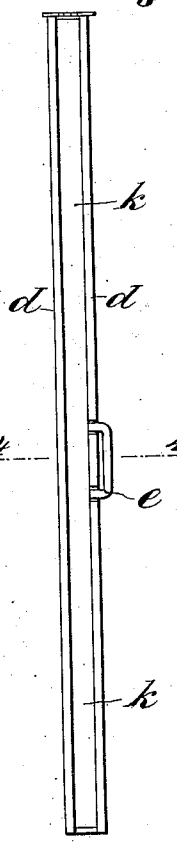


Fig. 2.



Fig. 3.



Fig. 5.

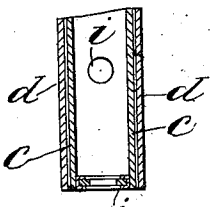


Fig. 6.

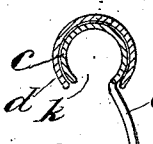


Fig. 4.

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UNITED STATES PATENT OFFICE.

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APPARATUS FOR THE MANUFACTURE OF ARTIFICIAL SILK.

No. 828,155. Specification of Letters Patent. Patented Aug. 7, 1906.

Application filed July 7, 1906. Serial No. 325,137.

To all whom it may concern:

Be it known that I, HENRI ETIENNE ALFRED VITTENET, a citizen of the Republic of France, and a resident of Auree Sur Loire, Haute-Loire, France, have invented certain new and useful Improvements in Apparatus for the Manufacture of Artificial Silk, of which the following is a specification.

In the manufacture of artificial silk by my process nitrocellulose is dissolved in a solution of acetone in a pure state or associated with a small quantity of sulfur dioxid, then expressed under pressure through a small orifice, and thus converted into a filamentary or thread-like form in imitation of silk, and then subjected in filamentary form to the action of sulfur dioxid, which latter renders the filament supple and brilliant and also permits of the recovery of the acetone vapors.

In order to carry out this process, so as to collect the mixture of acetone and sulfurous-acid vapors and at the same time protect the workmen from contact with this gas, which is injurious to respiration, I have devised the apparatus forming the subject of this invention. For each nozzle or squirter I provide a closed tube in which is produced a current of sulfur dioxid passing in an opposite direction to the movement of the thread. All these tubes are branched onto a general conducting-passage for the sulfur dioxid, and after having passed along these tubes the sulfur-dioxid and the acetone vapors reassemble in a collector which conducts the gases and the vapors into a suitable place where the separation of the acetone is effected.

The arrangement of the apparatus and its operation will be readily understood by the following description, reference being had to the accompanying drawings.

Figure 1 is a transverse section of the apparatus. Fig. 2 shows one of the sulfur-dioxid tubes in elevation. Fig. 3 is a plan of the top of the outer tube. Fig. 4 is a section on the line 4 4, Fig. 2. Fig. 5 is a plan of the top of the inner tube. Fig. 6 is a vertical section of the lower part of the tube, which is arranged above a nozzle, the latter not being shown. Fig. 7 shows in elevation a portion of an arrangement of circulation-tubes for the sulfur dioxid on the single gas-conducting tube. Fig. 8 shows in detail a section of the cock in this latter arrangement. Figs. 3, 4, 5, 6, and 8 are drawn to a larger scale than the other three figures.

The whole of the apparatus is carried on vertical standards A, on which are fixed arms B C D, the arm B supporting the pipe E, through which the sulfur-dioxid gas is conducted, the arm C supporting the collecting-pipe F of the sulfur-dioxid gas, which has passed through the fixing-tube in contact with the filament and the acetone vapor drawn along by it, and the arm D supporting the pipe G, through which is conducted the solution of nitrocellulose in acetone. This pipe G is provided with vertical expressing or squirting nozzles *a*, each of them being provided with a cock *b*.

On each nozzle is arranged a fixing-tube which is actually formed of two concentric tubes, the inner tube *c* and the outer tube *d*. The inner tube *c* can be turned within the tube *d* by means of the operating-handle *e*. These two tubes are provided with a vertical slot *k* throughout their height, so that by bringing the two slots together, as shown in Fig. 4, the thread can be laid hold of when it commences to issue from the nozzle in order to introduce it throughout the height of the tube, to cause it to pass out from the top, and to engage it over the upper roller H.

At the upper part the outer tube is almost completely closed and is provided with a radial recess *f*, (see Fig. 3,) the sides of which are extended to facilitate the introduction of the thread between them when starting. The inner tube is also nearly closed at its top and is provided with a radial recess *g*, which coincides with the recess *f* when the slots *k* of the two tubes coincide. When the inner tube is turned within the outer tube by means of the handle *e*, so as to completely close the tube, the recess *g* of the upper part of the inner tube comes underneath a solid portion of the top of the outer tube, and there only remains at the meeting-point of the two recesses *f* and *g* a small central hole, through which the thread or filament issues.

The upper pipe E, through which the sulfur-dioxid gas arrives, and the pipe F, through which it leaves, are connected to all the outer vertical tubes *d* by india-rubber connections *h h'*. The inner tube *c* is provided where these connections are located with a round hole *i*, which comes opposite the connection-aperture on the tubes *h h'* when the inner tube *c* has been turned to close the vertical slot *k*. In this position the sulfur-dioxid gas arriving through the upper part of the tube surmounting each nozzle descends in the said tube, passes out through the lower connection, and

reaches the collecting-pipe F through the flexible india-rubber connection h'. These india-rubber connections allow of raising the tube $c\ d$ above its nozzle when it is required to inspect or clean it or in order to more easily lay hold of the thread when starting or in the event of breakage. The tube simply rests on the nozzle, a sufficiently tight joint being obtained by an india-rubber ring j, arranged at the lower part of the tube d in a grooved ring, which rests upon a conical portion m below the nozzle. Each tube d is guided vertically and supported by two bars $n\ n'$, carried by angular brackets, which bars pass behind rollers $o\ o'$, carried by arms $p\ p'$. These rollers are engaged between the bars $n\ n'$ and the tubes.

The upper bar n' forms a spring, so that when the tube $c\ d$ is raised a small tooth or catch q on the back of the said bar comes to rest upon the arm p', which supports the lifted tube. It is only necessary to slightly pull the said bar to disengage the tooth or catch q and free the tube $c\ d$.

The upper connection h, through which the sulfur-dioxid gas arrives, is provided with a cock r, which is closed when required to raise the tube, so that the sulfur dioxid ceases to enter.

In the modification Figs. 7 and 8 each of the inlet and outlet pipes for the sulfur-dioxid gas is connected to the vertical tubes $c\ d$ by rigid pipes s, jointed at $t\ t'$. At t is a cock connection, which is automatically closed when the tube $c\ d$ is raised, so that the sulfur-dioxid gas ceases to enter the said tube, because then the passage of the pipe s is no longer opposite the horizontal passage u of the cock. In the case of these jointed rigid tubes the vertical movement of the tube $c\ d$ is a parallelogrammic movement.

This same apparatus can be employed for recovering in a condition of vapor the solvents employed in other processes for the manufacture of artificial silk, such as alcohol, ether, and carbon bisulfid.

I claim as my invention—

1. In an apparatus for the manufacture of artificial silk, the combination of means for forming a filament of metamorphosed cellulose, a closed fixing-tube for containing a gaseous fixing agent, said tube being provided with a small orifice for the passage of the filament, and means for passing a fixing-gas through said tube in contact with the filament.

2. In an apparatus for the manufacture of artificial silk, the combination of means for forming a filament of metamorphosed cellulose, and a fixing-tube comprising two concentric tubes provided with elongated slots, one of said tubes being adapted to turn relatively to the other to bring the slots into register to open the tube or out of register to close it.

3. In an apparatus for the manufacture of artificial silk, the combination of means for forming a filament of metamorphosed cellulose, and a fixing-tube comprising two concentric tubes provided with elongated slots and with radial slots in their tops, one of said tubes being adapted to turn relatively to the other to bring the slots into register to open the tube or out of register to close it.

4. In an apparatus for the manufacture of artificial silk, the combination of means for forming a filament of metamorphosed cellulose, and a fixing-tube comprising two concentric tubes provided with elongated slots and with flaring radial slots in their tops, one of said tubes being adapted to turn relatively to the other to bring the slots into register to open the tube or out of register to close it.

5. In an apparatus for the manufacture of artificial silk, the combination of means for forming a filament of metamorphosed cellulose, and a fixing-tube comprising two concentric tubes provided with elongated slots, one of said tubes being adapted to turn relatively to the other to bring the slots into register to open the tube or out of register to close it, and one of said tubes being provided with a handle.

6. The combination of means for forming a filament of metamorphosed cellulose, and a closed fixing-tube provided with a small orifice for the passage of the filament, a tube connecting with said fixing-tube for supplying a fixing-gas thereto and a tube connecting with said fixing-tube for exhausting said fixing-gas therefrom.

In witness whereof I have hereunto signed my name, this 23d day of June, 1906, in the presence of two subscribing witnesses.

HENRI ETIENNE ALFRED VITTENET.

Witnesses:

SAMUEL MARIUS,

MOUNARD SOLLE.