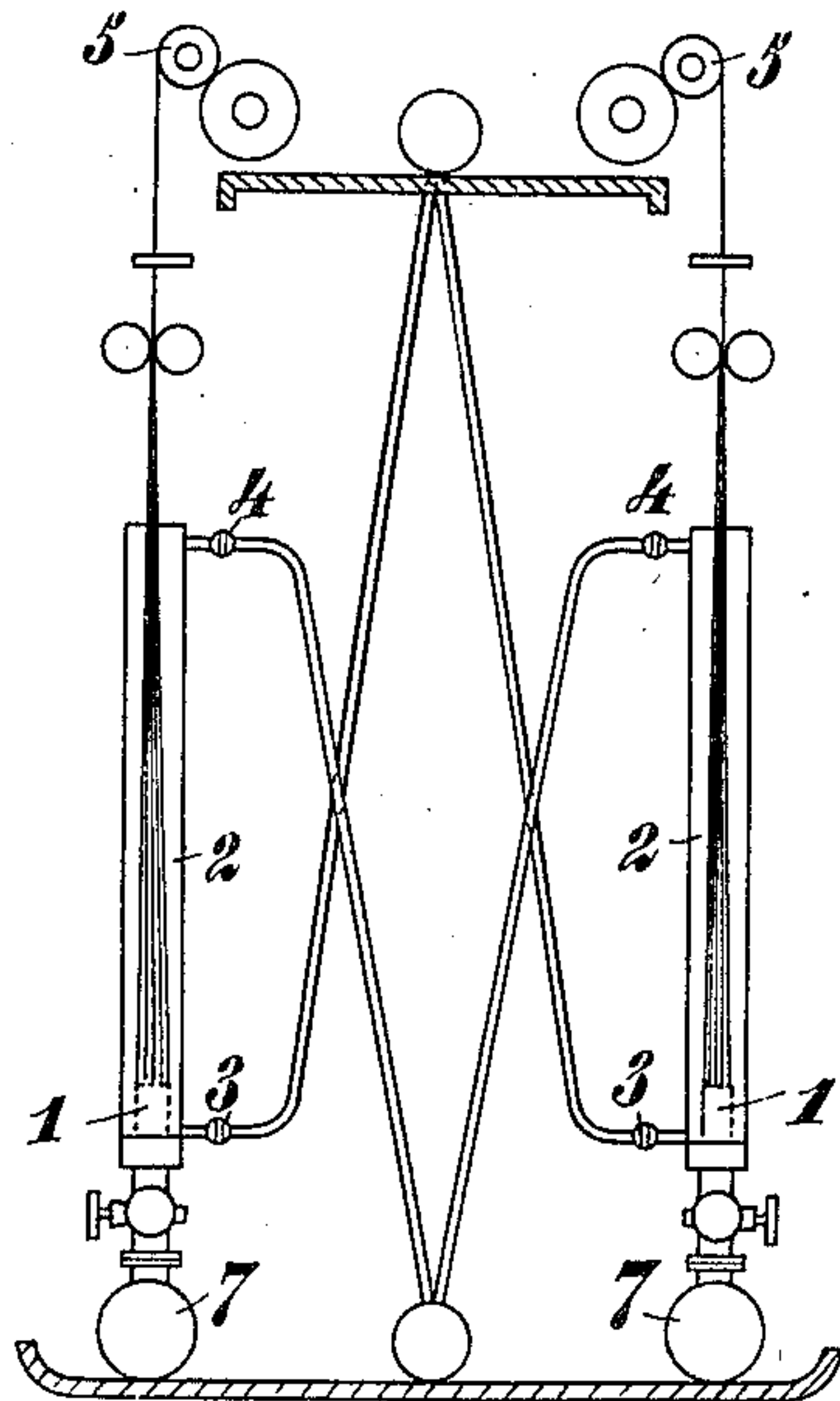


No. 820,351.

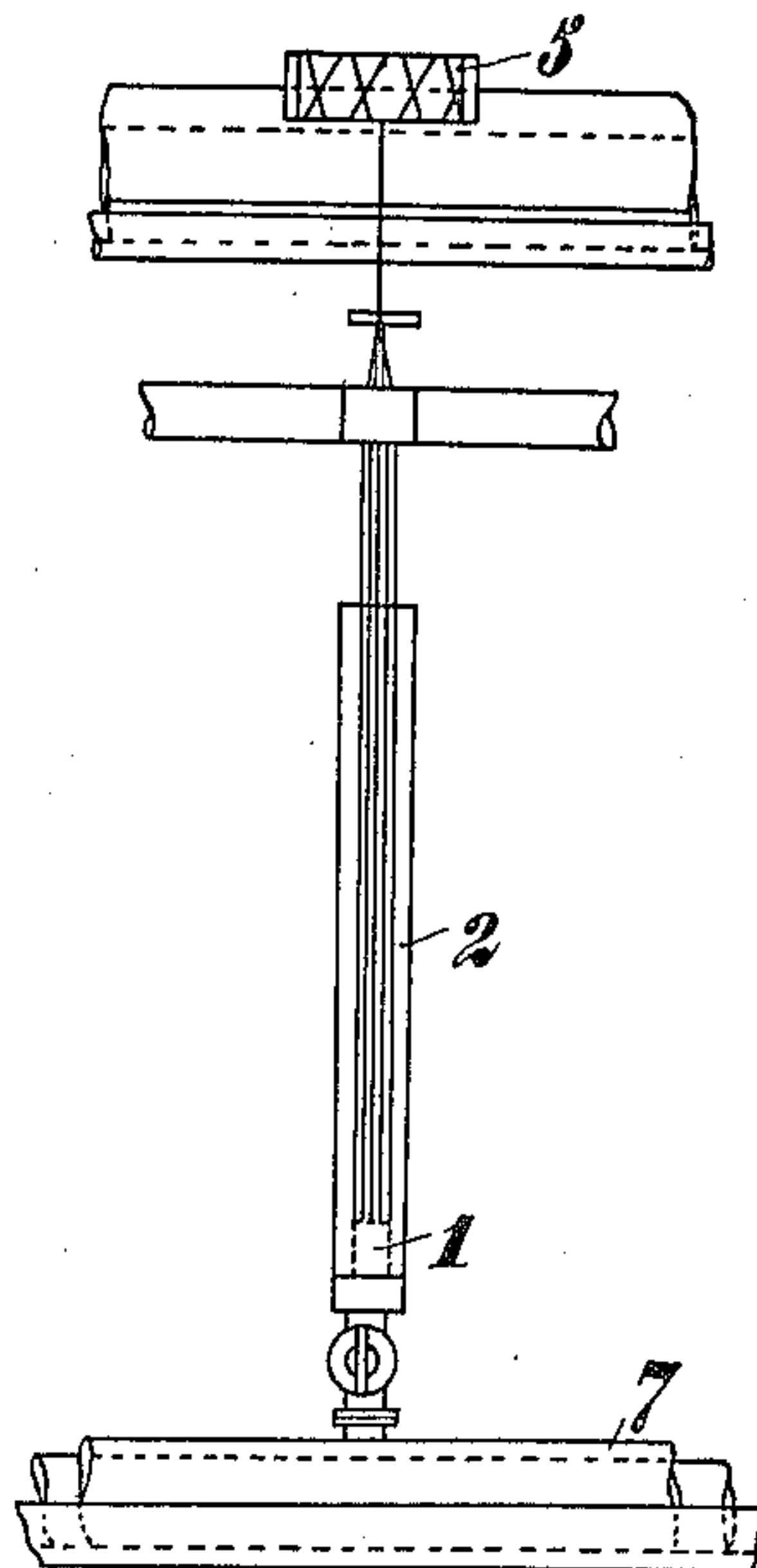
PATENTED MAY 8, 1906.

L. CRESPIN.  
PROCESS IN THE MANUFACTURE OF ARTIFICIAL SILK.  
APPLICATION FILED DEC. 2, 1905.

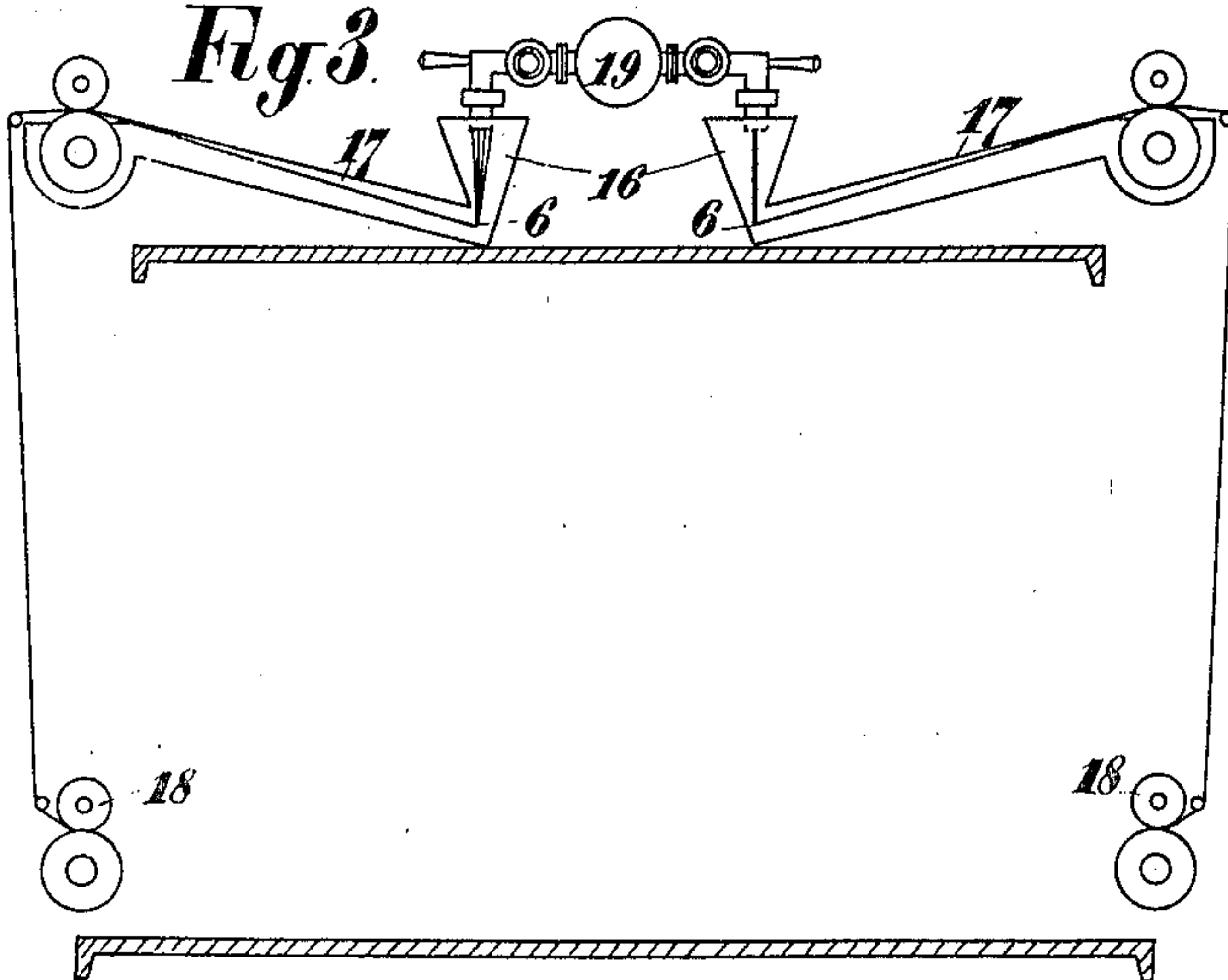
*Fig. 1*



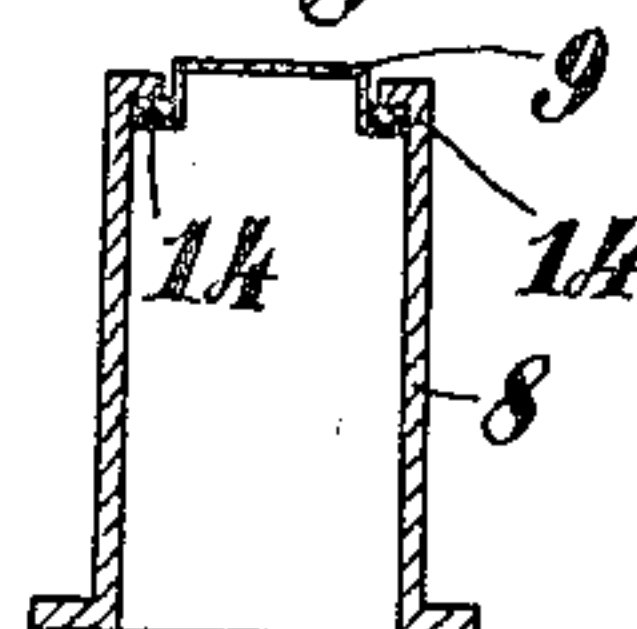
*Fig. 2*



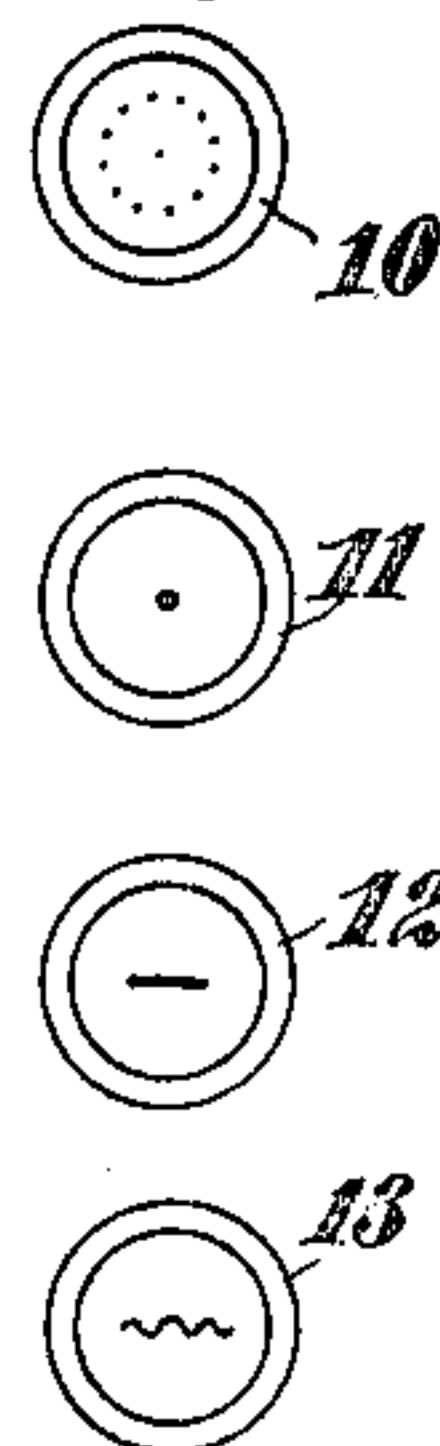
*Fig. 3*



*Fig. 4*



*Fig. 5*



Witnesses:  
William Doman Jr.  
Waldo M. Chapin

Inventor:  
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by Rosenbaum & Stockbridge  
Attys.



# UNITED STATES PATENT OFFICE.

LUCIEN CRESPIN, OF PARIS, FRANCE.

## PROCESS IN THE MANUFACTURE OF ARTIFICIAL SILK.

No. 820,351.

Specification of Letters Patent.

Patented May 8, 1906.

Original application filed February 4, 1905, Serial No. 244,186. Divided and this application filed December 2, 1905. Serial No. 289,983.

*To all whom it may concern:*

Be it known that I, LUCIEN CRESPIN, a citizen of the French Republic, residing at Paris, in the Department of the Seine, France, have invented certain new and useful Improvements in Processes in the Manufacture of Artificial Silk, of which the following is a specification.

The greatest expense in the manufacture of artificial silk, horsehair, straw, and the like with or from a nitrocellulose base is incurred in connection with the solvent for the nitrocellulose. This solvent simply serves as a vehicle for the nitrocellulose, and once the artificial silk or thread or horsehair or the like is formed it is necessary to cause such solvent to disappear.

In factories actually producing artificial silk or its equivalent it has been the rule to use the least possible quantity of solvent, which is composed of a mixture of ethylic alcohol and sulfuric ether, and once the desired object is attained—that is, the production of the silk, thread, or equivalent—the solvent mixture is allowed to evaporate. The whole of the solvent employed is thus lost.

In carrying out my improvements I substitute for the solvent above described a solvent mixture suited to the nature of the nitrocellulose which it is desired to dissolve—that is to say, a mixture of ethylic alcohol, methylic alcohol, and sulfuric ether, to which is added a certain quantity of castor-oil, palm-oil, or glycerin. A very clear and fluid collodion is thus obtained which readily lends itself to the production of filaments or the like. This collodion is then forced through a suitable nozzle into a water-bath, when part of the solvent is dissolved, after which the threads are wound up and the bath treated for the recovery of the contained solvent. For using the collodion thus formed in accordance with my invention I may employ many different forms of apparatus; but the two forms shown in the accompanying drawings will serve as types.

Figure 1 is a vertical section of one form of apparatus, and Fig. 2 represents the same apparatus in elevation and at right angles to Fig. 1. Fig. 3 shows in section the other form of apparatus, which is especially applicable for the production of ribbons or the like. Fig. 4 is a vertical section of one of the devices by which the filaments are formed

and through which the collodion is expressed or squirted. Fig. 5 illustrates in plan several varieties of such devices, the openings through which are varied according to the desired product.

In producing filaments or the like according to this invention the collodion when forced through the holes or openings in the different devices enters into a water-bath, (indicated by 2 in Figs. 1 and 2.) On entering this bath the threads or the like do not immediately solidify, but pass through a gelatinous stage in which they can be drawn out or attenuated to any desired size. During the passage of the threads or the like through the water-bath nearly the whole of the solvent employed is dissolved in or enters into combination with the water, and it is only necessary to regulate the water-inlet 3 and the water-outlet 4 (see Fig. 1) to insure that the issuing water shall contain about ten per cent. of alcohol.

In Figs. 1 and 2 the thread or the like forming nozzle or device 1 is provided with a number of minute or capillary holes, through which the collodion is forced by suitable pressure in the form of fine filaments. These filaments pass upward through the water-baths to the winding-rollers 5. In the form of device shown in this figure and in Fig. 2 the filaments pass straight from the nozzle to the winding-roller in a straight line.

In the form of apparatus shown in Fig. 3, and which is preferred for the manufacture of ribbons and the like, the thread or threads or equivalent from the forming-nozzle passes or pass around the angular edge 6 of the bath 17 containing the water on its or their way to the winding-roller 18. 19 indicates the main pipe containing the collodion. The water from the bath containing the mixture of ethylic and methylic alcohol is heated to drive off the alcohol, and the alcohol is condensed and collected. To this alcohol it only becomes necessary to add again the required weak proportion of sulfuric acid evaporated during the operation and the desired quantities of castor-oil, palm-oil, or glycerin to obtain a fresh solvent for a further charge of nitrocellulose. As nearly the whole of the solvent employed may be recovered in this manner, the collodion need not be made very thick. On the contrary, it can be economically made very liquid and fluid, with the result that the heavy pressure pre-



viously required to expel the collodion  
 through the nozzles may be very much re-  
 duced. In consequence of this the tubes 7  
 (see Fig. 1) or 19, (see Fig. 3,) containing the  
 5 collodion, may be formed of glass, ebonite, or  
 other suitable material which is inert to or is  
 incapable of being acted upon by the collo-  
 dion, which greatly improves the filaments or  
 the like produced. Another advantage of  
 10 using a very liquid or fluid collodion consists in  
 the practicability of employing a forming-noz-  
 zle with a series of capillary holes, as indicated  
 in 10, Fig. 5. A nozzle may consist of a glass  
 cylinder 8, (see Fig. 4.) furnished with a  
 15 flange, by means of which it may be attached  
 to the cock or tap. At its end is a flanged  
 cap or plate 9, of platinum, which may be  
 perforated with the capillary holes, as shown  
 at 10 in Fig. 5, or with one larger hole, as at  
 20 11, or with straight or undulatory slits, as in-  
 dicated at 12 and 13 in the same figure, ac-  
 cording to whether it is desired to produce  
 artificial silk, horsehair, straw, or ribbons.  
 25 The joint between the cap 9 and the cylinder  
 8 is maintained by means of a flexible rubber

packing-ring 14, the interior pressure keeping the joint tight.

This application is a division of the appli-  
 cation filed February 4, 1905, Serial No.  
 244,186.

Having described my invention, I claim—

The process for the production of artificial  
 silk and the like or equivalent, which consists  
 in dissolving nitrocellulose in a mixture of  
 ethylic alcohol methylic alcohol and sulfuric 35  
 ether with castor-oil, palm-oil or glycerin ex-  
 pressing the dissolved nitrocellulose through  
 a suitable nozzle into a water-bath where  
 part of the solvent is dissolved, winding up 40  
 the threads or the like, and treating the wa-  
 ter from the bath for the recovery of the con-  
 tained solvent, substantially as and in the  
 manner described.

In testimony whereof I have hereunto set  
 my hand in presence of two subscribing wit- 45  
 nesses:

LUCIEN CRESPIN.

Witnesses:

HENRY DANZER,  
 CAIUS DANZER.