March 15, 1938. A. R. ZART ET AL 2,111,502

MANUFACTURE OF ARTIFICIAL SILK

Filed Sept. 3, 1936

Fig. 4.

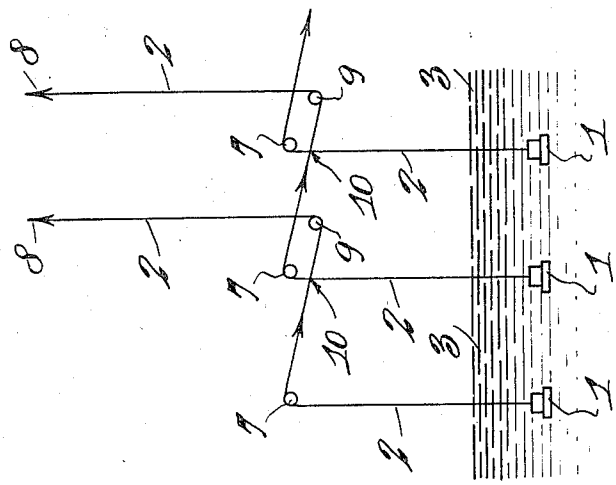


Fig. 3.

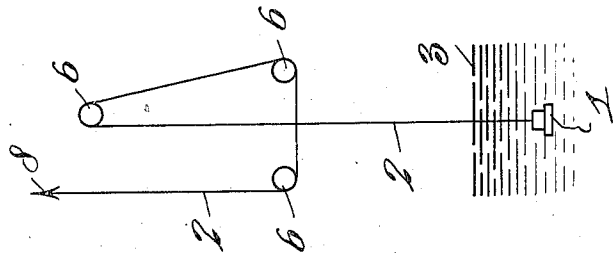


Fig. 2.

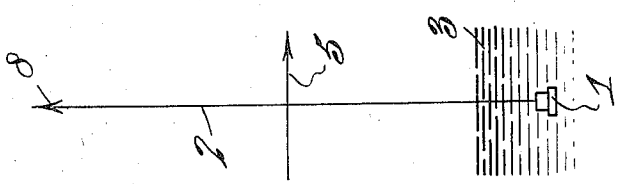
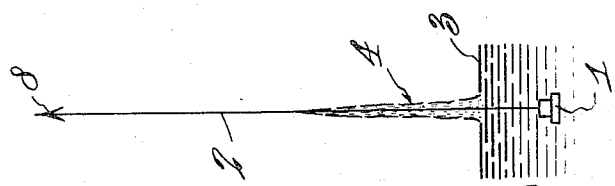


Fig. 1.



Inventor

Arthur Reinhold Zart
Alfred Maxton

By Thomas H. Byron

Attorney

Patented Mar. 15, 1938 2,111,502

UNITED STATES PATENT OFFICE

2,111,502

MANUFACTURE OF ARTIFICIAL SILK

Arthur Reinhold Zart, Wuppertal-Barmen, and Alfred Maxton, Kassel-Bettenhausen, Germany, assignors to North American Rayon Corporation, New York, N. Y., a corporation of Delaware

Application September 3, 1936, Serial No. 99,260
In Germany September 7, 1935

9 Claims. (Cl. 18—54)

The present invention relates to the manufacture of yarn of artificial origin but primarily has for its object to prevent the carrying of excess spin bath liquid by the freshly-spun thread as it leaves the said bath.

In the production of artificial silk by the so-called wet-spinning process, i. e., a process whereby the thread is extruded into liquid precipitating baths, as employed in the manufacture of artificial silk in accordance with the viscose, cuprammonium and acetate process, the freshly spun thread emerging from the precipitating bath and being drawn vertically upwardly carries with it a column of liquid which is much thicker and many times heavier than the thread itself. Due to the specific gravity of the liquid adhering to the thread, the liquid accumulates into large drops which fall back in a fan-like manner into the precipitating bath, using as their path the vertically moving thread. Owing to the heavy weight of the liquid which must be carried by the thread, and in view of the fact that the thread comprising a large number of fine elementary filaments is very weak in strength at this stage of its manufacture, i. e., shortly after the extrusion from the spinnerette and in an untwisted state, the accumulated liquid flowing backwardly along the thread causes numerous defects in the finished yarn, inasmuch as the outside filaments of the untwisted thread are stretched more and are partly dragged back toward the bath. These defects may be in the form of broken elementary filaments, irregular stretching of the individual filaments and the like, causing irregularities of denier, dyeing differences and other defects in the finished yarn, thus resulting in an inferior quality of the finished product.

It is therefore an object of the present invention, in order to overcome these difficulties, to provide a means for removing the liquid accumulation on the freshly spun thread by causing a temporary twist to be formed therein as it leaves the spin bath.

This and other objects will in part become obvious and in part be pointed out in the following specification and claims when taken in conjunction with the attached drawing, in which:

Fig. 1 is a diagrammatic view of the method heretofore employed;

Fig. 2 is a diagrammatic view of one form of the present invention;

Figures 3 and 4 are views similar to Fig. 2 of modified forms of the present invention.

In the attached drawing in which like numerals of reference indicate like parts, 1 indicates the spinnerette through which the thread 2 is extruded which is then drawn vertically upwardly as indicated by the arrow 8, by means of take-up rollers or the like not shown in the drawing. 3 indicates the surface of the precipitating bath, the spinnerette 1 being immersed in the latter.

As illustrated in Fig. 1, the thread 2 extruded by the spinnerette 1, in emerging from the precipitating bath 3 carries with it a column of liquid owing to the looseness of the untwisted thread and the high speed at which it is drawn off. The liquid due to its own weight flows back along the thread 2 into the precipitating bath in a fan-like form as indicated by 4.

In Fig. 2 a thread 5 is shown which diagonally crosses the path of the freshly spun thread 2. The thread 5 advancing horizontally at a high speed rubs against the vertically moving freshly spun thread 2 at their point of contact. Since both threads advance at a high speed, the rubbing contact of the auxiliary thread 5 causes a rotation of the freshly extruded thread 2 around its axis and thus produces a twist therein. This temporary twist which extends beyond the point of contact of the two threads as far back as to the spinnerette, causes a tightening of the spun thread and a coherence of the elementary filaments comprising the freshly extruded thread. Because of the effected solidity of the spun thread and the coherence of the different elementary filaments to one another, it was found that the freshly extruded thread is prevented from carrying an excessive amount of liquid as heretofore, and that the formation of drops of liquid on the thread after emerging from the precipitating bath is eliminated.

The twist which is set up in the spun thread unwinds itself prior to the collection of the thread on the take-up device, so that the wound yarn body contains the thread as heretofore in the untwisted state.

The modified form of the present invention shown in Fig. 3 utilizes the spun thread itself to produce the twist in the freshly extruded thread. For this purpose the thread is passed over three guiding rollers 6 causing it to diagonally cross and contact with itself between the two lower rollers 6. Thus the use of an auxiliary thread 5 as shown in Fig. 2 is eliminated.

Fig. 4 illustrates another modified arrangement of the present invention which is especially adaptable for spinning machines having a large number of spinnerettes arranged side by side. In this modification, guiding rollers 7 and 9 are provided over which the extruded thread is so

passed that it tangentially contacts with the adjacent spun thread at 10, and is then passed upwardly by means of the second guiding roller 9 in order to be wound onto the take-up device not shown in the drawing.

The distance from the surface of the precipitating bath at which the tangential contact of the freshly spun thread with itself or with an auxiliary thread takes place, may vary in length, it may be either 10, 30 or 50 cm. or more above the spinning bath surface.

The direction of the thread crossing the path of the spun thread must be essentially crosswise, though it is not necessary that it is exactly horizontal with respect to the vertically upward moving spun thread.

Having now set forth the invention as required by the statutes of the Patent Office, what is claimed is:

1. In a process for the manufacture of filaments of artificial origin, the steps of extruding the thread into a precipitating bath, passing it from said bath, simultaneously with said passage from the said bath causing a temporary twist to be formed in the said thread by passing a second thread substantially horizontally across and in contact with said first mentioned thread, and then passing the thread to a collecting device.

2. In a process for the manufacture of filaments of artificial origin, the steps of extruding the thread into a precipitating bath, passing it from said bath, simultaneously with said passage from the said bath causing a temporary twist to be formed in the said thread by passing a second thread substantially horizontally across and in contact with said first mentioned thread, allowing said thread to lose its temporary twist, and then passing the thread to a collecting device.

3. In a process for the manufacture of filaments of artificial origin in accordance with the wet spinning method, the steps of extruding the thread comprising a plurality of elementary filaments into a precipitating bath, passing said thread upwardly to a take-up device, and then passing a second thread in horizontal direction, said latter thread contacting with the said extruded thread above the surface of the precipitating bath.

4. In a process for the manufacture of filaments of artificial origin, the steps of extruding the thread into a precipitating bath, passing it upwardly over a guiding roller, then downwardly and horizontally by means of additional guiding rollers causing it to tangentially cross the path of and contact with the freshly extruded thread.

5. In a process for the manufacture of filaments of artificial origin, the steps of extruding the thread into a precipitating bath, passing it upwardly over a guiding roller, then passing it sidewardly causing it to contact with and twist the freshly extruded thread coming from an adjacent spinning place subsequently to the latter's issue from the bath, and then passing it upwardly to a take-up device by means of a guiding roller.

6. In a process for the manufacture of filaments of artificial origin, the steps of extruding the thread into a precipitating bath, passing it upwardly to a take-up device, and twisting said extruded thread by means of a second thread, said second thread crossing and contacting tangentially with said extruded thread above the surface of the bath.

7. In a process for the manufacture of filaments of artificial origin, the steps of extruding the thread into a precipitating bath, passing it upwardly from said bath, then downwardly, and then again changing its direction of travel causing the said thread to contact with and twist a subsequent portion of the said extruded thread above the surface of the bath.

8. In a process for the manufacture of filaments of artificial origin, the steps of extruding the thread into a precipitating bath, passing it upwardly and sidewardly, and then contacting tangentially with and twisting the freshly extruded thread coming from an adjacent spinning place immediately after the latter's issue from the bath.

9. In a process for the production of multifilament threads, the steps of extruding thread through a coagulating medium, drawing the thread from the medium and effecting a temporary twist in succeeding thread portions by contacting the same with another thread portion moving in a different direction, and then collecting the thread.

ARTHUR REINHOLD ZART.
ALFRED MAXTON.