

Dec. 6, 1927.

1,651,404

S. A. NEIDICH

VISCOSE PRODUCT

Filed May 1, 1926

FIG. I.

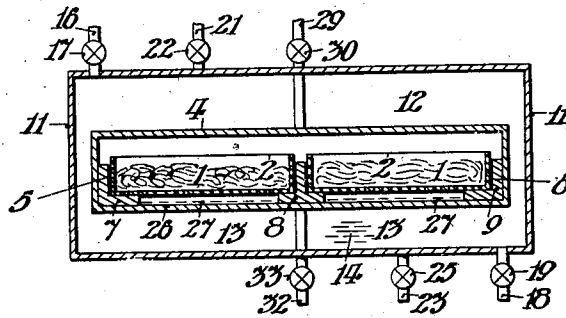
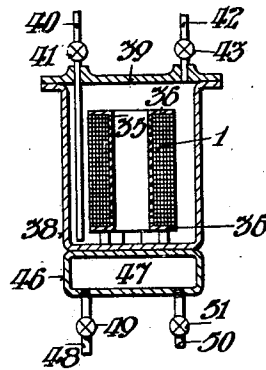


FIG. II.



INVENTOR:

SAMUEL A. NEIDICH,

By *Arthur E. Paige*
Attorney.

UNITED STATES PATENT OFFICE.

SAMUEL A. NEIDICH, OF EDGEWATER PARK, NEW JERSEY.

VISCOSE PRODUCT.

Application filed May 1, 1926. Serial No. 105,943.

Liquid viscose (cellulose sulphocarbonate or thiocarbonate) may be coagulated or precipitated to form a gelatinous semi-solid impure cellulose hydrate complex by progressively projecting a stream of such viscose into a heated atmosphere or into an aqueous solution containing a suitable acid, for instance, sulphuric or hydrochloric acid, or containing an acid salt such as sodium bisulphite or ammonium chloride, either with or without neutral salts or dehydrators, or both.

All such viscose products are amorphous and primarily so soft and impressionable that they may be marred by handling and must be dehydrated and desiccated to render them firm enough in texture for commercial use. Ordinarily, elimination of surplus moisture from filaments thus formed is effected by exposing them to air either at, or above, atmospheric temperature, while wound upon reels, and it is characteristic of filaments thus produced that they are only capable of an average of eighteen percent, elongation without fracture.

It is the object and effect of my invention to provide products such as filaments and threads for ordinary textile weaving, and what is termed "artificial horsehair", for millinery and other use, of such character as to be capable of greater elongation than the normal products aforesaid, and the products of my invention produced in accordance herewith are, in fact, capable of at least one hundred per cent elongation without fracture.

Such capacity for elongation is of great advantage in the use of such filaments in the formation of textile fabrics, wherein the filaments are subjected to unequal stresses; such as are occasioned by weaving such filaments in jacquard patterns for upholstery coverings and draperies, and particularly for fabrics which are to be embossed; for instance, textile fabrics which are used to form hat crowns and parts thereof in the millinery trade, and it is to be particularly noted that the abnormal capacity for elongation characteristic of my improved products is not, strictly speaking, elasticity, for the filaments do not manifest any tendency to retract or return to their initial length after being elongated, but are non-resilient and stay in the form to which they are extended. Consequently, such filaments and fabrics made therefrom may be embossed or other-

wise deformed to any desired configuration, without allowance for any renitence, whereas, the filaments of the prior art heretofore used for the purposes above contemplated, do manifest such renitence.

Moreover, such a filament of the prior art is easily deformed even by contact with itself in successive convolutions, and even slight indentations of the ultimate commercial filament formed by drying and contraction from its primarily soft gelatinous form are conspicuously noticeable because of the reflection of light therefrom; whereas, the commercial value of such a filament is largely dependent upon its uniformity of cross section and uniformly lustrous appearance. Therefore, my invention has the further advantage that filaments produced in accordance therewith have such uniformity of cross section and uniformly lustrous appearance.

My invention includes the various novel features of construction, arrangement and procedure herein set forth.

In the accompanying drawings; Fig. I is a transverse vertical sectional view of apparatus including foraminous trays with the freshly coagulated filaments loosely coiled therein, in an inclosure to which they may be subjected to the action of a dehydrating medium.

Fig. II is a transverse vertical sectional view of a retort containing a spool with viscose filaments wound in convolutions thereon for subjection to the action of a dehydrating medium.

I have found it convenient to form viscose by subjecting soda-cellulose to the action of carbon bisulphide; for instance, in the proportions of one hundred parts of the alkali-cellulose to ten parts of the carbon bisulphide, although a small excess of the latter is negligible. The cellulose sulphocarbonate thus formed is a loose mass, differing in appearance from soda-cellulose only by its pale yellow color. I then project the liquid viscose through suitable spinnerets into a coagulating bath, conveniently an aqueous solution containing fourteen per cent of sodium bisulphite and one-fourth of one per cent of tri-sodium phosphate. I discharge the coagulated filaments from said bath into trays conveniently formed of any suitable foraminous material; for instance, perforated sheet Monel metal. During the deposition of the filaments in said

trays; the filaments and trays may be relatively shifted both longitudinally and transversely, by any suitable mechanical means, or by hand, so that, as each filament 1 drops, it is received and coiled both transversely and longitudinally in its respective tray 2 which may be conveniently three inches deep, one foot wide, and three feet long. When said trays 2 are sufficiently charged with filaments 1, they may be temporarily included in any suitable dehydrating apparatus, for instance, in apparatus of the type claimed in my copending application Serial No. 105,945 filed May 1, 1926 for Letters Patent of the United States for improvement in apparatus for dehydrating viscose products, wherein such trays are successively pushed through the dehydrating apparatus 4 indicated in Fig. I which is what may be termed a "tunnel" conveniently including two parallel passageways 5 and 6, each of such dimensions as to permit the trays to be freely slid longitudinally there-through upon the guide rails 7, 8, and 9, which form said passageways. Said tunnel tube 4 is surrounded by the tube 11 forming jacket spaces 12 between them which may be divided by transverse partitions to form a longitudinal series of compartments, say, three, of which the intermediate compartment 13 may be supplied with a heating medium, such as warm water 14 which may be conveniently circulated therein through the inlet pipe 16 controlled by the valve 17, and the outlet pipe 18 controlled by the valve 19. Whereas, the end compartments may be supplied with a refrigerating medium, for instance cold water, which may be conveniently circulated therethrough by way of the inlet pipe 21 controlled by the valve 22 and the outlet pipe 23 controlled by the valve 25.

The wall of said warm, intermediate, compartment 13 may be slightly depressed beneath said passageways 5 and 6 to form a shallow basin 26 to receive alcohol 27, preferably ethyl hydroxid, C_2H_5OH , which may be conveniently introduced to said tunnel 4 through the pipe 29 controlled by the valve 30. The warmth of said intermediate section of the tunnel vaporizes said alcohol which percolates through the perforations of said trays 2 and surrounds the convolutions of the filaments 1 piled in said trays, with the effect of dehydrating said filaments. Of course, the alcoholic vapors tend to escape longitudinally through said passageways; but the walls of the end sections of said tunnel are maintained at such low temperature, by the refrigerating means aforesaid, that such vapors are condensed and gravitate back to said basin 26 where they are again volatilized by the heating medium. However, I find it convenient to provide said basin with a drain pipe 32

controlled by the valve 33 to permit said passageways 5 and 6 to be cleaned when necessary, by flushing them with water.

The process above described is so economical that fifty cubic centimeters of said liquid alcohol is sufficient to completely dehydrate four dry pounds of the filament. However, it is to be understood that the ordinary alcohol above specified is preferable only by reason of its low cost, as the higher alcohols act even more energetically and, therefore, it is to be understood that my invention includes the utilization of any alcoholic liquid or vapor for the purpose described.

Said trays 2 discharged from the dehydrating apparatus 4 may be shifted to filament winding mechanism, including individual winding devices for winding the filaments separately upon spools; the treatment above described having been such as to render the filaments smoothly cylindrical and so far resistant to deformation that they may be thus wound without detriment.

I find it convenient to form the filament spools of hard rubber, of the shape shown in Fig. II, each including a cylindrical tubular perforated barrel 35, two inches in diameter and five inches long, between end heads 36 which are four inches in diameter.

Under some circumstances, I find it preferable to pass the trays 2 through said dehydrating apparatus 4 so rapidly that the filament 1 contents thereof are not completely desiccated during such passage, and to further dehydrate such filaments after they are wound upon such spools, by immersing the latter in an alcoholic environment, in any suitable container, for instance, in a retort 38 having the removable lid 39. The dehydrating fluid may be circulated in said retort by way of the inlet pipe 40 controlled by the valve 41, and an outlet pipe 42 controlled by the valve 43. Said retort is arranged to be warmed by any suitable means, for instance by contact with the sub-jacent container 46 charged with warm water or steam 47 conveniently circulated therethrough by way of the inlet pipe 48 controlled by the valve 49, and the outlet pipe 50 controlled by the valve 51.

The dehydration effected by said apparatus shown in Fig. II proceeds outwardly from the inner convolutions of the filaments 1 on the spool barrels 35, as well as inwardly from the outer convolutions of said filaments thus wound, so that as the filament progressively shrinks, the convolutions are loosened and the initial tension thereof relaxed, with the effect of avoiding the stretching of the filaments which is inevitable when they are subjected to a dehydrating medium which is only accessible to the outer convolutions thereof for, in the latter case, the outer convolutions in shrinking must stretch over the inner convolutions

which have not been shrunken or relaxed.

However, regardless of any theory as to the precise operation of the procedure above described; the effect thereof is to produce filaments which are distinguished from filaments of the prior art by the advantageous abnormal elongation aforesaid, and also by their greater uniformity and brilliance and consequent commercial value. In other words; it is characteristic of my invention, as above described, first, that the dehydration and desiccation of the filament is completed in an alcoholic atmosphere; second, that the filament is subjected to the action of alcohol after it has been completely formed by coagulation, precipitation and setting; third, that the filament is left free to progressively shrink until it is completely dried; fourth, that such drying is effected without stretching the filament; fifth, that the filament thus treated is not only characterized by abnormal luster or gloss, as compared with normal viscose filaments; but, sixth, is constricted to uniformly cylindrical cross section; and seventh, is rendered practically non-resilient; so that, eighth, when thus dried, it is capable of abnormal elongation as compared with any non-resilient viscose product, and at least one hundred percent, permanent inelastic elongation without fracture; while ninth, retaining uniformity of cylindrical cross section and uniformity of luster or gloss, throughout its length.

Although I find it convenient to use apparatus constructed and arranged and in the manner above described, and claimed in my copending application aforesaid, in the manufacture of my improved product; I do not desire to limit myself thereto, as it is obvious that various modifications may be made therein, without departing from the essential features of my invention, as herein claimed.

I claim:

1. A non-resilient, abnormally lustrous viscose product, residue of an impure cellulose hydrate complex, after dehydration by contact with warm alcoholic vapor until it is completely dried; characterized by capacity for elongation, without fracture, to

a greater extent than normal viscose products, otherwise dehydrated.

2. A filamentous non-resilient, abnormally lustrous viscose product, residue of an impure cellulose hydrate complex, after dehydration by contact with warm alcoholic vapor until it is completely dried; characterized by capacity for elongation, without fracture, to a greater extent than normal viscose products, otherwise dehydrated; and further characterized by constriction thereof to uniformly smooth cylindrical form.

3. A non-resilient, abnormally lustrous viscose product, residue of an impure cellulose hydrate complex, after dehydration by contact with an alcoholic medium until it is completely dried; characterized by capacity for elongation, without fracture, to the extent of one hundred per cent.

4. A non-resilient, abnormally lustrous viscose product, residue of an impure cellulose hydrate complex, after dehydration by contact with warm alcoholic vapor until it is completely dried; characterized by capacity for elongation, without fracture, to the extent of one hundred per cent.

5. A filamentous non-resilient, abnormally lustrous viscose product, residue of an impure cellulose hydrate complex, after dehydration by contact with an alcoholic medium until it is completely dried; characterized by capacity for elongation, without fracture, to the extent of one hundred per cent; and further characterized by constriction thereof to uniformly smooth cylindrical form.

6. A filamentous non-resilient, abnormally lustrous viscose product, residue of an impure cellulose hydrate complex, after dehydration by contact with warm alcoholic vapor until it is completely dried; characterized by capacity for elongation, without fracture, to the extent of one hundred per cent; and further characterized by constriction thereof to uniformly smooth cylindrical form.

In testimony whereof, I have hereunto signed my name at Burlington, New Jersey, this 27th day of April 1926.

SAMUEL A. NEIDICH.