July 15, 1930. J. A. FIRSCHING 1,770,592

METHOD AND APPARATUS FOR TREATING ARTIFICIAL SILK

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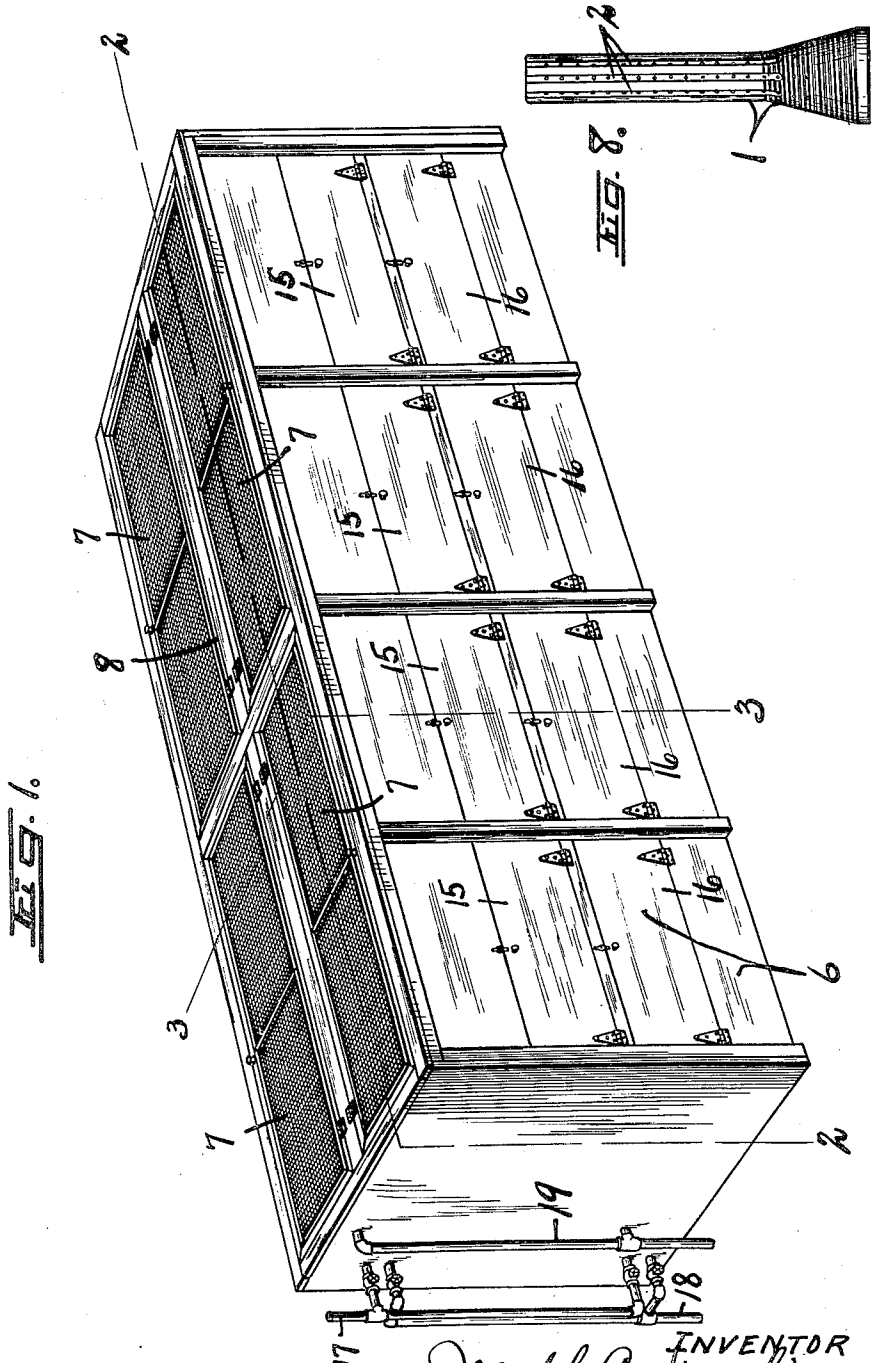


Fig. 1.

Fig. 8.

WITNESS
H. Hurst

INVENTOR
BY Joseph A. Firsching
Kinson & Simpson
ATTORNEYS

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FIG. 2.

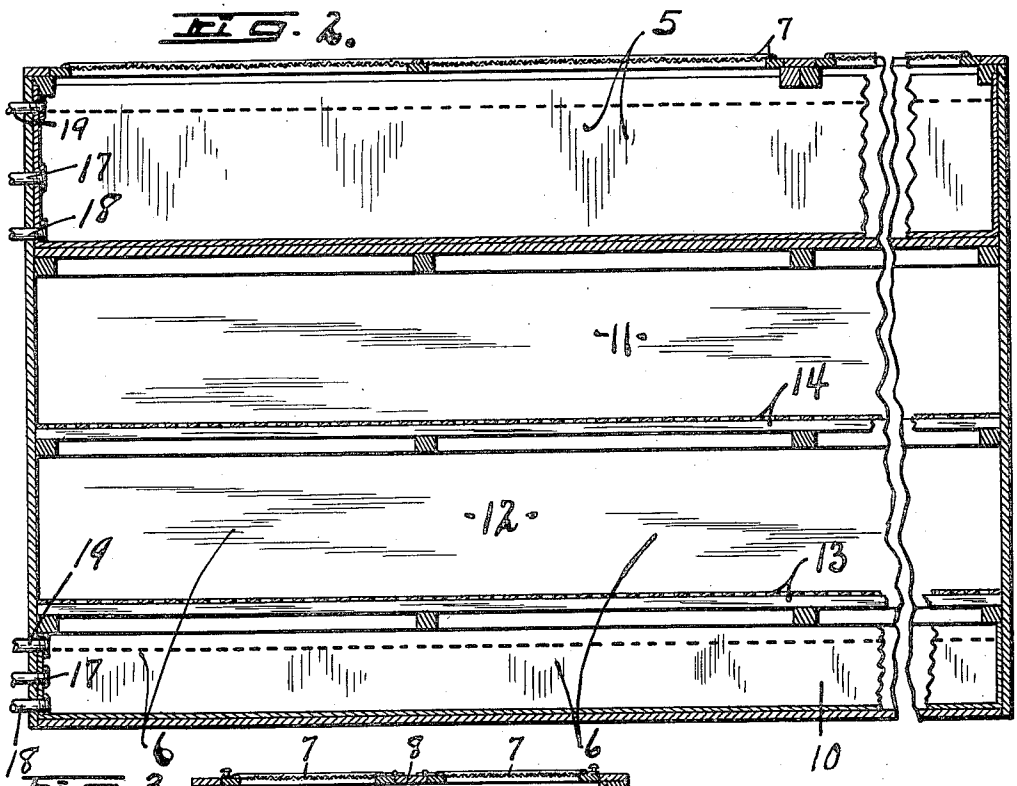


FIG. 3.

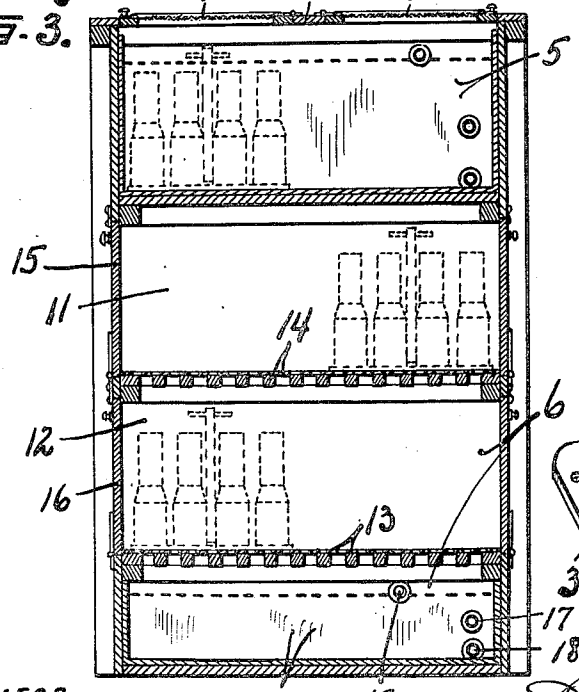
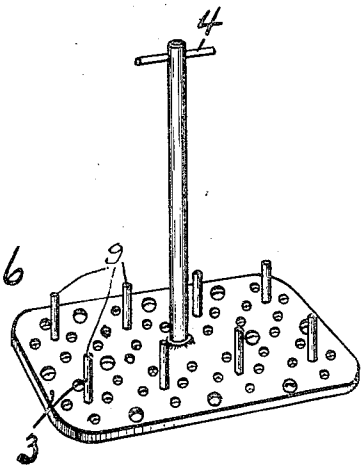


FIG. 4.



WITNESS

INVENTOR
Joseph A. Firsching

BY Lemson & Thompson
ATTORNEYS

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FIG. 5.

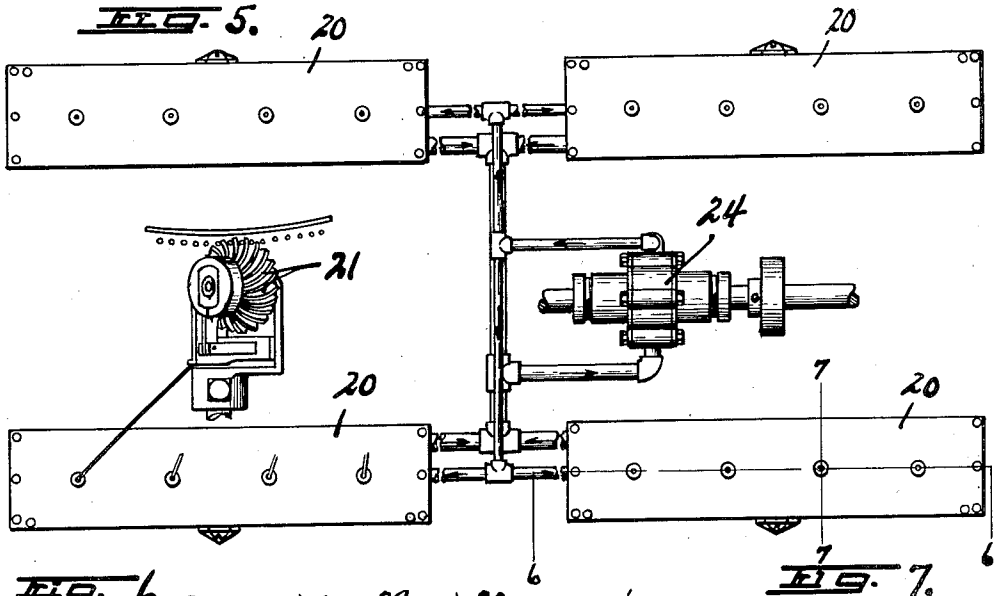


FIG. 6.

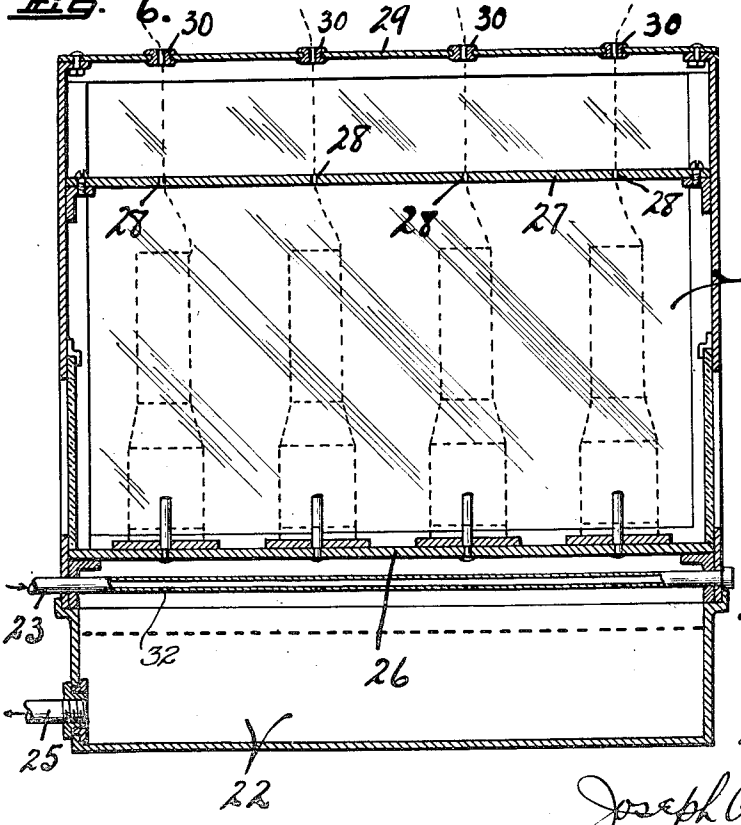
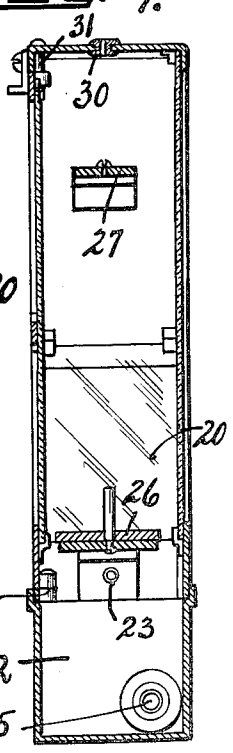


FIG. 7.



INVENTOR
Joseph A. Firsching
BY Kerr Thompson
ATTORNEYS

WITNESS
H. Wurst

Patented July 15, 1930 1,770,592

UNITED STATES PATENT OFFICE

JOSEPH A. FIRSCHING, OF UTICA, NEW YORK

METHOD AND APPARATUS FOR TREATING ARTIFICIAL SILK

Application filed September 29, 1925. Serial No. 59,431.

This invention relates to a new and novel method and apparatus for treating artificial silk.

The usual method practiced in the knitting of artificial silk is that the artificial silk is either treated with an oil, such as for instance, neat's-foot oil, in order to make the silk pliable, or in other cases the artificial silk is subjected to steam jets which are located on the knitting machine, with the idea that the steam will render the artificial silk pliable. In some cases both oil and steam are used.

The oil treatment has many disadvantages, for illustration, oil on an artificial silk such as rayon, has a deteriorating action. The process is expensive, not only due to the expenditure for oil, but from the further fact that it costs considerable money to remove the oil from the knitted fabric, and further the more the fabric is handled while wet, the greater the depreciation.

The use of steam jets has also many objections, particular as the steam jets in order to be effective are on the knitting machine, and this is very objectionable from the standpoint of labor conditions. And if the machines are stopped any length of time, the steam going onto the yarn softens it to such an extent that it breaks.

The process of this invention not only eliminates these disadvantages and objections, but results in the production of a much stronger, better wearing and more perfect fabric than any of the present methods.

Further, attempts to knit the artificial silk known as celanese, even when sprayed with water or treated with oil as described, have failed, while with the method of this application substantially 100 per cent perfect knitting is secured with celanese yarn.

Other objects and advantages relate to the details of the method and the apparatus, all as will more fully appear from the following description, taken in connection with the accompanying drawings, in which:—

Figure 1 is a perspective view of the primary conditioner.

Figure 2 is a section on line 2—2, Figure 1.

Figure 3 is a section on line 3—3, Figure 1.

Figure 4 is a perspective view of a support for carrying a plurality of bobbins.

Figure 5 is a top plan view of four secondary conditioners each arranged in connection with a knitting machine which, as is usual, embodies two sets of needles and knitting mechanisms.

Figure 6 is a section on line 6—6, Figure 5.

Figure 7 is a section on line 7—7, Figure 5.

Figure 8 is an elevation of the particular bobbin used in carrying out this method.

In the practice of the method herein, the artificial silk is first wound in the usual manner upon a tubular bobbin —1—. This bobbin may be of the usual form and construction except that it is provided with a plurality of longitudinally extending grooves —2—, and perforations through the wall of the bobbin opening into the grooves 2 which will permit water to flow from the interior of the tubular bobbin to the artificial silk wound thereon.

In like manner, the frusto-conical base of the bobbin is also formed with a plurality of perforations preferably arranged in a uniform manner so as to permit the supply of water to the inner portion of the artificial silk wound thereon in a substantially uniform manner.

After the silk has been wound upon the bobbin described, a plurality of these bobbins may be placed upon a suitable support or tray 3 equipped with a handle 4, by means of which it may be easily transported from place to place. This tray is then placed in a water tank 5 disposed as shown at the top of the primary conditioner 6. This primary conditioner, as illustrated, may be of a box-like structure formed of any suitable material, and having a metallic or other tank 5 mounted in its upper portion and supported therein in any suitable manner.

Access is obtained to the tank 5 through the upper portion of the conditioner which is formed with, in this instance four closures 7 hinged to a longitudinal extending substantially centrally arranged hinge-bar 8.

Preferably these closures consist of a framing and a screen or wire netting within the framing. By opening any one of the closures 7, access is obtained to the tank 5 and the tray 3 with its bobbins mounted upon the spindles 9 may be placed in the tank 5 which contains sufficient water to preferably completely immerse the bobbins with the artificial silk wound thereon.

By this construction of bobbin, not only the exterior of the coil of silk wound thereon is uniformly subjected to contact with the water, but in addition the water fills the interior of the hollow tubular bobbin and passes outwardly through the perforations in the wall thereof, and is spread substantially uniformly by the grooves in the wall of the bobbin so that the interior of the coil of yarn is also uniformly subjected to the water.

The bobbins may be allowed to remain immersed in the water in the upper tank 5 for a considerable period of time, as for instance a period of 24 hours, altho considerable variation is possible, and as it is not always possible to immediately use the yarn so treated, means is provided for maintaining the yarn in its moistened condition, and for that purpose the primary conditioner 6 is provided with a bottom tank 10 which extends throughout substantially the entire horizontal cross-sectional area of the conditioner and is adapted to contain water which will maintain the bobbins placed in the holding compartments 11 and 12 in a moistened, dampened condition.

The compartments 11 and 12 are arranged one above the other between the upper tank 5 and the lower tank 10 and the lower holding compartment 12 is separated from the tank 10 by means of a perforate partition wall 13, while the two compartments 11 and 12 are in a similar manner separated from each other by a perforate partition wall 14.

Swinging hinged doors 15 and 16 may be provided for closing the open front side of the compartments 11 and 12 respectively. When the bobbins, as for instance mounted on trays 3, have been subjected for the desired period of time to immersion in water in the tank 5, the tray is removed from the tank and is placed in one of the compartments 11 and 12 and is allowed to remain there until it is desired to use the yarn and supply it directly to the stitch wheel of a knitting machine.

The tanks 5 and 10 may be supplied with water through an inlet pipe 17 and the water may be drawn off through outlet pipe 18 and an overflow pipe 19 is provided for limiting the level of the water in the respective tanks.

For the purpose of maintaining the artificial silk in its moistened dampened condition until it is actually knitted into fabric, there is provided a secondary conditioner or a series of secondary conditioners —20— which are disposed adjacent the knitting machine or machines, and from which the yarn moves directly to the stitch wheel 21 as it is unwound from the bobbin or bobbins within the secondary conditioner —20—. It is essential that the yarn should be supplied to the stitch wheel 21 in the moist, damp condition which has been produced and maintained within the primary conditioner 6 and for that reason the secondary conditioner is provided with a tank 22 adapted to contain water, and which may continuously receive water through an inlet pipe 23 connected to the outlet of a pump 24 and the water returns from tank 22 to the pump 24 through an outlet pipe 25 which is connected to the inlet side of the pump 24.

In this illustration, four secondary conditioners are shown in Figure 5, all connected in a similar manner to the pump 24 and adapted to be utilized in connection with a machine which includes two sets of needles and knitting mechanisms.

In this illustration each secondary conditioner 20 is designed for holding four bobbins 1, and for that purpose is provided with a longitudinal spindle bar 26 disposed just above the tank 22 and of less width than the width of the conditioner so that moisture rising from the tank will pass freely around the bar 26 to the yarn upon the bobbins 1. A guide bar 27 is provided which extends longitudinally of the secondary conditioner and may be secured therein in any suitable manner, and is provided with openings or perforations 28 for the passage of the artificial silk as unwound from the bobbins on the spindle bar 26.

In addition, the cover 29 of the secondary conditioner is provided with a plurality of eyelets 30 equal in number to the number of bobbins for which the secondary conditioner is designed, and the artificial silk is carried through these eyelets and directly to the stitch wheel 21 of the knitting machine so that the yarn is supplied to the needles for knitting immediately as it is drawn from a conditioner which maintains it in the moistened dampened condition effected in the primary conditioner. Obviously, any number of threads of artificial silk may be supplied to one knitting machine, and these secondary conditioners may be of any suitable number for any one machine, and each secondary conditioner may be adapted to contain any desired number of bobbins. Preferably, a considerable portion of the secondary conditioner, as for instance, the longitudinal walls and portions of the lateral walls are formed of glass or some transparent material so that withdrawal of the artificial silk from the bobbins can be readily seen.

Preferably as indicated, the front wall is

hinged as at —31— so as to permit access to the interior of the secondary conditioner for the removal and insertion of bobbins. In this particular illustration, the inlet pipe —23— extends across the entire upper portion of the tank —22— and is provided with a series of perforations —32— which constitute the only outlets from the inlet pipe so that the water is supplied to tank —22— in a series of small streams or sprays which operate more effectively to supply moisture to the silk upon the bobbins —1—.

The treatment of the artificial silk known as rayon is of perhaps considerably greater commercial importance than that of celanese and as rayon would be destroyed by immersion in water, the silk is wound dry upon the bobbins and the bobbins with the silk thereon are placed in one of the chambers 11 or 12, which chambers contain a moisture-laden atmosphere due to the water in tank —10—. The silk is allowed to remain in the chamber subject to the damp atmosphere until the silk consumes or takes on sufficient moisture to render it pliable. Ordinarily a period of from 24 to 48 hours is sufficient. The silk may then be placed in the secondary conditioner which supplies sufficient moisture to permit of knitting the rayon without the use of steam or oil. This method of treating the yarn preliminary to knitting and then supplying the yarn to the stitch wheels and needles of a knitting machine directly from a conditioner effects the objects of this invention as above described, and not only produces a better fabric in a more economical manner, but permits the use of certain artificial silks that so far as I am aware, have never been capable of use for knitting on a spring needle machine.

Altho I have shown and described a specific apparatus and a particular process as adapted for being carried out in the use of that apparatus, I do not desire to restrict myself to the details of the method or in so far as the method is concerned, to any specific apparatus, except as the same may be particularly set forth in the claims hereto appended.

I claim:

1. The method of treating artificial silk on a bobbin, consisting in subjecting the artificial silk while on the bobbin to moisture sufficient to thoroughly dampen the same, and then maintaining the artificial silk in a moist atmosphere and supplying the same from said moist atmosphere directly to a knitting machine.

2. The method of treating artificial silk consisting in immersing the same in water until the same is rendered thoroughly pliable, maintaining the artificial silk in a moist atmosphere and supplying the same from said moist atmosphere directly to a knitting machine.

3. The method of treating artificial silk on a bobbin, consisting of subjecting the artificial silk while on the bobbin to immersion in a water bath, then maintaining the artificial silk in a moist atmosphere and supplying the same from said moist atmosphere directly to a knitting machine.

4. The method of treating artificial silk on a bobbin, consisting in supplying water to the exterior and interior of the body of artificial silk wound on the bobbin until the same is rendered thoroughly pliable, then maintaining the artificial silk in a moist atmosphere and supplying the same from said moist atmosphere directly to a knitting machine.

5. The method of treating artificial silk on a bobbin having a perforated tubular wall, consisting in immersing the bobbin with the artificial silk thereon in a water bath whereby the artificial silk is uniformly subjected to the water, then maintaining the artificial silk in a moist atmosphere and supplying the same from said moist atmosphere directly to a knitting machine.

6. The method of treating artificial silk consisting in subjecting the artificial silk to a water bath whereby the same is rendered pliable, then maintaining the artificial silk in a moistened condition in a primary conditioner containing the moist atmosphere, then placing the artificial silk in a secondary conditioner adjacent the knitting machine, and containing a moist atmosphere, and supplying the artificial silk directly from the secondary conditioner to the stitch wheel of a knitting machine.

7. An artificial silk conditioner comprising a water tank, means above the water tank for supporting the artificial silk and means for supplying water to said tank in the form of a plurality of small streams.

In witness whereof I have hereunto set my hand this 19th day of September, 1925.

JOSEPH A. FIRSCHING.