Sept. 18, 1928. 1,684,923

H. MAYER

APPARATUS FOR SOFTENING SILK, YARN, AND THE LIKE

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Fig. 1.

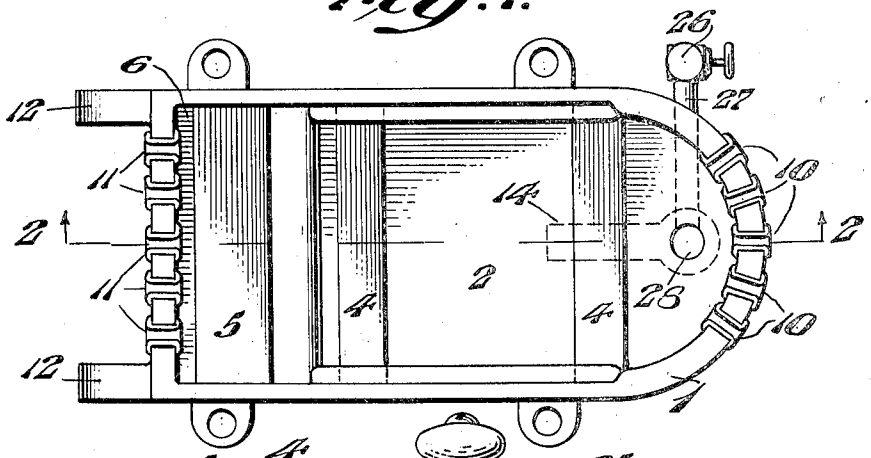



Fig. 2.

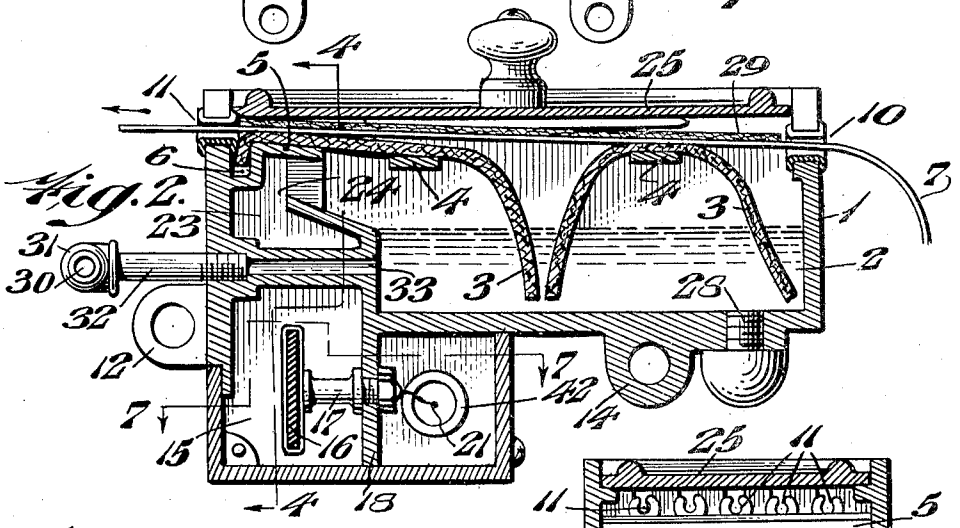



Fig. 3.

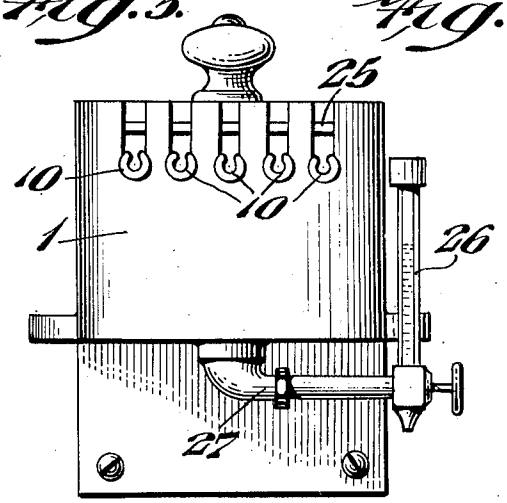
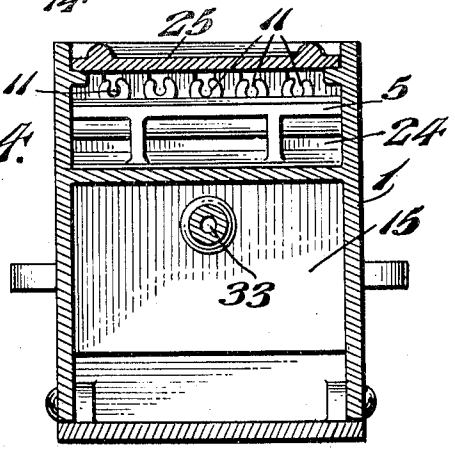



Fig. 4.




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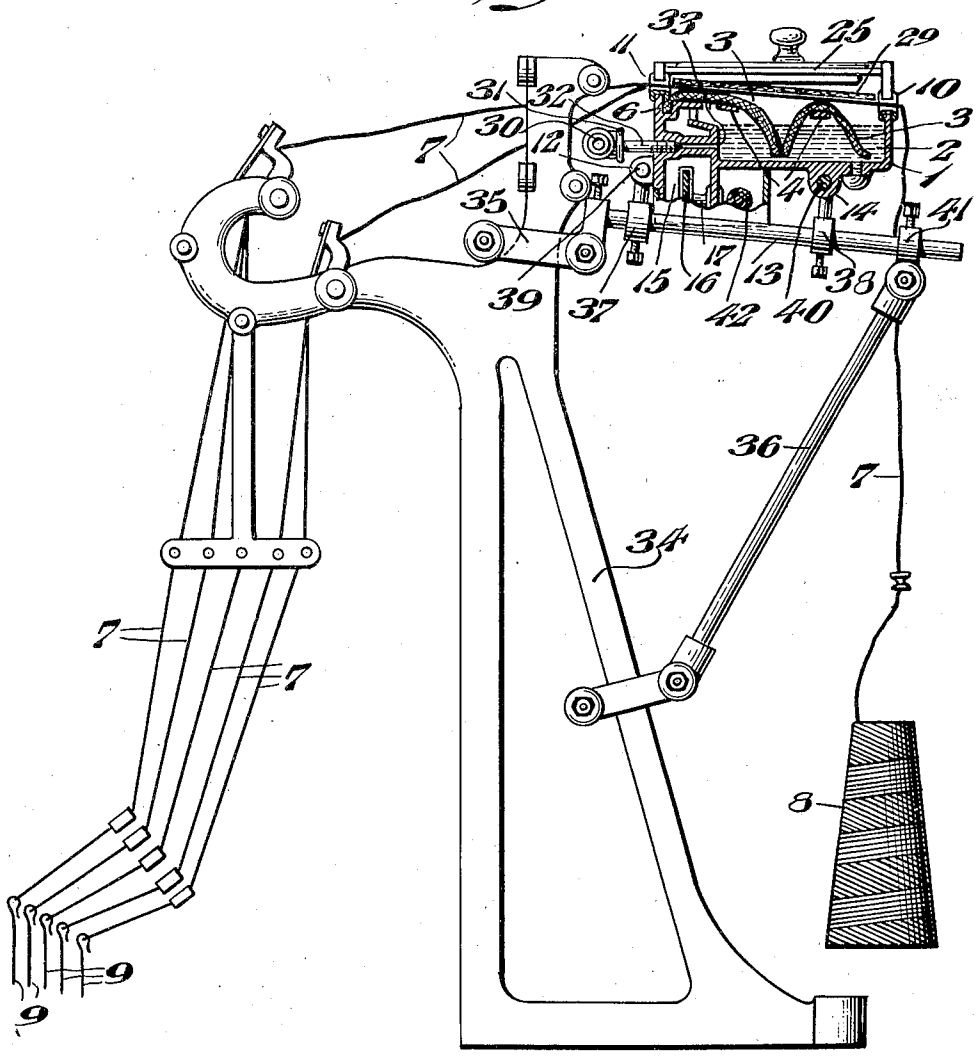
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Fig. 5.




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APPARATUS FOR SOFTENING SILK, YARN, AND THE LIKE

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Fig. 6.

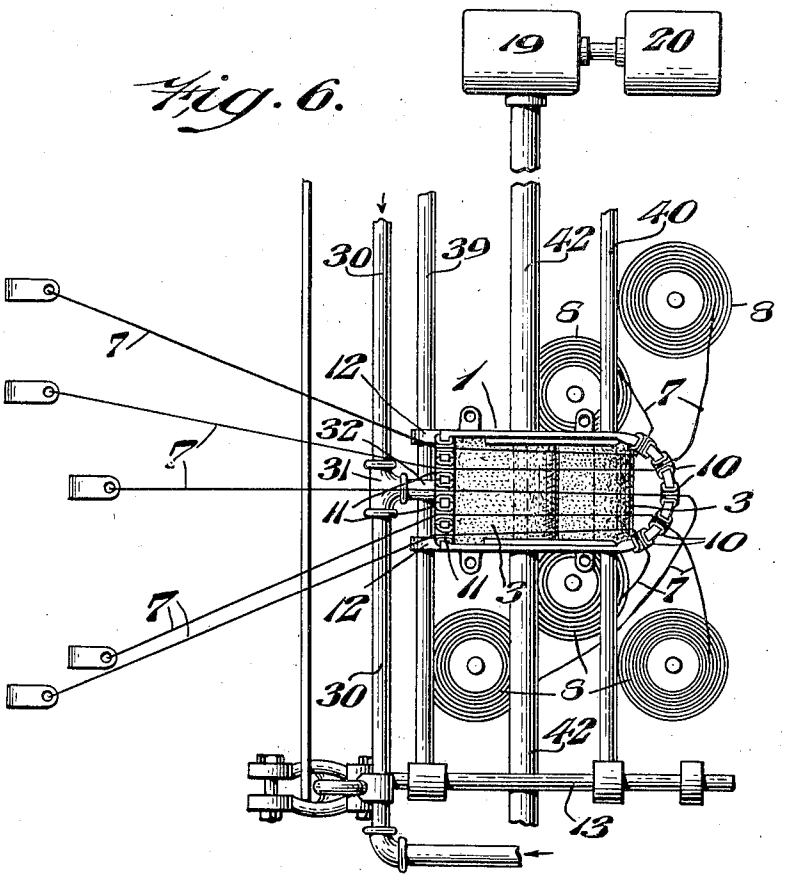
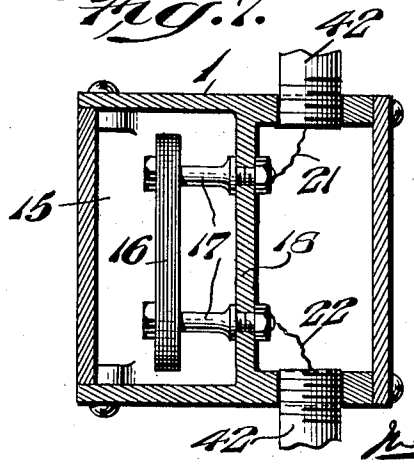



Fig. 7.




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# UNITED STATES PATENT OFFICE.

HERMAN MAYER, OF PHILADELPHIA, PENNSYLVANIA.

## APPARATUS FOR SOFTENING SILK, YARN, AND THE LIKE.

Application filed March 3, 1928. Serial No. 258,792.

This invention relates to a novel silk softener or apparatus for treating silk, yarn, cotton or other thread and relates more especially to apparatus in which the silk, yarn, cotton or other thread is treated as by a lubricating, oiling, dyeing, or moistening operation as it passes from the bobbin or cone to a knitting or weaving machine the purpose of which is to soften the silk, yarn, or cotton threads prior to utilization upon the particular machine upon which it is used.

The leading object of the present invention is the provision of a novel device arranged to moisten, oil, dye, or similarly treat silk, worsted, cotton or other yarns as they pass from the bobbin or cone to a knitting or other machine, particularly in passage from a bobbin to the needles of a knitting machine.

A further object of the present invention is to provide a novel apparatus of the character stated in which felt wicks are provided which absorb the water or other liquid employed in the softening of the silk, yarn, or cotton threads, as the threads pass over and contact with the felt wicks and in so doing absorb the water or other liquid employed.

A further object of the present invention is to heat the wicks above referred to, so that the thread in passing thereover is simultaneously softened and moistened, thereby making the threads flexible, which prolongs the life of the needles and guides, which might otherwise become damaged or broken due to the harshness of the threads employed.

A still further object of the present invention is to provide apparatus of the character stated in which winding apparatus is eliminated due to the fact that winding and rewinding to reduce hardness and stiffness of the threads employed can, by my novel apparatus embodied in the present invention, be eliminated.

A further object of the present invention is to provide a heating unit connected upon a motor line whereby when the motor is not in operation the heating unit is out of commission; and vice versa, when the motor is in operation the heating unit functions, so as to operate the apparatus so that when the temperature therein reaches a height beyond the softening point of the silk, yarn, or cotton, thereupon through thermostatic connections, the heating unit is automatically cut off, thereby permitting of proper softening of the article to be operated upon.

A still further object of the present invention is to provide means whereby an electric heating unit is utilized in order that water or other liquid and the silk, yarn thread or other material being operated upon may be simultaneously heated, moistened and softened, which heating element under the increase of units of temperature generates a vapor which moistens and softens the yarn, thread or silk for the desired purposes.

Other and further objects reside in the provisions of novel features of construction and in the novel arrangement combination and connection of parts as will hereinafter appear.

The invention consists of the novel construction hereinafter described and finally claimed.

For the purpose of illustrating my invention I have shown in the accompanying drawings one form thereof which is at present preferred by me, since the same has been found in practice to give satisfactory and reliable results, although it is to be understood that the various instrumentalities of which my invention consists can be variously arranged and organized and that my invention is not limited to the precise arrangement and organization of the instrumentalities.

Figure 1, represents a plan view of a silk softener embodying my invention.

Figure 2, represents a vertical section, taken upon the line 2—2 of Figure 1.

Figure 3, represents an end view of Figure 1.

Figure 4, represents a vertical section, taken upon the line 4—4 of Figure 2.

Figure 5, is a view in elevation, partly sectioned, illustrating the device embodying the invention applied to a knitting machine.

Figure 6, is a plan view of the parts shown in Figure 5.

Figure 7, is a view in horizontal cross-section taken upon the line 7—7 of Figure 2, showing the electric heater and its adjuncts.

Referring to drawings, in which similar numerals of reference indicate corresponding parts, 1 designates a generally rectangular or other shaped receptacle arranged to contain water or other liquid, the liquid being designated 2. Within the receptacle 1 there are arranged wicks 3 partly submerged in the

liquid 2 so that the wicks at all times will absorb liquid in the receptacle. The wicks are supported by cross bars 4, and the forward or left hand wick has its forward portion supported upon a ledge 5, and has its forward end inserted, in the pocket or seat 6 formed between the forward end of the ledge 5 and the juxtaposed wall of the receptacle 1. Arranged to travel over these wicks 3 is the silk, yarn, cotton or other thread 7, which material is fed from a bobbin or cone 8, see Fig. 5, to, for example, the needles 9 of a knitting machine, which for explanatory purposes, only, is shown as being a flat knitting machine in Fig. 6. The silk, yarn, or cotton threads 7 in passing through the moistener receptacle 1 are guided through the inlet eyelets 10, and egress through the exit eyelets 11. As clearly shown in Fig. 1, one end as the right hand end of the receptacle 1 is formed upon an arc of a circle, and the opposite end is provided with opposed lugs 12, through which lugs pass a supporting rod which is supported from the rod 13 forming part of the knitting machine. The bottom of the receptacle 1 is provided with a single lug 14 which is also supported from the rod 13. The forward and lower part of the receptacle 1 is provided with a compartment or electric oven 15, see Fig. 7, which is separated and apart from the major portion of the receptacle 1. Within this compartment 15 there is arranged an electric heating unit designated 16, supported by bolts 17, from the rear wall 18 of compartment 15. This heater is employed to heat the liquid within receptacle 1, and the wicks 3, and thereafter to moisten or soften the yarn, silk, or cotton thread 7 passing through receptacle 1.

The bolts 17 are in electrical connection with any suitable source of electric power, as a motor, not shown, and the motor is electrically connected with a regulator 19 and a thermostatic control device 20, see Fig. 6, conventional electric wiring 21—22 being provided.

Heat being delivered to the heating element 16 by the electrical connections the liquid contained in receptacle 1 is thereafter raised in temperature, there being a passage 23 communicating with the receptacle 1, and leading to an opening or space 24 to permit the heat to pass from the oven 15 to the receptacle 1. The receptacle 1 is provided with a removable cover 25, so that the interior of the receptacle 1 may be readily inspected. The receptacle 1 is provided with a guage 26 in order to determine the liquid level in the receptacle 1, which gauge may be of conventional form and communicates at its lower end with the pipe 27, which communicates with the bottom of the receptacle at the point 28.

While my device will function efficiently with the two felt wicks 3 already described, over which the silk, yarn or other thread passes it may be desirable to employ a third piece of wicking, 29 as seen in Fig. 2, the silk or yarn to be moistened passing over the wicks 3 and below the superimposed flat wick 29. The liquid 2 is supplied to the receptacle through the inlet pipes 30 which discharge into the T 31, from which leads the branch 32, which discharges into the passage 33 leading into the interior of the moistener. My novel thread moistener can be supported from the frame 34 of the knitting machine or the like in any suitable manner, but in the present instance I have shown the rod 13 as supported at its front end from the bracket or the like 35, while its rear end is supported upon a link 36, whose lower end is suitably supported from the framework 34. Upon the rod 13 are slidably mounted the front and rear collars 37 and 38, which carry respectively the front rod 39 which passes through the lug 12 and the rear rod 40 which passes through the rear bottom lug 14.

The rear adjustable collar 41 mounted on the rod 13 may also be employed, which is connected with the upper end of the link 36. By the adjustment of the collars 37, 38 and 41 with respect to the rod 13, it will be apparent, that the thread moistener can be quickly adjusted to any desired position with reference to the knitting machine. The electric wire conduits 42 effectively enclose the wiring and it will be seen that the heating unit is inclosed in a separate chamber and further that the wiring connections are effectively protected from any moisture being totally enclosed and fire proof.

The receptacle 1 can be made of any suitable material as cast iron, white metal, brass, copper, porcelain, or glass. The heating unit in the oven or chamber 15 is easily accessible and likewise its connections in the wiring chamber.

My novel softener can be attached to a full fashioned hosiery machine, a circular knitting machine or to silk spinning, weaving and winding machines as is evident.

The electric heating element 16 has an important function, since it not only heats the water, felt and the threads which are to be softened, but it also has a tendency as the temperature increases to generate a vapor which softens and lubricates the thread and the resultant fabric into which the thread is knitted.

The heating unit being inclosed in a separate chamber or oven 15, in the front of the casing and below the liquid, effectively heats the latter, and the heat rises and escapes through the passages 23 and 24 best seen in Figure 2, into the liquid chamber and impinges upon the wicks and threads passing thereover. The heating unit is firmly clamped to and supported from the wall 18, as will be understood from Figures 2 and 7.

In practice the heating unit is connected on motor lines, so that when the motor is not in operation the heating unit is not in service, in other words the unit starts and stops with the motor. When the temperature reaches a height beyond a point of softening, it will automatically cut off the current by the employment of the thermostatic regulator shown conventionally at 20, Fig. 6, which can be of any suitable construction which can be set at any temperature between 80° and 200° Fahrenheit.

The receptacle 1 can be filled to the desired height with water or any other liquids with the felt wicks 3 partly submerged. These wicks will at all times absorb the various liquids and will always be saturated. As the threads pass over and contact with said felt wicks they will absorb the water or liquids used, and in so doing will be readily lubricated, softened and moistened, making the threads so flexible, that the life of the needles and guides which otherwise are liable to break or become fractured by the hardness of the threads, will be indefinitely prolonged.

The use of my novel device further eliminates the use of some winding machinery, as today many of the threads or yarns can be purchased on cones and can be used as purchased directly on the knitting machine. In many cases at the present time, however, silk and like threads are wound and rewound many times in order to take the hardness and stiffness out of them. My novel device dispenses with this procedure, since it lubricates and softens the threads and the resultant fabric and thereby saves an extra operation of re-winding the fabric in order to apply some sort of a lubricant thereto.

By the pipe lines 30, water, oil or any dyeing liquid can be readily supplied to the passage 33. This pipe line or supply is in practice connected to each softener and on hosiery machines, one softener is used for each section, that is for knitting machines having 20 sections, there will be 20 softeners. This pipe line 30 preferably terminates in a reservoir (not shown) in which any desired liquid may be stored and will be governed by a valve (not shown) which when opened will supply each unit, each of the latter being provided with an overflow. The guiding devices 10 and 11 can be eyelets, or split guides through which the threads pass. These guides can be either two piece or solid, with straight holes therethrough, or if desired, porcelain, copper, brass or glass tubes extending through the walls of the softener can be used in place thereof, which tubes may also be used for heating and lubricating purposes.

The rear wall of the softener is preferably constructed of crescent shape in order to obtain more surface for the reception of the guides 10, and thereby making it easier for the threads to enter the same. It will be apparent that if desired the rear end of the casing or receptacle can be made flat the same as the front end.

It will be apparent that as the threads pass through the softener, as seen in Figure 2 they will be effectively moistened, oiled or lubricated.

My device is especially applicable to knitting machines of the straight or circular type adapted for the knitting of ladies silk hosiery, which is at the present time so extensively in vogue.

I am aware that the invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof, and I therefore desire the present embodiment to be considered in all respects as illustrative and not restrictive, reference being had to the appended claims rather than to the foregoing description to indicate the scope of the invention.

Having thus described my invention what I claim as new and desire to secure by Letters Patent, is:—

1. In a device of the character stated, a moistening receptacle having a chamber adapted to contain a liquid, a bar in the upper portion thereof, a wick supported on said bar and having its ends submerged in said liquid, front and rear guiding devices for the threads to be moistened, a heating chamber in said receptacle and below the liquid chamber therein arranged isolated from the latter at all times, and a heating element for said chamber also isolated from said liquid.

2. In a device of the character stated, a moistening receptacle having a chamber adapted for the reception of a liquid, an electric heater for said liquid, a chamber below said liquid chamber in which said heater is positioned having a passage leading from the upper portion thereof said heater being isolated from said liquid at all times, a plurality of wicks supported in said receptacle and having their ends submerged in said liquid, and an inlet conduit for conducting liquid to said receptacle, the heat from said heater passing around said inlet conduit.

3. In a device of the character stated, a receptacle adapted to receive a liquid, a cross bar in the upper portion of said receptacle, a pocket in the front of said receptacle, a wick supported on said cross bar and having its front end positioned in said pocket with its rear end submerged in said liquid, a heating oven in the lower portion of said receptacle, and a passage leading therefrom into the upper portion of said receptacle above said liquid.

4. In a device of the character stated, a receptacle having a front wall and a crescent shaped rear wall, guide devices in said front and rear walls, cross bars in the upper

portion of said receptacle, a plurality of wicks supported on said cross bars, a pocket in the front portion of said receptacle in which the front end of the front wick is seated, an upper flat wick resting upon said plurality of wicks, a heating chamber in the lower forward portion of said receptacle but separated from the liquid chamber, an electric heater therein, and a passage leading from said heating chamber to the upper portion of said receptacle.

5. In a device of the character stated, a liquid receiving chamber, an electrically heated chamber below and in front of the liquid chamber, thread guiding devices in the front and rear of said first named chamber, a plurality of lower wicks supported in said liquid chamber, an upper wick superimposed upon said lower wicks, the threads passing between said wicks, and a passage from said heating chamber for conducting heat against one of said lower wicks and thence into said liquid chamber.

6. In a device of the character stated, a liquid receiving chamber, an electrically heated chamber below and in front of the liquid chamber, thread guiding devices in the front and rear of said first named chamber, a plurality of lower wicks supported in said liquid chamber, an upper wick superimposed upon said lower wicks, the threads passing between said wicks, a passage from said heating chamber for conducting heat against one of said lower wicks and thence into said liquid chamber, and a removable cover for said liquid chamber.

HERMAN MAYER.