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APPARATUS FOR TREATING SINGLE THREADS WITH LIQUIDS

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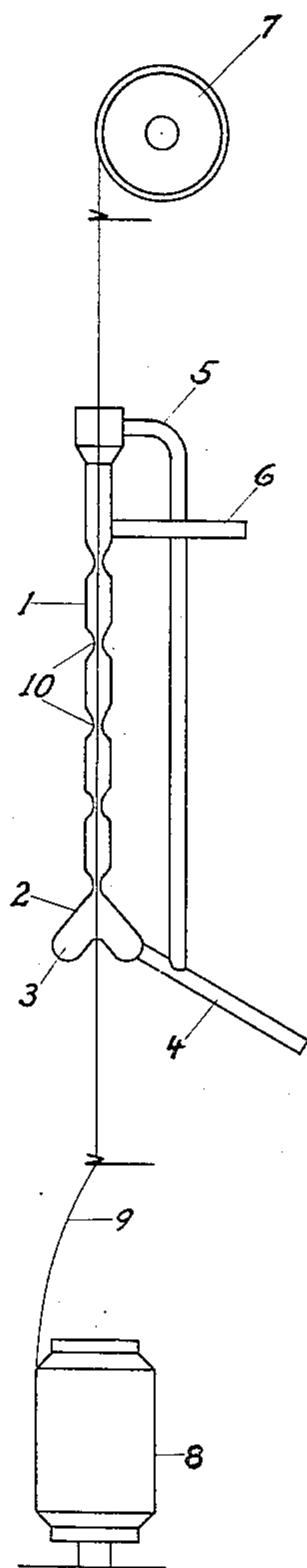


Figure 1.

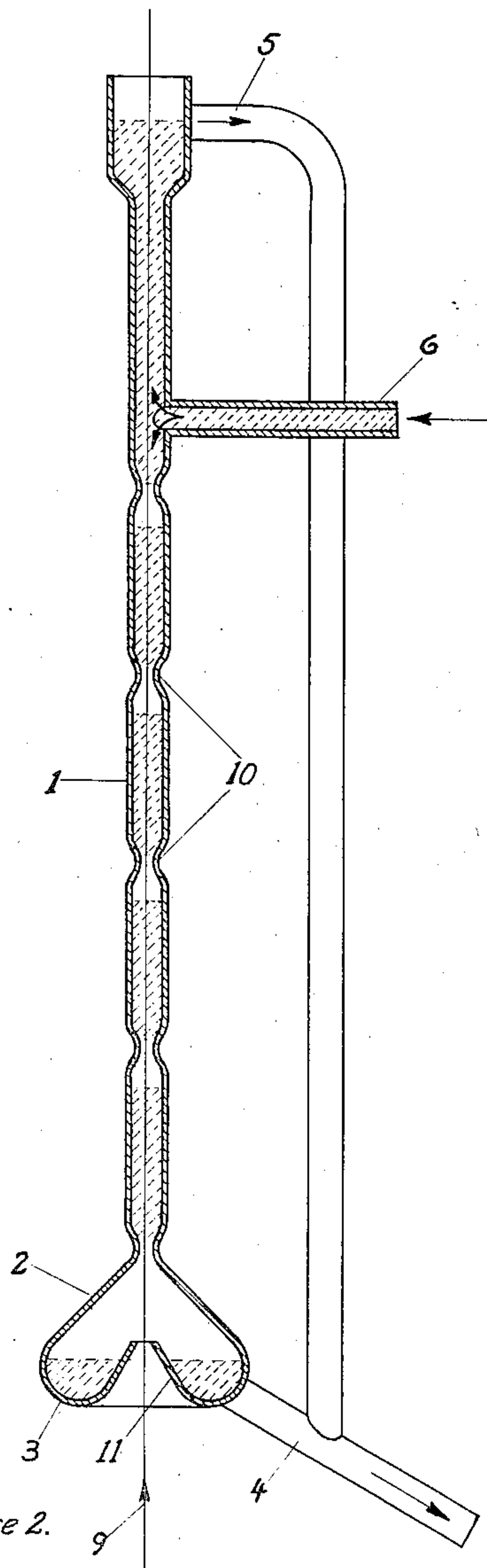


Figure 2.

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APPARATUS FOR TREATING SINGLE THREADS WITH LIQUIDS

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It is well known in the art to treat single threads with liquids by leading them together with liquid through curved tubes. It is also known to treat the threads in baths leading and directing them in the desired manner over rods or rollers. These methods of treating are accompanied with certain disadvantages, one of these consists in the fact that the threads are easily damaged by the undesired friction.

It has also been proposed to lead threads in straight direction, without deviating them, through casings or tubes filled with treating liquids. To this kind of devices belongs the so-called stretch spinning apparatus for producing cuprammonium silk, in which the thread is lead in a vertical direction and is collected by a spool without having changed substantially this direction. The disadvantage of that kind of devices is the fact that the jet of the liquid leaves the tube together with the thread, and could not be separated from the thread otherwise than to lead the thread by suitable means from the vertical direction. This method however is accompanied by the above mentioned inconveniences.

All these inconveniences are avoided by the invention, which consists in a tube, the lower extremity of which is bulged and the edge is turned inwards so that a circular channel is formed at the mouth of the tube. This channel serves for collecting the liquid, which is conducted sideways by a tube branching off from the channel. To prevent the fluid from flowing out of the pipe too rapidly, before exercising a sufficient effect on the filament, the pipe is of small diameter or provided with a number of contractions which in allowing the filament to pass through leave but little space for the passage of the fluid. A layer of fluid adheres to the filament, and if the filament move in the contrary direction to the fluid, the flow of the fluid is decreased to a

greater degree. The too rapid flowing out of the fluid is thus prevented.

The conduit for guiding the fluid into the pipe may be situated directly on the upper mouth or at any height of the sides of the pipe. In this manner it is possible to conduct the filament in a counter direction to the fluid through one part of the pipe and in the same direction through the other part of the pipe.

The invention may be employed in a most general way. For instance the outlet tubes of the spinning apparatus used in the stretch spinning process are formed according to the invention. In this way it is possible to lead the thread in a substantially vertical direction and without deviation to the collecting device without the jet of the liquid which remains nearly entirely in the circular channel from which it is conducted sideways. The advantages of the invention need not to be emphasized, for the precipitating liquid sprayed to the form of dust by the centrifugal force of the rotating spinning pot is very undesired and injurious to health.

A further example for the application of this invention is the simultaneous twisting and dyeing of the filament. For instance, the filament drawn from the twisting-bobbin over head is lead in comparatively straight line and without changing its direction upwards through the pipe and dyed under the influence of a dyeing-bath. On leaving the pipe, the filament travelling in the same direction is led to a bobbin. During the winding operation, the bobbin is sprinkled, sprayed or dipped into a bath to wash out any superfluous fluid adhering to the filament, so that the three operations of doubling, dyeing and washing are performed in one course.

This invention possesses several advantages not hitherto obtainable. The friction between the filament and the parts necessary for the wet treatment during a textile operation is reduced to a minimum by the filament

travelling in a straight line, and the filament is much more delicately treated. The apparatus is considerably simplified by the abolition of all guiding rollers and turning appliances. A further advantage of this apparatus is to be perceived in the fact that, the fluid employed in the treatment of the filament is subjected to continual and uniform renewal, rendering the treatment of the filament itself more perfect and uniform. Otherwise the inconveniences are avoided which prevail in the known devices in which threads are treated by liquid while lead in a substantially vertical straight direction. By using the invention one succeeds easily in separating the jet of the liquid from the thread travelling vertically.

Finally, in consequence of the damming effect of the contractions, but a small quantity of fluid can flow off, bringing about a much desired economy.

In the accompanying drawing a constructional example of the invention is diagrammatically shown.

Fig. 1 shows the complete disposition of apparatus for doubling and for wet-treatment.

Fig. 2 shows the treatment pipes.

The filament (9) is drawn over head in vertical direction from the doubling-bobbin (8), through the pipe (1) and wound on the bobbin (7). At equal distances the pipe (1) has contractions (10) and at the lower extremity a bulge (2) with the mouth-edge (11) turned inwards, forming a circular channel (3) connected with an exhaust-pipe (4). The feed-pipe (6) is connected up below the upper mouth. The overflow (5) connected with the exhaust-pipe (4) and placed shortly below the upper mouth, keeps the level of the fluid constantly uniform. It is specially desirable to guide the filament in an upward direction, starting from the turned-in mouth, and in a contrary direction to the flow of fluid, as then but little fluid can flow out, on account of the layer of fluid adhering to the filament.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:

1. An apparatus for treating single threads by liquids comprising a pipe provided with spaced constrictions and a channel shaped member connected with the lower end of the pipe adapted to drain off the liquid.

2. An apparatus for treating single threads by liquids, comprising a substantially straight pipe, narrow contractions arranged at certain distances in said pipe and a channel shaped member at the end of the pipe, adapted to drain off the treating liquid.

3. In combination, a pipe-like section, an inlet orifice thereinto, a series of constrictions, an inturned channel-shaped section at the bottom thereof, and an outlet in the said channel member.

4. In combination, a pipe-like section, an inlet orifice thereinto, a series of constrictions, in the tube below the said inlet orifice, an inturned channel-shaped section at the bottom thereof, and an outlet in the said channel member.

5. In a device of the class described, in combination, a tubular structure widened at its upper end with an overflow outlet leading to an overflow tube, entering at said widened end, said overflow tube running downwardly in a direction practically parallel to the first-named tubular structure, a series of constrictions in said first named tubular structure, said constrictions being evenly spaced, one from the other, an inlet feed pipe entering said first-named tubular structure at a point above the first constriction thereof, the lower end of said tubular structure being widened and inturned to form a drainage channel, and an exhaust pipe placed at an angle to the tubular structure and opening into said channel and joining said overflow tube below said channel.

6. In a device of the class described, in combination, a tubular structure widened at its upper end with an overflow outlet leading to an overflow tube, entering at said widened end, a series of constrictions in said first named tubular structure, the lower end of said tubular structure being widened and inturned to form a drainage channel and an exhaust pipe placed at an angle to the tubular structure and opening into said channel.

7. In a device of the class described, in combination, a tubular structure, a series of constrictions in said tubular structure, said constrictions being evenly spaced, one from the other, the lower end of said tubular structure being widened and inturned to form a drainage channel and an exhaust pipe placed at an angle to the tubular structure and opening into said channel.

8. In a device of the class described, in combination, a tubular structure widened at its upper end with an overflow outlet leading to an overflow tube, entering at said widened end, said overflow tube running downwardly in a direction practically parallel to the first-named tubular structure, a series of constrictions in said first named tubular structure, the lower end of said tubular structure being widened and inturned to form a drainage channel, and an exhaust pipe placed at an angle to the tubular structure and opening into said channel, and joining said overflow tube.

9. In a device of the class described, in combination, a tubular structure widened at its upper end with an overflow outlet leading to an overflow tube, entering at said widened end, said overflow tube running downwardly in a direction practically parallel to the first-named tubular structure, a series of constrictions in said first named tubular structure,

said constrictions being evenly spaced, one from the other, the lower end of said tubular structure being widened and inturned to form a drainage channel, and an exhaust pipe
5 placed at an angle to the tubular structure and opening into said channel and joining said overflow tube below said channel.

In testimony whereof we affix our signatures.

10 AUGUST HARTMANN.
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