No. 845,160. PATENTED FEB. 26, 1907.

L. CIPOLLINA.

MACHINE FOR MERCERIZING COTTON.

APPLICATION FILED MAY 27, 1903.

3 SHEETS—SHEET 1.

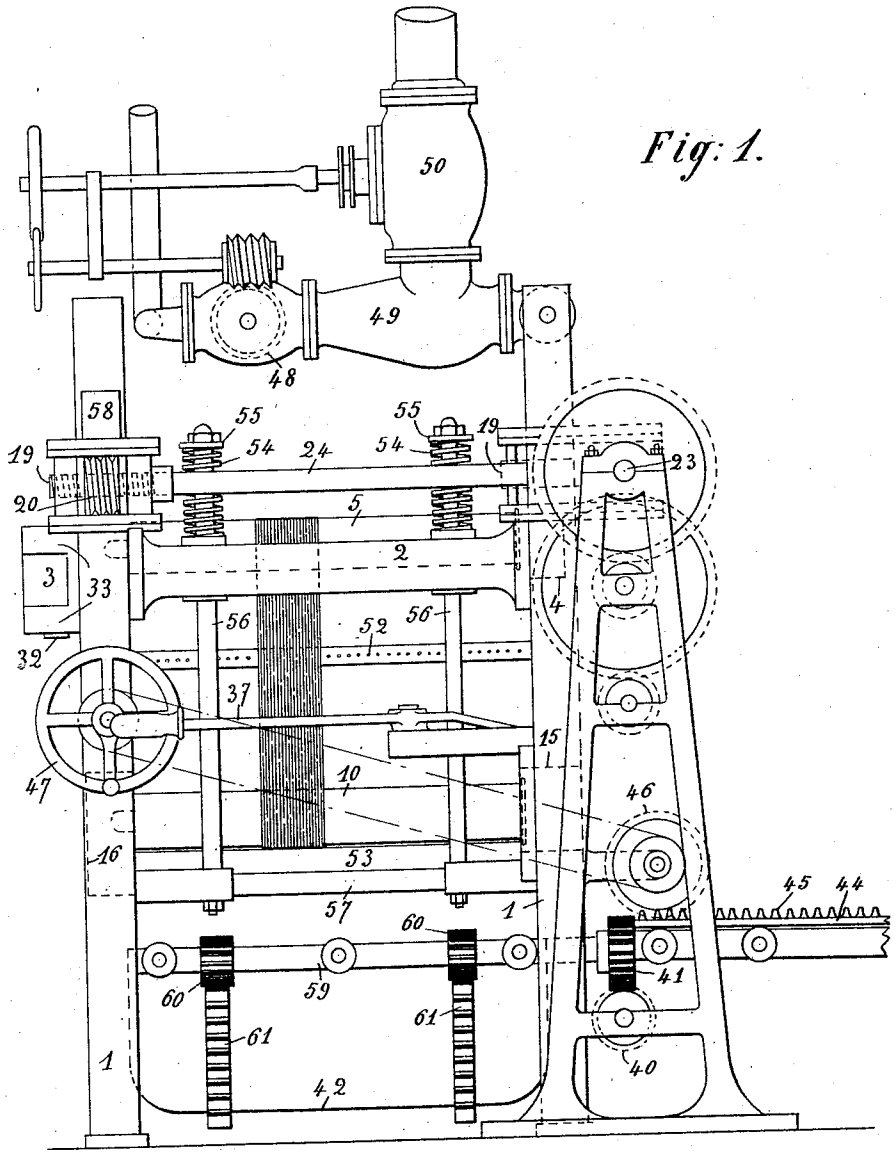

Fig. 1.

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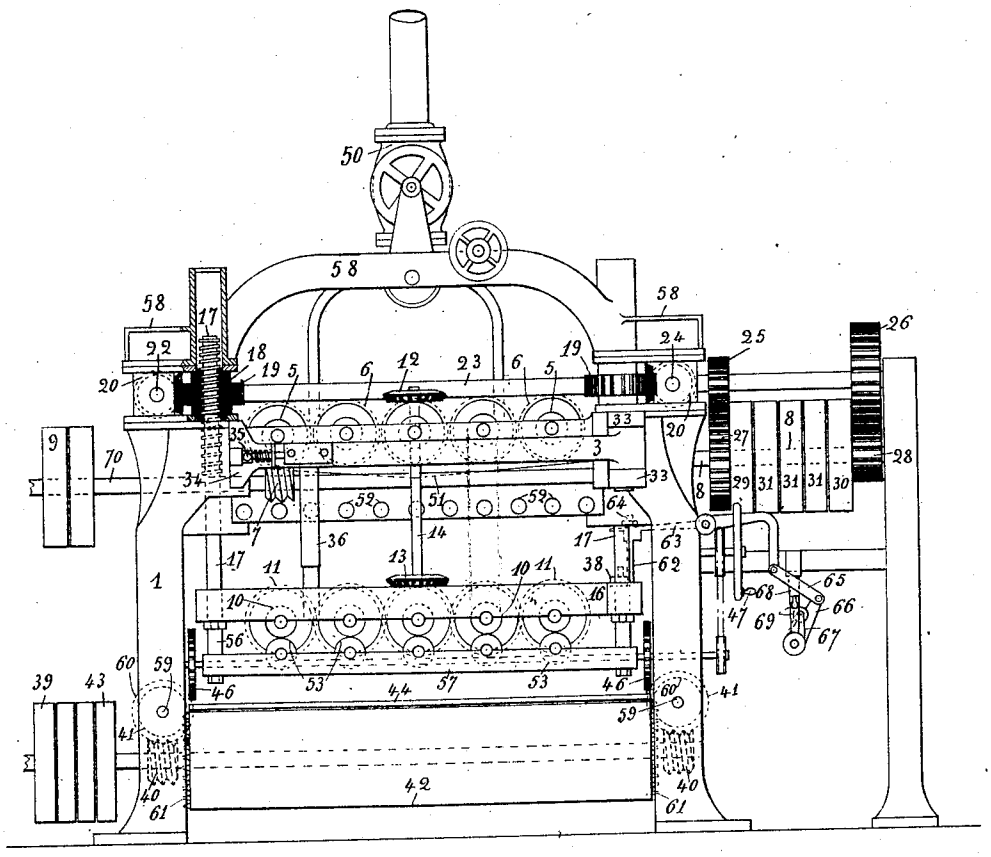
3 SHEETS—SHEET 2.

Fig. 2.



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3 SHEETS—SHEET 3.

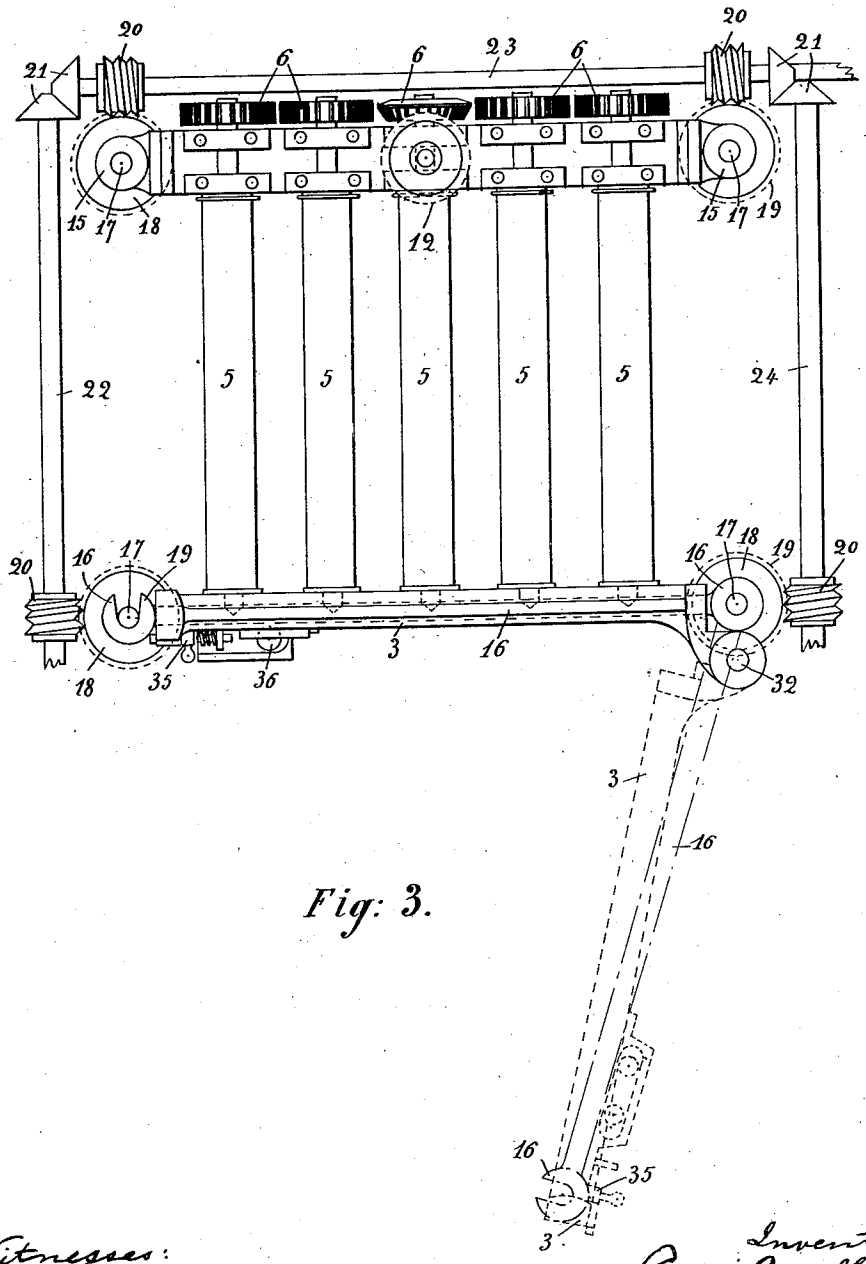

Fig. 3.

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UNITED STATES PATENT OFFICE.

LUIGI CIPOLLINA, OF RIVAROLO LIGURE, ITALY.

MACHINE FOR MERCERIZING COTTON.

No. 845,160. Specification of Letters Patent. Patented Feb. 26, 1907.

Application filed May 27, 1903. Serial No. 158,959.

To all whom it may concern:

Be it known that I, LUIGI CIPOLLINA, a subject of the King of Italy, residing at Rivarolo Ligure, Italy, have invented certain new and useful Improvements in Machines for Mercerizing Cotton, &c., of which the following is a full, clear, and exact description.

The object of my invention is to provide a cheap and efficient apparatus for the mercerizing of cotton, whereby the cotton is given a uniform brilliancy, practically that of silk. This I accomplish by giving to the hanks or loops of yarn a perfect and uniform degree of tension before they are dipped into the bath of caustic-soda solution, and while this may be accomplished by various devices and mechanisms I have found exceedingly efficient, and prefer to use to bring about such result and carry into operation my improved method of mercerizing, the apparatus shown in the drawings and hereinafter described.

My said invention is fully shown in the following specification, of which the accompanying drawings form a part, wherein similar numerals of reference designate like or equivalent parts wherever found throughout the several views, and in which—

Figure 1 is a view of the machine or apparatus which I prefer to use to carry out my process of mercerization. Fig. 2 is a front view of such apparatus, partially in section; and Fig. 3 is a plan view of the rotating cylinders of such apparatus and their supports.

The principal frame of the machine consists of four uprights 1, usually planted in the ground and united rigidly at the top by two side cross-bars 2, a front bar 58, and a rear bar 4. To this main frame are attached the various mechanisms necessary for the working of the machine.

The skeins to be treated are supported by two series of metallic horizontal coupled cylinders on identical vertical planes. The superior cylinders 5 are supported at their posterior extremities by bearings attached to the cross-bar 4 and carry the fixed helicoidal wheels 6, which are actuated by the endless screws 7, (of which in Fig. 2 only one is shown for simplicity's sake,) attached to the axle 70, which carries the driving-pulley 9. On their anterior ends the cylinders 5 end in a conical point which penetrates the cross-bar 3. The inferior cylinders 10 at the posterior ends of their axes bear toothed wheels which are put in gear one with the other and receive the motion from the superior cylinders 5 through conical toothed wheels 12 and 13, united by means of a vertical shaft 14 capable of vertical reciprocation. These inferior cylinders 10 are supported at their posterior ends in bearings attached to the cross-bar 15 and their anterior conical ends reset in the cross-bar 16.

The rods 17 are vertically reciprocated by the female screws 18, which are provided externally with helicoidal crowns. By moving these crowns by means of the endless screws 20 and the conical gears 21 a vertical motion of translation is transmitted to the cross-bars 15 and 16, thus changing the position of the cylinders with reference to the cylinders 5.

The conical gearings 21 are united together by means of the shafts 22, 23, and 24. The middle shaft 23 carries the two toothed wheels 25 and 26, which gear, respectively, with the toothed wheels 27 and 28 on the same shaft, on which are placed the fixed pulleys 29 and 30 and the loose pulleys 31. By means of a belt acting on the pulley 30 the motion is transmitted to the four endless screws 20 in the proper direction to lower the two cross-bars 15 and 16, so as to force the cylinders 10 away from the cylinders 5. By shifting the belt onto the pulley 29 reverse motion of increased velocity is transmitted to the endless screws 20, so as to lift up the cross-bars 15 and 16 and with the latter also the cylinders 10.

The front cross-bar 3 is so arranged as to swing through an arc of more than ninety degrees around the pivot 32 of the hinge 33 of the upright 1, and the free end 34 leans against the other upright 1 and is fixed by means of a spring-bolt 35, which enters into a guide in said upright. The inferior cross-bar 16 is also arranged so as to turn round the axle 17, as shown in Fig. 2, through an arc of more than ninety degrees with the cross-bar 3, to which it is united by means of the shaft 36.

To operate this apparatus and carry out my improved process of mercerization, the apparatus shown is operated as follows: To load the machine with the cotton skeins, the workman with his left hand frees the spring-bolt 35 from the upright in which it is inserted and with his right hand he grips the handle 36 and pulls toward him the two cross-

bars 3 and 16, thus widening the space between them sufficiently to allow of the freely putting in its place of the end of the cotton on the cylinders 5 and 10. The workman then pushes back into place the cross-bars 3 and 16, and by means of the lever 37 shifts the belt from the loose pulleys 31 onto the fixed pulley 30, thus putting into motion the various gearings and by means of the cylinders 10 and 5 giving a uniform tension to the various skeins of cotton. When the tension has reached the utmost limit of the unitarian resistance of the cotton, a stop attached to the cross-bar 15 strikes the projecting piece 38, Fig. 2, and compels the lever 37 to push the belt on the loose pulley 31, next to the fixed one 30. The projection 38 is on the shaft or pin 62, which is applied to the extremity of the lever 65 and is controlled by a screw 64. The lever 63 is joined to the lever 65 66 67. The latter acts on the rod 68, controlled by a spring, and causes the moving of the guides for the belts. The rollers 69 help the moving when the cotton has a convenient tension, and by pushing the belt on the pulley 39 this moves the two endless screws 40, which are in gear with the helicoidal wheels 41, wedged on the shafts 59, which are attached on the uprights 1. On said shafts 59 are secured the gear-wheels 60, which gear with the toothed bars 61, applied to the recipient 42, containing the liquid with a solution of caustic soda, which recipient, by means of the motion of the endless screws 40, is lifted up to the point in order that the cylinders 10, with the cotton, may be immersed in same. Putting the cylinders 5, and consequently also the skeins of cotton, into motion by means of the pulley 9 the cotton will of course be dipped for a suitable time, which ordinarily amounts to a few minutes. After the dipping by working the pulley 43 the recipient 42 is lowered and covered with its cover 44, the latter being provided with toothed bars 45, which gear with the toothed wheels 46, moved by means of a belt from the pulley 47, and the cotton is then washed. For this purpose the injecting-valve 48 receives steam from a boiler and injects it into the injector 49, usually of the Giffard type, where the cold water is drawn in by means of the cock 50. The water is pushed by the steam under a pressure of ninety pounds through the injector into the recipient 51 and by mixing up with steam is heated to a temperature of over 60°. From the recipient 51 the warm water is conveyed to the pipe 52, provided with a large number of small holes from which it is sprayed against the cotton while the latter is moving. Under and against the metallic cylinders which carry the cotton are pressed tightly the rubber cylinders 53 by means of the spiral springs 54, attached to the cross-bars 2, which push upward the ends of the rods 55, regulated by screws which sustain the cross-bars 57, sustaining the rubber cylinders 53. The object of these cylinders is to liberate the cotton from the caustic soda before the washing. During the washing, the casing 42 being provided with the covering 44, the wash-water dripping from the cotton will not weaken the caustic bath, and the latter may thus be used for subsequent operations with great economy. After the washing has been completed the operator shifts the belt by means of the lever 37 from the loose pulley 31 to the fixed pulley 29, which will impart a very rapid motion by means of its gearings to the endless screws 20, uplifting the cross-bars 15 and 16, and with them also the cylinder 10, so that the tension of the skeins of cotton will be relieved. The process of mercerization being thus completed, the operator then displaces the cross-bars 3 and 16 from their places and easily frees the mercerized cotton from the machine.

What I claim, and desire to secure by Letters Patent, is—

1. In a mercerizing-machine, a series of coupled rollers for supporting the hanks of yarn placed two by two, in vertical planes, two upper cross-bars supporting the upper rollers the front one being pivoted at one end to the frame of the machine and the other being fixed thereto, four corner guide-rods sliding vertically, and two lower cross-bars supporting the lower rollers, connected to the lower ends of said rods, the front rod being pivoted at one end to the frame of the machine and the other being fixed to such frame.

2. In a mercerizing-machine for yarn, a series of coupled rollers for supporting the hanks of yarn placed two by two in vertical planes, two upper cross-bars, lower cross-bars, four corner guide-rods sliding vertically, a tank containing the mercerizing liquid provided with toothed vertical bars, gears and worms coacting with said toothed bars for raising and lowering the tank, a cover for the tank provided with toothed bars and adapted to slide on rollers outside the machine, and means for sliding the cover from the rollers on the tank after it has been lowered.

3. In a mercerizing-machine for yarn, a series of coupled rollers for supporting the hanks of yarn placed two by two in vertical planes, two upper cross-bars and two lower cross-bars, a tank containing the mercerizing liquid adapted to be reciprocated vertically, a series of rubber rollers pressing against the lower rollers and supported by cross-bars which are suspended by vertical rods to the frame of the machine, and springs actuating the rods.

4. In a mercerizing-machine for yarn, a series of coupled rollers supporting the hanks of yarn placed in vertical planes, means for stretching the hanks and for rotating the rollers, a tank containing the mercerizing

liquid, means for raising and lowering the tank, a cover for the tank, means for sliding the cover on the tank after it has been lowered, and a series of washing-pipes provided with small holes arranged between the hanks parallel to the rollers.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

LUIGI CIPOLLINA.

Witnesses:
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AUGUSTE EGGENSCKWILER