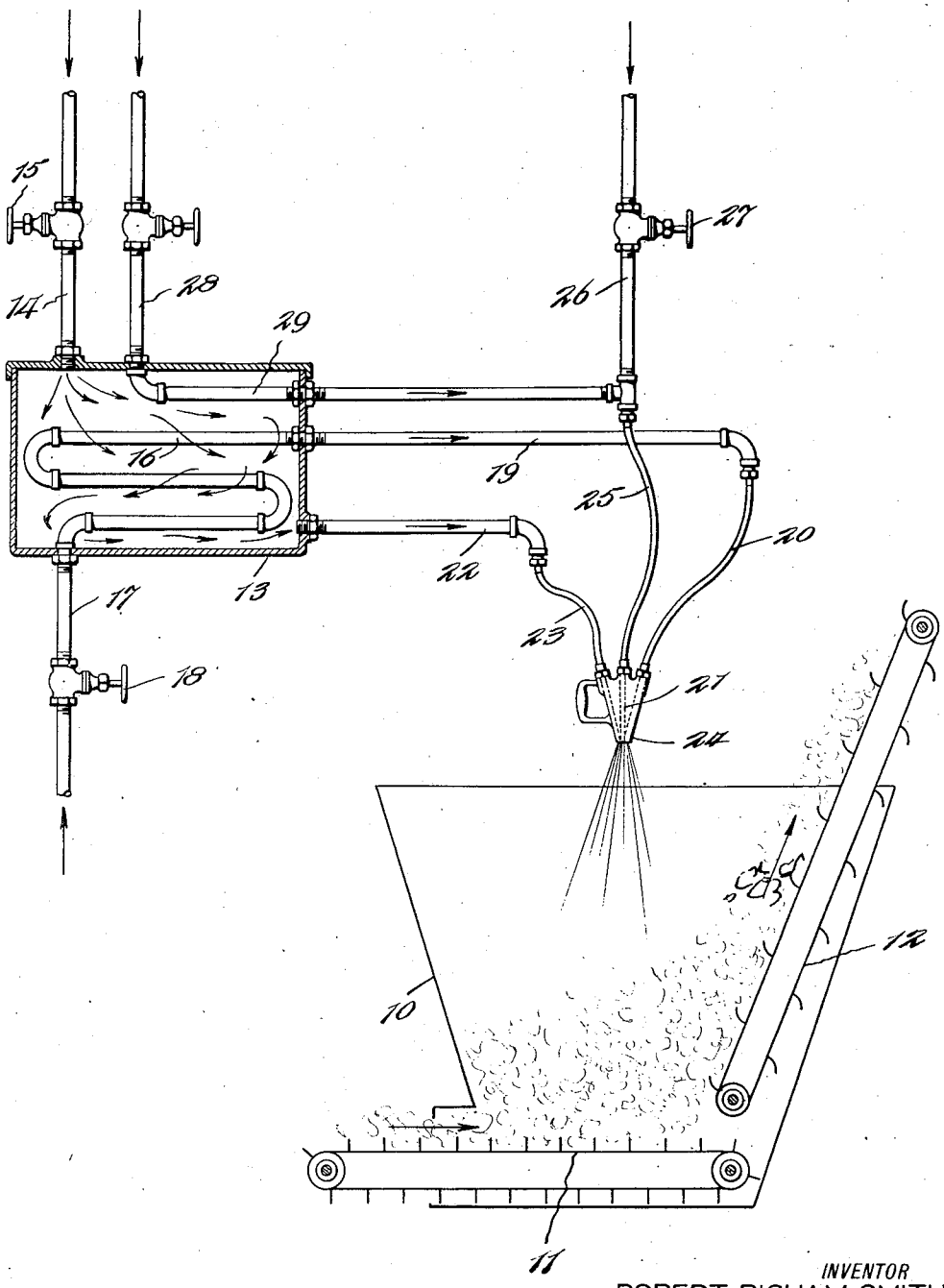
Sept. 13, 1927. 1,642,092

R. B. SMITH

METHOD OF CONDITIONING TEXTILE FIBERS

Filed June 28, 1926



INVENTOR
ROBERT BIGHAM SMITH

BY
Warren S. Orton.
ATTORNEY

Patented Sept. 13, 1927. 1,642,092

UNITED STATES PATENT OFFICE.

ROBERT BIGHAM SMITH, OF MACON, GEORGIA, ASSIGNOR OF ONE-HALF TO HUGHES L. SIEVER, OF KEYSER, WEST VIRGINIA.

METHOD OF CONDITIONING TEXTILE FIBERS.

Application filed June 28, 1926. Serial No. 118,893.

The invention relates in general to an improved method of conditioning textile fibers such as wool, jute, cotton and the like, when in the form of raw stock and before it has been spun into yarn. The invention is particularly useful in conditioning fibers which have had their natural lubricants removed by being boiled out, bleached or dyed. In the following description reference will be made specifically to a method of subjecting a mass of raw cotton stock to a single conditioning treatment.

The present invention constitutes a further development of the invention disclosed in my Patent No. 1,550,396, on "method of oiling cotton raw stock" granted August 18, 1925.

The primary object of the invention is to provide for a more perfect conditioning of textile fibers in their natural or grey state particularly in regard to the desirable humidifying and lubricating feature than has been possible where conventional methods such as the separate spraying or sprinkling of an oil on the stock and the blowing of moisture into rooms containing the stock are followed.

Incidental to this general object it is among the other objects of the invention to provide a lubricating treatment in which the lubricant is diffused uniformly throughout the mass of material treated in extremely minute particles so as to provide a treatment in which there will be present at the termination of the method, water in a finely divided state and in which both the lubricant and the water particles are capable of being further diffused through the fibers as they are fed through the carding and other machines during the subsequent steps of treating the fiber stock.

Broadly, the invention is attained by subjecting suitable lubricating oil to the action of a steam blast and in such way as to cause the oil to be atomized or broken up into finely divided particles and deposited with the incidental steam condensates on the material under treatment.

Another object of this invention is to provide for an improved method of introducing emulsifying agents into the textile fibers as an incident of treating the fibers for lubrication and humidification, and at the same time to avoid the objections inherent in known methods of treating such fibers with emulsifying agents.

Broadly, this aspect of the present invention is attained by adding to the steam-oil atomizing stream, one or more additional streams of conventional emulsifying agents, and/or by the selection of an oil of the character which will emulsify in the presence of the hot atomizing steam and which steam to effect this result has been caused to assume a pressure and a resulting temperature sufficient to emulsify as well as atomize the particular oil used.

Still another object of the invention is to provide for saponification in addition to the lubrication and humidification, and in general it is to be understood that the invention features the simultaneous treatment of the fibers to effect in a single operation the requisite condition to which such fibers are customarily subjected prior to being fed to the carding and other machining operations.

Various other objects and advantages of the invention will be obvious from a consideration of the preferred method of practicing the invention hereinafter described and from an inspection of the accompanying drawings and in part will be more fully set forth in the following particular description of one method and of one form of apparatus for practicing the method and the invention also consists in certain new and novel operations and features of construction and combination of parts hereinafter set forth and claimed.

In the accompanying drawing there is shown diagrammatically an instrumentality for conventionally practicing the methods featured in this application, but it is obvious that in addition to the steam line illustrated only one of the other feed lines is required to form the basic combination of steam-liquid atomizing form of conditioning textile fibers.

In the drawing there is shown a hopper 10 for receiving the fiber to be treated, and in the instant case it is to be assumed that the fiber is raw cotton, a pair of endless conveyers 11 and 12 act conventionally to move the cotton through and from the hopper.

At some suitable location in the mill, is

positioned a preheating chamber 13 into which is discharged steam through a steam pipe 14 controlled by a valve 15. Positioned in the chamber 13 is a coil of heating pipe 16 in the instant case shown to be part of an oil conduit. The intake end of the coil is in fluid communication with an oil supply pipe 17 intruded through the bottom of the chamber 13 and controlled by a valve 18. The discharge end of the coil leads from a side of the chamber through a fixed pipe 19 and flexible piping, preferably a lead pipe, 20 to an atomizer 21 provided with a discharge vent disposed to direct a thin stream of oil on to the cotton or other stock in the hopper. The oil as it is discharged is broken up into finely divided particles or atomized to form a mist or cloud of oil. This is attained most conveniently by causing a jet of steam under pressure to act on the oil in the same manner as an air atomizer functions. In the illustrated showing the steam is fed from a suitable source, as from the chamber 13, through a fixed piping 22 and flexible piping 23 to the atomizer 21.

Where it is desired to introduce other chemicals in addition to the oil and water to the fibers and to take advantage of the atomizing effect of the steam, it is suggested that an additional discharge nozzle 24 be incorporated with the atomizer and this nozzle be supplied from a flexible tubing 25 in turn supplied either directly and unheated through the supply pipe 26 controlled by a valve 27, or supplied from a pipe 28 which leads through the preheating chamber 13 as indicated at 29 so that the fluid content is subjected, more or less, to a preheating treatment before it is fed to the atomizer and discharged therefrom on to the stock under treatment.

In one practical application of the method herein disclosed the oil used is a pure, mineral lubricating oil, but it is suggested that other less efficient oils may be used for example, castor oil and lard oil. The amount of steam used in proportion to the oil has been, in the case of cotton from one to five pounds of steam per pound of oil; for wool and jute, two to ten pounds of steam per pound of oil. The steam used in this treatment has been under a pressure of about ten pounds but is varied dependent upon the oil and other liquids used. At this pressure it has been found that the steam acts not only to atomize the oil but at least to some extent to effect an emulsification of the oil without the necessity of using emulsifying agents particularly for this purpose. The action of the atomizer is to cause the oil particles to be broken up and forcefully ejected with the steam particles into the mass of fiber under treatment and while the oil particles are hot. While the particles are moving rapidly just after they are acted upon by the steam, they quickly lose their velocity and assume the form of a lazy, cloud-like mist which settles down on the filters. The steam coming into contact with the relatively cold fiber tends to condense thereon in the form of fine particles and this finely divided state of both the water and oil appears to increase the rapidity with which the oil permeates the mass over conventional methods where the oil is sprayed on to the mass of fibers. The water particles thus deposited have a tendency to evaporate from the natural heat of the room and from the friction of the fibers as they are being passed through the machines in the subsequent mashing operations. This subsequent movement of the oil and water particles tends further to divide the oil and further tends to distribute the oil uniformly throughout the entire mass of fiber.

Where other forms of conditioning reactions are desired in addition to the humidification and lubricating factors featured herein, the usual reagents may be added to or substituted for the oil. For instance, where an emulsification is desired it is suggested that to the oil mild alkaline substances such as borax, oleates, trisodium salts and alcohols be incorporated, or preferably these additional modifying reagents may be supplied through the conduit 25 so that a mixture of the ingredients will be effected at the point of application to the fiber rather than have these mixtures prepared with possibility of subsequent separation as characterizes emulsifying agents now supplied in bulk to the market.

It is also within the scope of the disclosure to apply saponifying reagents to the fiber in addition to or as a substitute for the oil treatment herein featured, and for this purpose any of the usual soap solutions may be fed through the pipe 25. These soap solutions may be any of the known soap forming chemicals and even stronger reagents such as the potassium and sodium hydrates at present used in liquid forms may be employed.

By means of the method herein disclosed there has been effected a more economic use of the reagents, the elimination of waste, a more uniform distribution of the material through the stock and in the case of preprepared mixtures of reagents there has been attained an avoidance of the separation of the reagents as frequently occurs where the stock mixture is permitted to stand for any length of time.

While I have shown and described, and have pointed out in the annexed claims, certain novel features of my invention, it will be understood that various omissions, substitutions and changes in the form and details of the device illustrated and in its operation

may be made by those skilled in the art without departing from the spirit of the invention.

Having thus described my invention, I claim:

1. In the art of treating textile fibers, the method which consists in projecting onto the fibers a stream of oil subjected to the atomizing effect of a stream of steam under pressure and at a temperature sufficiently high to emulsify the oil.

2. In the art of treating textile fibers, the method which consists in projecting onto the fibers a stream of mineral oil subject to the atomizing effect of a stream of steam under a pressure of about ten pounds.

3. In the art of treating textile fibers, the method which consists in projecting onto the fibers a stream of a fiber treating agent emulsifiable under heat, subjected to the atomizing effect of a stream of steam under pressure and at a temperature sufficiently high to emulsify the agent whereby the emulsion is formed at the instant the steam is projected onto the fibers.

4. In the art of treating cotton fibers, the method which consists in projecting onto the fibers a stream comprising oil and an emulsifying agent subject to the atomizing effect of a stream of steam under pressure whereby there is deposited on the fibers finely diffused particles of the emulsifying agent heated at the instant of application by the heat from the steam, together with hot particles of steam condensates.

5. In the art of treating textile fibers, the method which consists in subjecting the fiber to the action of a plurality of streams of preheated fiber treating agents, substantially free of water, said streams separated from each other until mixed by the atomizing action, forcefully projected thereon and incidentally mixed in a finely divided homogeneous state by means of steam through the agency of an atomizer.

6. In the art of treating textile fibers, the method which consists in projecting onto the fibers a stream including an emulsifiable agent, said stream being substantially free of water and subjected to the atomizing effect of a stream of steam under pressure whereby there is projected on to the fiber hot particles of the agent and particles of hot steam condensates supplied by the atomizing steam.

7. In the art of treating fibers, the method which consists in feeding to an atomizer a plurality of streams of fiber treating substances which have a tendency to separate when left undisturbed, subjecting said streams to the atomizing action of a stream of steam under pressure and under conditions which will tend to prevent cooling of the resulting mixture.

Signed at Macon, in the county of Bibb and State of Georgia, this sixteenth day of June, A. D. one thousand nine hundred twenty six.

ROBERT BIGHAM SMITH.