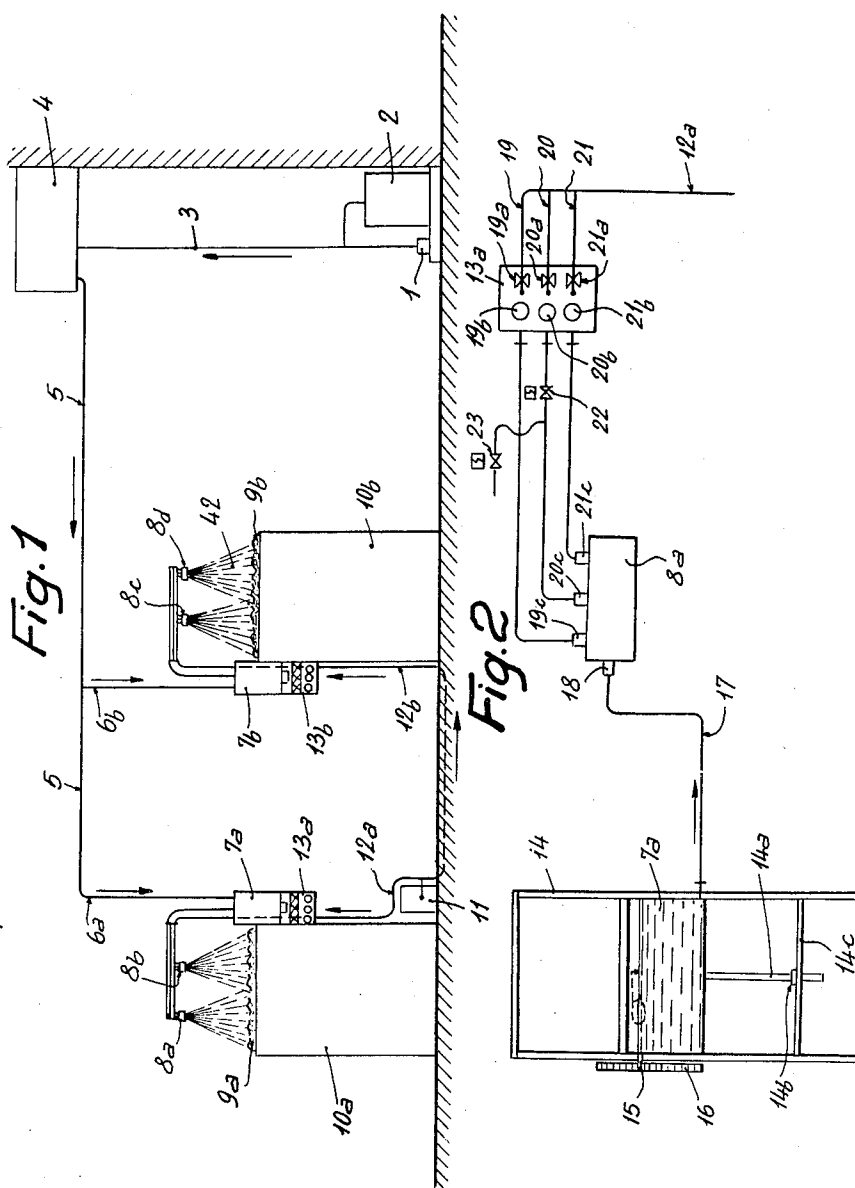


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2 Sheets-Sheet 1



Inventor
Roger Schlumberger
By Robert E Burns
Attorney

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R. SCHLUMBERGER
PLANT FOR OILING OR MOISTENING
TEXTILE FIBRES AND THE LIKE

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Fig. 3

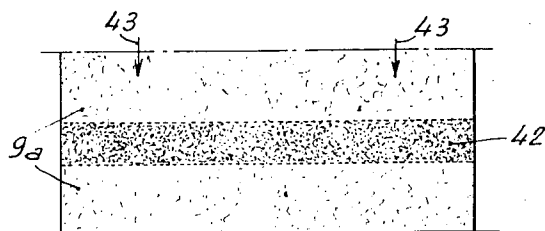


Fig. 4

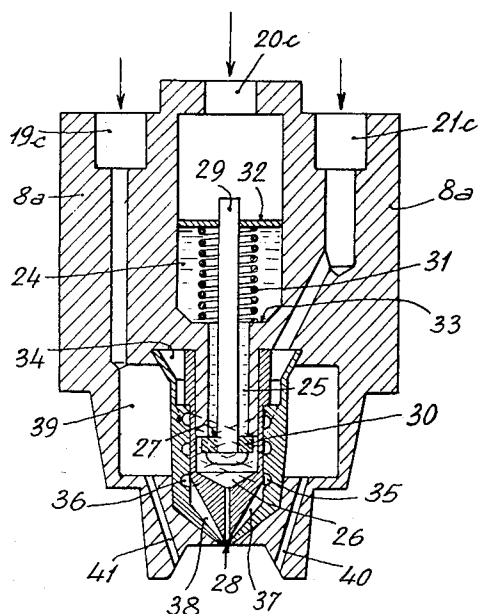
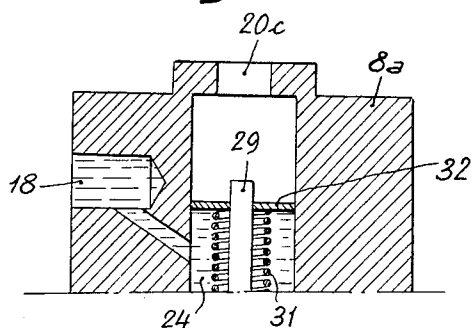


Fig. 5



Inventor
Roger Schlumberger
By Robert E. Burns
Attorney

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PLANT FOR OILING OR MOISTENING TEXTILE FIBRES AND THE LIKE

Roger Schlumberger, Saint-Germain-en-Laye, France

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7 Claims. (Cl. 299—58)

The present invention relates to improvements in apparatus of the kind serving more particularly, but not exclusively, for the oiling of cotton or other textile fibres.

It is known that the oiling consists in making the fibre absorb a variable quantity of clear or emulsified oil, and for cotton this operation is carried out before spinning, either on the lap of the cotton with the opener, or on the beaters, or on the card webs themselves. In this case it is necessary to atomize this oil very finely in various quantities capable of being reduced to 0.5% of the oiled material, and this may correspond to deliveries of the order of 2 grammes per minute by the atomizer.

At the place where the oiling takes place, the cotton is generally in the shape of a lap, the breadth of which may vary between 20 centimetres and 1 metre. The usual atomizers supply a jet which is substantially round, and this does not ensure a homogeneous oiling over a substantial width of the lap.

Furthermore, the atomization of oil is generally carried out with the help of compressed air of a pressure of at least 0.5 kg./cm.², and in the majority of cases this gives a rather violent projection, involving a risk of expelling the cotton, and with it the oil vapour or mist.

In apparatus of the kind under consideration, care must be taken that the supply of oil ceases if the advance of the lap of the cotton stops for any reason in view of the fact that if this is not done, the cotton, being under the atomizer at the time of stopping, becomes saturated with oil, and this would give rise to a troublesome tendency to stick. Now this condition, of an automatic stopping of the supply of oil when the advance of the cotton is stopped, is in general only imperfectly fulfilled in known installations.

The object of the present invention is to provide an apparatus which will remove the above-mentioned disadvantages.

For this purpose, the apparatus according to the invention comprises: an oil tank, an air-compressor supplying an air pressure of about 50 to 500 gr./cm.²; at least one atomizer comprising oil feed pipe and three separate pipe systems for air under pressure, that is to say, one control pipe line for controlling the oil inlet check valve, one atomization line for feeding an oil atomization system, and one dispersal line for feeding at least one blast pipe producing a jet and assuring sheet dispersal of the atomized oil jet produced by the said atomization system; and regulating and controlling means enabling the air admitted to the said three pipe systems to be separately regulated and controlled.

According to another feature of the invention, the oil tank, which has a constant level, can be adjusted in its height so that the constant level may be brought either above or below the atomizers, or on a level with them.

According to another feature of the invention, the three pipe lines of the atomizer can be supplied independently of one another and at different pressures.

According to another feature of the invention, the air

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feed pipe coming from the compressor terminates in a regulating and controlling panel, where it divides into three pipes going towards the three atomizer pipe systems and each has a sluice valve and a measuring appliance mounted on the said panel.

According to a further feature of the invention, the feed pipe of the pipe controlling the check valve has automatic controlling means arranged in such a manner as to ensure that oil is supplied to the atomizer when the device effecting the advance of the material to be oiled is in operation, and to stop this supply when the propelling device stops.

According to a further feature of the invention, the dispersal pipe line comprises two inclined blast pipes symmetrically arranged one on each side of the oil outlet pipe and in the same plane as the latter, in such a manner that the air jets produced by the said blast pipes intersect at a point located on the axis of the said outlet pipe.

According to another feature of the invention, the supply of oil may be regulated both by the height of the float tank and by the pressure of the atomizing air.

According to a further feature of the invention, the breadth of the sheet of atomized oil is regulated by the pressure of the air admitted to the dispersal pipe.

Further features and advantages of the invention will be gathered from the following description, reference being made to the accompanying drawings, in which:

Figure 1 is a diagrammatic view of the apparatus according to the invention;

Figure 2 is a diagrammatic view showing a pipe diagram of the compressed air and oil lines and related elements of the embodiment of Fig. 1.

Figure 3 illustrates diagrammatically in plan the shape of the sheet of oil mist supplied by the apparatus according to the invention;

Figure 4 is an axial longitudinal section of an atomizer according to the invention; and

Figure 5 is a partial view, in section on a diametral plane turned through 90° in relation to the plane of the section of Figure 4.

The apparatus according to the invention, which is illustrated diagrammatically in its entirety in Figure 1, comprises an oil pump 1 delivering oil from a tank 2 through an ascending tube 3 into a main tank 4.

From the tank 4 the oil passes along through a pipe 5, which divides into two branches 6a and 6b, to two constant-level tanks 7a and 7b, the arrangement of which will be described further on. The number of these tanks corresponds to the number of oiling points assembled in one plant. The example illustrated is assumed to comprise two oiling points, but this number may, of course, vary.

The atomization of the oil is effected by atomizers 8a, 8b, 8c, 8d, which are designed to effect the oiling of two laps of cotton 9a and 9b which pass over the usual beaters 10a and 10b respectively. Of course, the number of atomizers intended for one oiling point may be different from that illustrated in the drawings, according to the breadth of the lap to be oiled.

The atomizers are fed with air under pressure from a compressor 11 which preferably supplies a relatively low pressure of the order of 50 to 500 gr./cm.², in order to avoid a too violent projection of oil. The use of such a relatively low air pressure is rendered possible by the special construction of the atomizers, which will be described further on.

By means of two pipes 12a and 12b, the air under pressure from the compressor 11 reaches two regulating and controlling panels 13a and 13b respectively, the arrangement of these being described further on.

The atomizers are fed with oil from the constant-level

tanks 7a and 7b. As illustrated diagrammatically in Figure 2 for the tank 7a, these constant-level tanks can be adjusted in height. For this purpose they are slidable in vertical slideways 14, and can be brought to and held at any desired height by any appropriate means, such for example as a threaded bar 14a on which is screwed a nut 14b, bearing against a cross-bar 14c. The height of the oil level may be read on a fixed scale 16, in front of which moves a pointer 15 secured to the tank 7a. From the tank 7a a pipe 17 leads to an oil-admission coupling 18 of the atomizer, for example the atomizer 8a illustrated in Figures 2, 4 and 5.

The air pressure pipes coming from the compressor 11 divide into three lines, for example lines 19, 20 and 21, as illustrated in Figure 2 for the pipe 12a. In these pipes are inserted regulating sluice valves 19a, 20a, 21a, respectively, and pressure gages 19b, 20b, 21b respectively, which enable the air pressure in each of these three lines to be regulated, and thus enable the pressure which is established to be controlled. The sluice valves 19a, 20a, 21a, and the pressure gages 19b, 20b, 21b are connected on a regulating and control panel 13a which is associated with the atomizer 8a which is being supplied.

The air pressure pipes 19, 20, 21 terminate in admission couplings 19c, 20c, 21c respectively, which are provided on the atomizer 8a. In the pipe 20 are inserted a series-connected electro-valve 22, allowing air to enter into or be cut off from the coupling 20c, and also a shunt-connected electro-valve 23 which is beyond the section of the pipe 20 between the coupling 20c and the electro-valve 22 to the atmosphere. It should be noted that these electro-valves are synchronized with the device that advances the corresponding lap of cotton, 9a in the example illustrated, in such a manner that the valve 22 is open and the valve 23 is closed in order to admit air to the connection 20c when the said lap of cotton is moving forward normally, whereas the valve 22 closes and the valve 23 opens so as to open the connection 20c to the atmosphere when the lap of cotton stops.

The construction of the atomizers is illustrated in more detail, although diagrammatically, in Figures 4 and 5. The connection 20c communicates with a chamber 24, which is continued by a bore 25 of smaller diameter opening into a lower chamber 26, from which the oil outlet duct 28 starts.

A rod 29 having a substantially smaller diameter than the bore 25 passes through the latter and also extends into the chamber 24. The rod 29 has a collar 30 which bears against a shoulder 27, formed by the difference in diameter between the bore 25 and the chamber 26, under the action of a compression spring 31 inserted between a piston 32 fastened to the rod 29 and sliding in a fluid-tight manner in the chamber 24 on the one hand, and a shoulder 33 formed at the floor of the chamber 24 on the other hand. When the air under pressure is admitted through the connection 20c into the chamber space 24 above the piston 32, the latter descends against the thrust of the spring 31, removing the collar 30 from its seat 27 in such a manner as to establish communication between the oil outlet duct 28 and the chamber 24, which is supplied with oil by the pipe 17 (Figure 2) and the connection 18 (Figure 5).

The connection 21c is used for feeding a system which effects the atomization of the oil leaving the outlet duct 28. This system comprises in a known manner an annular chamber 34 communicating with two helical passages 35 and 36 of opposite pitch, terminating in two atomization pipes 37 and 38 respectively, which open in the region of the oil outlet duct 28.

According to a further feature of the invention, the air inlet connection 19c communicates with an annular chamber 39, from which two inclined air blast pipes or ducts 40, 41 start, these ducts being symmetrically ar-

ranged one on each side of the oil outlet duct 28 in the same plane.

The above apparatus operates as follows: The constant-level oil tanks 7a and 7b are first of all adjusted to the desired height, corresponding to the desired supply of oil, by turning the nut 14b in the appropriate direction, and the adjustment carried out can be read on the scale 16. The level inside each tank is kept constant by any device, not illustrated, comprising a float or the like. It should be noted that owing to the possibility of regulating the height of the constant-level tanks, this level can be brought to a height above, below or at the level of the atomizer or atomizers which are being fed.

Let us suppose that the device effecting the advance of the cotton laps to be oiled is in operation, and that consequently the valve 22 is open and the valve 23 is closed, since, as stated above, the said valves are synchronized with the advancing device. The opening of the sluice valve 20a will then cause air under pressure to be admitted into the upper part of the chamber 24, so as to cause the piston 32 to descend against the thrust of the spring 31, so as to induce a supply of oil through the oil outlet duct 28, which is fed from the corresponding constant-level tank (7a in the example illustrated), through the pipe 17, the connection 18, the chamber 24, the bore 25 and the lower chamber 26. It should be noted that the pressure of air in the pipe 20 can be regulated by the sluice valve 20a and read from the pressure gage 20b, but this pressure is in general invariable, in view of the fact that the pipe 20 serves only to control the admission of oil, while the supply of oil is regulated by other means.

As already outlined above, the electro-valves 22 and 23 are synchronized with the device that advances the cotton lap, and are associated in such manner that the valve 22 closes and the valve 23 opens when the advancing device stops. In this case, the supply of air under pressure to the connection 20c is cut off, and the section of the pipe 20 between the valve 22, which is then closed, and the connection 20c, is opened to the atmosphere by the valve 23, and this enables the spring 31 to push up the piston 32, so that the collar 30 bears against its seat 27, thus stopping the supply of oil. In this manner, stoppage of the advance of the cotton lap being treated automatically stops the supply of oil, thus avoiding saturating the cotton masses that are under the atomizer at the time. Likewise, when the advancing device starts again, this automatically causes the supply of oil to flow again, owing to the electro-valve 23 closing and the electro-valve 22 opening.

The oil leaving the outlet duct 28 is atomized in a manner known in itself by the jets of air coming from the passages 37 and 38, which are supplied with air under pressure by the pipe 21 through the helical passages 35 and 36 and the chamber 34. The sluice valve 21a enables the pressure of air serving for the atomization of the oil to be regulated, and this likewise enables the supply of oil to be regulated, together with the regulation obtained by means of the above-mentioned adjustment of the height of the constant-level tank 7a. This air pressure can be read off on the pressure gage 21b.

According to a characteristic of the invention, the substantially round atomized jet of oil produced by the oil-supply and atomizing systems that have just been described is subjected to the effect of two auxiliary air jets produced by the blast ducts 40 and 41. These blast jets have the effect of spreading out the atomized oil jet into a sheet, as illustrated diagrammatically at 42 in Figure 3, where the lap of cotton 9a, which is assumed to be advancing in the direction of arrows 43, can also be seen.

The distribution of the oil jet obtained by means of these blast jets issuing from the blasting ducts 40 and 41 can be regulated by varying the pressure of air in the pipe 19, terminating at the connection 19c, this being effected with the help of the sluice valve 19a.

The plant according to the invention has numerous

advantages as compared with known plants: Owing to the addition of auxiliary blast jets, the oil mist supplied by the atomizer is spread out into a strip which effects a homogenous oiling of the cotton lap that is being treated. The breadth of the zone in question can be regulated by the pressure of air supplied to the blast jets.

The supply of oil can be regulated both by the variable height of the constant-level tank and by the regulation of the pressure of the atomizing air.

With the aid of electro-valves which are branched on to the pipe line controlling the supply of oil, and which are synchronized with the device effecting the advance of the cotton lap being treated, the supply of oil is automatically cut off if the advance of the cotton lap stops, so as to prevent the lap from becoming saturated with oil, and is resumed when the cotton lap starts to advance again. It should be noted, on this point, that the supply of oil is stopped by the mere closing of the oil admission line, while the pipe lines feeding the atomization system and the jet spreading system are continually supplied with air under pressure, which ensures that the atomizer will immediately start to operate again when the advance of the cotton lap is resumed.

The sluice valves for regulating the pressure of air in the three separate pipes leading to each atomizer, and also the pressure gages are grouped on a control panel, thus facilitating the management and surveillance of the plant.

The special arrangement of the atomizer enables a relatively low pressure of air to be used, thus effecting a saving of energy, and avoiding a too violent projection of oil.

The form of construction described above and illustrated in the drawings is of course only given by way of example and not of limitation, and the nature, material, arrangement and mounting of the members may be modified in any suitable manner without going outside the limits of the invention.

Thus, although the plant has been described as regards its application to the oiling of cotton, it may be used for any other treatment of any kind of materials, for example, for moistening any kind of textile fibres.

What I claim is:

1. An apparatus for oiling textile fibers and the like comprising, in combination, at least one atomizer for producing an atomized jet of the oil to be applied to the fibers, said atomizer having an inlet for oil and an oil reservoir communicating with said inlet, an inlet for compressed air for controlling the flow of oil from said reservoir, an inlet for compressed air for atomizing the oil leaving said reservoir into an atomized jet, and an inlet for compressed air for dispersing the atomized jet, said second-named compressed air inlet communicating with at least one outlet duct and said last-named compressed air inlet communicating with at least one air blast duct for conducting the air admitted thereto to a point adjacent the atomized jet to direct air into said jet to impart to said jet a sheet-like form, a vertically adjustable oil tank communicating directly with said oil inlet for supplying oil thereto to introduce oil into said reservoir, the level of said oil tank being adjustable selectively to varying heights in relation to said oil inlet of said atomizer, an air compressor in fluid communicating relationship with all of said compressed air inlets, and regulating and controlling means for separately controlling the air flowing from said air compressor to each of said compressed air inlets, said controlling means including means for stopping the air flow to said first-named compressed air inlet, said last-named means being adapted to stop the air flow automatically upon cessation of movement of the fibers being oiled.

2. Apparatus as defined in claim 1, wherein the atomizer comprises two air blast ducts symmetrically inclined with respect to said outlet duct and in the same plane as the latter, whereby the air jets produced by said air blast ducts intersect at a point located on the axis of said outlet duct.

3. Apparatus as defined in claim 1, wherein the oil

tank is a constant-level tank, and means are provided to adjust the altitude of said tank so that the constant-level is located at any height with respect to said atomizer level.

4. Apparatus as defined in claim 1, wherein each compressed air inlet is separately connected to a pipe adapted to contain air from said compressor at a different pressure.

5. An apparatus for oiling textile fibers and the like comprising, in combination, at least one atomizer for producing an atomized jet of the oil to be applied to the fibers, said atomizer having an inlet for oil and an oil reservoir communicating with said inlet, an inlet for compressed air for controlling the flow of oil from said reservoir, an inlet for compressed air for atomizing the oil leaving said reservoir into an atomized jet, and an inlet for compressed air for dispersing the atomized jet, said second-named compressed air inlet communicating with at least one outlet duct and said last-named compressed air inlet communicating with at least one air blast duct for conducting the air admitted thereto to a point adjacent the atomized jet to direct air into said jet to impart to said jet a sheet-like form, said oil reservoir communicating with said outlet duct and a valve for controlling the flow of oil from said reservoir to said outlet duct, said valve having an actuating member communicating with said first-named air inlet and adapted to be actuated to open the valve by the compressed air admitted through said inlet, a vertically adjustable oil tank communicating directly with said oil inlet for supplying oil thereto to introduce oil into said reservoir, the level of said oil tank being adjustable selectively to varying heights in relation to said oil inlet of said atomizer, an air compressor in fluid communicating relationship with three air lines communicating respectively with the three compressed air inlets, and regulating and controlling means for separately controlling the air flowing from said air compressor to each of said compressed air inlets.

6. In an apparatus as defined in claim 1, the provision of a regulating and control panel, an air supply line between said panel and compressor, three lines between said panel and atomizer communicating respectively with the three compressed air inlets, and a flow control valve and a pressure gage for each one of said three lines mounted on the panel.

7. An apparatus for oiling textile fibers and the like comprising, in combination, at least one atomizer for producing an atomized jet of the oil to be applied to the fibers, said atomizer having an inlet for oil and an oil reservoir communicating with said inlet, an inlet for compressed air for controlling the flow of oil from said reservoir, an inlet for compressed air for atomizing the oil leaving said reservoir into an atomized jet, and an inlet for compressed air for dispersing the atomized jet, said second-named compressed air inlet communicating with at least one outlet duct and said last-named compressed air inlet communicating with at least one air blast duct for conducting the air admitted thereto to a point adjacent the atomized jet to direct air into said jet to impart to said jet a sheet-like form, said oil reservoir communicating with said outlet duct and a valve for controlling the flow of oil from said reservoir to said outlet duct, said valve having an actuating member communicating with said first-named air inlet and adapted to be actuated to open the valve by the compressed air admitted through said inlet, a vertically adjustable oil tank communicating directly with said oil inlet for supplying oil thereto to introduce oil into said reservoir, the level of said oil tank being adjustable selectively to varying heights in relation to said oil inlet of said atomizer, an air compressor in fluid communicating relationship with three air lines communicating respectively with the three compressed air inlets, and regulating and controlling means for separately controlling the air flowing from said air compressor to each of said compressed air inlets, said controlling means including means for stopping the air flow to said first-named compressed air inlet, said last-

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named means being adapted to stop the air flow automatically upon cessation of movement of the fibers being oiled.

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