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[54] **DEVICE FOR MOISTENING MOVING SURFACES**

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[30] **Foreign Application Priority Data**

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[51] **Int. Cl.**..... **B05b 3/02**

[58] **Field of Search**..... 239/120, 121, 127, 239/222, 223, 224

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[57] **ABSTRACT**

A rotating body, preferably conically shaped, is supplied with liquid which is thrown off by centrifugal force in an atomized form for moistening a moving surface, the rotating body being confined within a housing having an opening therein which controls the shape of the pattern of atomized liquid dispensed.

15 Claims, 3 Drawing Figures

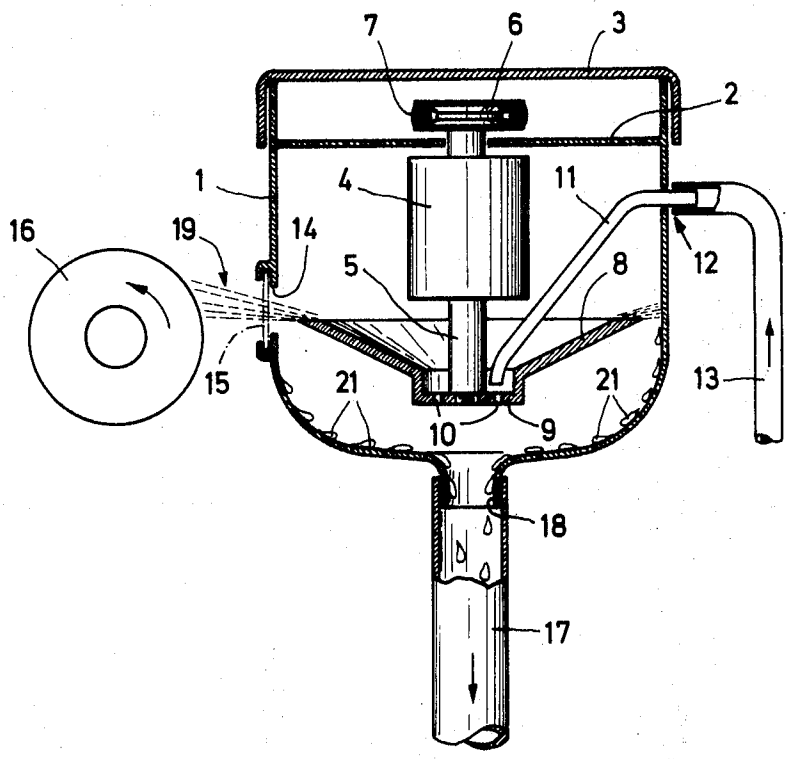
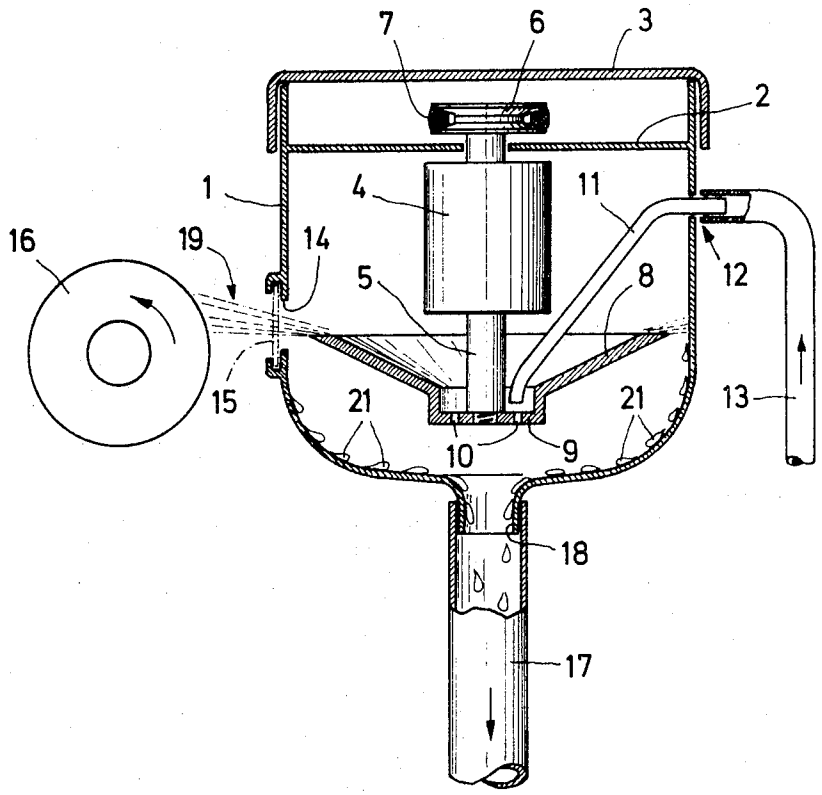


Fig. 1



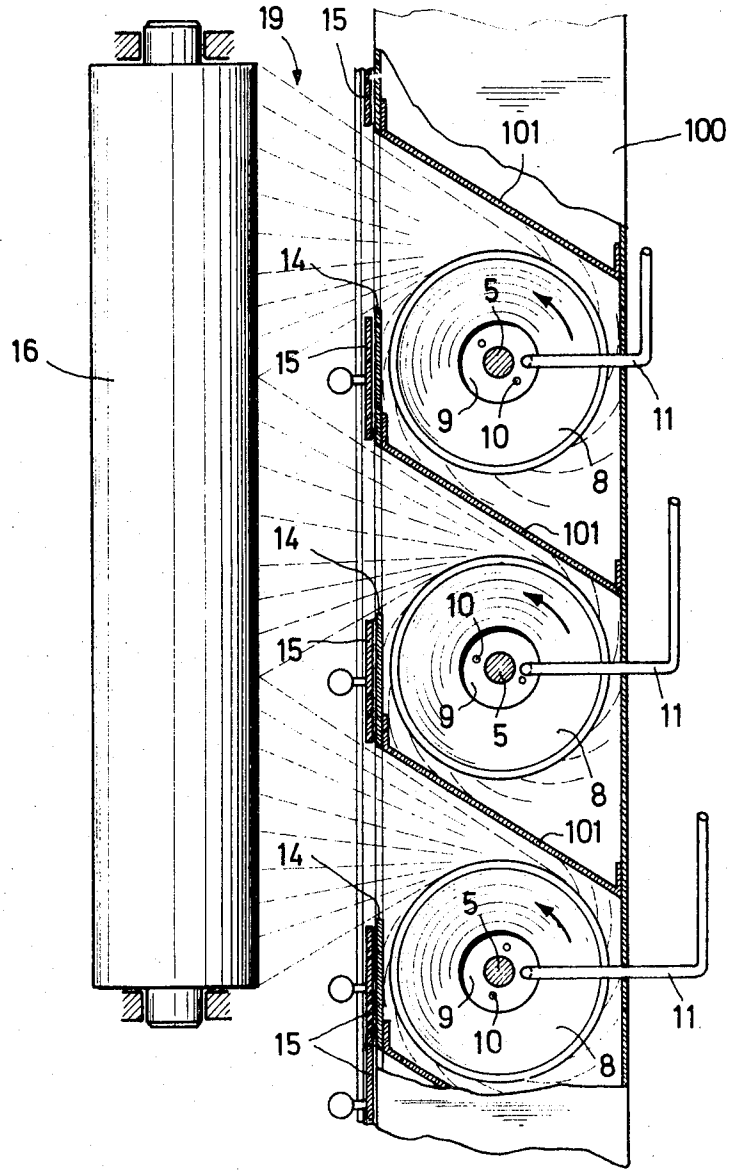

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Fig. 2

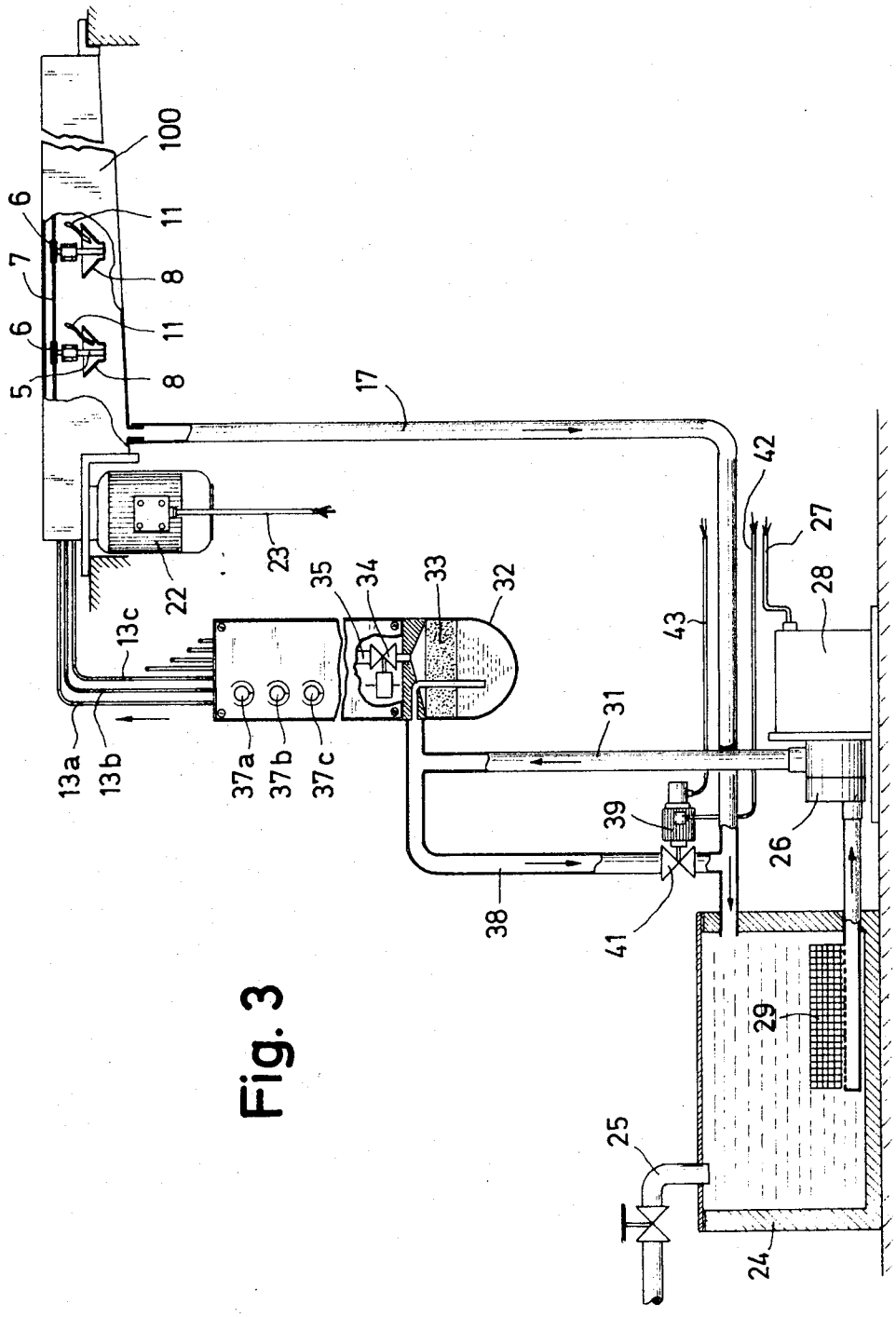
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Fig. 3

DEVICE FOR MOISTENING MOVING SURFACES

The invention relates to a device for moistening moving surfaces with a liquid, such as are found in printing machines, especially offset machines.

In printing operations there is often a need to moisten moving surfaces, namely, a paper web or the jacket surface of a rotating roll. In the moistening of rolls, it is known, for example, that a first roll can be allowed to turn in a water bath, and that the surface of this roll can be connected with distributor, or friction, rolls which distribute the water taken from the water bath evenly on the roll that ultimately is to be moistened. This arrangement has the disadvantage that the last roll can only be moistened as a whole, and that the moistened surfaces must be plain, and are not adaptable to changes in configuration or pressure. Moreover, the total amount of water that is applied, and therewith the uniformity of the moistening, can only be poorly controlled.

It has also been proposed to spray a liquid by means of compressed air fed spray nozzles onto the surface that is to be moistened. Suitable experiments have failed however, because the water particles produced were either too fine and were entrained as aerosol with the air stream, or they bounced on the surface to be moistened, so that there was no controlled moistening thereof. Also, in the case of nozzles of this kind, the amount of the liquid to be applied, that is, between 0.3 to 0.5 liters/hour cannot be controlled, or only at prohibitive expense. Moreover, chemical additives in the water often cause clogging of narrow nozzles and, finally because of the uncontrolled effect of the air flow issuing from the nozzles there is irregular drying out of the surface to be moistened, especially if the latter is tempered.

The invention is addressed to the problem of alleviating the indicated deficiencies, and to propose a device by means of which, with no excessive outlay, moving surfaces can be moistened entirely, or be localized application, with adjustable degrees of fineness.

The problem is solved by means of the invention in that opposite the surface to be moistened there is positioned a rotating contrifuging plate supplied with the liquid, and a housing surrounding said plate which has an opening toward the surface, from which opening a part of the liquid thrown off from the plate issues onto the surface in a fanlike configuration.

With this arrangement of a moistening device for moving surfaces, there is the advantage that operation can be effected with relatively large, readily controllable amounts of liquid, because for example only about 10 to 30 percent of the liquid thrown off issues through the housing opening. The desired fineness of moistening can therefore be adjusted with precision. In addition, the relatively large throughput quantities impart less contamination to the adjusting valves. Finally, no compressed air is used according to the invention, which air would entrain the atomized water particles.

In a preferred form of embodiment of the invention, the cross-section of the opening in the housing is adjustable, for setting the fan width of the issuing liquid, or there may be several centrifuging plates in a common housing, with at least one exit opening coordinated with each plate.

The centrifuging plates can be driven, according to the invention, by different motors or by a common motor. The amount of liquid fed to each plate is advantageously regulatable individually.

In a further preferred embodiment of the invention, the liquid is delivered to the centrifuging plates by a pump from a reservoir, whereby a part of the liquid flowing down which is not centrifuged is recycled to the reservoir.

Further characteristics and advantages of the invention are to be discerned in connection with the attached drawings from the description and claims below.

FIG. 1 shows a vertical cross-section of an individual centrifuging plate and housing for moistening surfaces according to the invention,

FIG. 2 shows a cut away partial top view of a device of the invention for the moistening of surfaces, and

FIG. 3 shows a schematic view of a device of the invention for moistening moving surfaces.

The principle of the invention can be best described with reference to FIGS. 1 and 2. According to FIG. 1, there is a bearing box 4 inside a housing 1 with intermediate floor 2 and removable cover 3, and in the bearing box 4 there is a shaft 5 which extends beyond it, both above and below, carried by roller bearings. At the upper end of shaft 5 there is fixed a corrugated pulley 6. Pulley 6 and shaft 5 with it are set into rotation by a V belt 7 that is driven by a motor (not shown). At the lower end of shaft 5 there is fixed a substantially conical shaped centrifuging plate 8 that rotates with shaft 5.

In the case of the embodiment illustrated in FIG. 1, the centrifuging plate 8 is held on the shaft 5 in such a way that the plate is attached by a cup-shaped floor 9 onto the threaded end of shaft 5. In floor 9 there are discharge openings 10. A liquid delivery conduit 11 terminates near floor 9 of centrifuging plate 8 and is carried out of the housing at 12, where a hose such as the liquid conduit 13, for example, is connected. The housing has a lateral opening 14 which can be wholly or partly closed (FIG. 2) by a vlave 15. Opening 14 is adjacent to the surface which is to be moistened, which in the illustrated example of embodiment is the jacket surface of a rotating roll 16. Housing 1 finally is funnel shaped at its lower part and is provided with a nipple 18 which is connected with a hose 17 or the like.

The described apparatus functions in the following way. Centrifuging plate 8 is set into rapid rotation via motor-driven V belt 7. A specific amount of liquid is introduced via conduit 11 into floor 9 of centrifuging plate 8. Because of centrifugal force, the liquid rises as a thin film on the conically shaped inner wall of plate 8, laterally upwardly to the edge of the plate, from which it is flung outwardly in a tangential direction. In the region of opening 14; —see FIG. 2— the liquid thrown out issues in the form of a fan 19 and reaches rotating roll 16 which is uniformly moistened in this way. At the place where the liquid thrown from plate 8 cannot issue through opening 14, it strikes the inside of the housing wall and flows, as indicated in FIG. 1, in small droplets 21, downwardly through conduit 17.

The liquid flowing down through conduit 17 does not need to be lost, however. It can rather be recycled, as will be described below, via conduit 11 to centrifuging plate 8. It is not a disadvantage, but rather an advantage, that only part of the liquid delivered via conduit 11 to centrifuging plate 8 is flung out through opening 14 and brought to the surface to be moistened, because

the relatively large quantity of liquid delivered via conduit **11** is more readily controlled than a correspondingly smaller amount. By setting valve **15**, the openings **14** can be wholly or partly closed, so that roll **16** or any other surface can be moistened only in selected areas.

As FIG. **2** shows, there may be a plurality of centrifuging plates **8** in a common housing **100**, which plates are separated from each other by partitions **101**.

In FIG. **3**, the overall structure of a moistening apparatus of the invention is shown schematically. In the figure, at the top right, there is seen the common housing **100** which encloses the plurality of centrifuging plates **8**. The centrifuging plates **8** are driven by a common motor **22**, supplied from an electrical conductor **23**, via a common V belt **7**. Instead of this arrangement, each plate **8** could be associated with its own drive motor.

Liquid may be delivered from a reservoir **24** which, when required, can be filled via a supply conduit **25**. A pump **26** is driven by a motor **28** connected with the electrical supply by a conductor **27**. Pump **26** sucks the liquid from reservoir **24** through a filter **29** and forces it through a conduit **31** into a filter vessel **32** which is furnished with a filter layer **33**. From the filter vessel **32** the liquid, after passing through filter layer **33**, reaches a conduit **35** which has a solenoid valve **34**, said conduit **35** branching into a plurality of branch conduits **13***a*, **13***b*, **13***c*, etc. Each of conduits **13** is (in a manner not shown) connected with a conduit **11** which opens into a centrifuging plate **8**. In each conduit **13**, there is moreover a needle valve (not visible in FIG. **3**) which can be electrically controlled by a button **37***a*, **37***b*, **37***c*, etc., by means of which needle valve the amount of liquid to be delivered to the centrifuging plate **8** in question is adjustable. For cleaning the needle valve, the control buttons **37** can be somewhat pulled out, whereafter the maximum amount of liquid flows through the valve, flushing it. With release of the button the preset amount of liquid again flows through conduit **13**.

Magnetic valve **34** in conduit **35** is closed upon cutting off of the printing machine associated with the moistening device of the invention, so that the individual conduits **13** will not empty. When the printing machine is started up again, there is thus liquid immediately available for the moistening.

The liquid flung from centrifuging plates **8** onto the inner wall of the housing flows down the wall and comes into conduit **17**, from which it is carried back to reservoir **24**.

As is further shown in FIG. **3**, there is a bypass conduit **38** connected with conduit **31** connected to pump **26**, upstream of filter vessel **32**, which bypass opens just before reservoir **24** into conduit **17** which contains the liquid flowing back. In conduit **38** there is an adjustable valve **41** controlled by a motor **39**. Motor **39** is connected to the electrical supply via a conductor **42**, and it can be switched on and off via a control conductor **43** connected with a remote control. Depending upon the setting of valve **41**, the liquid flowing through conduit **31** will be forced for the most part into the filter vessel, or carried back for the most part to reservoir **24**. In this way there is a further possibility of regulating the flow of liquid to the plates **8** as a function of the working speed of the printing machine. Valve **41** is advantageously always partly open so that the greatest possible amount of liquid constantly circulates, whereby deposits of dirt or the like can be prevented.

In another embodiment of the invention, there can be, in housing **100** which encloses the centrifuging plates **8**, a plurality of outlet openings **14**, e.g., opposite one another, so that at the same time, for example, two rolls can be moistened. With the device of the invention, instead of the jacket surface of a roll, it is also possible to a moisten a passing paper web or other print material, e.g., a textile or plastic web, directly, instead of by means of a roll. The jacket surface of the roll can also be tempered, that is to say, cooled or heated. Water is primarly considered as the moistening liquid, to which if required additives such as alcohol or the like can be supplied. As already noted, the amount of liquid delivered to the surface to be moistened depends substantially upon the operating speed of the printing machine. The amount of liquid that is delivered can also depend upon the kind of printing that is being done, and can be correspondingly controlled. Control of selected areas can be effected by means of valve **15**. Control of the amount of liquid is effected by means of the buttons **37** which actuate the needle valve, and by means of remote controlled valve **41**.

I claim:

1. Apparatus for use with printing machines for moistening moving surfaces such as rolls and webs, comprising a plurality of rotating bodies positioned in side by side relationship for rotation about parallel axes adjacent the surface to be moistened, an elongated housing surrounding said rotating body provided with openings corresponding to each of the rotating bodies opposite said moving surface, and means to supply liquid to the rotating body to be thrown outwardly through said openings in an elongated narrow pattern onto said moving surface, said elongated housing also including interior baffle means positioned between each of said rotating bodies whereby liquid thrown off by each of said bodies issues from the housing through only the corresponding opening provided therein.

2. The invention defined in claim **1**, wherein said rotating bodies include a generally conical surface mounted for rotation about a vertical axis, said surface being provided with a discharge opening for excess liquid.

3. The invention defined in claim **2**, wherein each opening is elongated to produce a fan-shaped discharge of liquid.

4. The invention defined in claim **3**, wherein said housing includes a plate movably mounted with respect to each opening to vary the area thereof to change the size of said fan-shaped discharge.

5. The invention defined in claim **2**, wherein said housing is provided with a discharge outlet for excess liquid trapped inside the housing, including pumping means for recirculating said excess liquid to the rotating body.

6. The invention defined in claim **5**, wherein said means for recirculating said excess liquid includes filter means.

7. The invention defined in claim **2**, wherein said means to supply liquid to the rotating body includes valve means to vary the amount of liquid supplied.

8. The invention defined in claim **3**, wherein said elongated openings in the housing are arranged generally in longitudinal alignment to provide a composite fan-like pattern, said housing also being provided with a discharge opening for excess liquid thrown off by the

rotating bodies, and pump means for recirculating excess liquid to said rotating bodies.

9. The invention defined in claim **8,** wherein said housing includes means to adjust the dimensions of said openings to regulate the fan-like pattern of liquid thrown outwardly of the housing.

10. The invention defined in claim **9,** wherein said means to adjust the dimensions of an opening comprises a flat plate positioned against a wall of the housing and slidable to change the size of the opening.

11. The invention defined in claim **1,** wherein said housing is provided with a discharge opening for excess liquid thrown off by said rotating body, and pump means for recirculating said liquid to said rotating body.

12. The invention defined in claim **11,** wherein said pump means includes electro-mechanical valve means to control the supply of liquid to said rotating body.

13. The invention defined in claim **12,** wherein said pump means includes reservoir means, conduit means to return liquid from said discharge to the reservoir means, and a pump having bypass conduit means to supply liquid from the reservoir means to said rotating body.

14. The invention defined in claim **13,** wherein said pump means includes means to filter liquid supplied by the pump to the rotating body.

15. The invention defined in claim **14,** wherein said pump means includes electro-mechanical valve means to control said liquid supplied to the rotating body.

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