

[54] **CLEANING APPARATUS FOR OFFSET PRINTING MACHINES**

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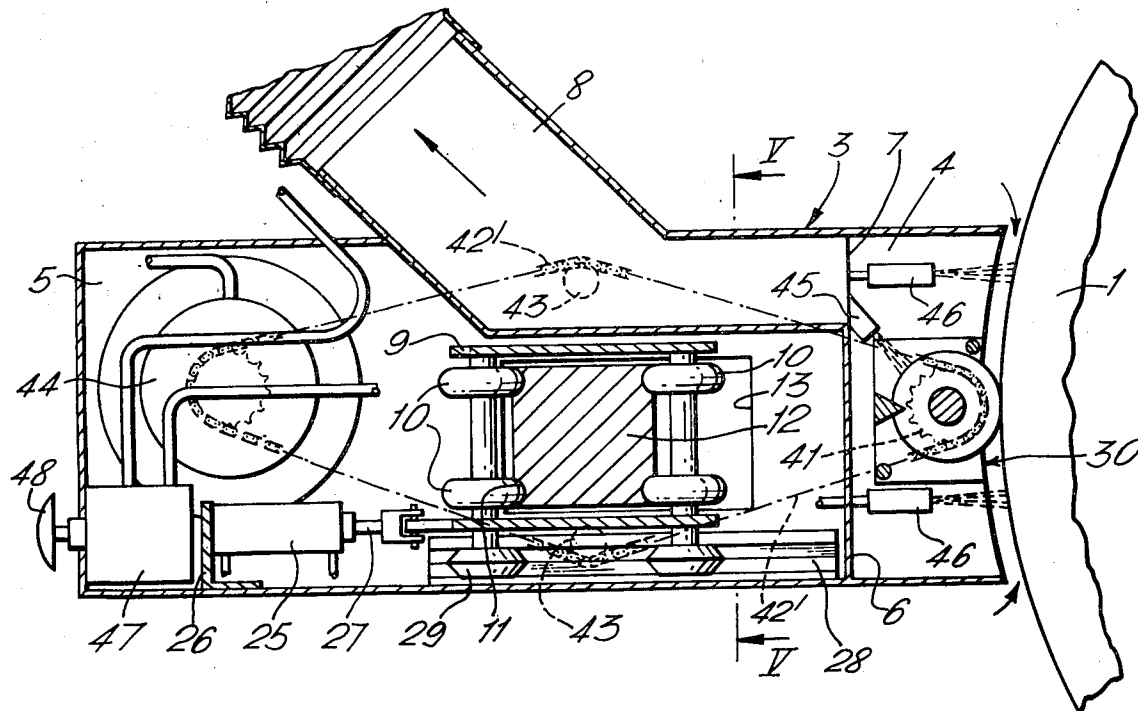
Assistant Examiner—C. K. Moore

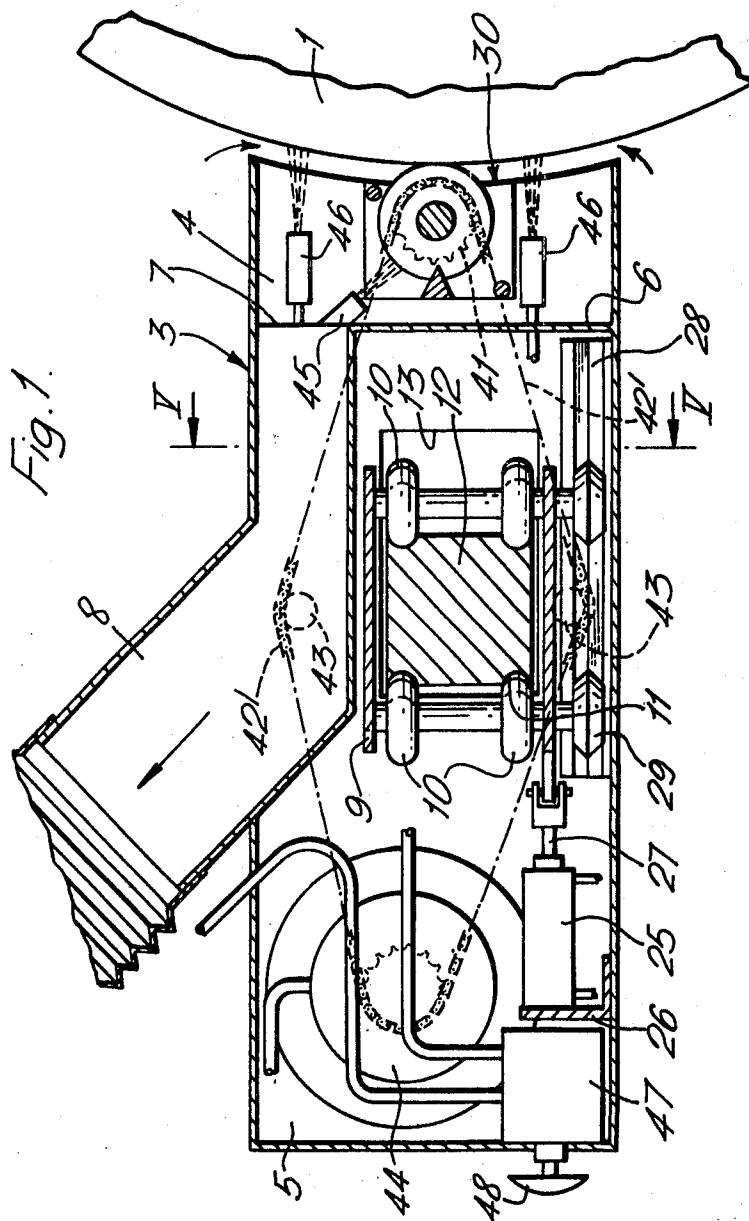
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[57] **ABSTRACT**

A roller-shaped cleaning tool for a rotating cylinder surface in an offset press is rotatably mounted in a housing that is open in front. The cleaning tool is presented to the cylinder surface through the opening in the housing. The cleaning tool produces an atmosphere of atomized cleaning liquid and washed-off dirt in the housing and this atmosphere is drawn off through an outlet which is connected to a source of sub-atmospheric pressure.

7 Claims, 6 Drawing Figures





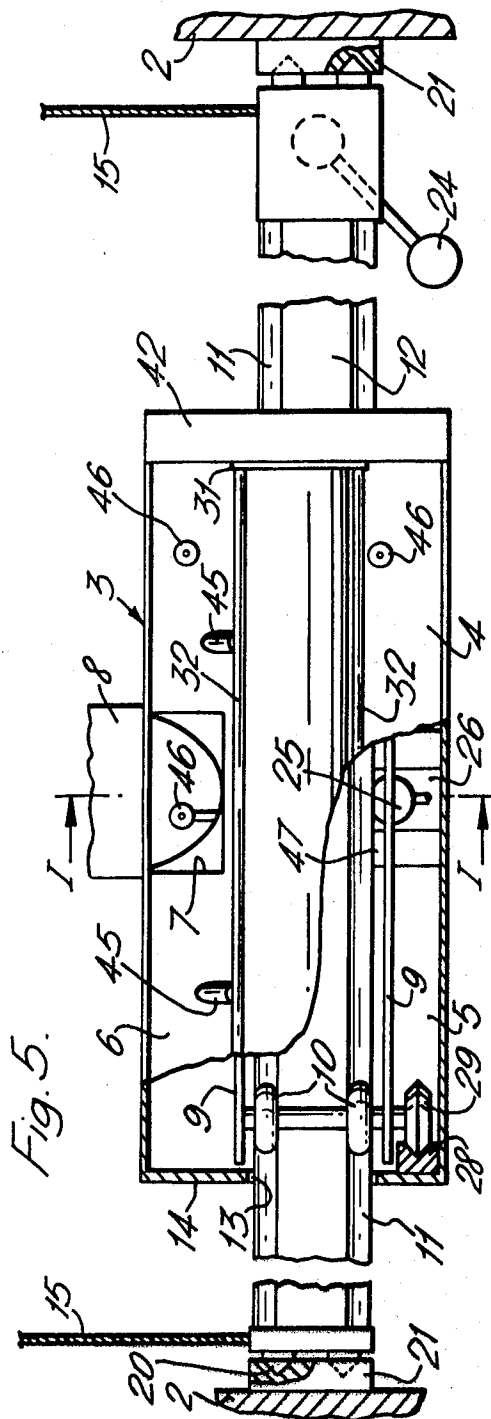
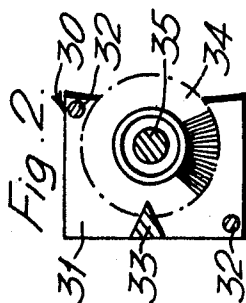
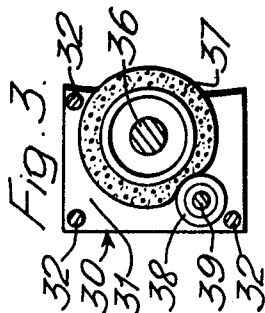
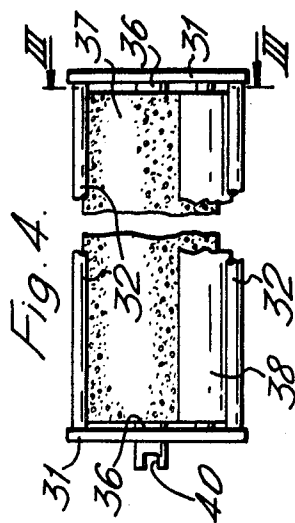
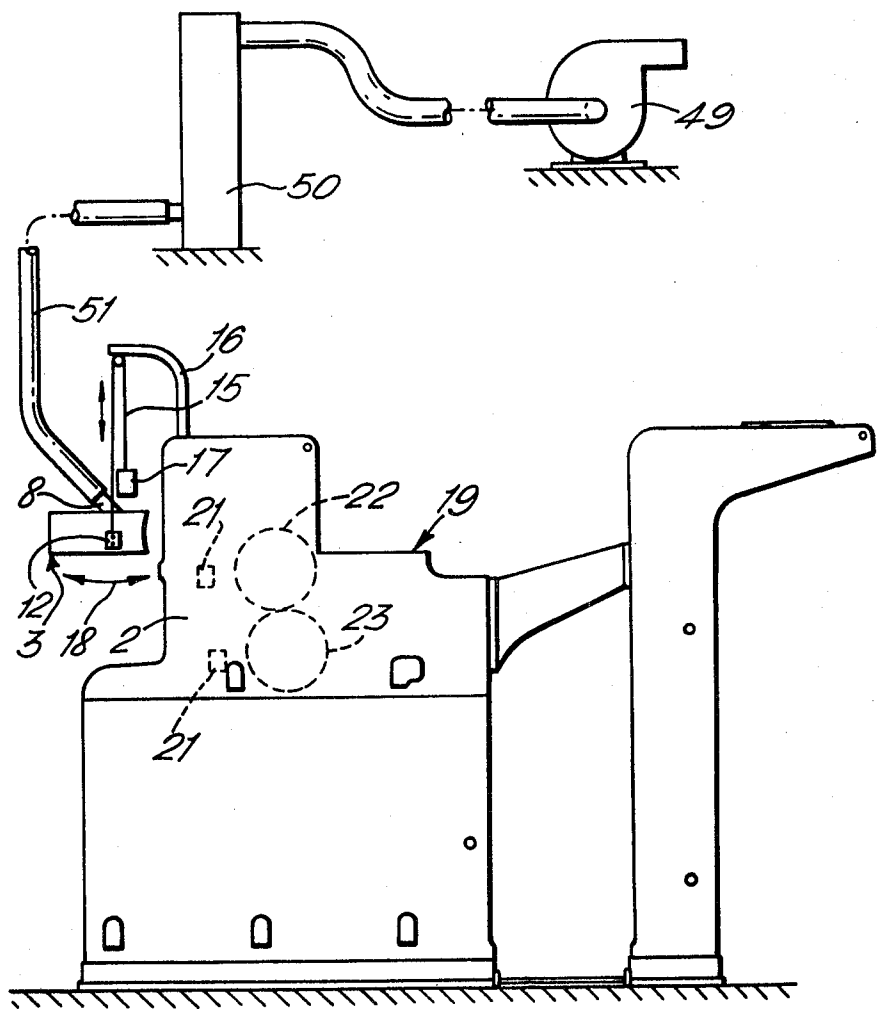


Fig. 6.



CLEANING APPARATUS FOR OFFSET PRINTING MACHINES

BACKGROUND OF THE INVENTION

The present invention relates to a cleaning apparatus for a cylinder surface (printing plate and/or blanket) in offset printing machines, comprising a roller-shaped cleaning tool which is rotatably mounted in a housing that is open in front, and to which there may be supplied a cleaning or washing fluid.

The printing plate and the blanket of offset printing machines are usually washed or cleaned manually by means of suitable cleaning tools which are sufficiently rigid to remove dirt, but at the same time sufficiently soft not to damage the printing plate or the blanket. However, offset machines are very expensive, and since a manual cleaning is time-consuming, a number of attempts have been made to provide printing machines with a cleaning device which may mechanically clean the cylinder surface and reduce the cleaning time.

It is of crucial importance for a good result of a cleaning of the cylinder faces in offset printing machines that there is no splashing of cleaning liquid and washed-off dirt. It may be difficult to achieve satisfactory conditions in this respect, since the cleaning tool may easily convey the removed dirt back onto the cylinder surface that is being cleaned, and washing liquid and dirt may also force its way out through the gaps formed between the cylinder surface and the edges of the opening in front of the housing of the cleaning apparatus.

SUMMARY OF THE INVENTION

The object of the present invention is to provide a simple and inexpensive cleaning apparatus performing an effective cleaning of the cylinder surface without messing up other parts of the printing machine.

In order to achieve this, the cleaning tool is designed so that a continuous cleaning of the tool is obtained while providing an atmosphere of atomized cleaning liquid and washed-off dirt, and an outlet from the open-front housing is adapted to be connected to a source of sub-atmospheric pressure, whereby air is drawn into the housing through the narrow gaps present between the cylinder surface and the edges of the opening in front of the housing and further out through the outlet together with atomized cleaning liquid and washed-off dirt.

The apparatus may comprise a brush roller and/or a sponge roller as cleaning tools. If a brush roller is provided, a per se known impact means is used for continuously cleaning the roller, the bristle of the brush roller striking against the impact means to atomize the cleaning liquid. If a sponge roller is used, it is preferred to provide a rotatably mounted squeeze roller for squeezing the sponge in order to remove cleaning liquid therefrom, said liquid being atomized by being thrown out from the sponge roller and the squeeze roller.

The establishment of an atmosphere of small water droplets, which may be drawn out through said outlet, may also be promoted if the apparatus in addition to having spray nozzles for supplying cleaning liquid to the surface of the cleaning tool, also has spray nozzles for supplying cleaning liquid to the cylinder surface, said liquid being partly atomized by impact against the cylinder surface.

It has proved that an aspiration combined with a suitable atomization of the cleaning liquid effectively pre-

vents soiling of the printing machine, the stream of air that is drawn in at the edges of the front opening of the housing being sufficiently strong to carry all the moisture present at these edges into the housing and sweep the moisture therein out through said outlet. Thus, without any further discharge, the apparatus may operate without cleaning liquid and dirt to an objectionable extent escaping from the apparatus and soiling other parts of the printing machine.

The invention will now be further illustrated, reference being had to the accompanying drawings, which illustrate an embodiment of a cleaning apparatus according to the invention.

DETAILED DESCRIPTION OF THE DRAWINGS

FIG. 1 is a central section through the apparatus transversely of the axes of the cylinders, the surfaces of which are to be cleaned.

FIG. 2 is a section through a cleaning tool unit for use in the apparatus in FIG. 1.

FIG. 3 is a section similar to that of FIG. 2 through a second cleaning tool unit for use in the apparatus in FIG. 1.

FIG. 4 is a front view of the cleaning tool unit in FIG. 3.

FIG. 5 is a front view of the apparatus in FIG. 1, i.e., viewed from the cylinder surface to be cleaned, a part of the figure, however, being shown in section corresponding to the line V—V in FIG. 1.

FIG. 6 is an elevational view of an offset printing machine diagrammatically illustrating the positioning of the apparatus according to the invention in the offset printing machine and the air aspirating device to which the apparatus is connected.

In FIG. 1 there is indicated a cylinder 1 which may be a printing plate cylinder or a blanket cylinder. The cylinder 1 is mounted in side walls 2 (FIG. 5) of the offset printing machine. The cleaning apparatus consists of a housing 3 which is divided into a cleaning compartment 4 and a "machine" compartment 5. The cleaning compartment 4 is open in front, i.e., at the side facing the cylinder 1. The rear wall 6 of the cleaning compartment 4 is in its upper part provided with an opening 7 leading to an outlet 8. In the motor compartment 5 there is mounted a frame 9 which at either end has four guide wheels 10. These guide wheels 10 engage grooves 11 in a guide rail 12 traversing the motor compartment 5 and extending out through openings 13 in the end walls 14 of the housing 3. The guide rail 12 is suspended from a support 16 (FIG. 6), by means of wires 15, in such a manner that the guide 12 may be raised and lowered manually, the guide for instance being balanced by counterweights indicated at 17 in FIG. 6. Because the guide 12 with the apparatus 3 is suspended by wires or the like, it may be relatively easily swung in the direction of the printing plate cylinder or the blanket cylinder as indicated by an arrow 18 in FIG. 6. The guide may be locked in a fixed position on the offset machine 19 by means of locking pins or studs 20 provided on the guide 12 and engaging recesses in stationary locking plates 21 on the side walls 2 of the printing machine. One set of such locking plates 21 may be provided abreast of the printing plate cylinder 22, a second set of locking plates 21 being provided abreast of the blanket cylinder 23. The locking studs 20 at one end of the guide 12 may be fixed, whereas the locking studs at the other end of the guide 12 may be retracted and

again inserted into the recesses in the appurtenant locking plate 21 by means of a handle 24.

The frame 9 with the wheels 10 is displaceably mounted in the housing 3 by means of wheels 29 guided in grooves in guide rails 28 provided at either end of the housing 3. The displacement of the frame 9 is effected by means of a hydraulic cylinder 25, which is secured to a bracket 26 in the housing 3, the piston rod 27 of the cylinder being secured to the frame 9. Since the frame 9 is guided on the guide rail 12, which during operation of the apparatus is locked in position between the locking plates 21, the actuating of the cylinder 25 will cause the housing 3 to move towards or away from the cylinder 1. By means of a suitable hydraulic control the cylinder 25 may hold the cleaning tool of the apparatus in contact with the cylinder 1 with any desired force.

In the cleaning compartment 4 there is mounted a cleaning tool unit which is generally designated by 30. The apparatus may comprise several such cleaning tool units having various types of cleaning tools which are specially adapted to the printing plate and the blanket respectively. One such cleaning tool unit 30 which is especially adapted for a cleaning of the blanket cylinder, is illustrated in FIG. 2. This unit consists of two end plates 31 connected by circular bars 32 at two opposite corners and a triangular impact rod 33 at the rear edge of the unit. The end plates 31 together with the tie rods 32 and 33 form a frame in which a brush roller 34 having a shaft 35 is rotatably mounted. The brush roller 34 is mounted so that the bristle strikes the rod 33 during rotation of the roller, whereby dirt and liquid will be stripped from the bristle.

In FIG. 3 there is illustrated another cleaning tool unit 30 having a corresponding frame formed by two end plates 31 and circular tie rods 32. In this frame there is rotatably mounted a shaft 36 carrying a sponge roller 37. Such a cleaning tool is suitable for cleaning the printing plate. A squeeze roller 38 having a shaft 39 is mounted for idle rotation in the end plates 31. The distance between the centres of the sponge roller 37 and the squeeze roller 38 is such that the squeeze roller will compress the sponge lining of the sponge roller 37. Thus, when the sponge roller 37 rotates, liquid will continuously be pressed from the roller.

As illustrated in FIG. 4, one end of the shaft 36 is provided with a dog clutch 40 which upon insertion of the cleaning tool unit into the cleaning compartment 4 through the front opening engages a sprocket wheel 41 located in a chamber 42 in the housing 3 at one end of the cleaning compartment 4. It will be understood that also the shaft 35 of the brush roller 34 is provided with such a dog clutch for engagement with the sprocket wheel 41. By means of a chain 42' which is guided on guide wheels 43 in order to clear the guide 12, the sprocket wheel 41 is operatively connected with a motor 44 in the motor compartment 5.

In the cleaning compartment 4 there are also provided spray nozzles 45 for supplying cleaning liquid to the surface of the cleaning rollers 34 and 37 and further spray nozzles 46 for supplying cleaning liquid to the blanket or the printing plate, or a protective liner (of gum arabic) on the printing plate. Liquid is supplied to the spray nozzles 45 and 46 through pipes, which for most parts are not illustrated in order not to overbur-

den the drawing. In the motor compartment 5 there is illustrated a valve device 47 for controlling the supply of liquid to the spray nozzles. The valves may be operated by means of one or more handles 48 on the side of the housing 3 remote from the cylinder 1.

As best illustrated in FIG. 6, the outlet 8 from the part of the housing 3 which constitutes the cleaning compartment 4, is connected to a suction fan 49. Between the outlet 8 and the fan 49 there is inserted a cyclone 50 for separation of aspirated air and liquid. The washed-off dirt from cylinder 1 and the cleaning fluid, atomized by nozzles 45 and 46, are drawn into outlet 8 and toward cyclone 50 by suction fan 49 from the narrow gap between the cylinder 1 surface and the edges of the opening in front of housing 3. The conduit 51 leading from the outlet 8 to the cyclone 50 is flexible in order to permit movement of the apparatus 3 between the two operating positions abreast of the two cylinders and an inoperative position in which the apparatus does not hamper the operation of the offset machine.

The apparatus illustrated in the drawing is in certain cases mounted upside down, i.e., so that the outlet 8 will be on the lower side.

What we claim are:

1. Cleaning apparatus for a cylinder surface such as a printing plate and/or a blanket cylinder in offset printing machines, comprising a housing having an open front end adapted to be mounted adjacent the cylinder thereby presenting a narrow gap therewith, a roller-type cleaning tool operatively mounted for rotation in said housing and extending outwardly of said open end into cleaning engagement with said cylinder means for supplying cleaning fluid to said cylinder surface and said cleaning tool, means cooperating with said cleaning tool for atomizing the cleaning fluid supplied thereto and the dirt washed off the cylinder by said tool, an outlet mounted on said housing in communication with said open front and thereof, suction means interconnected with said outlet for drawing air, together with the atomized fluid and washed-off dirt, into said housing from the narrow gap and through said outlet.

2. Cleaning apparatus as claimed in claim 1, wherein said cleaning tool comprises a bristle brush roller.

3. Apparatus as claimed in claim 2, wherein said means cooperating with said tool comprises an impact rod mounted adjacent said roller and bearing against the bristles thereof so as to atomize the cleaning liquid.

4. Apparatus as claimed in claim 1, wherein said cleaning tool comprises a sponge roller.

5. Apparatus as claimed in claim 4, wherein said cleaning tool further comprises a rotatably mounted squeeze roller for compressing the sponge in order to remove cleaning liquid therefrom, said liquid being atomized by being thrown out from the sponge roller and the squeeze roller.

6. Apparatus as claimed in claim 1, wherein said supply means comprises spray nozzles for supplying cleaning liquid to the cylinder surface, said liquid being partly atomized by impact against the cylinder surface.

7. Apparatus as claimed in claim 6 wherein said supply means further comprises additional spray nozzles for supplying cleaning fluid to said cleaning tool.

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