

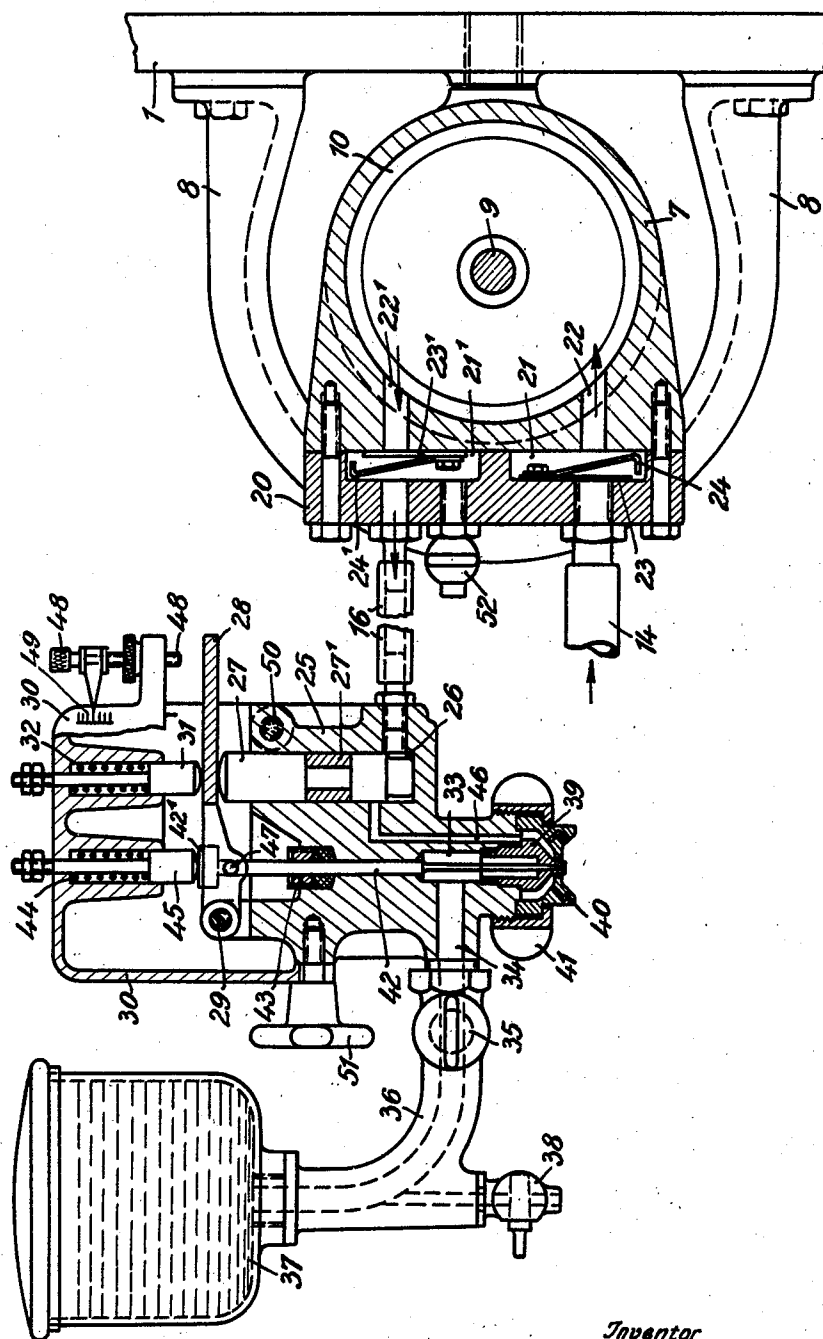
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DEVICE FOR SPRAYING PRINTED SHEETS

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DEVICE FOR SPRAYING PRINTED SHEETS

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My invention relates to means for spraying an offset-preventing liquid on to freshly printed sheets coming from a printing machine, wherein a piston moved by means of compressed air is connected with a nozzle needle closing a spraying nozzle, and imparts an opening movement thereto.

In order to prevent the soiling of fresh sheets coming from a printing press during piling, the prints are sprayed in a known manner with a suitable offset-preventing liquid. Spraying appliances operated by compressed air are usually employed for this purpose. The liquid should only be sprayed on to the printed surfaces in quite definite quantities, in order to attain the requisite effect, and to prevent the superposed printed sheets sticking together.

Spraying devices are known in which a piston is displaced under the action of the compressed air, and thereby displaces, in the direction of an opening movement, a nozzle needle connected with it, which opens and closes the spraying nozzle. In order to prevent the spraying liquid from entering the space accommodating the piston, special packings must be provided for the nozzle needle. Since the needle is only of small diameter, this sealing gives rise to serious difficulties. A packing that is too tightly arranged hinders the movement of the nozzle needle, so that the latter does not quite close the mouth of the nozzle. Drops of liquid are thus formed on the nozzle, and drip on to the printed sheet. These drops however disturb the further treatment of the printed sheets by sticking the latter together. Under some circumstances such drops may hinder the execution of multi-colour printing. Notwithstanding the packings employed it has moreover not been found possible to prevent the spraying liquid reaching the chamber that accommodates the piston. The piston is therefore liable to jam, and it is then not possible to spray an accurately measured quantity of liquid on to the sheet and to maintain the rhythmical operation of the spraying apparatus. The apparatus therefore has to be frequently taken apart and cleaned.

This invention starts therefore from an appliance in which a piston, moved by means of compressed air, and arranged in a separate chamber, acts by means of a lever upon the nozzle needle that closes the spraying nozzle, and imparts an opening movement to the needle.

Such apparatus is known for the spraying of paint and other liquids. In this known apparatus, however, two separate compressed-air pipes

are connected with the spraying device, one of which, the auxiliary pipe, leads to a chamber containing the piston, and the second, the main pipe, leads to the spraying nozzle. The piston upon which the air supplied through the auxiliary pipe acts has to open from time to time a valve which is constantly subject to the pressure prevailing in the main pipe, or is kept closed by a correspondingly strong spring.

This known apparatus, which is put into and out of operation by hand, and the manipulation of which may therefore take up any length of time, cannot be employed, owing to the inertia of its parts, for sprinkling the sheets coming out of a printing machine with a medium for preventing offsetting because for the spraying operation controlled in a known manner by the printing machine only a fraction of a second is available, and during this very short interval of time quite a definite quantity of liquid has to be sprayed.

The disadvantage of this known apparatus is obviated by the present invention, which consists essentially in the feature that the compressed air required for the spraying operation is led into a chamber which accommodates only the piston, and into which there opens a duct controlled by the piston and leading to the spraying nozzle, the compressed air passing directly to the spraying nozzle through this duct.

According to a further feature of the invention the structure of the spraying apparatus may be such that a spring-loaded plunger which acts on the piston coacting with the nozzle needle are guided in a hinged cover of the casing, so that, after the cover has been hinged back, the nozzle needle may readily be withdrawn for cleaning purposes. It is therefore possible to clean the spraying apparatus without affecting the correct adjustment of the apparatus, which is of great importance, when cleaning is carried out during operation. The adjustment may be made by an adjusting device provided with a scale for regulating the lifting motion of the nozzle needle which determines the quantity of spraying medium flowing out each time.

The spraying apparatus according to the invention is illustrated in one form of construction by way of example in section, partly in side elevation, in the accompanying drawing.

The pipe 16, which serves for the supply of compressed air, for instance taken from a compressed air pump 10, leads to a chamber 26 which is formed in the casing 25 of the spraying de-

vice and in which a piston 27 provided with packing means 27¹ is vertically slidable. On this piston rests a lever 28 which is pivoted in the casing 25 on a pin 29. In the axial direction of the piston 27 there presses from above on the lever 28 a plunger 31 which is guided in the cover 30 of the casing 25 and which is acted on by a spring 32 and holds the piston 27 in its bottom position.

In the casing 25 is a second chamber 33, into which a passage 34 opens. The latter is directly connected by an intermediate piece 36 containing a cock 35 with a container 37 of transparent material for receiving the spraying liquid. By closing the cock 35, for instance when the spraying device is to be cleaned, the admission of spraying liquid to the spraying device can be interrupted. Through a second cock 38 the container 37 can be emptied.

In the chamber 33 is fixed at the bottom a spraying nozzle 39 which is surrounded by an air nozzle 40. The latter is connected by a cap nut 41 with the casing 25. The conical outflow opening of the spraying nozzle 39 is closed in a fluid-tight manner by a nozzle needle 42 which is guided in a bore of the casing 25. This bore is provided at its upper end with a packing which can be adjusted by means of a screw 43. Against the adjustable head 42¹ of the nozzle needle 42 presses under the action of a spring 44 a plunger 45 which is guided in the cover 30 of the casing 25. The nozzle needle 42 is held in its closed position by this plunger 45.

In this arrangement, when compressed air is admitted to the chamber 26, the piston 27 is forced upwards and uncovers the opening of the passage 46 which leads to the air nozzle 40. Through this air nozzle only compressed air will thus at first flow out, before the liquid enters. During the upward motion of the piston 27 this piston forces the lever 28 upwardly. On the lever 28 are driver pins 47 which, during the further upward motion of the piston, bear from below against the adjustable head 42¹ of the nozzle needle 42 and raise the latter. A small quantity of liquid will now be carried along by the compressed air flowing out of the air nozzle 40 and will be atomised. The quantity of liquid to be atomised each time is easily adjustable by means of an adjusting screw 48 provided with an index arm movable adjacent a scale 49. By means of this adjusting screw 48 the lifting movement of the lever 28 is limited. When the compressed-air inlet is shut off, for instance by means of a valve, not shown, the springs 32 and 44 become effective. During the downward movement of the piston 27 the spraying nozzle 39 is closed by means of the nozzle needle 42 and then the piston 27 closes the passage 46. Through the mode of operation of the spraying device, just described, the finest atomisation of the spraying medium is always brought about, without the formation of drops or large particles which would leave traces on the printed sheet or cause disturbances in the further treatment of the sheets. Moreover, the spraying gun according to the invention operates automatically, without mechanically or electrically controlled valves for determining the moment of spraying, when the air pressure is reached, which is necessary for overcoming the force of the springs 32 and 44.

For the purpose of cleaning the spraying nozzle, the nozzle needle and so forth, the cover 30 which is pivoted about a pin 50 can be hinged back after the release of a closing screw 51. The nozzle

needle can then be readily withdrawn. No change is made in the previously effected adjustment of the parts, so that the described co-operation of compressed air and quantity of liquid is always maintained.

The spraying device is in every case mounted above the delivery pile of the printing press, which is arranged in a different way in the different types of printing presses. In every case only one air pipe 16 has to be connected with the pump and the spraying device is then ready for use. This makes the spraying device extremely simple and cheap. Owing to this simplification, errors due to faulty adjustments of the device become impossible.

In the constructional example shown in the drawing the arrangement is such that for the production of the compressed air for atomising the spraying liquid the air pump provided on a sheet feeder is used.

The cylinder 7 of this compressed air pump is mounted on the frame 1 of the printing machine so as to oscillate in a bearing bracket 8. The piston 10 of this pump is in usual manner moved to and fro by means of the piston rod 9. Through drawing out the piston rod 9 a suction action is produced and the suction side of the pump cylinder 7 is connected by means of a hose or pipe connection 14 with suckers (not shown) of a sheet-feeder. On the piston rod 9 being pushed into the cylinder, compressed air is produced, which in accordance with the invention is used for the spraying device. For this purpose the compression side of the pump cylinder is connected through a pipe 16 with the spraying device.

To the pump cylinder 7 there is fixed a cover plate 20 provided with two hollow spaces 21 and 21¹. From each of these hollow spaces extends a passage 22 and 22¹ respectively to the interior of the cylinder 7. To the hollow space 21 is connected the suction pipe 14 and to the hollow space 21¹ the compression pipe 16 leading to the spraying device. The suction pipe 14 is closed in the hollow space 21 by a leaf spring 23 provided with an abutment plate 24 and the passage 22¹ leading into the hollow space 21¹ is closed by a leaf spring 23¹ provided with an abutment plate 24¹. In this arrangement, on the piston 10 of the air pump performing its suction stroke, the spring-loaded valve 23 which closes the suction pipe 14 will open, and at the same time the spring-loaded valve 23¹ of the compression pipe 16 will be forced against its seat and thus closed. Conversely, on the pump piston performing its compression stroke, the spring-loaded valve 23 is forced against its seat and closed, while the spring-loaded valve 23¹ is opened, so that the compressed air passes from the pump cylinder 10 into the compression pipe 16 and thence to the spraying device.

In printing machines having no automatic sheet feeder a separate air pump may be used. I claim:

1. A spraying device of the kind described, comprising in combination, a casing having two chambers, a reservoir for a spraying liquid connected to one of said chambers, a spraying nozzle connected to the same chamber, a nozzle needle for closing said spraying nozzle, a spring-load pressure plunger for holding said nozzle needle in its closed position, an air nozzle surrounding said spraying nozzle, a piston movable in the second chamber, said second chamber being arranged separate from said nozzle needle, an air

duct connecting said second chamber with said air nozzle and having an admission port in the path of said piston, a spring-loaded pressure bolt for holding said piston in a position for closing said air admission port, a compressed air conduit connected to the last said chamber, and a lever for lifting said nozzle needle and actuated by said piston.

2. A spraying device of the kind described, comprising in combination, a casing having two chambers, a reservoir for a spraying liquid connected to one of said chambers, a spraying nozzle connected to the same chamber, a nozzle needle for closing said spraying nozzle, a spring-loaded plunger for holding said nozzle needle in its closed position, an air nozzle surrounding said spraying nozzle, a piston movable in the second chamber, said second chamber being arranged separate from said nozzle needle, an air duct connecting said second chamber with said air nozzle and having an admission port in the path of said piston, a lever for lifting said nozzle needle and resting on said piston, a spring-loaded plunger acting on said lever and holding said piston in a position for closing said air admission port, a compressed air conduit connected to the second chamber, and an adjustable stop to limit the lifting stroke of said lever.

3. A spraying device of the kind described, comprising in combination, a casing having two chambers, a detachable cover on said casing, a reservoir for a spraying liquid connected to one of said chambers and carried by said casing, a spraying nozzle connected to the same chamber, a nozzle needle for closing said spraying nozzle, a spring-loaded plunger guided in said cover and adapted to hold said nozzle needle in its closed position, an air nozzle surrounding said spraying nozzle, a piston movable in the second of said two chambers, said second chamber being arranged separate from said nozzle needle, an air duct connecting said second chamber with said air nozzle and having an admission port in the path of said piston, a lever for lifting said nozzle needle and pivotally arranged in said casing, said lever resting on said piston, a spring-loaded

plunger guided in said cover and adapted to act on said lever and to hold said piston in a position for closing said air admission port, a compressed air conduit connected to the second chamber, and an adjusting device arranged on said cover and adapted to limit the lifting movement of said lever.

4. A spraying device of the class described, comprising in combination, means forming two chambers, a reservoir for a spraying liquid connected to one of said chambers, a spraying nozzle connected to the same chamber, a nozzle needle for closing said spraying nozzle, an air nozzle surrounding said spraying nozzle, a piston movable in the second chamber, said second chamber being separate from said nozzle needle, an air duct connecting said second chamber with said air nozzle and having an admission port in the path of said piston, a lever for lifting said nozzle needle and actuated by said piston, spring means for holding said piston in a position for closing said air admission port, said spring means also acting on said lever to hold said nozzle needle valve closed, and a compressed air conduit connected to the second chamber.

5. A spraying device of the class described, comprising in combination, means forming two chambers, a reservoir for a spraying liquid connected to one of said chambers, a spraying nozzle connected to the same chamber, a nozzle needle for closing said spraying nozzle, an air nozzle surrounding said spraying nozzle, a piston movable in the second chamber, said second chamber being separate from said nozzle needle, an air duct connecting said second chamber with said air nozzle and having an admission port in the path of said piston, a lever for lifting said nozzle needle and actuated by said piston, means to adjust the lifting movement of said lever, spring means for holding said piston in a position for closing said air admission port, said spring means also acting on said lever to hold said nozzle needle valve closed, and a compressed air conduit connected to the second chamber.

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