Aug. 23, 1966 F. H. GOYETTE 3,268,172

SHOWER DEVICE WITH SHUT-OFF MEANS

Original Filed Jan. 27, 1964 2 Sheets-Sheet 1

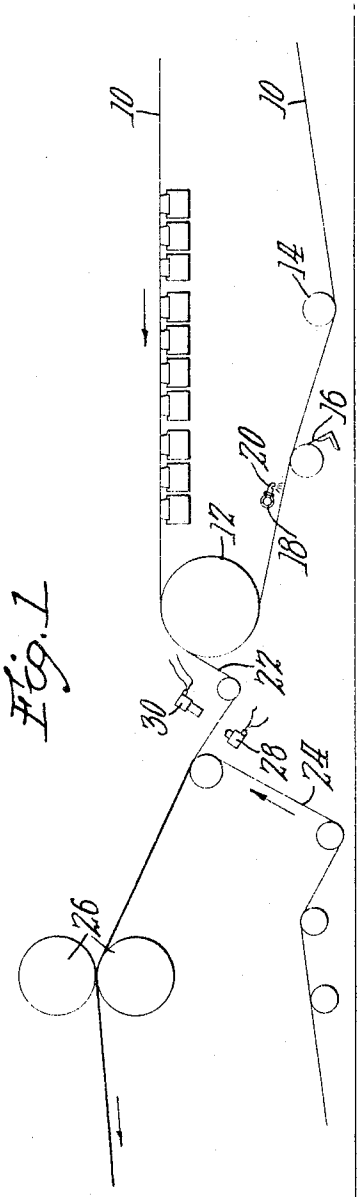


Fig. 1

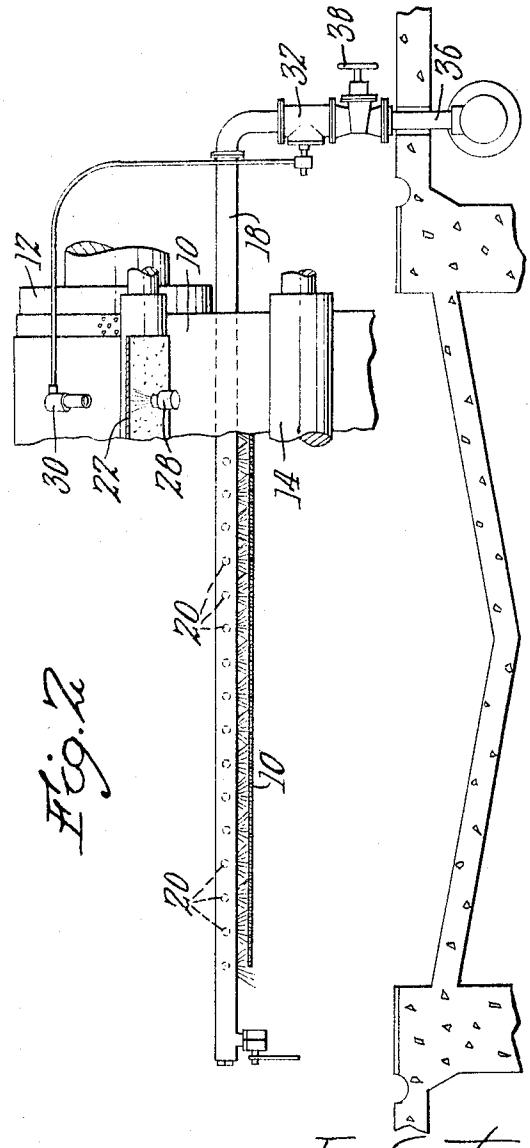


Fig. 2

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Fig. 3

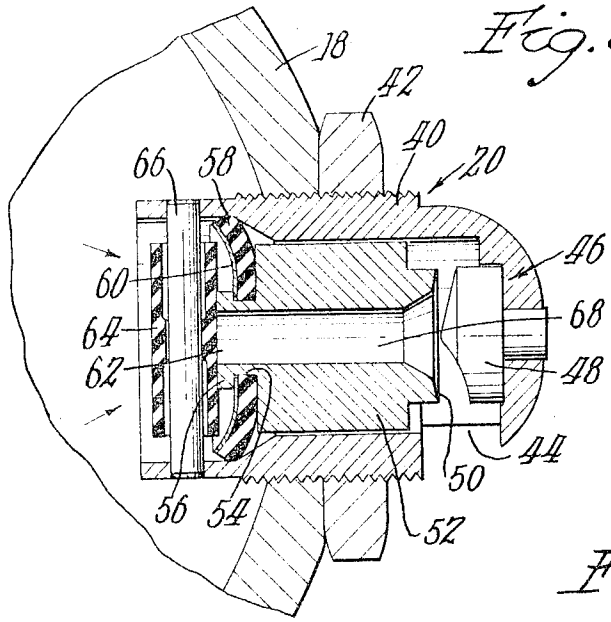


Fig. 4

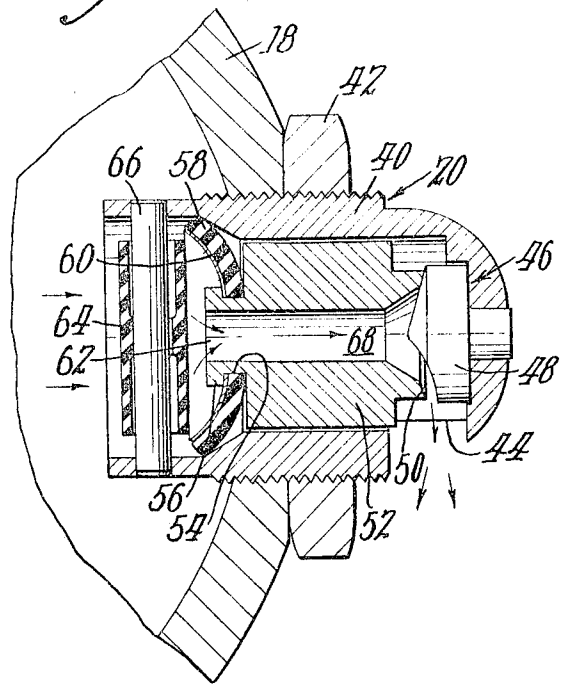
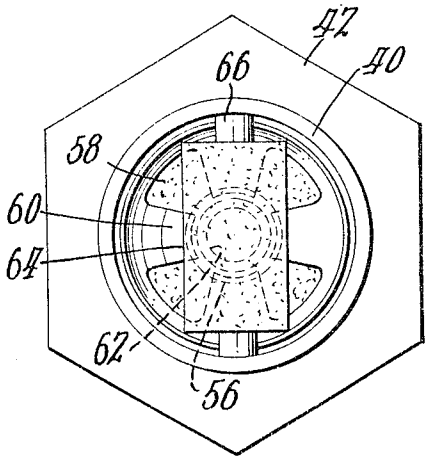


Fig. 5



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SHOWER DEVICE WITH SHUT-OFF MEANS

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Original application Jan. 27, 1964, Ser. No. 340,180. Divided and this application Oct. 8, 1965, Ser. No. 494,015

1 Claim. (Cl. 239—109)

This application is a division of my prior application Serial No. 340,180, filed Jan. 27, 1964, and relates principally to a shower which includes a nozzle or nozzles particularly adapted for the papermaking industry, especially for modern, high speed machines. These nozzles have normally closed orifices with means for automatically opening the orifices under conditions of water pressure. Shower nozzles of the prior art are ordinarily continuously open without having shutoff devices integrally associated therewith and depend upon a remote valve in the supply pipe for turning the shower on or off. Thus it is seen that the nozzles cannot be turned on and off instantaneously since the valve being at a distance, time elapses between the time the valve is turned on and the arrival of water at the nozzles. On the other hand, it is important to conserve water and of course a great deal of water is used and much is wasted in the papermaking industry.

For instance, where the web leaves the Fourdrinier wire and moves onto the felt of the press part of the machine it sometimes breaks, in which case it will follow the wire and wedge between the wire and the first wire roll, which wrinkles and damages the wire. It is necessary to provide means to strip this broke from the wire, and continuously operating showers are utilized which exert a fluid spray on the Fourdrinier wire, spraying through this wire to strip the broke. Even though a shutoff valve is used for the showers so that they are not continuously operated and sensing means is provided to turn the valve on, this has been so slow in the prior art due to the necessity for the shower fluid to travel from the valve to the nozzles, that the broke or part of it passes the shower before the shower becomes fully operative.

In the present invention sensing means is provided for the sheet as it passes from the couch roll and the sensing means is connected in such a way as to operate an on and off valve in the supply pipe for the shower pipe, but each nozzle is provided with its own automatically operating shutoff means which operates to open the individual nozzle immediately upon the application of water pressure thereto so that instantaneously upon the operation of the single valve in the water supply pipe, the shower pipe being full of water, pressure is exerted on the individual shutoff means for each nozzle, opening the same and causing the shower to operate, so that the shower is operated before the sheet approaches the shower area even though this should be but a matter of a fraction of a second.

Other objects of the invention reside in the provision of specific means for automatically closing and maintaining in closed condition the individual nozzles all the while the sheet is continuous, but upon break of the sheet, water pressure instantaneously causes the nozzles to open.

Other objects and advantages of the invention will appear hereinafter.

Reference is to be had to the accompanying drawings in which:

FIG. 1 is a diagrammatic view illustrating the end of the Fourdrinier part and showing the web and the position of the shower as the web passes from the Fourdrinier part to the press part;

FIG. 2 is a view in elevation illustrating the shower pipe and the connections, parts being broken away;

FIG. 3 is an enlarged section through the novel nozzle showing the shutoff means and showing the nozzle closed;

FIG. 4 is a similar view showing the nozzle open, and

FIG. 5 is a plan view of the nozzle.

In illustrating the invention, the particular nozzles utilized are preferably self-cleaning but obviously other kinds of nozzles can also be used.

Referring now to FIG. 1 there is shown the Fourdrinier wire at **10**. This wire is traveling in the direction shown by the arrows in FIG. 1 passing over the couch roll **12** and the wire rolls **14** which are often provided with doctors such as at **16**. The shower pipe is indicated at **18** and a line of nozzles at **20**, and it will be seen that the shower or spray issuing from the shower impinges upon the inner side of the wire and passes through the wire thus stripping off any broke which may be clinging to the wire.

The stock or sheet is indicated at **22** and this is shown as passing off the couch roll onto the felt of the first press. The felt is indicated by the reference numeral **24** and travels in the direction of its arrow, the first press being shown at **26**. In the diagram of FIG. 1 there is shown a photoelectric device comprising a source of illumination and a P.E. cell **28** and **30** respectively and this is for the purpose of sensing any break in the sheet **22** as it passes the gap between the couch roll and the felt.

The photoelectric device is arranged to operate a solenoid operated valve which is of commercial construction and located in a water supply pipe in the area at **32** thereof, FIG. 2. This valve is a shutoff valve and as long as the sheet **22** is interposed between the lamp **28** and the P.E. cell **30** the valve at **32** will stay closed, but upon a break occurring in the sheet **22**, the solenoid valve will be energized to open the shower pipe **18** to the pressure of the water in the supply pipe which is indicated at **36** and which may also be provided with a manual shutoff valve **38**.

It will be seen that there is a row of the nozzles **20** evenly spaced along the shower pipe and in FIG. 2 they are shown as being directed toward the Fourdrinier wire **10** passing beneath the same. Thus it will be seen that when a break occurs in the sheet **22** instantaneously the solenoid valve at **32** will be turned on, thus applying pressure to the shower pipe contents and to the shower nozzles themselves. In this invention the shower pipe is always full of water as will be explained hereinafter so that the pressure operated shutoff valves in each nozzle are themselves instantaneously operated to shut off the nozzle when the solenoid valve **32** is shut off and to open when valve **32** is open.

The details of the shower nozzles themselves are shown in FIGS. 3 to 5. Each nozzle comprises a body portion **40** exteriorly threaded to be threaded in tapped holes in the wall of the shower pipe, and a nut **42** is utilized to lock the nozzles in position with the orifices of the nozzles as at **44** being located in the desired direction, in this case downwardly. The self-cleaning mechanism and shower forming means which is indicated generally at **46** is old and well known and forms no particular part of the present invention. However, the element **48** is a spray button which has a certain cooperative arrangement with respect to the lower end **50** of the piston member **52** which is adapted to move longitudinally in the shower nozzle body **40** creating a spray and also providing for cleaning of the nozzle.

The piston **52** as shown in FIG. 3 extends upwardly and terminates in a reduced neck or waist portion **54** and a terminal head **56**. Between the head **56** and the main body portion of the piston **52** there is attached a generally circular diaphragm indicated at **58**. This diaphragm is

provided with a spring **60** or the like which normally tends to bring the piston upwardly in FIG. 3 so that the orifice **62** of the piston abuts a shutoff valve **64**. The shutoff valve **64** is preferably made of plastic, rubber, or some such material providing a good closing seat for the orifice **62** and may be held in any way desired across the interior of the body of the nozzle as for instance by means of a pin or the like **66** which has its ends connected in the nozzle body.

In FIG. 3, the nozzle is shown in its closed position where the orifice **62** is firmly held against the underside of the valve **64**. Although the shower pipe may be full of water, if the valve at **32** is closed, this water will not exert enough pressure on the diaphragm to move the piston **52** from its FIG. 3 position wherein it is closed to its FIG. 4 position wherein it is open. However, at the instant that the valve **32** is opened, the water pressure from the supply pipe will be impressed upon all of the water in the shower pipe because this pipe is always full. This pressure is of course transmitted evenly to all of the diaphragms in the various nozzles, causing retraction of the various pistons **52** against the spring action and allowing water to flow through the central portion **68** of each piston **52** and out through the orifices.

Thus when a sheet break occurs between the Fourdrinier wire and the press part, valve **32** is instantaneously energized and the nozzles are all opened so that the broke is stripped from the Fourdrinier wire by the shower just before the first wire roll is approached, and the broke thus is caused to drop into the pit in the floor and does not travel along the wire any further than the shower. Immediately however that the sheet is once more intact, the shower nozzles stop as explained and thus it will be seen that a great deal of water is saved which would otherwise be wasted when it is not needed.

It is pointed out that the particular shower herein described is useful in other places besides on the Fourdrinier wire and the electric eye or sensing apparatus can also be used in other spots along the papermaking machine.

Having thus described my invention and the advantages thereof, I do not wish to be limited to the details herein disclosed, otherwise than as set forth in the claim, but what I claim is:

A spray nozzle for a pipe comprising a generally cylindrical body with a central bore therein and therethrough, a counterbore at one end and a spray button adjacent the other end of said central bore, the counterbored end of the body being attached to the pipe and open thereto,

a tubular cylindrical piston loosely fitted and axially movable within the bore and adapted to engage said button at one end to form a spray vent, said tubular piston having a portion of reduced diameter at the other end thereof, a head formed by said reduced diameter, said head being generally in the area of the counterbore,

a generally flexible washer surrounding the reduced portion and engaging the head, the washer being held in the cylindrical body of the counterbore, said washer being resilient and normally holding said piston in one position but yielding under pressure allowing motion thereof,

a fixed valve seat arranged at the counterbored end of the shower nozzle body, the washer normally holding the piston to the valve seat in said one position so that the nozzle is normally closed, the valve seat occupying only a portion of the open end of the spray nozzle body,

said washer thereby being accessible to fluid in the pipe at all times but displaceable only under conditions of fluid pressure imposed at the open end of said shower nozzle body causing the piston to move away from the valve seat, allowing fluid to flow past the seat and through the piston to the spray vent, and at the same time causing the piston to engage the button.

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