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(54) **Paint roller cleaning apparatus.**

(57) The invention provides apparatus for cleaning rollers used for applying emulsion paint and other water-based solutions to surfaces, the apparatus comprising a housing (1) within which a roller (3) can be mounted for rotation about its longitudinal axis for discharging a plurality of discrete jets of water or other liquid towards and onto a surface of a roller (3) mounted within the housing (1) through discharge orifices (9) which are so positioned and aligned that the discrete jets make contact with the roller surface at positions offset from the axis of rotation of the roller (3), each said jet overlapping with its neighbouring jet or jets so as to present a continuous liquid front along substantially the entire length of the roller (3).

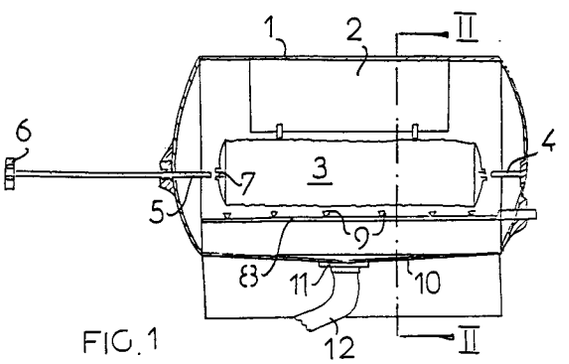

FIG. 1

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This invention relates to apparatus for cleaning rollers used for applying emulsion paint and other water based solutions to such surfaces as walls and ceilings for such purposes as, for example, decoration.

According to the present invention in one aspect there is provided apparatus for cleaning rollers used for applying emulsion paint and other water based solutions to surfaces, the apparatus comprising a housing within which a roller can be mounted for rotation about its longitudinal axis on a spindle or between spaced pivots, and means for discharging a plurality of discrete jets of water or other liquid towards and onto a surface of a roller mounted within the housing through discharge orifices which are so positioned and aligned that the discrete jets make contact with the roller surface at positions offset from the axis of rotation of the roller, each said jet overlappping with its neighbouring jet or jets so as to present a continuous liquid front along substantially the entire length of the roller.

The Applicants have found that, unless the jets overlap before making contact with the roller, areas of residual paint tend to remain on the roller; eg. streaks appear at locations on the roller which have not been subjected to pressurised contact of the jet with the fibres of the roller.

It is preferred that the plurality of jets are disposed in a generally linear array substantially parallel to the longitudinal axis of the roller.

The spindle or pivots may be so positioned that in use of the apparatus the roller is mounted with its longitudinal axis substantially vertical. Alternatively, the spindle or pivots may be so positioned that in use of the apparatus the roller is mounted with its longitudinal axis substantially horizontal.

Two pivots may be provided, one fixed and one adjustable. The adjustable pivot preferably comprises a screw threaded rod movable towards and away from a roller located within the housing.

The base of the housing may be inclined, a drain being provided to convey used liquid from the housing.

In another aspect, the present invention provides paint roller cleaning apparatus comprising a housing, means for supporting a roller to be cleaned within the housing whilst enabling the roller to spin freely about its longitudinal axis, means for conveying water or other liquid into the housing interior and to discharge the same as discrete jets onto the surface of the roller through a series of discrete orifices, the orifices being so aligned that jets of water or other liquid issuing therefrom make contact with the roller surface at positions offset from the longitudinal axis of the roller, each said jet overlapping with its neighbouring jet or jets so as to present a continuous liquid front along substantially the entire length of the roller.

It has been found to be preferable to construct the discharge orifices such that there is substantially even liquid pressure over the cross-sectional area of the jet and over substantially the entire length of the liquid front. This is suitably achieved by locating a restrictor hole between the orifice and the liquid supply, the hole being sited immediately prior to, or upstream of, the orifice. The restrictor hole is generally aligned with the centre of the discharge orifice and has an area less than the area of the discharge orifice. In order to ensure that the liquid pressure is substantially even over substantially the entire length of the liquid front, the area of the restrictor hole is made substantially smaller than the inner cross sectional area of a manifold which conveys water or other fluid to the orifices.

In a preferred embodiment, the jets are caused to overlap prior to contacting the roller surface by virtue of being discharged through a slotted orifice behind which lies the restrictor hole. The jet thus formed is generally fan-shaped. The slot suitably is a straight slot, i.e. a slot having generally parallel longer sides, for example, a rectangular slot. Most advantageously, the apparatus may be provided with a plurality of discharge nozzles, each such nozzle having a generally hemispherically shaped end face in which is set a discharge nozzle in the form of a straight slot.

The invention also comprehends a method of cleaning a roller through the use of an apparatus of the type defined above.

The invention will now be described by way of example only with reference to the accompanying diagrammatic drawings in which:-

Figure 1 is a side view in section of paint roller cleaning apparatus in accordance with the invention in which the roller is mounted about a horizontal axis ;

Figure 2 is a section taken along line II-II of Figure 1;

Figure 3 is an end view of the apparatus illustrated in Figures 1 and 2;

Figure 4 is a side view in section of a further embodiment of the apparatus of the invention, in which the roller is mounted for rotation about a vertical axis; and

Figure 5 is a side view in section of a spray manifold used in the apparatus of Figures 1 to 4.

The roller cleaning apparatus illustrated in Figures 1 to 3 comprises a generally cylindrical housing 1 provided with a pivotable flap 2 to enable a paint roller 3 to be positioned within the housing interior between a fixed pivot 4 and an adjustable pivot 5. The adjustable pivot 5 comprises a screw threaded rod movable towards and away from one end of the roller 3 by means of a knob 6. The roller

is of conventional configuration and comprises an outer paint absorbing tubular layer carried by an inner hollow shaft 7.

Positioned within the interior of the housing 1 is a length of pipe 8 (e.g. of copper) formed with a series of discrete orifices 9. These orifices are preferably rectangular or fan shaped in section. The pipe 8 extends through one wall of the housing to receive a hose or the like.

The base 10 of the housing 1 slopes downwardly towards a drain 11 connected to an outlet hose 12.

As will be seen more particularly from Figures 2 and 3 of the drawings, the pivots 4,5 are positioned so that the longitudinal axis of a roller mounted between the pivots is offset from the centre line of the housing. More importantly, the discharge orifices 9 of the pipe 8 are directed towards points on the roller surface which are also offset from the longitudinal axis of the roller.

In use of the apparatus illustrated, the housing 1 is mounted on a fixed stand 14 and a roller to be cleaned is positioned between the fixed and adjustable pivots 4,5 with the inwardly facing ends of the fixed pivot 4 and the adjustable pivot 5 positioned against the open ends of the shaft 6. The pressure applied by the pivots is insufficient to inhibit free rotation of the roller. Water under pressure is then admitted to the pipe 8 to cause discrete fan shaped water jets to be emitted from the orifices 9. Because of their alignment, the jets emitted make contact with the roller surface at positions offset from the rollers longitudinal axis thereby imparting rotational movement to the roller. This rotational movement ensures speedy and efficient cleaning of the roller.

Polluted water leaves the housing via the drain 11, this procedure being assisted by the inclined base of the housing.

In an alternative embodiment, the housing illustrated is effectively turned through a right angle so that the roller 3 is positioned with its longitudinal axis substantially vertical.

Figure 4 illustrates another embodiment of the invention in which the roller, shown in phantom and denoted 15, is mounted for rotation about a vertical axis. Thus, the apparatus comprises a housing formed from an extruded cylindrical body 16, onto which are detachably secured (e.g. by means of a friction fit) a top cover 17 and a bottom cover 18. The bottom cover 18 is provided with a waste outlet 19 and a roller bottom spindle 20. The top cover is provided with a roller top spindle 21 and an opening 22 through which the inlet end of a spray manifold 23 may pass. The top and bottom covers conveniently are formed by injection moulding. The spray manifold comprises a tubular member 24 supplying discharge nozzles 25. In Figure 4, seven discharge nozzles are shown but there may be more or fewer in number. The lower closed end 26 of the tubular member 24 is retained within a seat 27 in the bottom cover whilst the upper open end 28 protrudes through the top cover 17 and can be connected to a pressurized supply of water or other cleaning fluid. In order to use the apparatus, the top cover or the bottom cover is removed and the roller is mounted on one of the spindle members 20 or 21. The detached cover is then refitted such that its spindle engages the shaft of the roller. The apparatus is then used in the manner described for the embodiment of Figures 1 to 3. Where necessary, a spindle adaptor 29 can be employed so that the apparatus can accommodate rollers of different sizes.

Figure 5 shows a preferred configuration for the spray manifold. Thus, in this embodiment there are six discharge nozzles 25, although there may be a greater or lesser number if desired. Each nozzle is provided with a restriction hole 30, the area of which is significantly smaller than the cross-sectional areas of either the tubular member 24 or the discharge orifice 31. Each nozzle 25 has a generally hemispherical front face in which is set the slotted discharge orifice 31. The construction of the nozzles is such that a fan-shaped jet of water or other cleaning fluid is produced, and the distance between the nozzles is set such that the fan-shaped jets overlap before coming into contact with the roller. Thanks to the area of the restriction hole 30 being significantly smaller than the cross-sectional area of the tubular member 24, the pressure of liquid emerging from the nozzles is substantially constant along the line of nozzles. Consequently, the liquid pressure is substantially even along the entire liquid front.

The efficiency of the apparatus of the present invention is illustrated by the following test report obtained on an apparatus incorporating the nozzle arrangement shown in Figure 5. Thus, a wall having an area of 115ft^2 was painted using (a) a 9" roller and (b) a 12" roller. This was carried out four times for each of the following tests and the figures shown below are average times.

1. The wall was painted and the rollers were washed under the tap by hand.
   (a) 9" Roller: after 15 minutes there was still some residual paint coming from the roller when it was washed and squeezed.
   (b) 12" Roller: the same results were obtained as with the 9" roller.
2. The wall was painted and the rollers were set up in the washer.
   (a) 9" Roller - Average wash time:- 4.5 minutes
   (b) 12" Roller - Average wash time:- 8.0 minutes

The rollers were checked by hand after the test and no visible paint could be squeezed from them.

3. The wall was painted and the rollers were left unwashed for two hours. They were then washed in the roller washer.

(a) 9" Roller - Average wash time:- 6 minutes

(b) 12" Roller - Average wash time:- 10½ minutes

4. Several rollers were collected that had been hand washed and then left. The most recent had been left approximately three months. All rollers tested had become matted and had an unsuitable texture for painting.

All were placed in the washer for five minutes and all were refurbished to a suitable painting texture.

It will be appreciated that the foregoing is merely exemplary of particular embodiments of paint cleaning apparatus in accordance with the invention and that modifications can readily be made thereto without departing from the true scope of the invention.

Claims

1. Apparatus for cleaning rollers used for applying emulsion paint and other water-based solutions to surfaces, the apparatus being characterised by a housing (1,16) within which a roller (3,15) can be mounted for rotation about its longitudinal axis on a spindle or between spaced pivots, and means (8,24) for discharging a plurality of discrete jets of water or other liquid towards and onto a surface of a roller mounted within the housing through discharge orifices which are so positioned and aligned that the discrete jets make contact with the roller surface at positions offset from the axis of rotation of the roller, each said jet overlapping with its neighbouring jet or jets so as to present a continuous liquid front along substantially the entire length of the roller.

2. Apparatus according to claim 1 characterised in that the jets are disposed in a generally linear array substantially parallel to the longitudinal axis of the roller.

3. Apparatus according to claim 1 or claim 2 characterised in that there is located immediately upstream of each discharge orifice (9,25), a restrictor hole (30), the restrictor hole being aligned with the centre of the discharge orifice.

4. Apparatus according to claim 3 characterised in that the area of the restrictor hole (30) is less than the area of the discharge orifice.

5. Apparatus according to claim 3 or claim 4 characterised in that the plurality of discharge orifices is provided on a spray manifold which has an internal cross-sectional area significantly larger than the area of each restrictor hole, such that the liquid pressure of the resulting liquid front is substantially even along substantially the entire length of the front.

6. Apparatus according to any one of the preceding claims characterised in that the discharging means comprises a discharge orifice which is shaped as a slot such that the resultant jet is substantially fan-shaped.

7. Apparatus according to any one of the preceding claims characterised in that two pivots or spindles are provided, one fixed and one adjustable.

8. Apparatus according to any one of the preceding claims wherein the base of the housing (1,16) is inclined and is provided with a drain (11,19) to convey used liquid from the housing.

9. A paint roller cleaning apparatus comprising a housing (1,16), means (4,5,20,21) for supporting a roller (3,15) to be cleaned within the housing whilst enabling the roller to spin freely about its longitudinal axis, means for conveying water or other liquid into the housing interior and to discharge the same as a plurality of discrete jets onto the surface of the roller through a series of discrete orifices (9,25), the apparatus being characterised in that the orifices are so aligned that jets of water or other liquid issuing therefrom make contact with the roller surface at positions offset from the longitudinal axis of the roller, each said jet overlapping with its neighbouring jet or jets so as to present a continuous liquid front substantially the entire length of the roller.

10. A method of cleaning a roller used for applying emulsion paint and other water-based solutions to surfaces, the method comprising mounting the roller within an apparatus as defined in any one of the preceding claims, directing water or other cleaning liquid through the discharging means so as to provide an array of overlapping liquid jets of a pressure sufficient to cause the roller to rotate, and maintaining the passage of liquid through the discharge means for a time sufficient to remove substantially all the paint or other water-based solution from the roller.

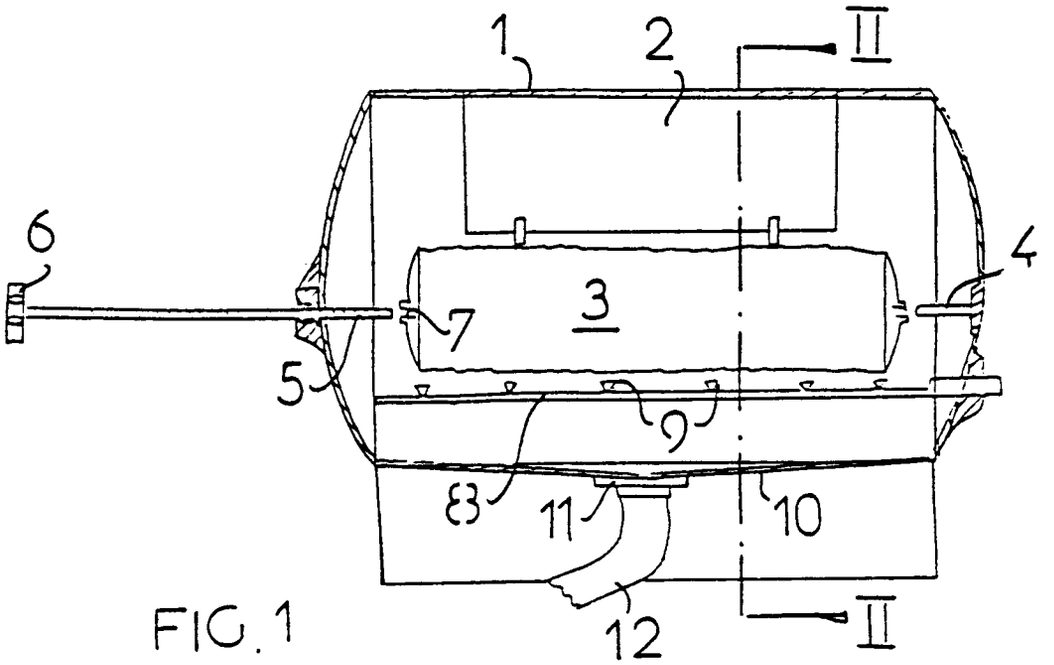

FIG. 1

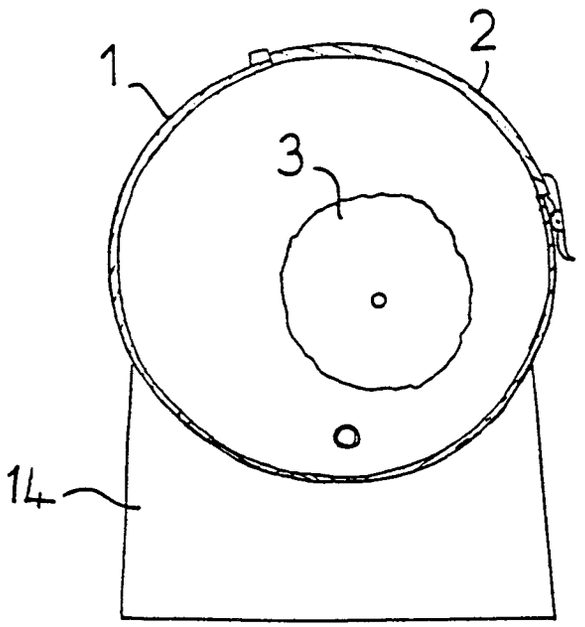

FIG. 2

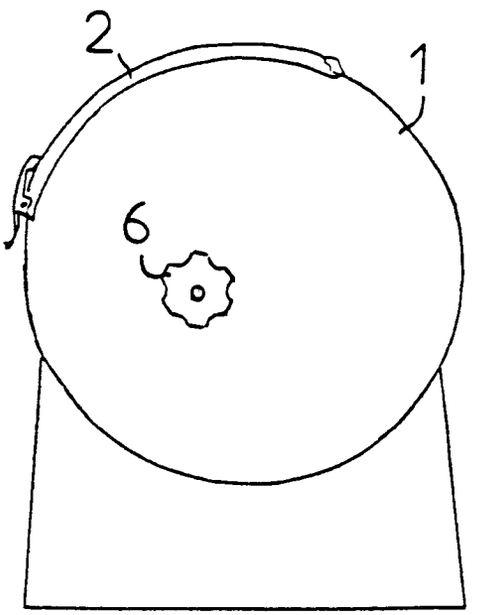

FIG. 3

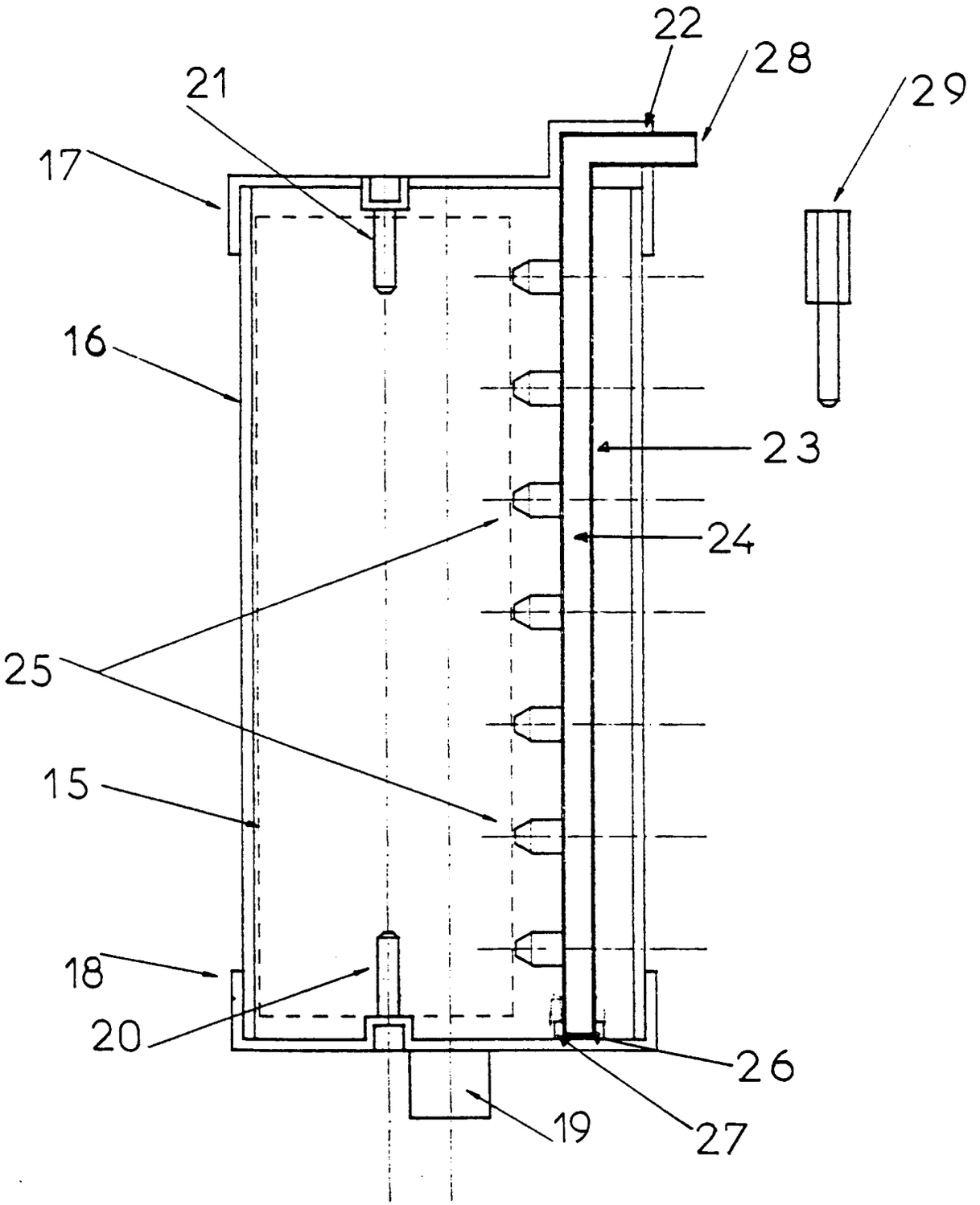

FIG. 4

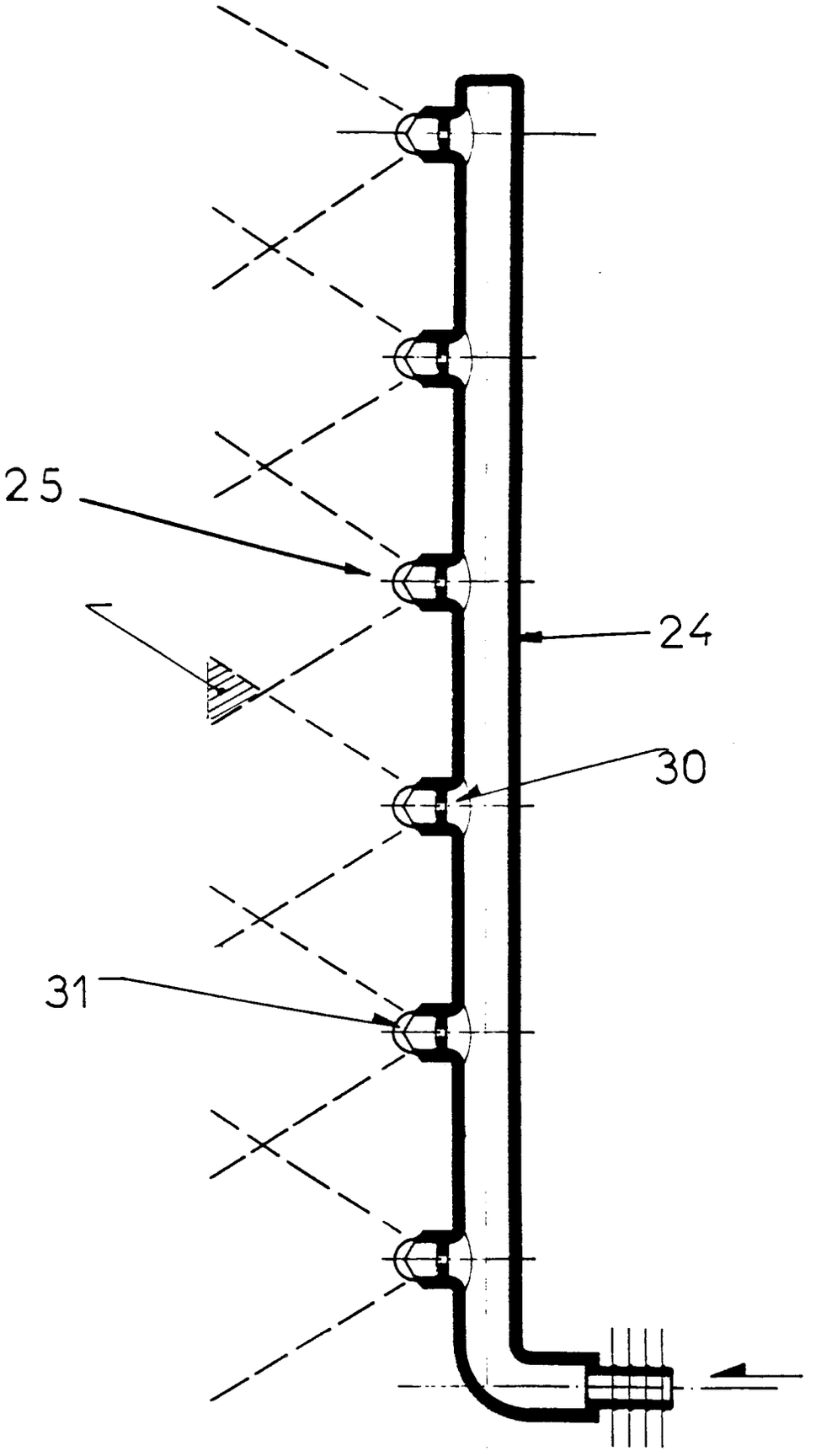

FIG. 5

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EUROPEAN SEARCH REPORT

Application Number EP 91307030.6

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	DE - A - 2 138 659 (HOYER) * Totality * --	1	B 08 B 3/00
A	DE - A1 - 2 360 884 (BOSCH) * Totality * --	1	
A	DE - B1 - 2 927 737 (LECHLER) * Fig. 5 * --	1	
A	DE - A1 - 3 414 880 (LECHLER) * Totality * --	1,3-6	
A	US - A - 3 688 785 (STEVENS) * Fig. 1 * ----	1,8	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

B 05 B 1/00
B 08 B 3/00

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
VIENNA	14-10-1991	KNAUER

CATEGORY OF CITED DOCUMENTS

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