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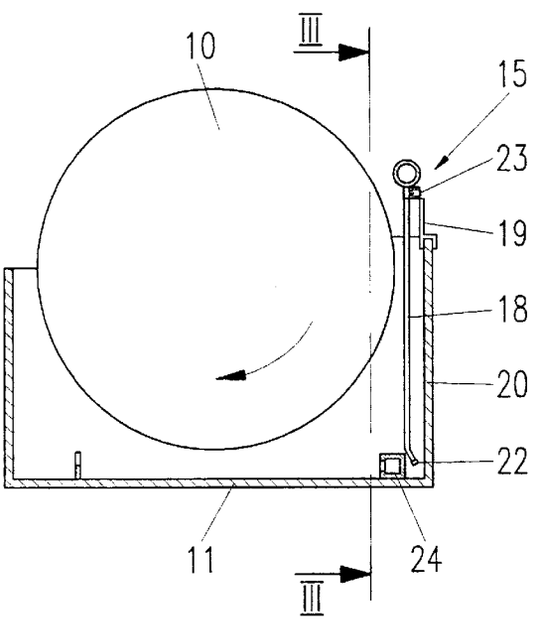
(54) Method for processing fountain solutions for offset printing

(57) In the method for processing fountain solutions for offset printing oxygen contained in compressed air is added to the water to modify its surface tension and to improve its viscosity. Thereby the use of isopropyl alcohol can be avoided.

The device for implementing the method includes a damping unit (5) containing a scoop roller (10) in a fountain solution tank (11) that is arranged ahead of the inking unit (4) and in which the fountain solution tank is provided with an air supply unit (15) driven by compressed air.

FIG. 2



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Description

The present invention relates to a method for processing fountain solutions for offset printing and further relates to a device for implementing the method.

Offset sheet printing machines include, in addition to the different cylinders, an inking unit and a damping unit, whereby the damping unit is situated ahead of the inking unit and designed to damp the not printing parts of the offset plate mounted onto the plate cylinder before the inking. More precisely said, offset printing is based on the principle of the reciprocal repulsion between oliophilic, that means ink containing, and hydrophilic, that means water containing solutions on the offset plate.

The water generally used in the damping unit is normal city supply water or, if that water is hard, softened water. To such water between 2 and 5 % of a fountain solution concentrate is added which includes different substances that stabilize the pH value, influence the surface tension, provide the offset plate with a plate protection and have antimicrobacterial properties. Such fountain solution concentrates are commercialized under different trade names and with different compositions.

Water processed accordingly has still not the desired properties to assure that the offset plates are completely and homogeneously damped on the parts provided for. In the known Methods for processing fountain solutions, to the water, that may have been softened, and to which a fountain solution concentrate has been added, an agent, normally isopropyl alcohol, is added that increases the viscosity and modifies the surface tension. The addition takes place in doses of between 5 to 20 % in volume, depending on the quality of the water. However, due to its low fire point the isopropyl alcohol vaporizes completely and due to its chemical composition loads the air with vaporized organic substances. Therefrom results a considerable pollution of the environment.

Starting from this known state of the art it is the object of the present invention to propose a method for processing fountain solutions that does not load the environment with vaporized organic substances and that moreover reduces the costs of the processing method. In such a method oxygen, particularly oxygen contained in the air, is added to the water to improve its wetting properties by modifying the surface tension and enhancing its viscosity.

In the device for implementing the method in which a damping unit including a scoop roller in a fountain solution tank is arranged ahead of the inking unit the fountain solution tank is provided with a oxygen supply unit, particularly an air supply unit.

The invention will be described with respect to the drawing of embodiments of the device.

Figure 1 schematically shows a section through a part of an offset sheet printing machine,

Figure 2 is an enlarged partial detail of Figure 1 of a first embodiment of the invention,

Figure 3 shows, at the same scale as in Figure 2, a section along line III-III,

Figure 4 shows, in a section according to line IV-IV in Figure 5, a second embodiment of the invention,

Figure 5 shows a section along line V-V in Figure 4,

Figure 6 shows, in a section along line VI-VI in Figure 4, a variant to the embodiment of Figure 5,

Figure 7 shows, in a section along line VII-VII in Figure 8, a variant to the previous embodiments,

Figure 8 shows a section along the line VIII-VIII in Figure 7,

Figure 9 shows, in a section along line IX-IX in Figure 10, a third embodiment of the invention, and

Figure 10 shows a section along line X-X in Figure 9.

Figure 1 schematically shows one of possibly several printing groups of an offset sheet printing machine with a plate cylinder 1, an impression cylinder 2 and a rubber blanket cylinder 3 arranged in-between, as well as the inking unit 4 with its different inking drums that transfer the ink onto the plate cylinder, and the damping unit 5.

The paper sheet 6 proceeds from the intermediate drum 7 to a first feeder drum 8 from where it proceeds to the impression cylinder 2 and continues to the second feeder drum 9 from where the sheet may proceed to a further drum and, if provided for, to a further inking unit or to a coating module.

The damping unit 5 includes a scoop roller 10 that scoops water from a fountain solution tank 11 at a given rotational speed, and a metering roller 12 that regulates the water quantity, and finally a damping roller 13 that humidifies the offset printing plate 14 with a regular film of damp.

In Figure 2 one recognizes, at an enlarged scale, the scoop roller 10 in the fountain solution tank 11 and the water conduit 24 as well as the air supply unit 15 according to the invention.

The method according to the invention is based on the finding that by adding oxygen or surrounding air respectively to the water, the viscosity of the water increases. That means that a similar effect is obtained as by using isopropyl alcohol, without, however, the necessity to provide such a substance and without loading the

environment with vaporized organic substances. It is useful to use compressed air that is available in most printing offices.

The section of Figure 3 shows the fountain solution tank 11 with its rear wall cut away and the water conduit 24 with the holes 25. The scoop roller 10 is shown in dotted lines. The air supply unit 15 is mainly formed of a linkage of bars 16, to which compressed air is supplied by a hose 17, as well as from a certain number of dipping tubes 18 - in the shown embodiment nine - connected to the linkage of bars 16. The whole air supply unit is mounted onto the rear wall 20 of the tank 11 by means of a certain number of clamps 19, see also Figure 2, and can be removed easily for cleaning purposes, whereby between the hose 17 and the linkage of bars 16 a plug-type connection 21 is provided.

Each dipping tube is provided with a nozzle 22 to achieve that the air is blown in finest particles into the fountain solution. Moreover, it is advantageous to provide for a metering valve 23 at each connection between dipping tube and linkage bar to allow an individual metering of the air volume for each dipping tube.

Although tests have shown that the other gazes contained in the air, as e.g. the nitrogen, do not disturb the processing, it is imaginable to use compressed air enriched with oxygen or oxygen alone.

In the Figures 4-10 further embodiments and variants thereof of the air supply unit are shown. In the first embodiment according to Figures 2 and 3 the elements of the air providing unit are preferably made of metal. While appropriate metal is resistant to the components of the fountain solution it may be desirable to use also elements made of plastics.

The embodiment and its variants according to Figures 4 to 8 comprise for example two plastics tubes 26 and 27 provided with small holes 28. The tubes are arranged lengthwise and approximately parallel to the water conduit 24. The air conducting tubes are connected to a hose 17 supplying compressed air. The tubes are connected by a similar or the same plug-type connection 21 as in the previous embodiment.

In the embodiment of Figures 4 and 5 the tubes 26 and 27 are one above the other, and for maintaining the tubes in place between the tank wall 20 and the water conduit 24 a sheet metal or plastic foil 29 is provided, the foil being clamped to or suspended on the top of the wall 20 of tank 11.

In the variant of Figure 6 the two tubes 26 and 27 are arranged on the other side of the water conduit 24 and the sheet metal or plastic foil 30 has is provided with a step 31 at its bottom part.

In the variant of Figures 7 and 8 the two tubes are not on top of the other but on both sides of the water conduit 24, also held in place by the stepped sheet metal or plastic foil 30.

In the third embodiment according to Figures 9 and 10 the air is provided by a plastics cushion 32, the cushion covering a major part of the bottom of the tank, across preferably between the water conduit 24 and a rib 35, and along the lengthside of the tank. The cushion 32 is provided with openings 33 at its top surface 34. The cushion is connected in a similar way to hose 17 as the tubes.

It follows from the above that there exist a great variety of supplying air to the water. One of the critical criteria is the - small - size of the holes for a good distribution of the air. The connection to the compressed-air hose of the tubes as well as of the cushion may comprise a metering valve 36.

Claims

1. A method for processing fountain solutions for offset printing, characterized in that oxygen or oxygen contained in the air is added to the water to improve its wetting properties by modifying the surface tension and enhancing its viscosity.

2. A method according to claim 1, characterized in that air in fine distribution is blown through the water containing a fountain solution concentrate.

3. A device for implementing the method according to claim 1, in which a damping unit (5) including a scoop roller (10) in a fountain solution tank (11) having a water conduit (24) is arranged ahead of the inking unit (4), characterized in that the fountain solution tank (11) is provided with an oxygen or oxygen containing air supply unit (15; 26, 27; 32).

4. A device according to claim 3, characterized in that the air supply unit (15) includes a linkage of bars (16) connected to a hose (17) for compressed air which linkage of bars is connected to a certain number of dipping tubes (18).

5. A device according to claim 3, characterized in that each dipping tube (18) is provided with an exit nozzle (22) and in that a metering valve (23) is arranged between the dipping tube (18) and the linkage of bars (16).

6. A device according to claim 3, characterized in that the air supply unit (15) is provided with clamps (19) to enable to affix it removably to the fountain solution tank (11) and includes a plug-type connector (21) between the linkage of bars (16) and the hose (17) for the compressed air.

7. A device according to claim 3, characterized in that the air supply unit comprises at least one plastics tube (26, 27) provided with holes (28) and arranged near the bottom of the fountain solution tank (11) in the vicinity of the water conduit (24).

8. A device according to claim 7, characterized in that two air supply tubes (26, 27) are arranged approximately parallel to the water conduit (24) along a wall (20) of the fountain solution tank (11), one tube (27) being arranged above the other (26) and either between the wall (20) and the water conduit (24) or on the other side of the water conduit.

9. A device according to claim 7, characterized in that two air supply tubes (26, 27) are arranged approximately parallel to the water conduit (24) along a wall (20) of the fountain solution tank (11), one tube being along the other.

10. A device according to claim 9, characterized in that the tubes (26, 27) are arranged on both sides of the water conduit (24).

11. A device according to claim 7, characterized in that the tubes (26, 27) are held in place by a sheet metal or plastics foil (29, 30) provided with clamps or hooks for being fixed removably to a wall of the fountain solution tank.

12. A device according to claim 7, characterized in that the tubes (26, 27) are connected to a hose (17) for the compressed-air, the connection including a plug-type connector (21) and a metering valve (36).

13. A device according to claim 3, characterized in that the air supply unit comprises a cushion (32) made of plastics material and arranged at the bottom of the fountain solution tank (11), said cushion being provided at its surface (34) with holes (33).

14. A device according to claim 13, characterized in that the cushion (32) is connected to a hose (17) for the compressed-air, the connection including a plug-type connector (21) and a metering valve (36).

FIG. 1

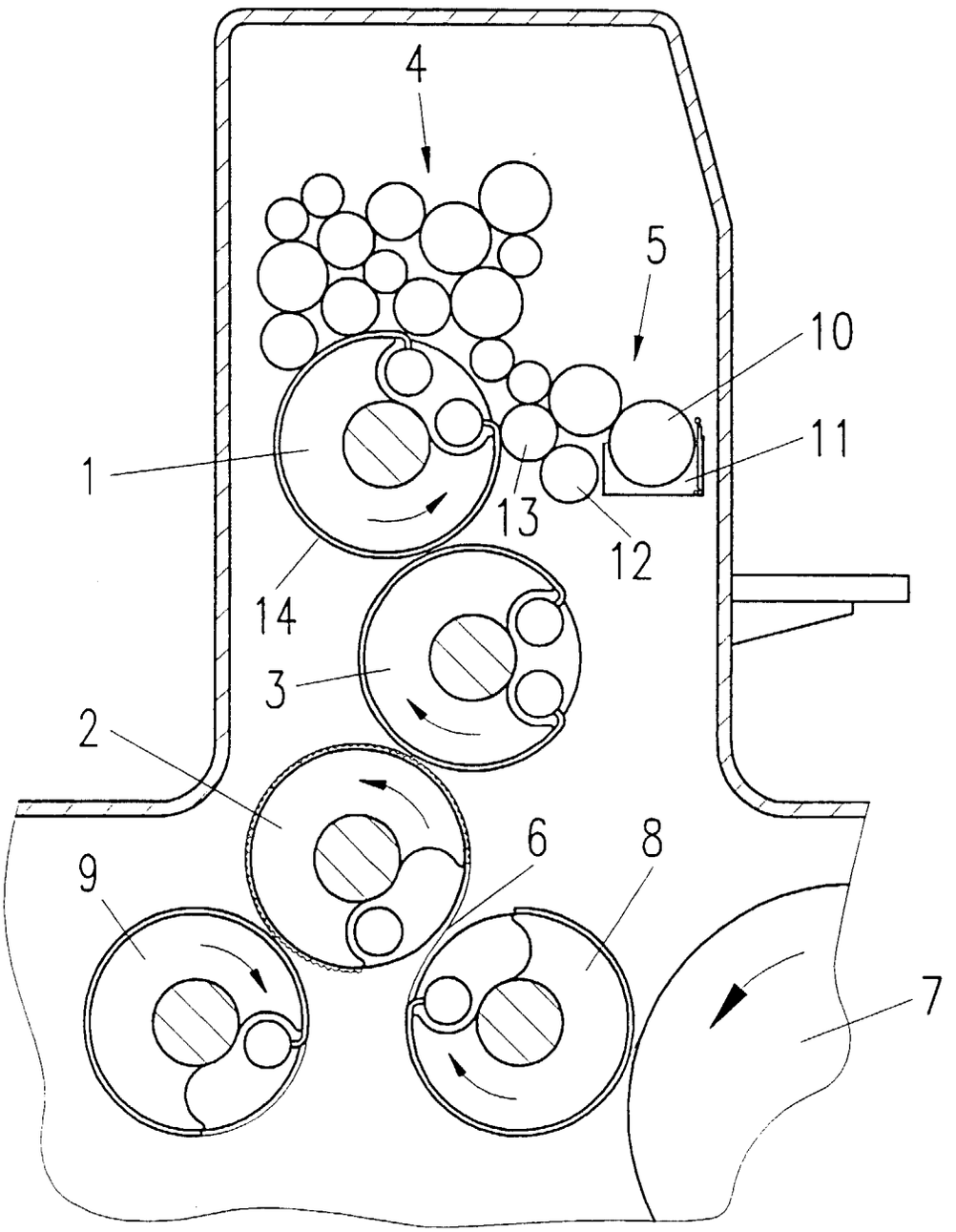


FIG. 2

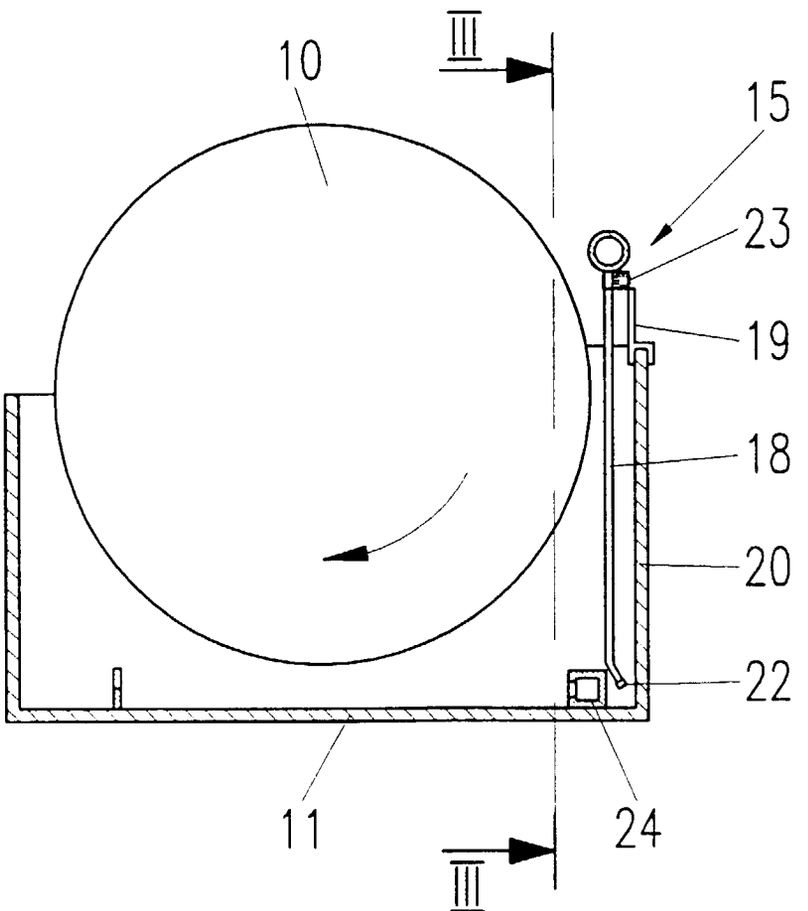


FIG. 3

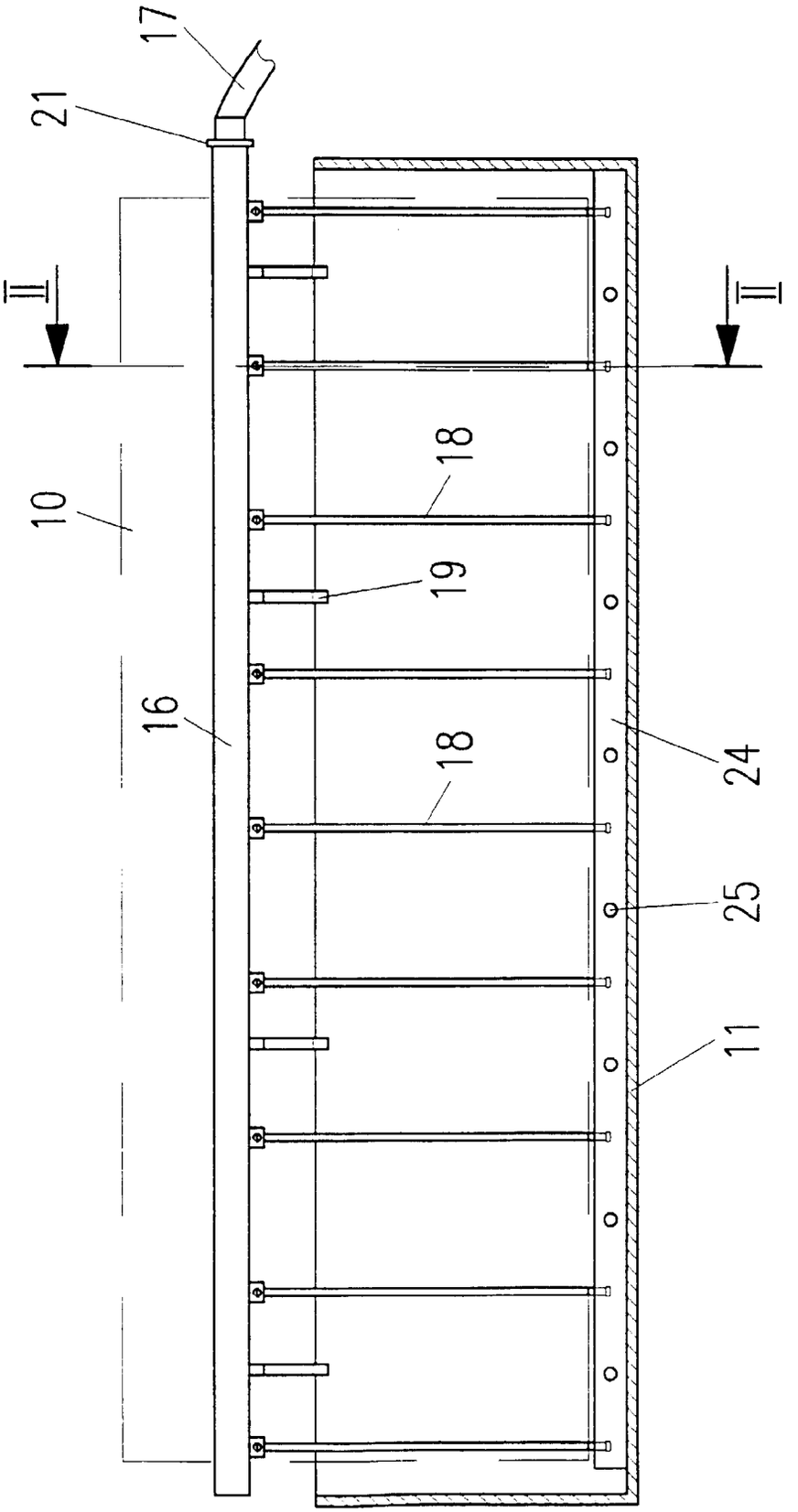


FIG. 4

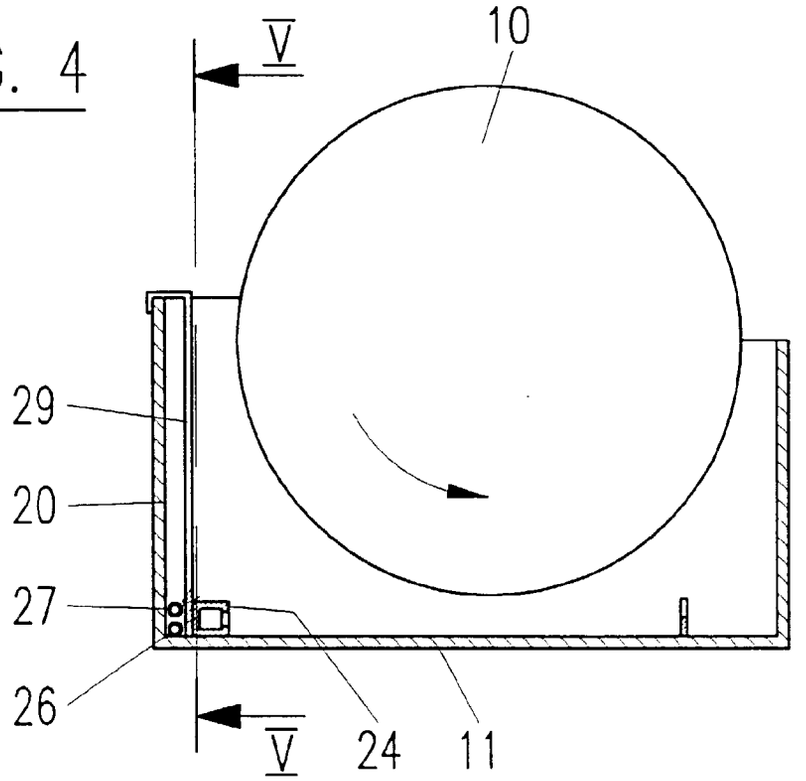


FIG. 6

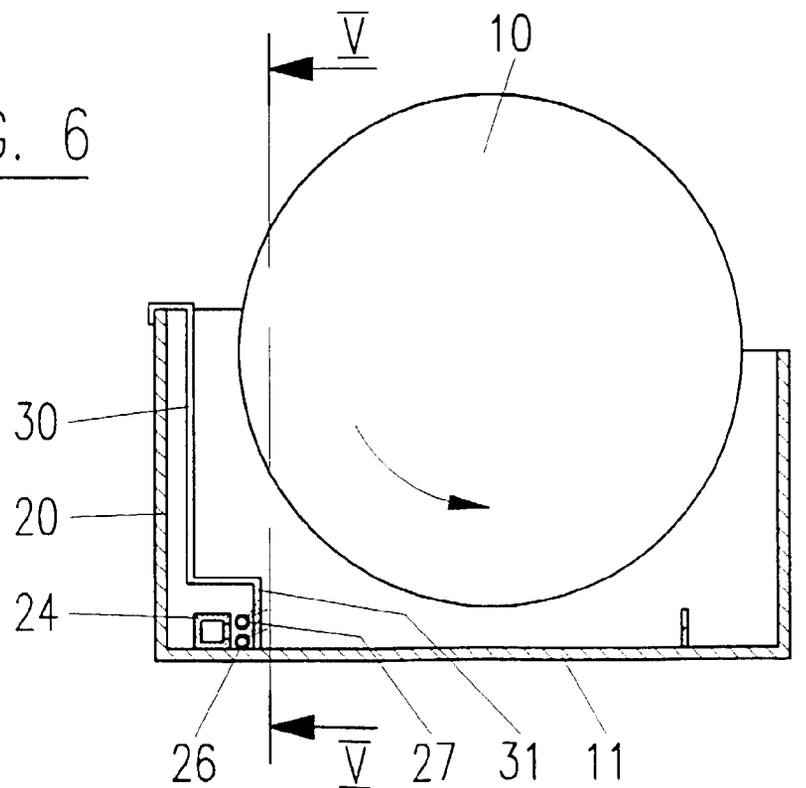


FIG. 5

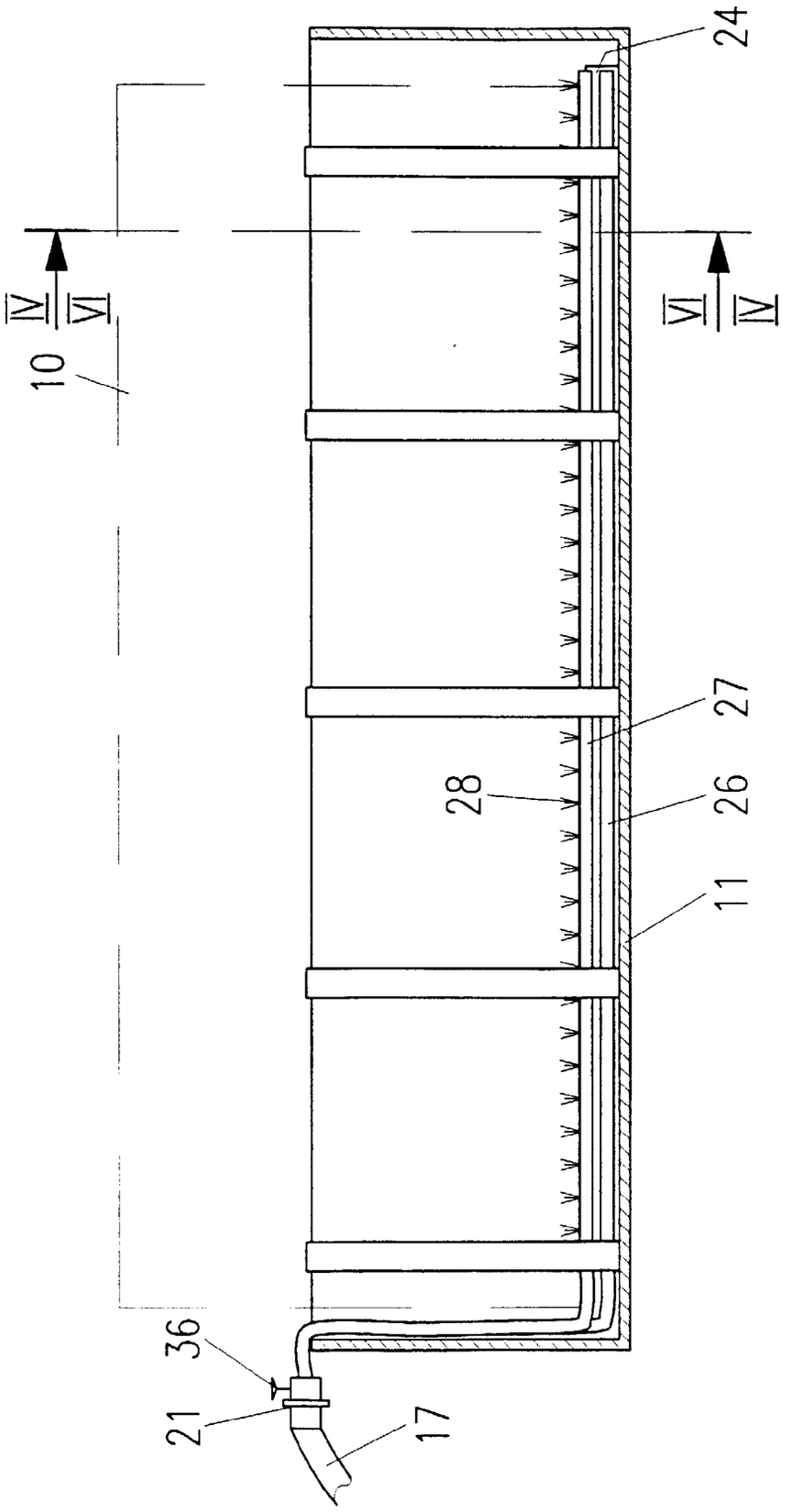


FIG. 7

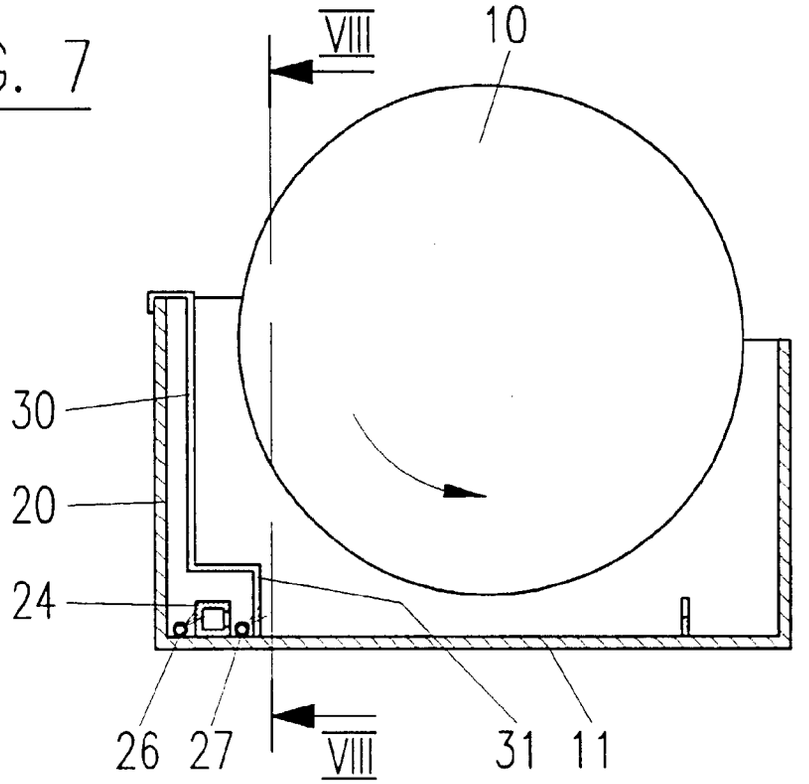


FIG. 9

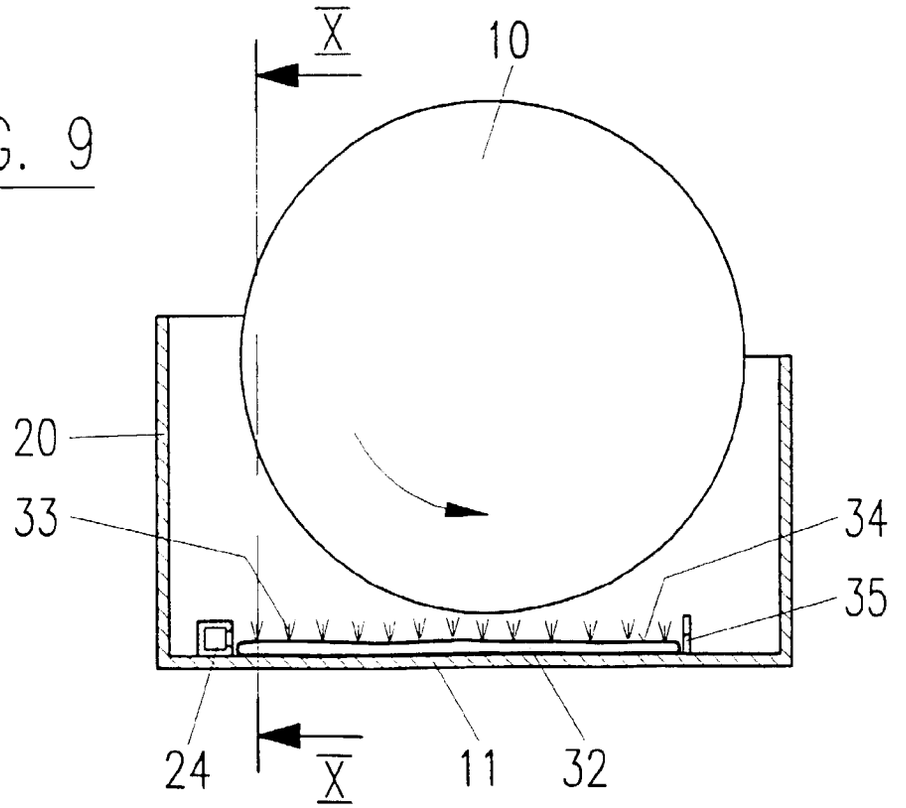


FIG. 8

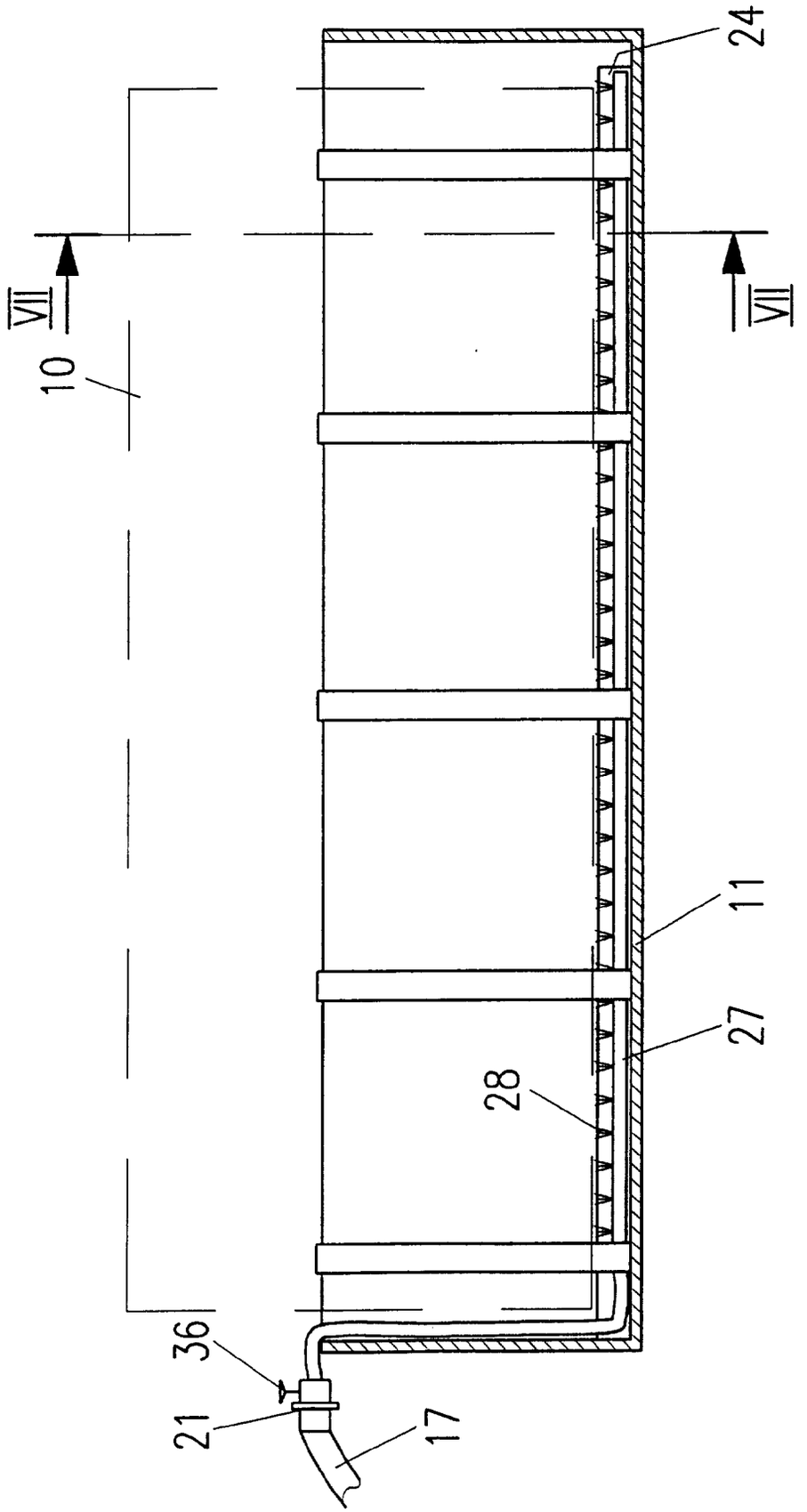
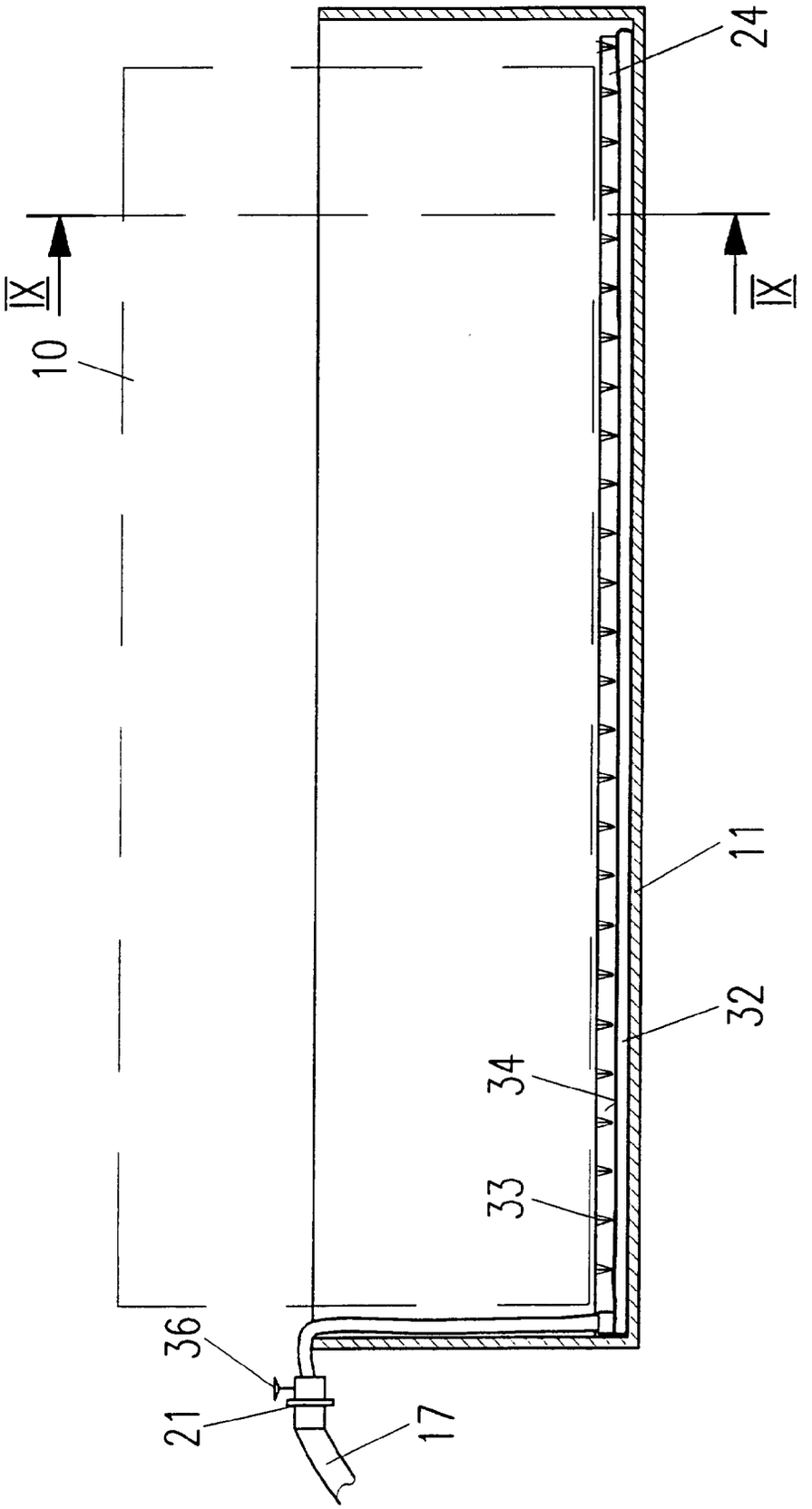


FIG. 10



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EUROPEAN SEARCH REPORT

Application Number
EP 98 81 0354

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.6)
A	PATENT ABSTRACTS OF JAPAN vol. 013, no. 385 (M-864), 25 August 1989 & JP 01 136746 A (TOPPAN PRINTING CO LTD), 30 May 1989 * abstract *		B41F7/32 B41F7/24
A	DE 34 43 510 A (WEITMANN & KONRAD FA) 5 June 1986		
A	WO 95 03177 A (GUERINI ARTURO) 2 February 1995		

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

B41F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	30 July 1998	Madsen, P

CATEGORY OF CITED DOCUMENTS

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