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(54) **System for cleaning outside walls**

(57) System for cleaning outside walls (14), comprising a main frame (1) provided with at least one row of sprayers (9a,9b), a water feed, a cylindrical brush (2) and a drive motor (3) for rotating the brush (2). The brush is

provided with an adjustable cover (19) and the main frame (1) is provided with attaching means (8,12) for attaching the main frame (1) to a gondola (13). The system also comprises a transport frame (4) on which the main frame (1) can be placed using the gondola (13).

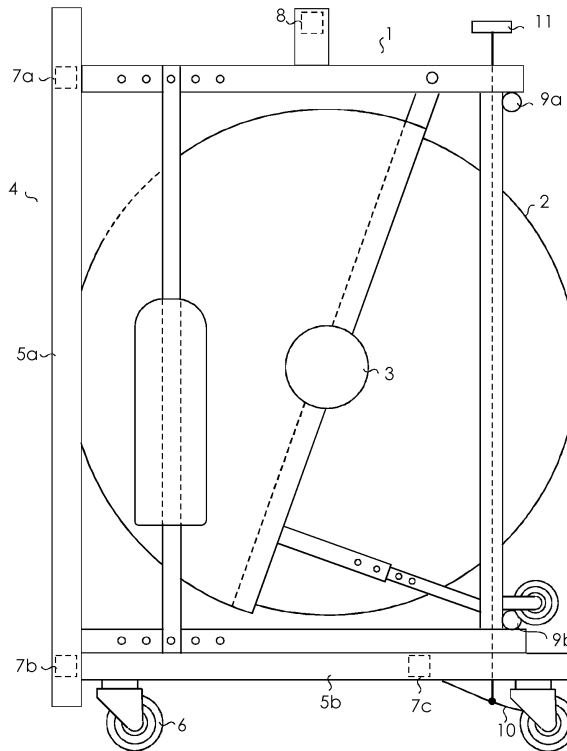


Fig. 1

Description

[0001] The invention relates to a system for cleaning an outside wall, comprising a main frame provided with at least one row of sprayers, with water feed means and with an at least substantially cylindrical brush disposed rotatably around a longitudinal axis, with drive means for rotating the brush in a position of use, with a cover for shielding at least a side of the brush remote from the outside wall and with attaching means for attaching the main frame to hoisting means.

[0002] Systems of this type are known. The drawback of known systems is that they must be given a relatively rigid form in order to enable transport thereof. The rigid construction necessarily makes the weight relatively high, thereby limiting the field of application. The system according to the invention obviates this drawback and has the feature that the system also comprises a transport frame on which the main frame can be placed using the hoisting means. The transport frame is embodied here such that the main frame is supported optimally during transport. The weight of a main frame embodied in this way can then be reduced such that the system can also be utilized in situations where the hoisting means only have a limited capacity.

[0003] A favourable embodiment of the inventive system has the feature that the attaching means are adapted to attach the main frame to a gondola. When a main frame is given a sufficiently light form, an unmodified gondola can carry this main frame while a person can moreover also take up position in the gondola. This person can be carried together with the main frame along the surface for cleaning. He/she can herein inspect this surface and intervene manually where necessary. It is also important that when the inventive system is used the existing infrastructure substantially does not have to be modified, and this has the effect of lowering the threshold.

[0004] A further favourable embodiment has the feature that an underside of the main frame is provided with a safety bracket so that, in the unlikely event that for instance the lower edge of the main frame makes contact with the surface for cleaning, the hoisting means are stopped. The main frame is here preferably provided with connecting means for connecting the safety bracket to an additional safety bracket forming a standard part of the gondola, so that the safety circuit of the gondola does not have to be modified.

[0005] A further favourable embodiment has the feature that the transport frame is provided with a recess in which the safety bracket can be received. In this way the main frame can be placed on the transport frame without the safety bracket activating the safety circuit of the gondola.

[0006] A further favourable embodiment has the feature that the system also comprises an auxiliary frame which is mounted pivotally in the main frame and in which the brush is rotatably mounted. The system preferably also comprises adjusting means for the purpose of ad-

justing a position of the auxiliary frame relative to the main frame and, more particularly, adjusting a pressure of the brush on the surface for cleaning.

[0007] A further favourable embodiment, which contributes toward a minimizing of the weight of the main frame, has the feature that the cover comprises a jacket of the auxiliary frame manufactured from foil and/or fabric.

[0008] A further favourable embodiment has the feature that the cover takes an at least substantially C-shaped cross-sectional form, and that a rear side of the cover is provided with an opening running in a longitudinal direction. The brush which brushes the water from the surface for cleaning herein operates as a pump which blows the water outward via this opening. The advantage is that the water is no longer left on the surface and that, after drying of the surface, there are substantially no drops and streaks visible.

[0009] A further favourable embodiment has the feature that the main frame is provided with at least one ion exchanger and with additional adjusting means for the purpose of adjusting a position of the at least one ion exchanger relative to the main frame. The ion exchanger is used to demineralize water fed to the sprayers. Drops which are occasionally left on a clean surface will hereby leave behind substantially no streaks or droplets when they dry. The main frame can be positioned parallel to the surface for cleaning in simple manner by adjusting the position of the relatively heavy ion exchanger relative to the main frame using the additional adjusting means.

[0010] The invention will now be further elucidated on the basis of the following figures, wherein:

Fig. 1 shows a schematic side view of a possible embodiment of a system according to the invention;

Fig. 2 shows a schematic side view of a main frame mounted under a gondola;

Fig. 3 is a schematic front view of this main frame;

Fig. 4 shows schematically a possible movement diagram along an outside wall.

[0011] Fig. 1 shows a schematic side view of a possible embodiment of a system according to the invention. Suspended in a main frame 1 is a rotatably disposed brush 2 which can be driven with a motor 3 provided with an internal toothing. Main frame 1 is placed here on a transport frame 4 consisting of two L-shaped carriers 5a,5b provided with wheels 6 and connected to transverse connections 7a,7b,7c. On the top side the main frame 1 is provided with a carrying bar 8 with which it can be attached to a gondola which forms part of a building and so does not form part of the system. Using the gondola the main frame 1 is lifted from transport frame 4 and moved via a predetermined path along the outside wall of the building, wherein water is fed to two pipes 9a,9b which are provided with sprayers, not visible in the figure, and wherein brush 2 is driven by motor 3, this such that

the outside wall is cleaned. In order to prevent main frame 1 being caught behind for instance a protruding sill of the outside wall during a descending movement, the underside is provided with a safety bracket 10 which can move upward and transmits this movement to a plate 11. Plate 11 will then press in a safety bracket, not shown in the figure, which forms part of the gondola, after which a safety circuit forming part of the gondola interrupts the descending movement. A person present in the gondola can then take appropriate measures. In order to prevent safety bracket 10 activating the safety circuit shortly before main frame 1 is placed on transport frame 4, transverse connection 7c is placed slightly to the rear, thereby creating a recess in which safety bracket 10 can be received.

[0012] Fig. 2 shows a schematic side view of a main frame 1 mounted under a gondola, with rotatably disposed brush 2 which can be driven with a motor 3. On the top side main frame 1 is provided with a carrying bar 8 which can be hooked into two hooks 12, which are in turn fixed into a bottom of gondola 13. Using gondola 13 the main frame 1 is moved via a predetermined path along an outside wall 14 of the building, wherein water is fed to two pipes 9a,9b which are provided with sprayers, not shown in the figure, and wherein brush 2 is driven by motor 3, this such that the outside wall is cleaned. In order to prevent main frame 1 being caught behind for instance a protruding sill of outside wall 14 during a descending movement, the underside is provided with a safety bracket 10 which can move upward and transmits this movement to a plate 11. Plate 11 will then press in a safety bracket 15 forming part of the gondola, after which a safety circuit forming part of the gondola interrupts the descending movement. Brush 2 is mounted in an auxiliary frame 16 which can pivot around a shaft 17, and auxiliary frame 16 is provided with adjusting means 18 for setting a position of brush 2 relative to main frame 4. Auxiliary frame 16 also forms a support for a cover 19 manufactured from foil or fabric. During cleaning of outside wall 14 brush 2 brushes water from outside wall 14. This water mixed with air can leave cover 19 via an opening 20 running in a longitudinal direction in cover 19, whereby it is no longer left on outside wall 14. The water for pipes 9a,9b is moreover supplied via two ion exchangers 21 a,21 b, of which only ion exchanger 21 a is visible in the figure, so that water possibly left on outside wall 14 leaves substantially no streaks or stains. By feeding water at a relatively low pressure, for instance 3 Bar, to pipes 9a,9b it is possible to realize relatively large droplets being generated by the sprayers, whereby the water hardly nebulizes and is discharged almost completely via opening 20 and the lower edge of cover 19. Ion exchangers 21 a,21 b are mounted on slidably embodied strips 22a,22b with which the centre of gravity of main frame 4 can be adjusted such that main frame 4 hangs parallel to outside wall 14 in a position of use. If desired, main frame 4 can be provided with wheels 23 which, for instance in the case of wind, prevent main frame 4 coming

into contact with outside wall 14.

[0013] Fig. 3 shows a schematic front view of main frame 1, in which brush 2 is disposed rotatably and can be driven with motor 3. Also visible are carrying bar 8, pipes 9a,9b and safety bracket 10, in addition to opening 20, ion exchangers 21 a,21 b and wheels 23. Sprayers 24 mounted in pipes 9a,9b are also shown.

[0014] Fig. 4 shows schematically a possible movement diagram of main frame 1 along an outside wall 14. Main frame 1 is attached to a gondola 13 which is in turn mounted on a known hoisting device 25 which can move over a rail 26 on a roof of a building 27. Main frame 1 is moved downward, wherein water is supplied via pipe 9b and herein cleans a section of outside wall 14. The device is then moved laterally over the width of a section and is then moved upward again, wherein water is supplied via pipe 9a and wherein it likewise cleans a section. In this way outside wall 14 can be cleaned in a short period of time.

Claims

1. System for cleaning an outside wall, comprising a main frame provided with at least one row of sprayers, with water feed means and with an at least substantially cylindrical brush disposed rotatably around a longitudinal axis, with drive means for rotating the brush in a position of use, with a cover for shielding at least a side of the brush remote from the outside wall and with attaching means for attaching the main frame to hoisting means, **characterized in that** the system also comprises a transport frame on which the main frame can be placed using the hoisting means.
2. System as claimed in claim 1, **characterized in that** the attaching means are adapted to attach the main frame to a gondola.
3. System as claimed in claim 2, **characterized in that** an underside of the main frame is provided with a safety bracket.
4. System as claimed in claim 3, **characterized in that** the main frame is provided with connecting means for connecting the safety bracket to an additional safety bracket forming part of the gondola.
5. System as claimed in claim 4, **characterized in that** the transport frame is provided with a recess in which the safety bracket can be received.
6. System as claimed in any of the foregoing claims, **characterized in that** the system also comprises an auxiliary frame which is mounted pivotally in the main frame and in which the brush is rotatably mounted.

7. System as claimed in claim 6, **characterized in that** the system comprises adjusting means for the purpose of adjusting a position of the auxiliary frame relative to the main frame. 5
8. System as claimed in claim 7, **characterized in that** the cover comprises a jacket of the auxiliary frame manufactured from foil and/or fabric. 10
9. System as claimed in claim 8, **characterized in that** the cover takes an at least substantially C-shaped cross-sectional form, and that a rear side of the cover is provided with an opening running in a longitudinal direction. 15
10. System as claimed in any of the foregoing claims, **characterized in that** the main frame is provided with at least one ion exchanger and with additional adjusting means for the purpose of adjusting a position of the at least one ion exchanger relative to the main frame. 20

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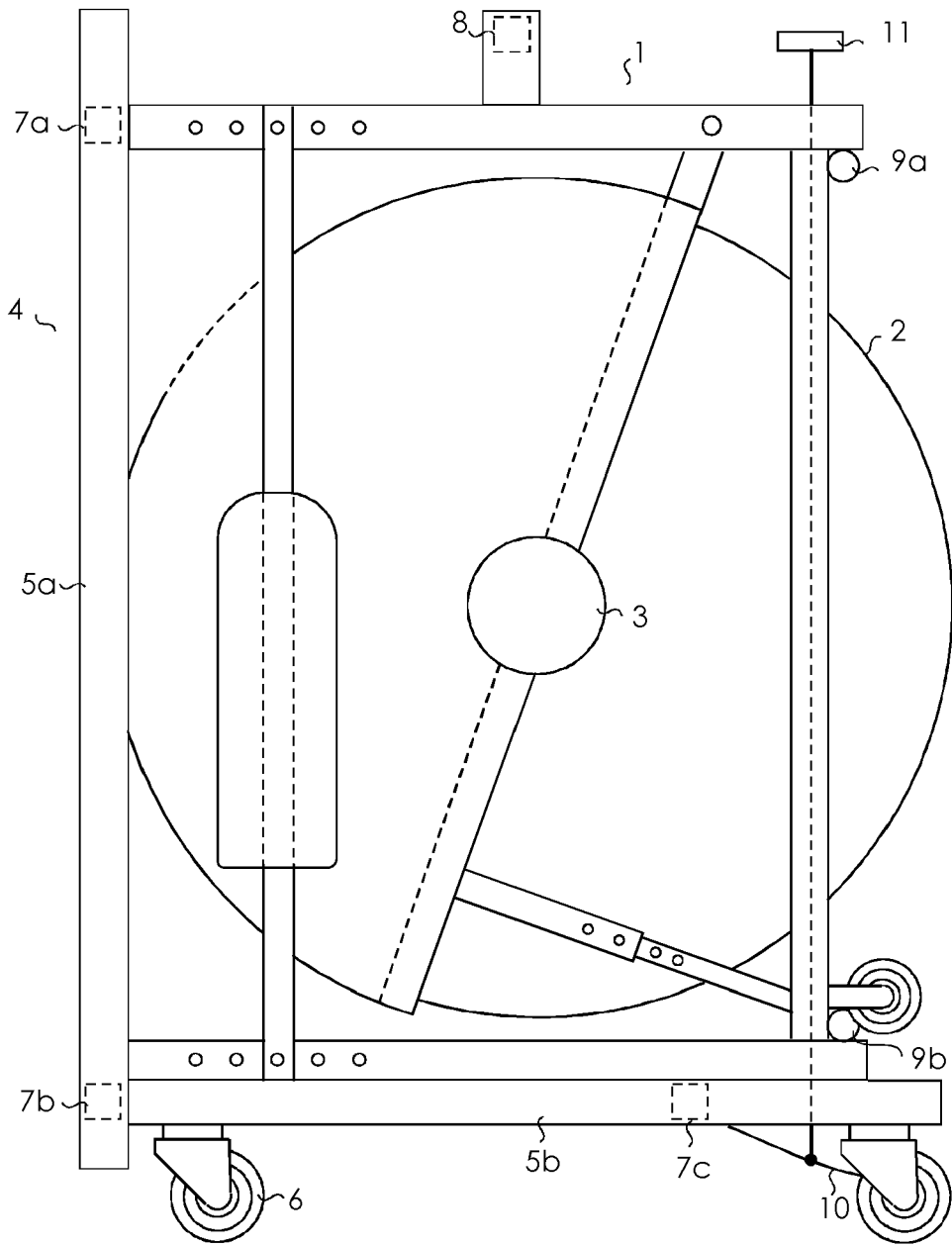


Fig. 1

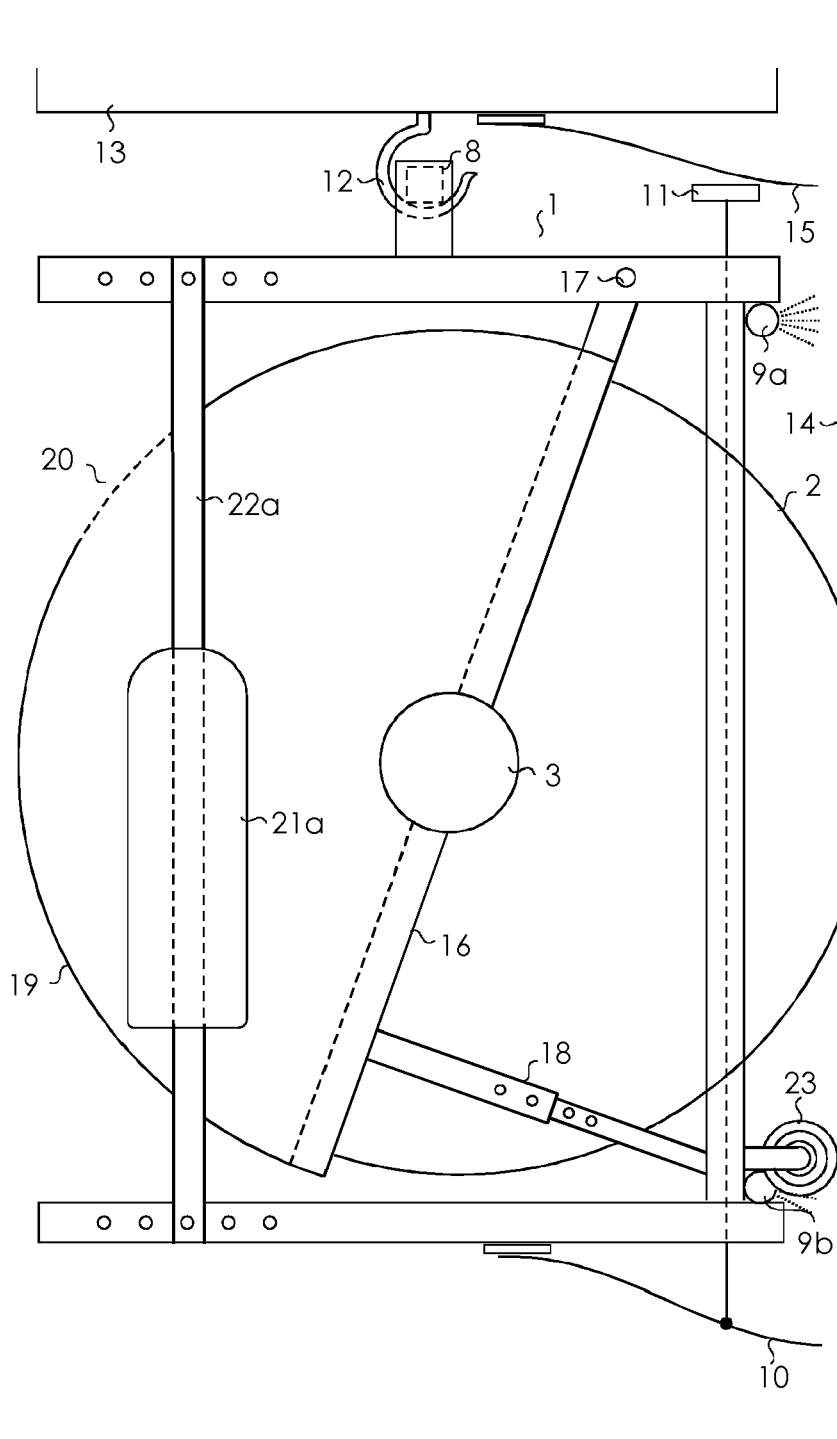


Fig. 2

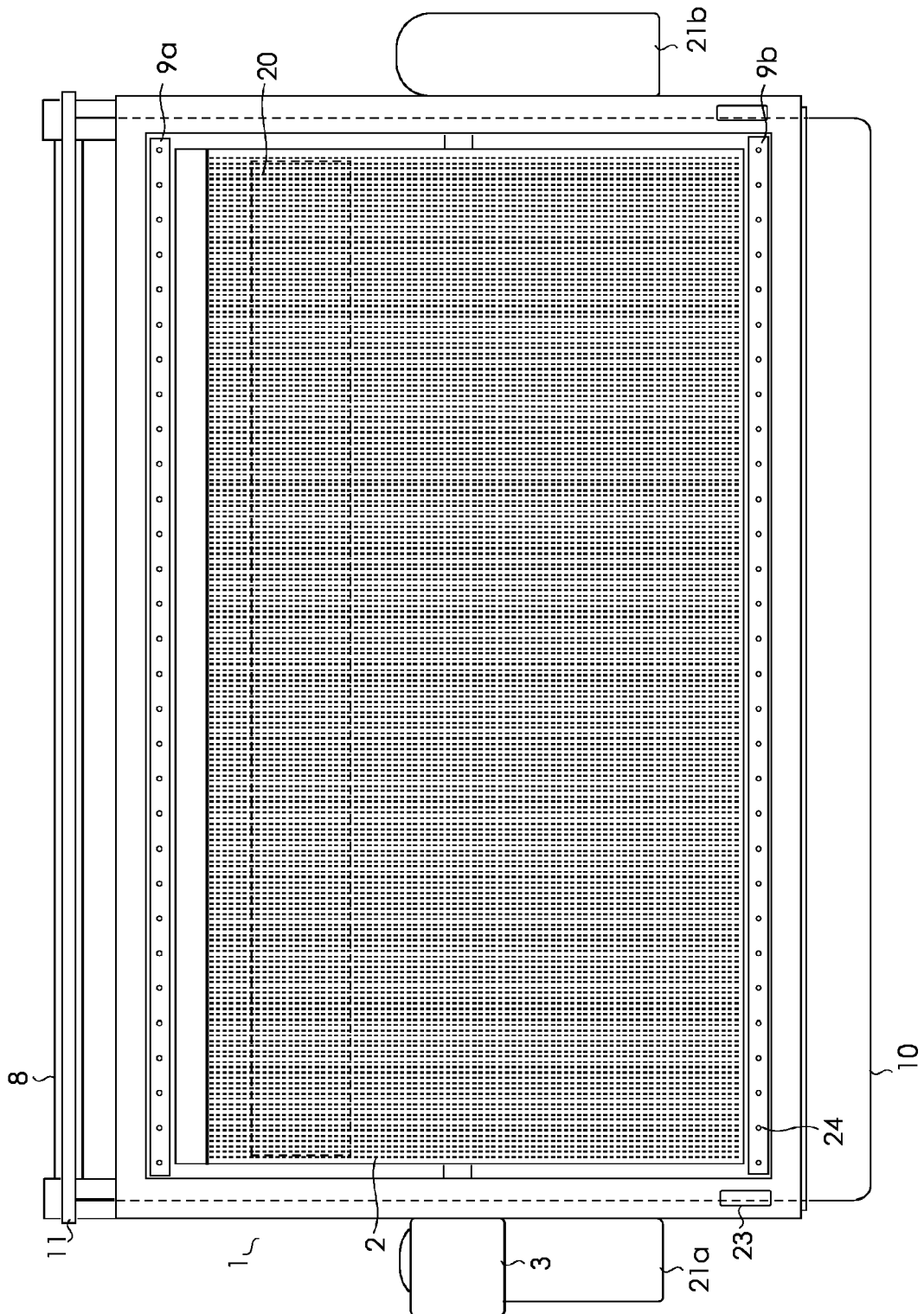


Fig. 3

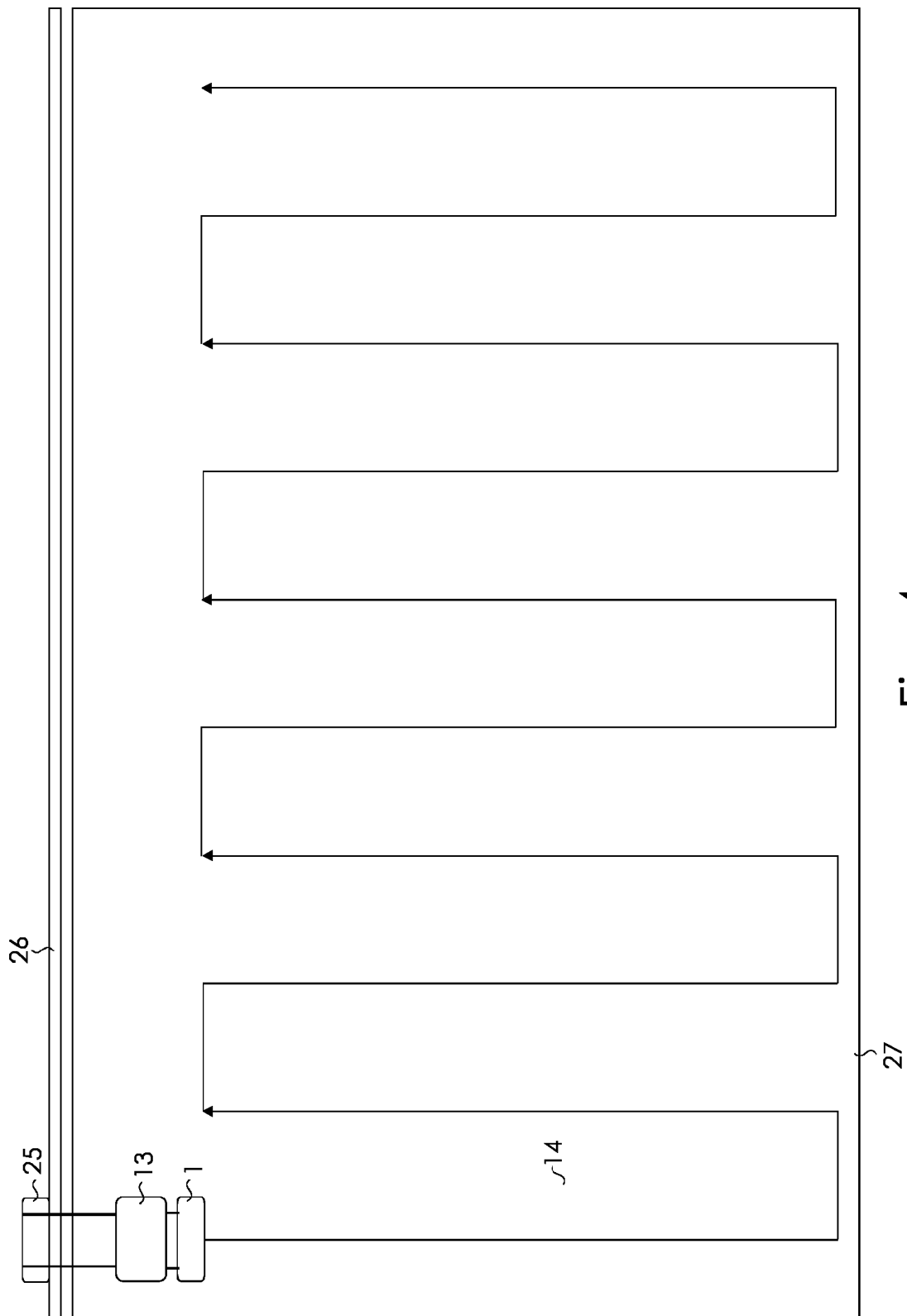


Fig. 4



EUROPEAN SEARCH REPORT

Application Number
EP 08 10 4043

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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A	----- US 5 240 503 A (LEVY RONI [IL] ET AL) 31 August 1993 (1993-08-31) * abstract; figures 1-5 *	1-10	
A	----- DE 20 2004 009740 U1 (SCHMIDT INNOVATIVE TECHNIK GMB [DE]) 11 November 2004 (2004-11-11) * abstract; figures 1-3 *	1-10	
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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 1 October 2008	Examiner Muller, Gérard
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 08 10 4043

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82