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(54) **Device for wetting a surface**

(57) The invention relates to a device (6) for wetting a surface (5), consisting of a transfer member (8) which can be arranged in a container (7) filled with liquid, and means (9) for moving the transfer member (8) out of the container (7) to the surface (5) for wetting. The transfer member (8) can be plate-like and have means (10) for dosing liquid, while the moving means (9) can be adapted to hold the transfer member (8) horizontal during its

movement.

The moving means (9) can comprise a pressing part (15) which can be operated by the surface (5) for wetting and which can be moved in opposite direction to the transfer member (8). The moving means can comprise for this purpose a number of arms (16) which are mounted movably in a frame (17) and which are connected on one side to the pressing part (15) and on the other to the transfer member (8).

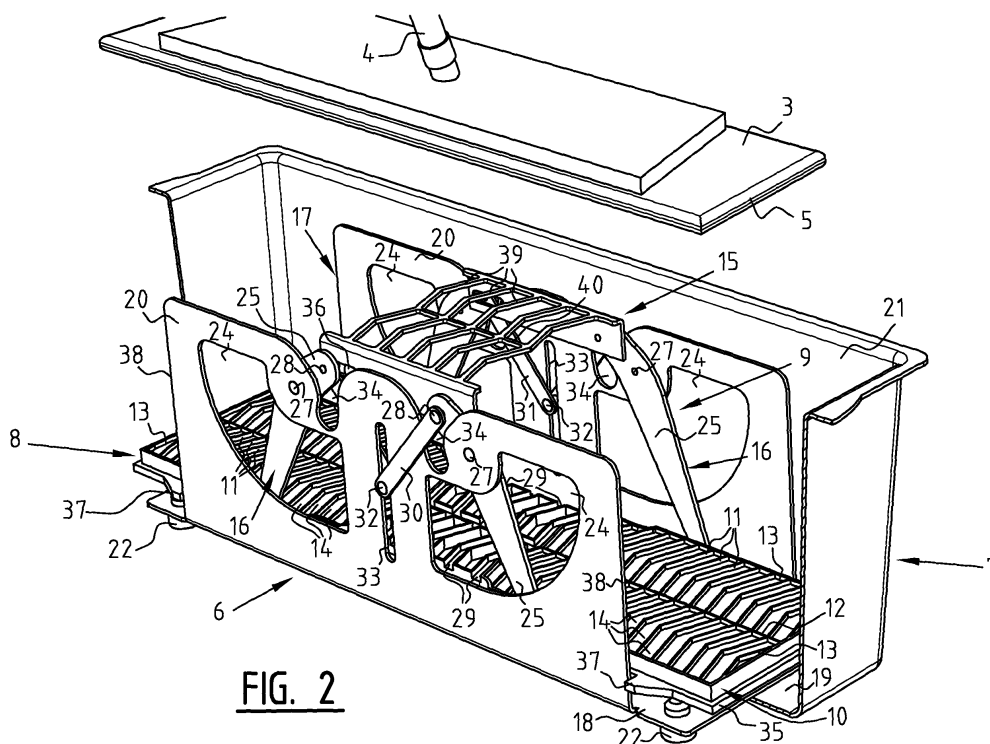


FIG. 2

Description

[0001] The invention relates to a device for wetting a surface, more particularly the surface of a microfibre cloth.

[0002] Microfibres are being used to an increasing extent for both professional and domestic cleaning. Cleaning is quicker with microfibre products than with conventional products, while no cleaning agents are moreover required with microfibre products. The operation of microfibre cloths is based on a combination of mechanical cleaning and lipophilic action. A special feature of microfibre cloths is that they hold the dirt so well that they become saturated during use and must then be washed.

[0003] Microfibres are very thin and light synthetic fibres consisting of polyester and polyamide. By subjecting these fibres to a chemical treatment or by exerting a force thereon the connection between the polyamide and the polyester is broken, so that the initially round fibre falls apart into a star-shaped core of polyamide surrounded by wedge-shaped polyester fibres. The polyester part forms the actual microfibre which penetrates deeply into the pores of a surface for cleaning and is thus responsible for the mechanical cleaning, while the star-shaped polyamide core is lipophilic and thus holds oil and fat.

[0004] Just as conventional cleaning cloths, microfibre cloths are used in combination with water. The dosage is however much more critical here than in the case of conventional cloths; when a microfibre cloth becomes too wet, the microfibrils will slide on a water film over the surface for cleaning, whereby the cleaning action is lost. Microfibre cloths are found in practice to produce the best result when they are damp, i.e. with a quantity of water which has roughly the same weight as the dry cloth.

[0005] Microfibre cloths are wetted in practice by users on the basis of experience by being sprayed or immersed in water and then wrung out to a degree such that roughly the correct amount of moisture remains. It will be apparent that this results in varying amounts of moisture, and therefore in variable results. Another option is to wet microfibre cloths at a central location using precisely measured quantities of water and to then supply them in damp state to the location where they are to be used. This can also be done by drying the microfibre cloths only to the desired degree of dampness after washing. However, both these options require a complicated logistical system, which must moreover be sufficiently flexible to enable for instance rapid supply of extra cloths when a space for cleaning is for instance found to be unexpectedly dirty. There is moreover a risk of pathogen formation when damp microfibre cloths are stored for a prolonged period, so that this is undesirable from a hygiene viewpoint.

[0006] There is therefore a need for a device with which microfibre products such as cloths can be wetted in a precise and reproducible manner at the location where they are used.

[0007] The invention provides for this purpose a wet-

ting device which comprises a transfer member which can be arranged in a container at least partly filled with liquid, in addition to means for moving the transfer member out of the container to the surface for wetting. During each movement the transfer member can thus carry a precisely determined quantity of liquid from the container to the surface for wetting, so that this surface is always wetted to precisely the correct degree.

[0008] In a preferred embodiment of the wetting device the transfer member is plate-like and has means for dosing liquid, and the moving means are adapted to hold the plate-like transfer member substantially horizontal during the movement out of the container to the surface for wetting. The plate-like transfer member can wet a microfibre cloth over its whole surface in one movement, wherein the amount of liquid can be set precisely by the dosing means.

[0009] When the dosing means comprise at least one opening of determined dimensions formed in the plate-like transfer member, the quantity of liquid transferred can be determined by allowing liquid dosed through the opening(s) to escape during the movement of the transfer member.

[0010] In addition or instead, the dosing means can comprise at least one open chamber formed on the plate-like transfer member and bounded by an edge. The height of the edge then determines the quantity of liquid which can be transferred in one movement.

[0011] The transfer member is preferably elongate. This ensures that the surface is wetted over its whole width. This is important because cleaning cloths are usually attached to an elongate carrier which is moved in transverse direction over the surface for cleaning.

[0012] A wetting device which is simple to use is obtained when the moving means can be operated by the surface for wetting.

[0013] This can for instance be achieved in that the moving means comprise a pressing part which can be operated by the surface for wetting and which can be moved in substantially opposite direction to the transfer member. By placing the surface for wetting on the pressing part and pressing downward the transfer member is then moved upward and pressed against the surface.

[0014] An efficient mechanism is obtained when the pressing part is situated above the transfer member and has at least one opening, while an optimal contact is ensured between the transfer member and the surface for wetting.

[0015] A structurally simple embodiment of the wetting device is obtained when the moving means comprise at least one arm which is mounted movably in a frame and which is connected on one side to the pressing part and on the other to the transfer member. A direct mechanical coupling is thus effected between the pressing part and the transfer member.

[0016] When the frame is substantially U-shaped and comprises a bottom and two side walls, wherein the moving means are bearing-mounted in the side walls of the

frame, the surface for wetting can be placed from above in the wetting device.

[0017] A stable suspension and a uniform movement of the transfer member is achieved when the moving means comprise two substantially U-shaped arms, the free end parts of which are mounted pivotally in the side walls of the frame and a middle part of which carries the transfer member.

[0018] The pressing part is in that case preferably connected pivotally to the free end parts of the U-shaped arms, whereby the desired opposite movement is ensured.

[0019] For optimal guiding of its movement, the pressing part is preferably mounted slidably in the side walls of the frame.

[0020] In order to allow the transfer member to move upward out of the container along a precisely defined path, the frame and the transfer member preferably have co-acting guides.

[0021] With a view to long-term problem-free operation, the wetting device is preferably manufactured from moisture-resistant materials, such as for instance plastics or moisture-resistant metals such as stainless steel or aluminium.

[0022] The invention is now elucidated on the basis of two embodiments, wherein reference is made to the accompanying drawing, in which corresponding components are designated with reference numerals increased by '100', and in which:

Fig. 1 shows a perspective view of a user cleaning a surface using a microfibre cloth which is attached to an elongate cleaning member, wherein a container is present which has therein a wetting device according to a first embodiment of the invention,

Fig. 2 is a partly sectional perspective view of the container with the wetting device of fig. 1 and part of the cleaning member therein,

Fig. 3 shows a view corresponding to fig. 2 of the container and the wetting device during a first phase of the movement of the transfer member to the surface for wetting,

Fig. 4 shows a view corresponding to fig. 2 and 3 in the position in which the transfer member is pressed against the surface for wetting,

Fig. 5 shows a partly cross-sectional side view of the container with the wetting device and the cleaning member with the surface for wetting,

Fig. 6 is a perspective view of an alternative embodiment of the wetting device according to the invention,

Fig. 7 shows a perspective view of the frame of the wetting device of fig. 6,

Fig. 8 shows an insert for guiding of the pressing part of the wetting device of fig. 6,

Fig. 9 is a perspective view of the plate-like transfer member of the wetting device of fig. 6, and

Fig. 10 is a perspective view of the pressing part of

that wetting device.

[0023] For the purpose of cleaning a surface 1, for instance a floor, use is made of an elongate and flat cleaning member 3 which is attached to a handle 4. A user 2 moves this cleaning member 3 reciprocally over floor 1 in the direction of arrow A, so roughly transversely of the longitudinal axis thereof (fig. 1). A microfibre cloth 5, a so-called flat mop, is arranged on the underside of cleaning member 3. This microfibre flat mop 5 is damp, i.e. it contains roughly its own weight in liquid. The microfibre flat mop 5 is supplied dry and attached in dry state to cleaning member 3, and only then wetted using a wetting device 6 according to the invention, which is accommodated in a container 7 partially filled with liquid. In practice this container 7 will otherwise usually be positioned on a special trolley workstation instead of on floor 1 as shown here.

[0024] Wetting device 6 according to the invention comprises a transfer member 8 and means 9 for moving transfer member 8 from container 7 to the surface of the microfibre flat mop 5 for wetting.

[0025] In the shown embodiment transfer member 8 is formed by a plate 35 of a hard plastic, for instance PVC, which is provided with means for dosing a determined quantity of liquid. These dosing means are formed here by a profiled upper surface 10 which can for instance be manufactured from natural or synthetic rubber. This upper surface 10 can be fixed in openings of plate 35 by means of pins 41 (fig. 5). The profile of the upper surface is formed by a number of upright edges 11 extending roughly transversely of the longitudinal axis of the elongate transfer member 8, and a central edge 12. A peripheral edge 13 further runs around upper surface 10. This peripheral edge 13 and central edge 12 are interrupted at several positions 29, as will be elucidated below. The different edges 11, 12, 13 of the profile form a number of chambers 14 in upper surface 10. The liquid for transferring is transported in these chambers 14. Owing to the presence of a large number of chambers 14 separated from each other by edges 11, 12, sufficient liquid will always be transferred, even if transfer member 8 is not completely horizontal, for instance because container 7 is slightly at an incline. Profile edges 11 do not run here precisely transversely of the longitudinal axis of transfer member 8 but have an angled progression, whereby chambers 14 have the form of chevrons. This ensures that the microfibre flat mop 5 is wetted over its full width.

[0026] In the shown embodiment moving means 9 can be operated by the cleaning member 3 to which the microfibre flat mop 5 for wetting is attached. Wetting device 6 is provided for this purpose with a pressing part 15 which can be moved in opposite direction to transfer member 8; when this pressing part 15 is pressed downward by cleaning member 3, transfer member 8 moves upward out of container 7.

[0027] In the shown embodiment moving means 9 are of mechanical nature and comprise two arms 16 which

are both mounted pivotally in a frame 17 and which are connected on one side to pressing part 15 and on the other to transfer member 8. Frame 17 in which arms 16 are mounted is here U-shaped and has a bottom 18 with which it rests - via a number of legs 22 - on bottom 19 of container 7, and two side walls 20 which extend upward along side walls 21 of container 7 and in which arms 16 are bearing-mounted. In the shown embodiment frame 17 is manufactured from a moisture-resistant metal, for instance stainless steel or aluminium, and is provided with weight-reducing holes 23, 24 in bottom 18 and side walls 20.

[0028] In the shown embodiment arms 16 are U-shaped and have two free end parts 25 and a middle part 26. Free end parts 25 are to some extent curved and are on the one hand mounted pivotally in frame 17 at the position of the curve using pins 27 and on the other connected pivotally at their outer ends to pressing part 15 using pins 28. Middle parts 26 of the two arms 16 carry transfer member 8, which lies loosely thereon. Transfer member 8 can thus be exchanged in simple manner, for instance when use is made of microfibre flat mops 5 of different dimensions which require a different quantity of liquid. It is otherwise also possible to envisage only the rubber upper surface 10 of plate 35 being detached and replaced. Middle parts 26 are slidable along the underside of transfer member 8 and can optionally be provided with a low-friction coating, or even with guide rollers. Transfer member 8 further has guide cams 37 which co-act with outer edges 38 of frame 17 in order to allow accurate vertical up and downward movement of transfer member 8.

[0029] Arms 16 are not only connected to each other via pressing part 15 but also via two pairs of connecting rods 30, 31. Each connecting rod 30, 31 is connected at one end to one of the arms 16 and pressing part 15 by one of the pins 28, and at its opposite end connected to another connecting rod 31, 30 respectively by a pivot pin 32. These pivot pins 32 are mounted for vertical sliding in slots 33 in frame 17. Further formed in frame 17 are recesses 34 in which pins 28 can be received during the movement of pressing part 15 and moving means 9. Connecting rods 31 and the associated arm 16 are otherwise connected via pins 28 not only for pivoting but also for horizontal sliding to pressing part 15 in that pins 28 are received in slots 36. Pressing part 15 is otherwise profiled in similar manner to upper surface 10 of transfer member 8 in that it has a grid of angled cross bars 39 and a central longitudinal bar 40. Openings are formed between these cross and longitudinal bars 39, 40.

[0030] During use of wetting device 6 the cleaning device 3 with the flat mop 5 fixed thereon is first moved over container 7 (fig. 2) and subsequently moved downward until the surface of cloth 5 rests on pressing part 15. Cleaning member 3 with flat mop 5 is then pressed further downward, whereby pressing part 15 moves downward and transfer member 8 is moved upward from the bottom 19 of container 7 by a pivoting movement of arms 16

round pins 27 (fig. 3). Liquid is here transferred in chambers 14 since in the rest position transfer member 8 is situated below liquid surface S in container 7 (fig. 5). When transfer member 8 and pressing part 15 meet each other (fig. 4) the grid of cross bars 39 and longitudinal bar 40 disappears into the profiled upper surface 10 at the position of the interruptions 29 in edges 12, 13. The whole upper surface 10 can hereby be brought into close contact with the surface of the microfibre flat mop 5 under cleaning member 3, so that the liquid in chambers 14 is taken up into flat mop 5. The microfibre flat mop 5 is thus wetted in the correct manner over its whole active surface area, wherein the degree of wetting is determined solely by the form and dimensions of transfer member 8, and does not therefore depend on chance, as in the wetting methods used heretofore. After use, when cleaning member 3 is lifted upward out of container 7, transfer member 8 drops back under its own weight to the bottom 19 of container 7. A resetting member such as a spring could otherwise also be used for this purpose.

[0031] In another embodiment of wetting device 106, which is recommended at the present time, the dosing means are formed by a series of openings 114 of determined dimensions formed in the plate 135 which forms transfer member 108 (fig. 6, 9). A precisely determined quantity of liquid can escape through these openings 114 when transfer member 108 is moved upward. It has been found in practice that a smaller quantity of liquid can thus be dosed than is possible in the embodiment with chambers 14. This is of particularly great importance for microfibre cloths. Transfer member 108 can be precisely adjusted to the wetting requirements of any type of flat mop by varying the number of openings 114 and/or their dimensions.

[0032] In this embodiment the pressing part 115 also has openings between cross and longitudinal bars 139, 140, through which the surface of flat mop 5 can come into contact with the liquid on plate 135. The pattern of the openings in pressing part 115 is here not adapted to the pattern of openings 114 in plate 135.

[0033] In order to be able to withstand usually rough handling, the connecting rods 30, 31 pivotable about two pins 28, 32 are replaced in this embodiment by a V-shaped part 130 (fig. 10) forming an integral part of pressing part 115. Situated on the tip of the V-shape 130 is a pin 132 which is mounted slidably in a curved slot 133. This slot 133 is not formed directly in side wall 120 of frame 117 but in a plastic insert 142 (fig. 8) which is arranged in an opening 144 in side wall 120 by means of fixing elements 143 (fig. 7). The plastic of insert 142 slides better and is more durable than the stainless steel or aluminium of side wall 120.

[0034] Because slot 133 is curved in this embodiment, pressing part 115 can perform a curvilinear movement. One of the arms 116 which carry transfer member 108 need therefore only be connected pivotally to pressing part 115 instead of pivotally and slidably. Only one slot 136 thus has to be formed per side in pressing part 115.

[0035] Although the invention is elucidated above on the basis of an embodiment, it will be apparent that it is not limited thereto but can be varied in numerous ways. The form and dimensions of the various components could thus be chosen differently, while more or fewer than two arms could also be used to move the transfer member up and downward. A cable transmission could for instance also be applied instead of a mechanical transmission with pivot arms. It is even possible to envisage an embodiment in which the transfer member is moved upward by a drive which is started by the cleaning member operating a switch. The wetting device could further be manufactured from materials other than in the example, for instance wholly from plastic or, conversely, wholly from metal. The moving means could also be mounted directly in the container so that the use of a separate frame could be dispensed with.

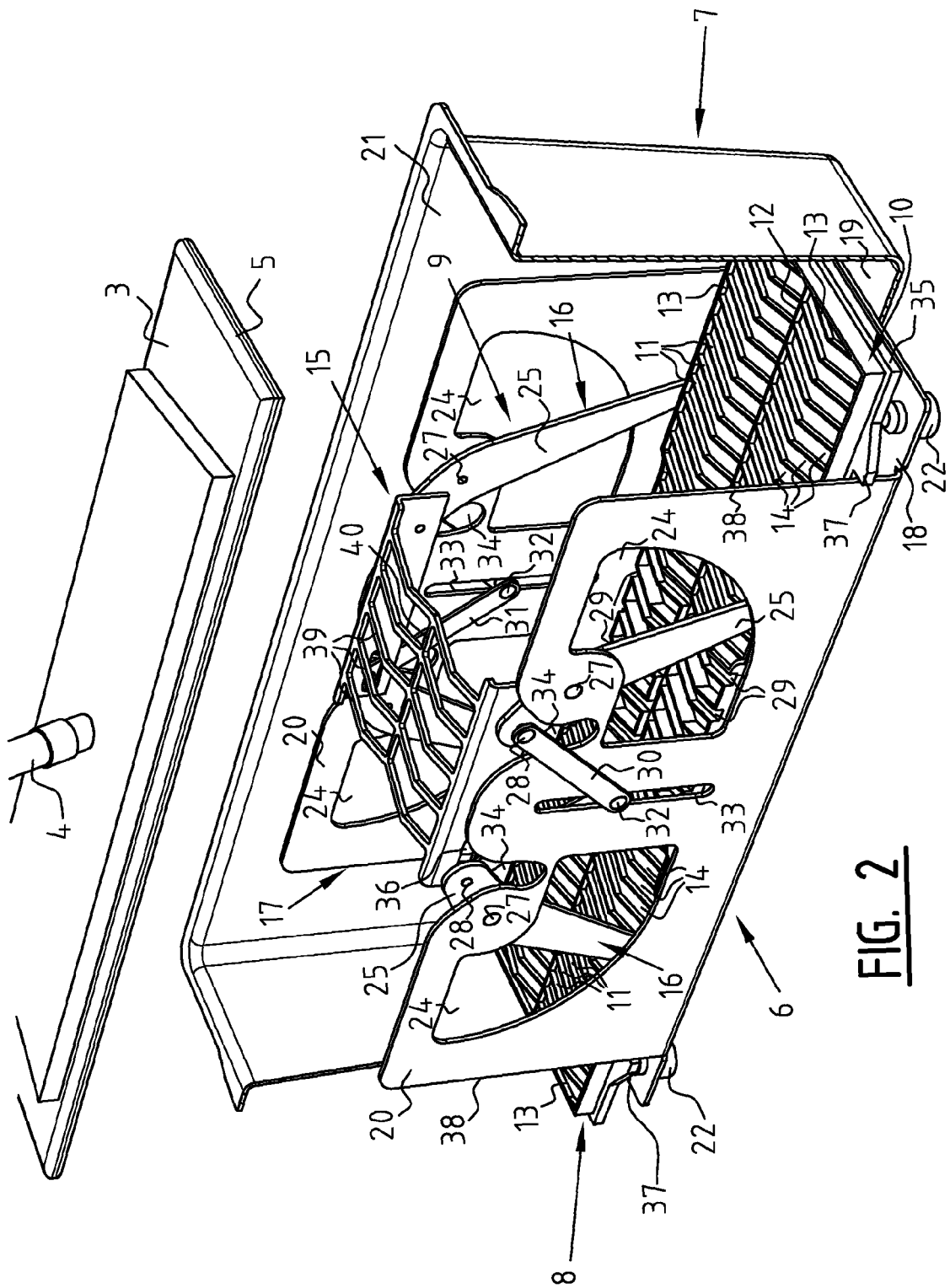
[0036] The scope of the invention is therefore defined solely by the following claims.

Claims

1. Device for wetting a surface, comprising a transfer member to be arranged in a container at least partly filled with liquid, and means for moving the transfer member out of the container to the surface for wetting. 25
2. Wetting device as claimed in claim 1, **characterized in that** the transfer member is plate-like and has means for dosing liquid, and the moving means are adapted to hold the plate-like transfer member substantially horizontal during the movement out of the container to the surface for wetting. 30
3. Wetting device as claimed in claim 2, **characterized in that** the dosing means comprise at least one opening of determined dimensions formed in the plate-like transfer member. 35
4. Wetting device as claimed in claim 2 or 3, **characterized in that** the dosing means can comprise at least one open chamber formed on the plate-like transfer member and bounded by an edge. 40 45
5. Wetting device as claimed in any of the foregoing claims, **characterized in that** the transfer member is elongate. 50
6. Wetting device as claimed in any of the foregoing claims, **characterized in that** the moving means can be operated by the surface for wetting. 55
7. Wetting device as claimed in claim 6, **characterized in that** the moving means comprise a pressing part which can be operated by the surface for wetting and which can be moved in substantially opposite direc- 56
- tion to the transfer member.
8. Wetting device as claimed in claim 7, **characterized in that** the pressing part is situated above the transfer member and has at least one opening. 57
9. Wetting device as claimed in claim 7 or 8, **characterized in that** the moving means comprise at least one arm which is mounted movably in a frame and which is connected on one side to the pressing part and on the other to the transfer member. 10 58
10. Wetting device as claimed in claim 9, **characterized in that** the frame is substantially U-shaped and comprises a bottom and two side walls, wherein the moving means are bearing-mounted in the side walls of the frame. 15 59
11. Wetting device as claimed in claim 10, **characterized in that** the moving means comprise two substantially U-shaped arms, the free end parts of which are mounted pivotally in the side walls of the frame and a middle part of which carries the transfer member. 20 60
12. Wetting device as claimed in claim 11, **characterized in that** the pressing part is connected pivotally to the free end parts of the U-shaped arms. 25 61
13. Wetting device as claimed in claim 12, **characterized in that** the pressing part is mounted slidably in the side walls of the frame. 30 62
14. Wetting device as claimed in any of the claims 9-13, **characterized in that** the frame and the transfer member have co-acting guides. 35 63
15. Wetting device as claimed in any of the foregoing claims, **characterized in that** it is manufactured from moisture-resistant materials. 40 64



FIG. 1



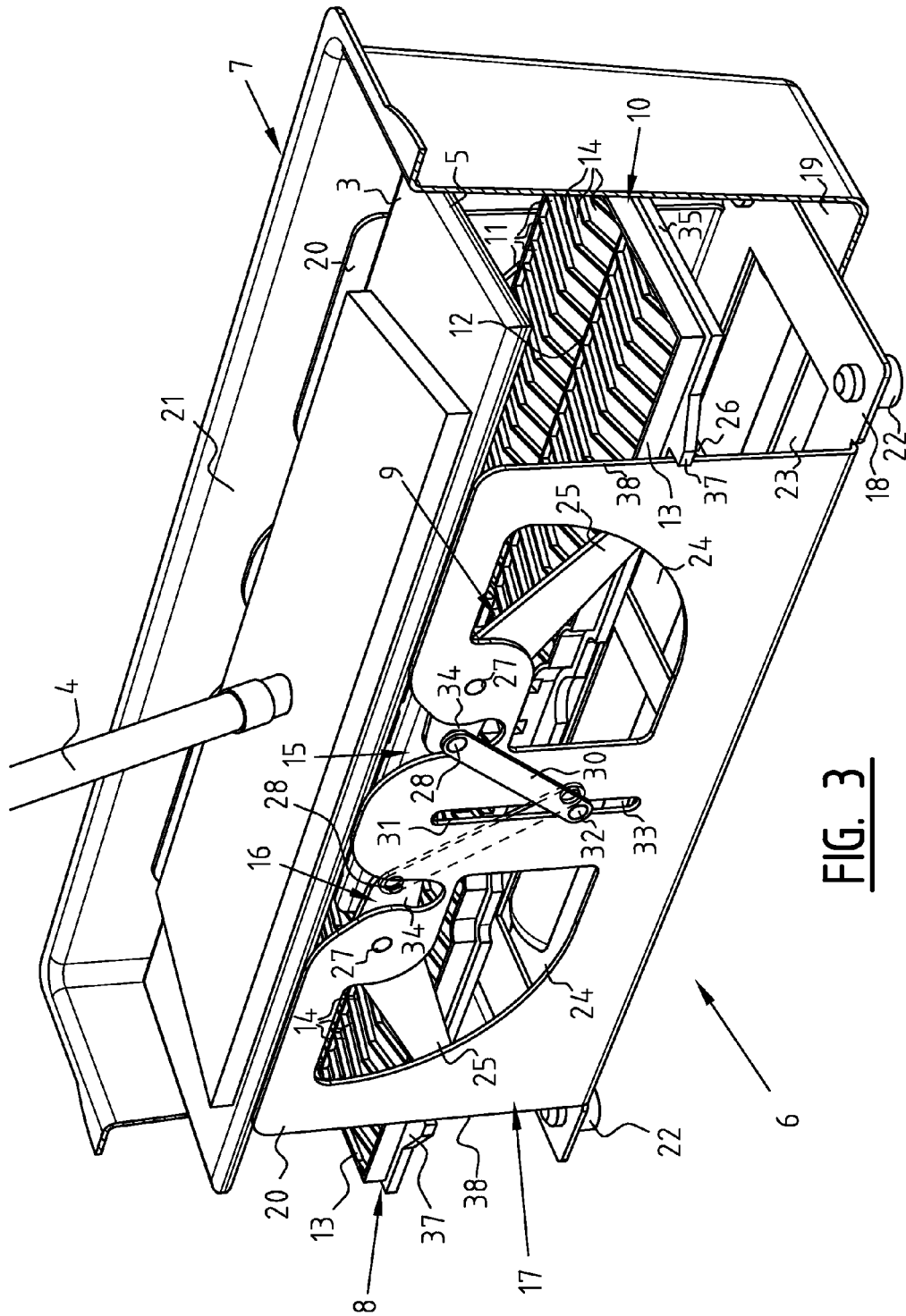


FIG. 3

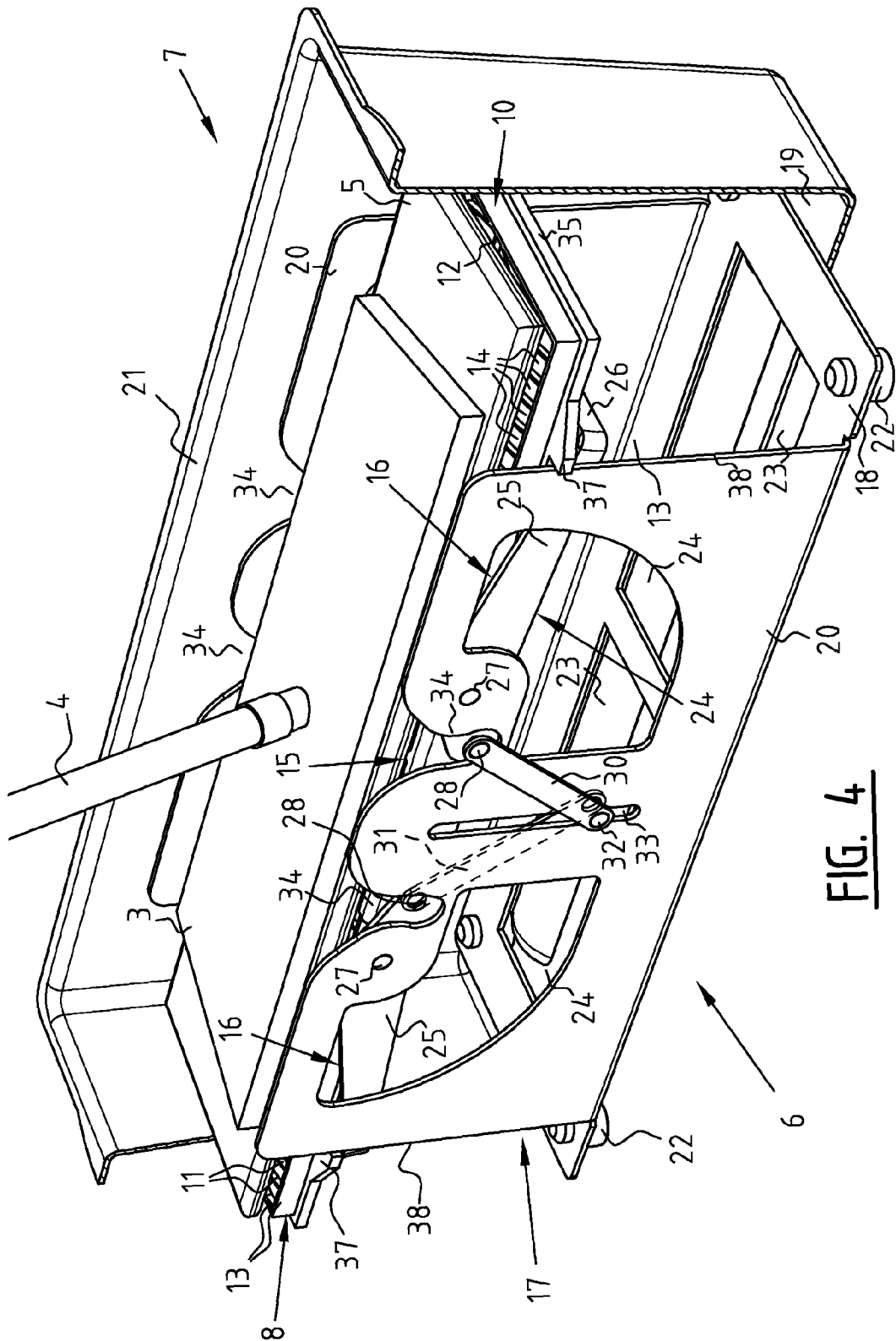


FIG. 4

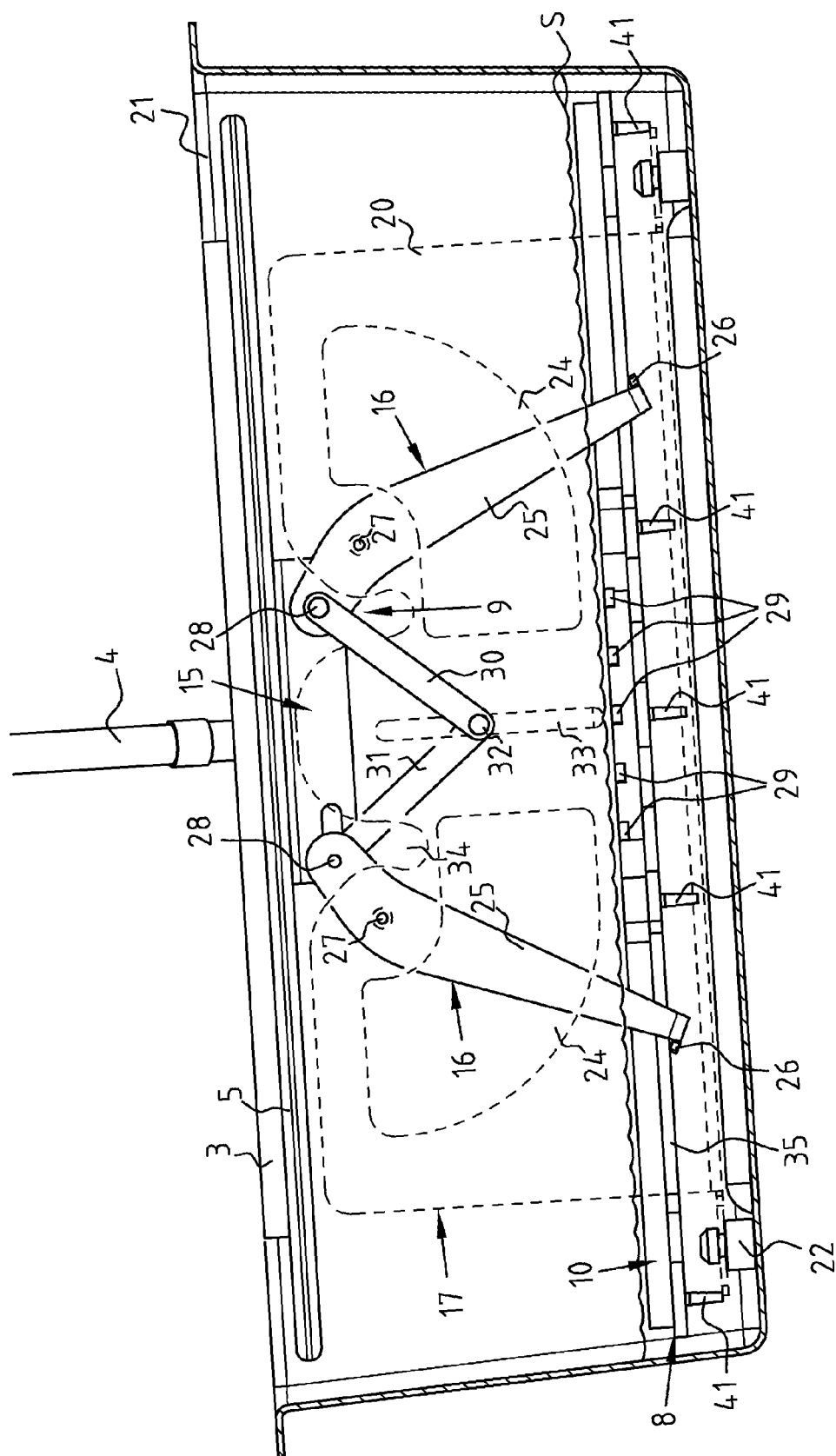


FIG. 5

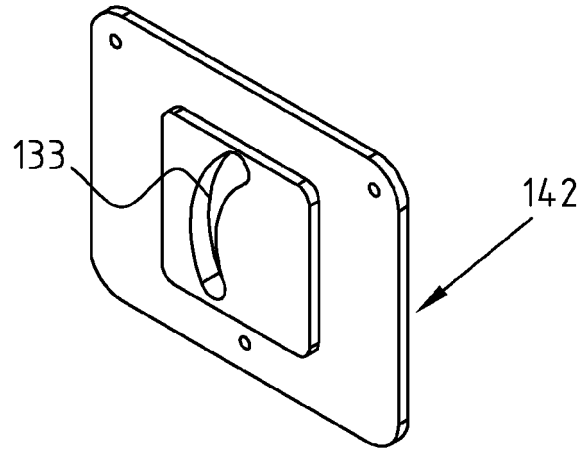


FIG. 8

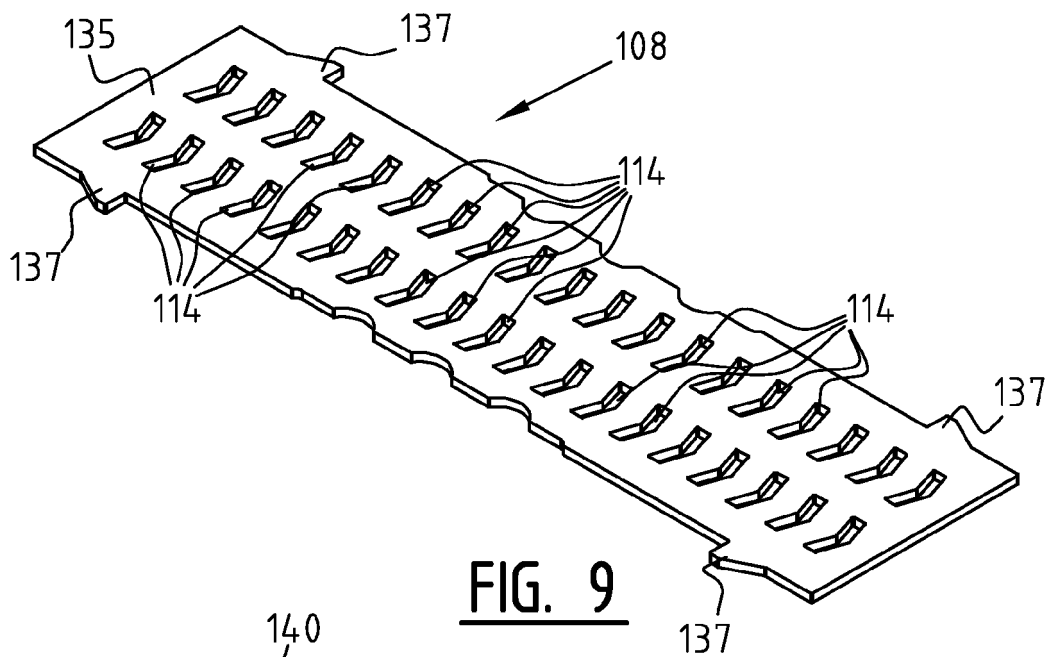


FIG. 9

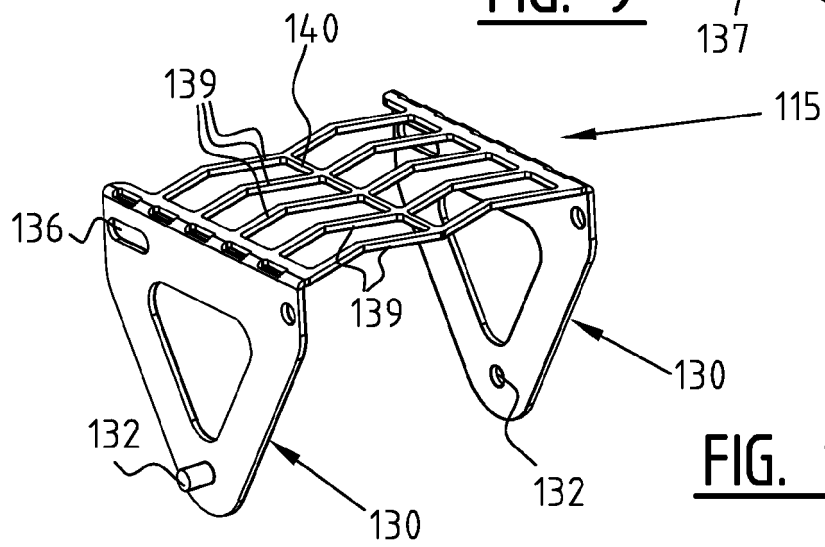


FIG. 10



EUROPEAN SEARCH REPORT

Application Number
EP 09 00 4711

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 31 July 2009	Examiner Cabral Matos, A
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 09 00 4711

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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