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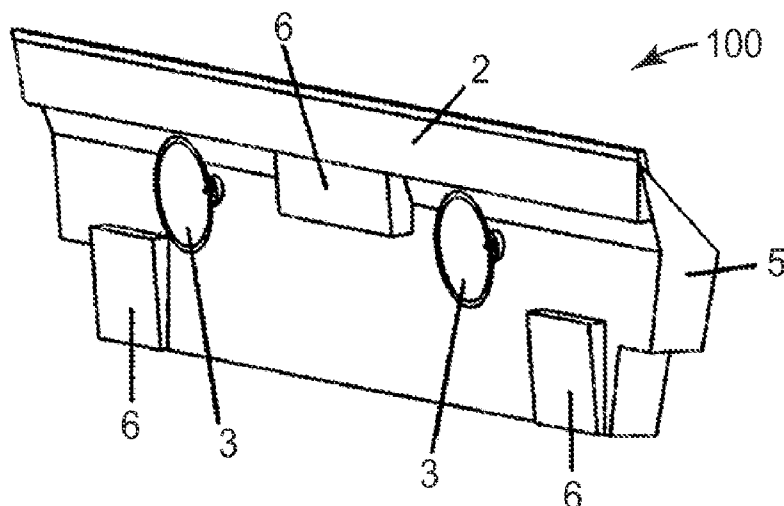


FIG. 1

(57) Abstract: A multifunctional plane surface cleaner is disclosed that comprises: a cleaning part, the cleaning part being used for cleaning a plane surface to be cleaned; a dirty liquid recovery container part, the dirty liquid recovery container part being used for the recovery of dirty liquid generated during cleaning operations, the cleaning part being mounted on the dirty liquid recovery container part, wherein the dirty liquid recovery container part comprises: a dirty liquid receiving chamber having an entrance, the dirty liquid receiving chamber being used for containment of dirty liquid.

MULTIFUNCTIONAL PLANE SURFACE CLEANER, ASSEMBLY AND METHOD OF USE

Technical Field

5 The present invention relates to the field of cleaning tools, and in particular relates to the cleaner field such as indoor cleaning.

Background Art

10 People adopt all kinds of cleaning agents and tools for the cleaning of glass, table tops, metal and other plane surfaces in the context of indoor cleaning and sanitation. Typically, the use of cleaning agents for spraying of surfaces and wipes, sponges etc for wiping down surfaces are most ubiquitous, after which rubber scraping strips are most commonly employed to scrape up the dirty liquid generated during cleaning; however, this dirty liquid gets everywhere and easily pollutes the indoor environment.

15 Many varieties of multifunctional window cleaners are on the market, such as those disclosed in the contents of US patent documents US4954001, US5054945, US5328283, US4778301, all of which employ cavities or built-in sponges to hold the unused cleaning agent, and employ rubber scraping strips to scrape surfaces clean once the reserve cleaning agent has been dispensed and wiped over the glass. In addition, patent documents W0 01/01841 and US5271682 both describe a window cleaner with a built-in
20 container that uses a pump to dispense the cleaning agent under pressure; however, none of the descriptions contained in the above documents relate to the functions of dirty liquid recovery.

25 US patent document US20080060156 discloses a "sandwich" structure design comprising two absorbing function blocks and one scraping strip, the absorbing function blocks being comprised of a porous material and capable of absorbing a certain amount of dirty liquid when scraping clean. Patent document WO 2007/111939 A2(2007-10-4) describes an integrated hand-held window cleaner that employs sponge and other porous materials to spread and absorb cleaning agents; however, being wholly reliant upon the
30 sponge itself to effect its cleaning and absorptive functions limited its ability to recover and contain dirty liquid.

 In summary, at present the vast majority of cleaners emphasize the dispensing of cleaning agents and cleaning of dirty surfaces, however, very few consider how to treat the

dirty water generated during scraping down and thereby prevent widespread pollution of the indoor environment.

Summary of the Invention

5 Disclosed is a multifunctional plane surface cleaner that is equipped to clean surfaces to be cleaned and at the same time capable of collecting the dirty liquid generated during cleaning operations. In one embodiment, the multifunctional plane surface cleaner assembly may be suitable for cleaning large-scale surfaces to be cleaned. In one embodiment, the multifunctional plane surface cleaner comprises a cleaning part, the
10 cleaning part being used for cleaning a plane surface to be cleaned, and a dirty liquid recovery container part, the dirty liquid recovery container part being used for the recovery of dirty liquid generated during cleaning operations, the cleaning part being mounted on the dirty liquid recovery container part, wherein the dirty liquid recovery container part comprises: a dirty liquid receiving chamber having an entrance, the dirty
15 liquid receiving chamber being used for the containment of dirty liquid.

In one embodiment, the dirty liquid recovery container part further comprises at least one guider, the guider being used to guide the dirty liquid generated during cleaning operations into the dirty liquid receiving chamber via the entrance.

In one embodiment, the dirty liquid receiving chamber includes an overflow control structure to prevent overflow of collected dirty water, the overflow control
20 structure being mounted proximate to the entrance. Specifically, the overflow control structure has a "Λ" shape.

In one embodiment, at least one guider has capillaries or has undergone super-hydrophilic material treatment.

25 In one embodiment, the multifunctional plane surface cleaner further comprises an adherence part, the adherence part being mounted on the outside of the dirty liquid recovery container part and used to adhere the cleaning part to the plane surface to be cleaned.

In one embodiment, the adherence part comprises at least one suction cup, the at
30 least one suction cup being adapted for adhering said cleaning part to the non-magnetic plane surface to be cleaned.

In one embodiment, the adherence part comprises at least one magnetic adhesion device, the at least one magnetic adhesion device being adapted for adhering the cleaning part to the magnetic plane surface to be cleaned.

In one embodiment, the multifunctional plane surface cleaner further comprising a
5 dirty liquid absorbing part, the dirty liquid absorbing part being interchangeably mounted inside and/or outside the dirty liquid receiving chamber and which is used in combination with the cleaning part to absorb the dirty liquid generated during cleaning.

In one embodiment, the dirty liquid absorbing part is made from porous washable material. According to one embodiment, the porous washable material comprises a sponge.

10 In one embodiment, the cleaning part comprises at least one cleaning bar. According to one embodiment, the at least one cleaning bar is made of rubber or silica gel.

In one embodiment, the cleaner further provides a multifunctional plane surface cleaner assembly, the multifunctional plane surface cleaner assembly comprising a
15 plurality of the above-mentioned multifunctional plane surface cleaners, the plurality of multifunctional plane surface cleaners being used in combination to clean large-scale plane surfaces to be cleaned.

In one embodiment, disclosed is a method of use for the multifunctional plane surface cleaner, the method of use comprising: using one of the above-mentioned multifunctional plane surface cleaners as a conventional cleaner to clean a plane surface to
20 be cleaned; using another multifunctional plane surface cleaner mentioned above as a dirty liquid recovery container for the recovery of dirty liquid generated during cleaning operations conducted by the functional plane surface cleaner being used as a conventional cleaner.

The multifunctional plane surface cleaner has both cleaning and dirty liquid
25 recovery functions, further providing a plurality of adherence functions to adhere to different cleaning surfaces. The multifunctional plane surface cleaner may serve as a dirty liquid recovery container in combination with other cleaning tools for the recovery of dirty liquid. In addition, once assembled, the multifunctional plane surface cleaner may further serve as a cleaner assembly for the cleaning of large-scale plane surfaces.

30 Description of Figures

In order to make the above and additional purposes, attributes and advantages of the present invention clearer and more comprehensible, further explanation of the present invention is provided by the following attached figures and embodiments.

Figure 1 is a structural schematic of the multifunctional plane surface cleaner as described in one embodiment of the present invention;

Figure 2 is a lateral sectional view of the multifunctional plane surface cleaner as described in one embodiment of the present invention;

Figure 3 is a structural decomposition diagram of the multifunctional plane surface cleaner as described in one embodiment of the present invention;

Figure 4 is a diagram illustrating one usage state of the multifunctional plane surface cleaner as described in one embodiment of the present invention;

Figure 5 is a diagram illustrating another usage state of the multifunctional plane surface cleaner as described in one embodiment of the present invention;

Figure 6 is a structural schematic of the multifunctional plane surface cleaner assembly as described in one embodiment of the present invention;

Figure 7 is a diagram illustrating the method of use of the multifunctional plane surface cleaner assembly as described in one embodiment of the present invention.

Detailed Description

Detailed description of the embodiments of the present invention is provided below. Examples of said embodiments are shown in the accompanying Figures, wherein identical markers indicate identical or similar components throughout. The embodiments described in the reference diagrams below are illustrative and intended as an explanation of the present invention and are not to be interpreted as limiting the present invention in any way.

In reference to Figures 1-5, a multifunctional plane surface cleaner 100 is shown, comprising as a minimum a cleaning part 2 used for cleaning of plane surfaces to be cleaned A and a dirty liquid recovery container part 5 used for the recovery of dirty liquid generated during cleaning operations. The cleaning part 2 is mounted on the dirty liquid recovery container part 5, wherein the dirty liquid recovery container part 5 comprises as a minimum a dirty liquid receiving chamber 50 having an entrance 51, the dirty liquid receiving chamber 50 being used for containment of dirty liquid. Specifically, the dirty

liquid receiving chamber 50 can be a container for holding dirty liquid, the cleaning part 2 being mounted on top of the container while dirty liquid is collected inside the container.

Further, in the multifunctional plane surface cleaner provided in the present invention, the dirty liquid recovery container part 5 may further comprise at least one
5 guider 1 used to guide the dirty liquid generated during cleaning operations into dirty liquid receiving chamber 50 via the entrance 51. At least one guider has capillaries or has undergone super-hydrophilic material treatment to facilitate channelling of dirty liquid into the dirty liquid recovery container part 5.

The dirty liquid receiving chamber 50 includes an overflow control structure 52 to
10 prevent overflow of collected dirty water, the overflow control structure 52 being mounted proximate to the entrance 51. For example, in one embodiment, the overflow control structure 52 has an angled or "A" shape to prevent back flow of dirty liquid that is collected in dirty liquid receiving chamber 50. The action of the overflow control structure 52 is particularly evident when the cleaning level of surface to be cleaned is configured as
15 in Figure 5.

The multifunctional plane surface cleaner 100 may further comprise an adherence part used to adhere the cleaning part to the plane surface to be cleaned. Specifically, the adherence part is mounted on the outside of the dirty liquid recovery container part. In reference to Figure 2 and Figure 3, the adherence part may comprise at least one suction
20 cup 3 mounted on the dirty liquid recovery container part 5 and is adapted to adhere the cleaning part 2 mounted on the dirty liquid recovery container part 5 to a non-magnetic plane surface to be cleaned, such as glass. In addition, the adherence part may further comprise at least one magnetic adhesion device 6, this at least one magnetic adhesion device 6 may also be mounted on the dirty liquid recovery container part 5 and is adapted
25 to adhere the cleaning part 2 mounted on the dirty liquid recovery container part 5 to a magnetic plane surface to be cleaned, such as a magnetic plane surface.

The multifunctional plane surface cleaner 100 may further comprise a dirty liquid absorbing part 4. The dirty liquid absorbing part 4 may be interchangeably mounted inside and/or outside the dirty liquid receiving chamber 50 and used in combination with the
30 cleaning part 2 to absorb the dirty liquid generated during cleaning. Preferably the dirty liquid absorbing part 4 is made of porous washable material. For example, said porous washable material may be a sponge.

The cleaning part 2 of the multifunctional plane surface cleaner 100 comprises at least one cleaning bar 2, the function of the cleaning bar 2 being to carry out cleaning in combination with the cleaning agent. It should also be mentioned that the shape and material of the cleaning bar 2 may be altered for different applications. For example, where the plane surface to be cleaned is glass, at least one cleaning bar 1 shall preferably be bar shaped and made of either rubber or silica gel.

Figures 1-5 give a practical example of the multifunctional plane surface cleaner.

Figure 1 shows a multifunctional plane surface cleaner 100 that can be used on windows, table tops, glass or magnetic surfaces. The cleaning function of this multifunctional plane surface cleaner is shown in Figure 2, and the mounted rubber scraping strip 2 (i.e. the above-mentioned cleaning bar 2) equipped to scrape up dirty liquid in different directions.

The component parts and functions of the multifunctional plane surface cleaner as shown in Figure 3 are described below:

Guidance strip 1 (i.e. the above-mentioned guider 1) may have undergone super-hydrophilic material treatment, the guidance strip 1 with capillaries facilitates channelling of dirty liquid into the dirty liquid recovery container.

Cleaning strip 2 (i.e. the above-mentioned cleaning bar 2) may be made of either rubber or silica gel, the intrinsic properties of these materials enable the strip to easily clean glass and other plane surfaces, and also scrape surfaces to remove stubborn marks;

Suction cup 3 (i.e. a type of adherence part 3 mentioned above) may be used to adhere cleaner to glass and other smooth surfaces;

Absorbent material 4 may be sponge or other porous washable material to facilitate absorption of dirty liquid, once "saturated" with dirty liquid, it may be removed and cleaned.

Container 5 (i.e. a type of dirty liquid recovery container part 5 mentioned above) not only joins together with other components such as the cleaning strip to form a complete cleaner unit, the shape of its entrance also permits ready installation of absorbent materials that contain dirty liquid to become a container. It should be noted that when the cleaner is used on a horizontal plane surface as shown in Figure 5, the container's angled or "Λ" shaped design prevents back flow of dirty liquid.

Magnetic adhesion device 6 (i.e. a type of adherence part 6 mentioned above) may be mounted on magnetic metal surfaces. For example, when cleaning the interior surfaces of a fridge, removing the thick layer of ice that coats the inside can be problematic; also, melt water can get everywhere. Furthermore, suction cups may have difficulty finding
5 purchase on such low temperature and uneven surfaces, which is where the magnetic adhesion device comes into its own. Regardless of how the ice layer melts, it can provide a constant "adhesive strength".

In conclusion, the multifunctional plane surface cleaner described in this document employs a mounted cleaning strip to clean plane surfaces and fulfil its "cleaning" function,
10 while also employing a distinctive structure to serve as a container and fulfil its dirty liquid "recovery" function.

In addition, the multifunctional plane surface cleaner 100 provided may further be used in combination with other cleaning tools as a dirty liquid recovery container, or in combination with other identical units.

A multifunctional plane surface cleaner assembly, the multifunctional plane
15 surface cleaner assembly comprises a plurality of multifunctional plane surface cleaners 100, the plurality of multifunctional plane surface cleaners 100 being used in combination to clean large-scale plane surfaces to be cleaned. For example, a plurality of cleaners 100 can be linked together as necessary and attached to the surface to be cleaned to recover
20 and contain dirty liquid, as shown in Figure 6.

A method of use for the multifunctional plane surface cleaner comprising using
one multifunctional plane surface cleaner 100 as a conventional cleaner to clean a plane surface to be cleaned; using another multifunctional plane surface cleaner 100 as a dirty
25 liquid recovery container for recovery and containment of dirty liquid generated during cleaning operations conducted by the functional plane surface cleaner being used as a conventional cleaner. For example, Figure 7 illustrates the application whereby dirty liquid is removed from a table top. The diagram clearly demonstrates the two principal functions of the multifunctional cleaner, namely "cleaning" and "recovery". In the case that the user already has a glass cleaner, the multifunctional plane surface cleaner 100 can be used as a
30 cleaner and/or container.

In other words, the multifunctional plane surface cleaner can be used in combination with cleaners already in the user's home, or joined to other identical units to form a set of assembled tools that can be used directly.

The embodiments described above illustrate the principles and efficacy of the present invention and do not limit the present invention in any way. It will be obvious to those skilled in the art that all changes or improvements to the present invention that do not depart from the spirit and scope of the invention lie within the scope of the present invention. The extent of protection conferred by the patent rights of the present invention shall take as standard the terms defined in the claims of this application.

10

Claims

1. A multifunctional plane surface cleaner (100) comprising:

a cleaning part (2), said cleaning part being used for cleaning a plane surface to be
5 cleaned (A); and

a dirty liquid recovery container part (5), said dirty liquid recovery container part
being used for the recovery of dirty liquid generated during cleaning operations, said
cleaning part (2) being mounted on said dirty liquid recovery container part (5), wherein

said dirty liquid recovery container part (5) comprises: a dirty liquid receiving
10 chamber (50) having an entrance (51), said dirty liquid receiving chamber being used for
containment of said dirty liquid.

2. The multifunctional plane surface cleaner of claim 1, wherein the dirty liquid
recovery container part further comprises:

15 at least one guider (1), said guider being used to guide the dirty liquid generated
during cleaning operations into said dirty liquid receiving chamber via said entrance.

3. The multifunctional plane surface cleaner of claim 2, wherein:

said dirty liquid receiving chamber (50) includes an overflow control structure (52)
20 to prevent overflow of collected dirty water, said overflow control structure being
mounted proximate to said entrance.

4. The multifunctional plane surface cleaner of claim 3, wherein:

said overflow control structure (52) has a angled shape.

5. The multifunctional plane surface cleaner of claim 2, wherein:

said at least one guider (1) has capillaries or has undergone super-hydrophilic
material treatment.

6. The multifunctional plane surface cleaner of claim 1 further comprising an

adherence part, said adherence part being mounted on the outside of said dirty liquid

recovery container part and used to adhere said cleaning part to said plane surface to be cleaned.

5 7. The multifunctional plane surface cleaner of claim 6, wherein said adherence part comprises:

at least one suction cup (3), said at least one suction cup being adapted for adhering said cleaning part to the non-magnetic plane surface to be cleaned.

10 8. The multifunctional plane surface cleaner of claim 6, wherein said adherence part comprises:

at least one magnetic adhesion device (6), said at least one magnetic adhesion device being adapted for adhering said cleaning part to the magnetic plane surface to be cleaned.

15 9. The multifunctional plane surface cleaner of claim 2, further comprising a dirty liquid absorbing part (4), said dirty liquid absorbing part being interchangeably mounted inside and/or outside the dirty liquid receiving chamber (50) and used, in coordination with said cleaning part, to absorb the dirty liquid generated during cleaning.

20 10. The multifunctional plane surface cleaner of claim 9, wherein:
said dirty liquid absorbing part (4) is made of a porous washable material.

11. The multifunctional plane surface cleaner of claim 10, wherein:
said porous washable material comprises a sponge.

25 12. The multifunctional plane surface cleaner of claim 1, wherein:
said cleaning part (2) comprises at least one cleaning bar.

30 13. The multifunctional plane surface cleaner of claim 12, wherein:
said at least one cleaning bar is made of rubber or silica gel.

14. A multifunctional plane surface cleaner assembly, said multifunctional plane surface cleaner assembly comprising a plurality of multifunctional plane surface cleaners as claimed in any one of claims 1-13, said plurality of multifunctional plane surface cleaners working in combination to clean large-scale plane surfaces to be cleaned.

5

15. A method of use for the multifunctional plane surface cleaner comprising:

using one multifunctional plane surface cleaner as claimed in any one of claims 1-13 as a conventional cleaner to clean a plane surface to be cleaned; and

10 using another multifunctional plane surface cleaner as claimed in any one of claims 1-13 as a dirty liquid recovery container for recovery and containment of dirty liquid generated during cleaning operations conducted by the functional plane surface cleaner being used as a conventional cleaner.

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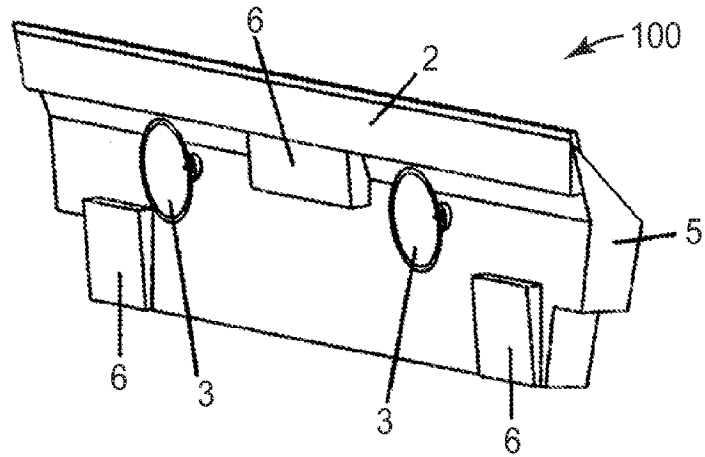


FIG. 1

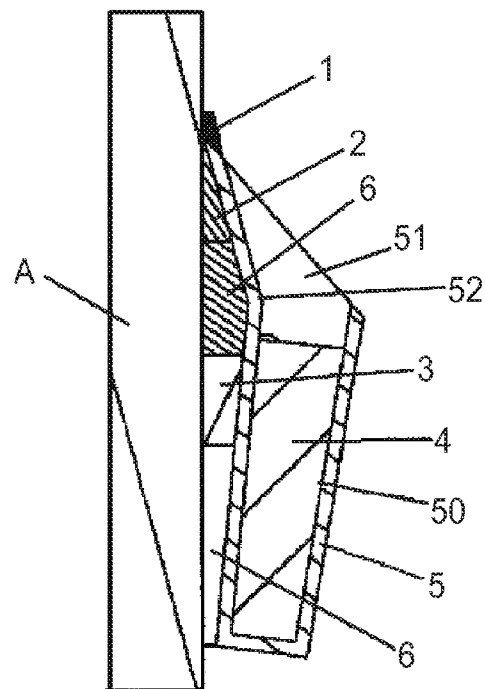


FIG. 2

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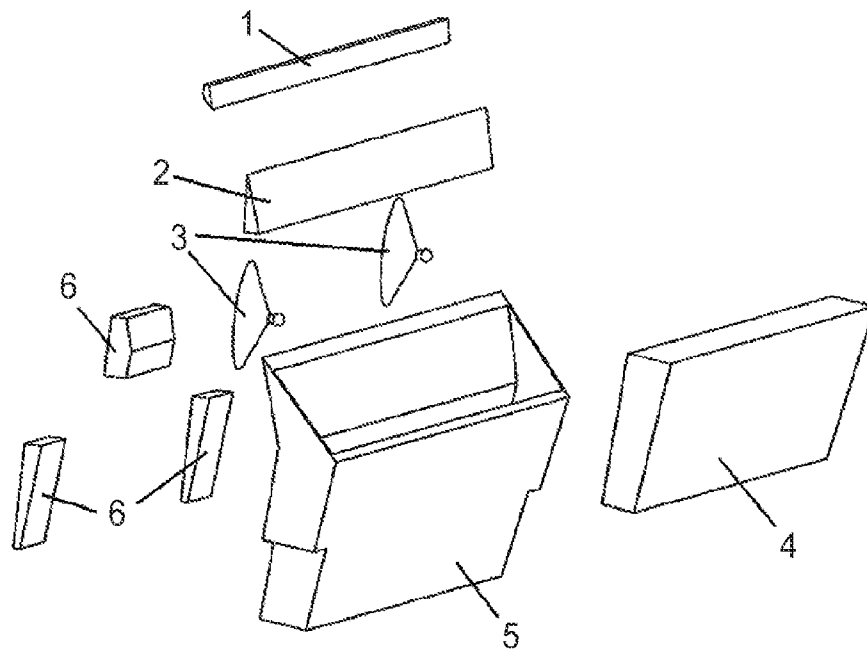


FIG. 3

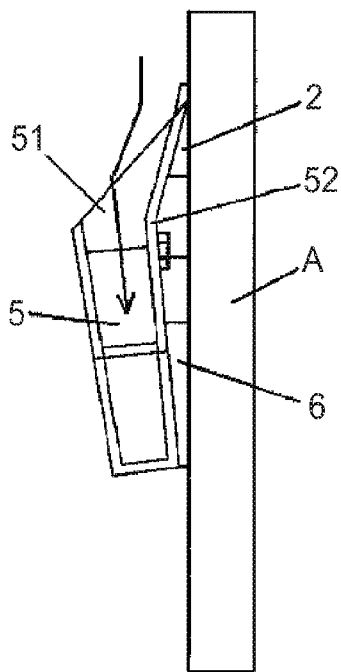


FIG. 4

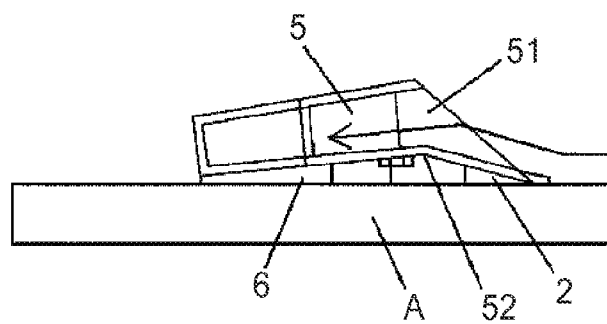


FIG. 5

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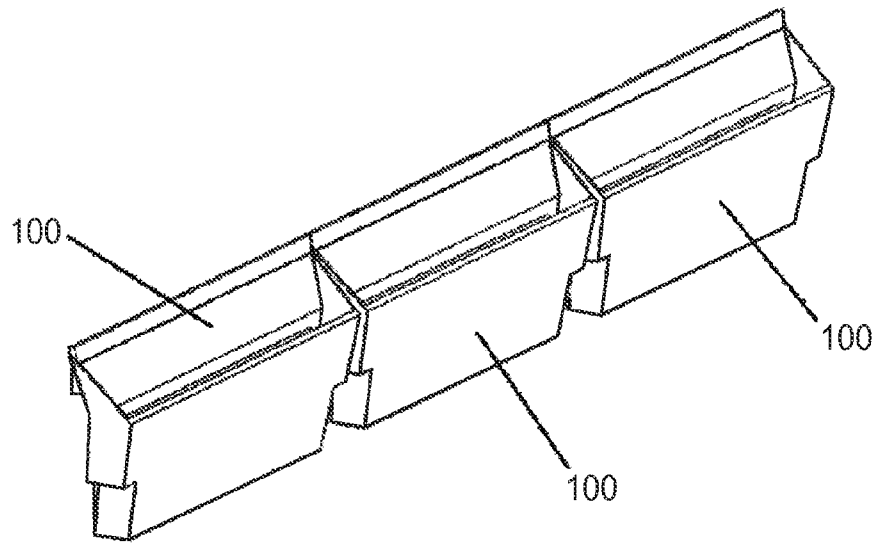


FIG. 6

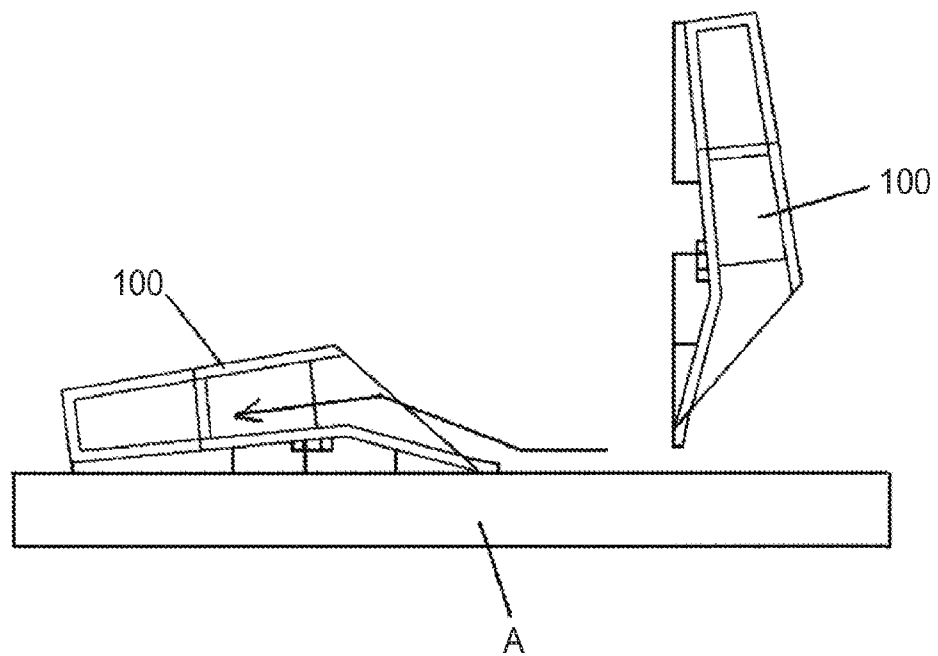


FIG. 7