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### (54) Adapter plate for dust filter bags

(57) Adapter for dust filter bags in the form of a plate (1) made from a material dust filter bags, which by a user can be transformed to a design conformed to an optional holder for dust filter bags in vacuum cleaners, in which a bag is used for dust collection, said plate having an aperture (3) for taking up of a dust filter bag to be connected to an air flow channel of a vacuum cleaner. The material of the plate has a cross-sectional profile, the extension (a) of which in the thickness direction of the plate exceeds the thickness (b) of the material the plate is made of.

Fig. 6

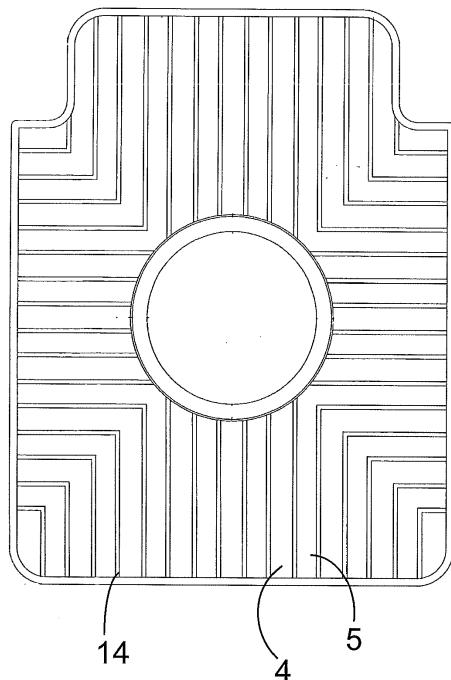
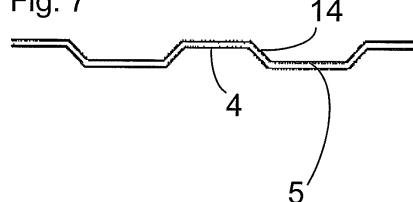


Fig. 7



## Description

### Technical field

**[0001]** The present invention relates to an adapter plate intended for dust filter bags, which adapter plate can be transformed by a user to a design conformed to an optional holder for dust filter bags in vacuum cleaners, in which a bag is used for dust collection.

### Background

**[0002]** At the very front of a conventional dust filter bag there is a holder plate, normally made from cardboard, the outline of which varies for different vacuum cleaner models. This has resulted in the jungle of dust filter bags in the market. Large resources are demanded in order to keep a complete supply of bags in store, and thus, there is a market for adapter plates. Such adapter plates are preferably made from hard plastic, and might have a form corresponding to the cardboard piece for the respective vacuum cleaner model, at least for the most frequent occurring models. For the more rare models it is not economically efficient to make/store a specially designed adapter, and for these models there is a universal adapter, which the user simply will have to cut or clip according to a holder plate from a dust filter bag intended for the respective vacuum cleaner.

**[0003]** One example of this prior art is disclosed in SE 507 311, which describes a dust separator for a vacuum cleaner. This dust separator comprises an adapter in the form of a separate plate having an aperture which is intended to be connected to the air flow channel of the vacuum cleaner and in association to which a dust filter bag is arranged. Thereby, the dust filter bag is provided with a flange surrounding an aperture therein, which flange shall retain the dust filter bag in the adapter plate during use. The flange is thereby designed in such a way that it can be folded, broken or otherwise deformed so that it can be passed through the aperture in the adapter without harming the adapter, when the dust filter bag is full.

**[0004]** In order for an adapter plate to fulfill its function it must have some rigidity and strength. This means that it might take a comparatively large force for cutting the material into the correct design, much material is wasted, and there might be a problem when inserting the adapter plate into grooves in the dust filter bag holders of vacuum cleaners from some manufacturers.

### Summary of the Invention

**[0005]** One object of the invention is thus to provide an adapter for dust filter bags, with which one or a small number of bags can be adapted to a large number or all vacuum cleaner models, which adapter plate is improved in relation to the prior art so that it more easily than before can be given the form which is necessary for exactly the

vacuum cleaner model the user has.

**[0006]** Another object of the invention is to provide an adapter plate for dust filter bags, which reduces the consumption of material, and accordingly will be more advantageous with regard to both environmental as well as cost aspects.

**[0007]** These and other objects will be achieved with the present invention having the features defined in the characterizing part of the main claim. Advantageous embodiments and developments of the invention are defined in the sub claims.

**[0008]** Thanks to the design of the adapter according to the invention it is thus achieved that having a rigidity corresponding to a plate made from a thicker material, the adapter plate according to the invention can be made thinner and even substantially thinner compared to a conventional adapter plate of the kind existing in the market.

**[0009]** The adapter according to the invention will thus be substantially more easy to clip or cut to the desired design while at the same time it will fit into most of the recesses in existing vacuum cleaners. At some manufacturers, the holders might be rather narrow, but thanks to the profiled form of the adapter plate according to the invention, when desired it can easily be deformed to some extent in the thickness direction in order to fit into such narrow grooves. At the same time, the adapter plate will fill up grooves adapted to adapters having thicknesses exceeding the thickness of the material of the adapter according to the invention.

### Short description of the drawings

**[0010]** Further objects, advantages and characterizing features of the invention will be evident from the following description of the embodiments shown in the attached drawings, on which

Fig. 1 shows a schematic view of an adapter plate according to the present invention, seen from above;

Fig. 2 shows a schematic cross-sectional view taken along the line II-II in Fig. 1, illustrating the cross-sectional profile of the adapter plate according to the invention;

Fig. 3 shows a view corresponding to the view according to Fig. 1 of an alternative embodiment of the invention,

Fig. 4 shows a view corresponding to the view according to Fig. 1 and Fig. 3 of another alternative embodiment of the invention,

Fig. 5 shows a cross-sectional view corresponding to the view according to Fig. 2 of an alternative embodiment for the layer of material of the adapter plate according to the invention,

Fig. 6 shows a view corresponding to the view of Fig. 1, 3, and 4 of still another embodiment of the invention, and

Fig. 7 shows a cross-sectional view corresponding to the view according to Fig. 2 and 5 of the cross-sectional profile in the embodiment according to Fig. 6 of the adapter plate.

#### Detailed description of the Invention

**[0011]** In Fig. 1 is schematically shown an adapter plate 1 in the form of a plate 2 with an aperture 3 taken up in the plate, in which aperture a dust filter bag is placed in order to be connected to the dust suction channel of a vacuum cleaner. This is conventional and the details regarding the connection to the dust suction channel will therefore not be discussed in more detail in this context. The outer form or contour of the adapter plate shown in Fig. 1 is only one example of many, since the intention is that it should be possible to cut the adapter plate 1 to a desired design. The outer form could thus be e.g. rectangular as well.

**[0012]** The adapter plate 1 is profiled so that ridges 4 and valleys 5 are formed, in this embodiment running in parallel with each other in one direction, which is further illustrated more clearly in Fig. 2, from which it is evident that the plate has been given a pleated cross-sectional form. By the pleating is attained that the extension of the plate in the thickness direction of the plate, in Fig. 2 referenced "a", substantially exceeds the thickness of the material "b". Thereby, the stiffness of the plate also increases, and with retained stiffness the thickness of the material can thus be decreased, resulting in environmental as well as economical gain. The exact profile of the pleating shown is only one example among many plausible profiles. Another variant instead of the profile shown is that the ridges 4 and valleys 5 are identical on both sides of the adapter plate 1. The width, roundness and form of the ridges 4 and valleys 5 can also be the object of a large number of variants, such as the form of a sine wave, a square wave or a triangular wave.

**[0013]** According to a preferred embodiment of the present invention the thickness of the plate is at least 1.5 times the thickness of the material, and advantageously at least 2 times the thickness of the material.

**[0014]** Thanks to this profiling the stiffness increases substantially when the thickness of the material remains the same, meaning that the thickness of the material can be reduced with retained stiffness.

**[0015]** The adapter plate with accompanying bag is placed in grooves in a holder arranged for this purpose, which holder is not shown in the drawings, for dust filter bags in a vacuum cleaner. The width of the groove might vary between different vacuum cleaners, and with the design according to the invention a good adaptability is obtained, since the profiling can be deformed to some extent in order to fit also into more narrow grooves, while

it still fills out grooves being wider.

**[0016]** With a thinner material the plate will be much easier to clip to the desired form in order to fit different vacuum-cleaners existing in the market.

**[0017]** In Fig. 3 an alternative embodiment is shown, in which different parts of the adapter plate has been profiled in different directions. In the view shown in Fig. 3, which should not be regarded as a limitation, ridges 4 and valleys 5 run in parallel with each other adjacent to the, in Fig. 3, areas corresponding to the longitudinal borders of the plate on each side of the aperture for the bag, while ridges 6 and valleys 7 at the corresponding cross borders run perpendicular thereto.

**[0018]** In Fig. 4 a further alternative embodiment of the adapter plate according to the invention is shown, the profiling being comprised of concentric ridges 8 and valleys 9, surrounding the aperture for the dust filter bag in the adapter plate.

**[0019]** In Fig. 5 an alternative embodiment is shown schematically for the cross-sectional profile of the plate, which in this case has a flat side 10 and a wavy side 11 having regularly alternating ridges 12 and valleys 13. The alternative with one flat side might occur in combination with all possible profiling of the adapter plate 1, partly with regard to the directions of the profiling, such as straight or curved grooves in one or several directions or concentric grooves, and partly with regard to the width and rounding of the ridges 4 and valleys 5.

**[0020]** Fig. 6 shows still another embodiment of the invention. In this embodiment the adapter plate has alternating ridges 4 and valleys 5, running in parallel with each other in confined areas. In the transition between different such areas the ridges 4 and valleys 5 are angled at essentially a right angle. Between each ridge 4 and an adjacent valley 5 there is a sloping, narrow transition area 14. Together, the ridges 4, valleys 5 and the transitions areas 14 give the adapter plate a stiffness which exceeds the stiffness being the result of only the material thickness. The adapter plate is two-sided, and on its opposite side the ridges 4 on the first side correspond to valleys 5, and vice versa.

**[0021]** The cross-sectional profile of the adapter plate according to Fig. 6 is shown in Fig. 7. In here, it is clearly seen that the total measure of the adapter plate in the thickness direction is substantially larger than the thickness of the material used, resulting in a good fit in the above mentioned grooves in the holder for the dust filter bag. The pleated form can, when desired, be somewhat flattened so that the adapter plate also fits into grooves being more narrow.

**[0022]** In all cases described above the same stiffness is obtained for the adapter plate according to the invention as for a conventional, flat adapter plate having a larger thickness, while at the same time the clipping resistance is substantially reduced.

**[0023]** In the preferred embodiment of the invention, the adapter plate according to the invention is manufactured from plastic material. However, the plate could also

be manufactured from another material.

### Claims

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1. Adapter for dust filter bags in the form of a plate (1) made from a material dust filter bags, which by a user can be transformed to a design conformed to an optional holder for dust filter bags in vacuum cleaners, in which a bag is used for dust collection, 10 said plate having an aperture (3) for taking up of a dust filter bag to be connected to an air flow channel of a vacuum cleaner, **characterized in that** the material of the plate has a cross-sectional profile, the extension (a) of which in the thickness direction of the plate exceeds the thickness (b) of the material the plate is made of
2. Adapter plate according to claim 1, **characterized in that** said extension (a) is at least 1.5 times the 20 material thickness (b) of the plate.
3. Adapter plate according to any of claims 1 or 2, **characterized in that** said extension (a) is at least 2 times 25 the material thickness (b) of the plate.
4. Adapter plate according to any of claims 1 - 3, **characterized in that** the cross-sectional profile of the plate forms a regular wave pattern with ridges (4) and valleys (5). 30
5. Adapter plate according to any of the claims 1 - 3, **characterized in that** the cross-sectional profile of the plate has one flat side (10) and an opposite profiled side (11) having regularly alternating ridges (12) 35 and valleys (13).
6. Adapter plate according to any of claims 4 or 5, **characterized in that** the cross-sectional profile of the plate is uniform all over of the plate, so that all ridges 40 (3) and valleys (5) run in parallel with each other.
7. Adapter plate according to any of claims 4 or 5, **characterized in that** the plate differently profiled in different parts in such a way that ridges (4; 6) and valleys (5; 7) run in different directions in different parts 45 of the plate.
8. Adapter plate according to any of claims 4 or 5, **characterized in that** the plate is profiled in such a way 50 that it comprises ridges (8) and valleys (9) in the form of concentric rings around said plate aperture (3).
9. Adapter plate according to any of the previous claims, **characterized in that** the plate is manufactured from a plastic material. 55

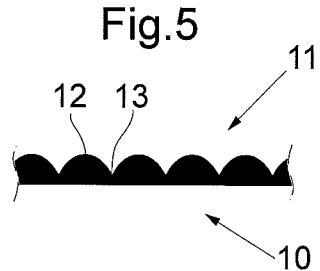
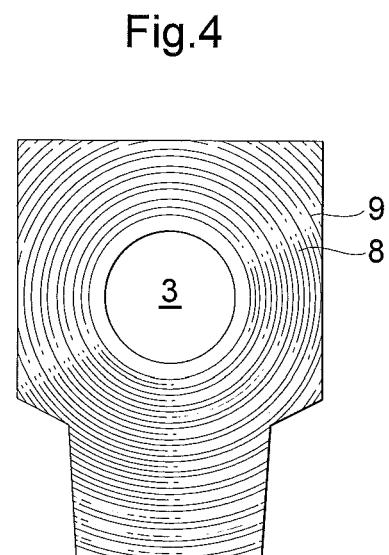
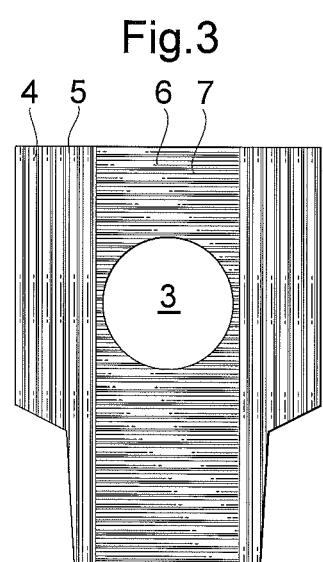
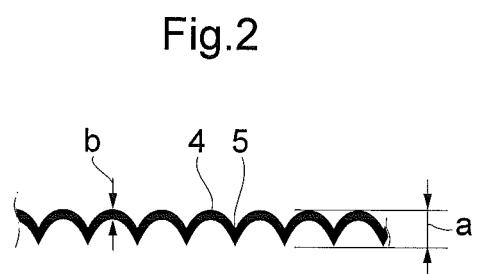
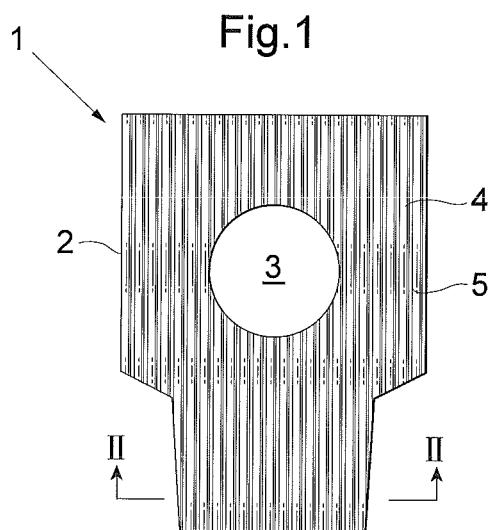


Fig. 6

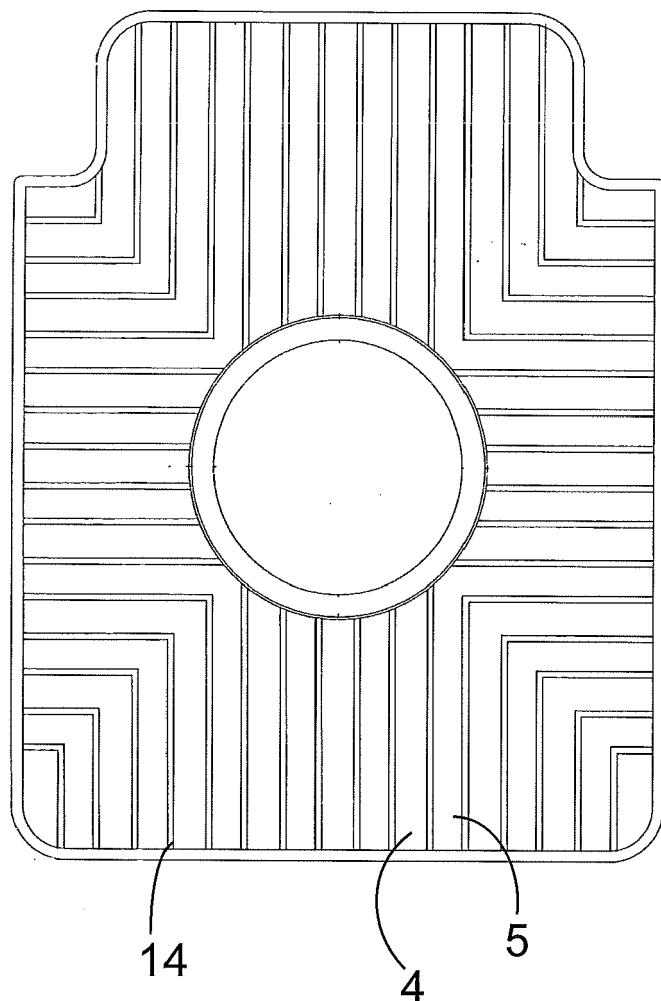
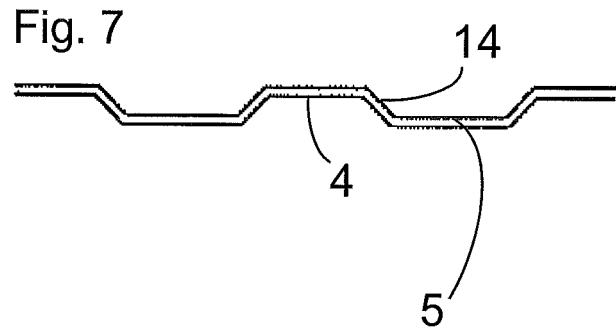


Fig. 7





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Application Number

EP 14 44 6505

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