DISPOSABLE WIPER

This invention relates generally to disposable wipers used to clean surfaces such as floor surfaces and wall surfaces of a house and the like.

As a convenient measure to clean a surface of a house floor or the similar surfaces, it is well known to use a sheet-like wiper made of various materials such as nonwoven fabric, woven fabric or paper. Sometimes, different types of such wiper have been selectively used depending on the condition of the surface to be cleaned. Specifically, the wiper presenting a good cushioning effect is preferred for the surface which is apt to be scratched by vigorous scrubbing while the wiper presenting a significant clawing effect is preferred for the surface which is heavily dirty and can not be cleaned without vigorous scrubbing. It is also well known to impregnate such wiper with a suitable oily agent or to coat this with a suitable adhesive agent in order to facilitate the dust capture.

Generally, it is annoying to exchange the wiper of one type with the wiper of the other type during operation of cleaning. To avoid this, it is a principal object of the

invention to provide one and same wiper with a plurality of wiping functions.

The object set forth above is achieved, according to the invention, by a disposable wiper comprising a base layer made of thermoplastic synthetic resin, a dust catching layer made of plural continuous filaments of thermoplastic syntectic resin parallelly extending in one direction and placed upon at least one surface of said base layer, and a cover layer made of thermoplastic synthetic resin and provided with an opening through which said dust catching layer is partially exposed and placed upon said dust catching layer, wherein there are provided a plurality of spots arranged intermittently in said one direction at which said respective layers are bonded together.

Fig. 1 is a perspective view illustrating a manner in which a disposable wiper according to the invention is used;

Fig. 2 is a perspective view showing the disposable wiper as partially broken away;

Fig. 3 is a fragmentary plan view of the disposable wiper;

Fig. 4 is a sectional view taken along a line IV-IV in Fig. 3; and

Fig. 5 is a view similar to Fig. 4 showing an alternative embodiment of the invention.

Details of a disposable wiper according to the invention will be more fully understood from the description given hereunder in reference with the accompanying drawings.

Fig. 1 is a perspective view of a cleaner device 2 with a disposable wiper in the form of a sheet-like wiper 1 attached thereto. The cleaner device 2 comprises a plate-like head 3 and a stick-like handle 4. The wiper 1 is put against a bottom surface 3B of the head 3 and folded along a pair of side margins 16, which are transversely opposed and extend in parallel to each other, onto a top surface 3A of the head 3 so as to be releasably clamped to the top surface 3A by clips 8. With the cleaner device 2 having the wiper 1 attached thereto in such a manner, the handle 4 may be held by the user's hands to scrub a surface of a house floor with the wiper 1.

Referring to Fig. 2 showing the wiper 1 in a perspective view as partially broken away, a surface of the wiper 1 intended to come in contact with the floor surface is faced upward and side margins 16 of the wiper 1 illustrated by Fig. 1 as being folded back are laterally unfolded. The

wiper 1 is a rectangular piece defined by the transversely opposite side margins 16 extending in parallel to each other and longitudinally opposite end zones 14 extending orthogonally to the side margins 16. Structurally, the wiper 1 comprises a base layer 21 intended to be put against the bottom surface 3B of the head 3, a dust catching layer 22 placed upon one side of the base layer 21, and a cover layer 23 placed upon the dust catching layer 22 and thereby partially covering the dust catching layer 22. The base layer 21 is made of a thermoplastic synthetic film having a thickness of 0.05~ 0.3 mm or a nonwoven fabric of thermoplastic synthetic fibers (staple fibers) having a basis weight of 150 ~ 1,000 g/m^2. The dust catching layer 22 is made of a web obtained by evenly opening of a tow comprising a plurality of continuous thermoplastic synthetic fiber filaments having a fineness of 1 ~ 25 deniers. To form the dust catching layer 22, the web is cut in a desired size and its thickness is selected so as to provide a good cushioning effect with a basis weight of 150 ~ 3,000 g/m^2. As a material for the cover layer 23, a nonwoven fabric made from thermoplastic synthetic fibers (staple fibers) with a fineness of 30 ~ 500 g/m^2 is employed. While fineness of the synthetic fibers employed as a material for the base layer 21

and the cover layer 23 is not critical, fibers-shift occurring in the cover layer 23 should be less significant than filaments-shift occurring in the dust catching layer 22 when the cleaner device 2 is scrubbing the floor surface. To meet this requirement, the cover layer 23 is preferably made of the nonwoven fabric characterized by their individual fibers (staple fibers) entangled or intertwined and such nonwoven fabric can be obtained by various methods such as melt bonding, binder bonding (i.e., chemical bonding), spun lacing, needle punching, spun bonding and melt blowing.

In such wiper 1, the dust catching layer 22 occupies the base layer 21 except the side margins 16, i.e., a transversely middle region of the base layer 21, with their individual filaments 22A continuously extending in parallel to one another between the longitudinally opposite end zones 14 of the base layer 21. The cover layer 23 is substantially identical to the base layer 21 in size as well as shape and provided in its region placed upon the dust catching layer 22 with opening(s) 24. Each of the openings 24 is preferably dimensioned to have a length L as measured longitudinally between the opposite end zones 14 and a width W as measured transversely between the opposite side margins 16. The length L is sufficient to expose, at least partially, a

plurality of filaments 22A lying in the region defined inside this opening over 1/10 ~ 8/10 of their full length and the width W is at least 5 mm. The cover layer 23 may be provided with either the single opening 24 or the plural openings 24. In the case of plural openings 24, a pattern of their distribution is not critical so far as these openings occupy 20 ~ 80 % of the effective area of the cover layer 23 exactly corresponding to the area of the dust catching layer 22. In the case of single opening 24, on the other hand, it is preferred to locate this opening 24 centrally of the base layer 21. It should be understood here that the cover layer 23 may be selectively dimensioned to be larger or smaller than the base layer 21 as the occasion demands.

Fig. 3 is a fragmentary plan view showing the wiper 1 in an enlarged scale. In a region defined by each opening 24, the base layer 21 and the dust catching layer 22 placed directly upon the base layer 21 are heat-sealed together under pressure at first heat-seal spots 26 which are intermittently arranged between the opposite end zones 14. Consequently, these two layers 21, 22 are integrated at the first heat-seal spots 26 in a state of film substantially thinner than the region surrounding these first heat-seal spots 26. While the first heat-seal spots 26 are illustrated

and described as arranged intermittently inside the respective side margins 16 (Fig. 1), these first heat-seal spots 26 may extend to the respective side margins 16 if it is desired.

The base layer 21, the dust catching layer 22 and the cover layer 23 placed one upon another outside each opening 24 are heat-sealed together under pressure at second heat-seal spots 27 arranged intermittently like the first heat-seal spots 26 and integrated at these spots 26 in a state of film substantially thinner than the region extending around the second heat-seal spots 27. It should be understood that, in the opposite end zones 14, these base layer 21, dust catching layer 22 and cover layer 23 are heat-sealed together under pressure at relatively wide and long third heat-seal spots 28. In the opposite side margins 16, the base layer 21 and the cover layer 23 are placed upon each other and heat-sealed together under pressure at fourth heat-seal spots 29 (Fig. 2).

Fig. 4 is a sectional view taken along a line IV-IV in Fig. 3. As shown, the wiper 1 is so configured that the dust catching layer 22 is swollen inside the opening 24 relative to its region extending around the opening 24 and the spots

26 at which the dust catching layer 22 is heat-sealed together with the base layer 21 are recessed relative to the upper surface 31 of the dust catching layer 22 extending around the spots 26. Outside the opening 24, the dust catching layer 22 is sandwiched between the base layer 21 and the cover layer 23 which lies at a level lower than that of the upper surface 31. The spots 27 at which the base layer 21, the dust catching layer 22 and the over layer 23 are heat-sealed together are recessed relative to the upper surface of the cover layer 23 extending around the spots 27. With such configuration, it is at the apex surface 31 of the dust catching layer 22 that the wiper 1 attached to the cleaner device 2 comes first in contact with the surface to be cleaned. Pressing of the cleaner device 2 against the surface to be cleaned causes the apex surface of the cover layer 23 also to come in contact with the surface to be cleaned. In this manner, the layer 22 functions as a first dust catching layer and the layer 23 functions as a second dust catching layer. These layers 22, 23 may be previously impregnated with a suitable oily agent to facilitate dust and/or dirt to be caught. It is also possible to coat the cover layer 23 with a suitable adhesive agent, instead of impregnating this layer 23 with an oily agent.

With the wiper 1 configured as has been described above, the first dust catching layer 22 exposed inside the opening 24 may be utilized when it is undesirable to vigorously scrub the surface to be cleaned. If the surface to be cleaned is heavily dirty and can not be cleaned without more or less vigorous scrubbing, the second dust catching layer 23 defined by the cover layer may be utilized.

Particulate dust necessarily limiting a contact area between the cover layer 23 and such dust has conventionally often made dust catching difficult even if the cover layer 23 is previously coated with an adhesive agent. According to the inventive wiper 1, the individual filaments 22A of the dust catching layer 22 exposed inside the opening 24 can rather freely shift between each pair of adjacent heat-seal spots 26 and thereby collect such particulate dust in the dust catching layer 22. The particulate dust thus collected is held among a plurality of filaments 22A and prevented thereby from readily falling off from the wiper 1. In addition, the particulate dust no more contacts the surface to be cleaned, so there is no apprehension that the particulate dust once collected might scratch the surface to be cleaned.

The heat-seal spots 26, 27 are harder than the rest of

the dust catching layer 22 as well as the cover layer 23 and conventionally have sometimes scratched the floor surface or the like. The wiper 1 according to the invention effectively avoids such scratching by recessing these spots 26, 27 relative to the dust catching layer 22 as well as to the cover layer 23.

The wiper 1 functioning in the manner as has been described above allows dust and/or dirt not only to be clawed off by the filaments 22A from the floor surface as the wiper 1 is moved in the direction orthogonal to the filaments 22a to scrub the floor surface but also to be easily collected in the dust catching layer 22. To achieve such effect, the filaments 22a in the wiper 1 attached to the head 3 as illustrated by Fig. 1 preferably extend longitudinally of the head 3.

Fig. 5 is a view similar to Fig. 4 showing an alternative embodiment of the invention. According to this embodiment, the wiper 1 comprises the base layer 21, a pair of dust catching layers 22, 22 placed upon upper and lower surfaces of the base layer 21, respectively, and a pair of cover layers 23, 23 covering the respective dust catching layers 22, 22. The upper and lower dust catching layers 22, 22, and the upper and lower cover layers 23, 23 are heat-

sealed together with the base layer 21 at the spots 26, 27 common to these layers. With the wiper 1 according to this embodiment, after one side of the wiper 1 has been made dirty, the wiper 1 can be turned over to use the other side thereof.

When the invention employs a nonwoven fabric as material for the base layer 21 and/or the cover layer 23, natural fibers or regenerated fibers up to 30 % by weight of the base layer 21 and/or cover layer 23 can be used. Bonding of the base layer 21, the dust catching layer 22 and the cover layer 23 can be achieved, in addition to the heat-sealing technique, by use of a suitable adhesive such as a hot melt adhesive. If the cover layer 23 is provided with the relatively small opening 24, bonding together of the base layer 21 and the dust catching layer 22 inside the opening 24 is unnecessary depending on the size of the opening 24. As a material for the cover layer 23, not only a nonwoven fabric but also a thermoplastic synthetic film may be employed and such materials may be previously formed on its surface with irregularities to improve the effect of scratching off dust and/or dirt from the floor surface.

The wiper according to the invention includes a relatively bulky dust catching layer comprising a plurality

of filaments and a cover layer placed upon this dust catching layer. Such feature of the invention allows the dust catching layer and the cover layer to be selectively utilized depending on the condition of the surface to be cleaned. Specifically, the filaments may be utilized for the surface which is less resistant to a vigorous scrubbing and the cover layer may be utilized for the surface which can not be cleaned without vigorous scrubbing. The invention allows also the particulate dust which can not be easily caught by the cover layer to be collect among the filaments.

WHAT IS CLAIMED IS:

1. A disposable wiper comprising a base layer made of thermoplastic synthetic resin, a dust catching layer made of plural continuous filaments of thermoplastic synthetic resin parallelly extending in one direction and placed upon at least one surface of said base layer, and a cover layer made of thermoplastic synthetic resin and provided with an opening through which said dust catching layer is partially exposed and placed upon said dust catching layer, wherein there are provided a plurality of spots arranged intermittently in said one direction at which said respective layer are bonded together.

2. The disposable wiper according to Claim 1, wherein said cover layer is made of a nonwoven fabric having also a function of dust catching.

3. The disposable wiper according to Claim 1 or 2, wherein the spots at which said base layer and said dust catching layer are bonded together are recessed relative to an apex surface of the dust catching layer exposed through said opening inside said opening and the spots at which said base

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layer, said dust catching layer and said cover layer are bonded together are recessed relative to an apex surface of said cover layer extending around said spots.

4. The disposable wiper according to any one of Claims 1 through 3, wherein said base layer and said cover layer are made of a nonwoven fabric containing thermoplastic synthetic fibers of 70 ~ 100 % by weight.

5. The disposable wiper according to any one of Claims 1 through 4, wherein said cover layer is provided with a plurality of openings.

6. The disposable wiper according to Claim 1, wherein said dust catching layer has a cushioning effect higher than that of said cover layer.

7. The disposable wiper according to Claim 2, wherein the filaments of said dust catching layer are adapted to shift more easily than individual fibers of said cover layer as said dust catching layer and said cover layer scrub a floor surface.

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