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DATE OF RECEIPT		

9800836-0

16 APR 1998

1905

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[Document Name] Specification

[Title of the Invention] Cleaning Tool ✓

[Claims]

5 [claim 1] A cleaning tool having a handle, a holding plate connected to said handle, a resilient member provided on said holding plate and a fiber cloth detachably covering said resilient member, characterized by that

a number of protruded portions each having a pit in a top portion thereof are formed on a surface of said resilient member.

10 [claim 2] A cleaning tool as claimed in claim 1, wherein said holding plate and said resilient member are rectangular in shape, respectively, and said protruded portions are arranged in lines parallel to a longitudinal direction of said resilient member and in rows parallel to a width direction of said resilient member such that said protruded portions in one of the lines appear in valley portions between said protruded portions in another line adjacent to the one line, respectively, in zigzag manner.

15 [claim 3] A cleaning tool as claimed in claim 2, wherein each of said protruded portions is substantially triangular in cross section in a plane parallel to said holding plate and apexes of the triangular cross sections of said protruded portions in the one line and apexes of the triangular cross sections of said protruded portions in the another line are opposite.

20 [claim 4] A cleaning Tool as claimed in claim 2, wherein said protruded portions have substantially a saw-tooth shape in cross section taken along the longitudinal direction perpendicular to said holding plate and said pits are formed in positions corresponding to top portions of the saw-tooth portions of said protruded portions.

25 [claim 5] A cleaning tool as claimed in claim 2, wherein a width (D_1) of a skirt portion of said protruded portion formed in a center portion of said resilient member is large and that formed in a peripheral portion of said resilient member is small and a width (D_2) of said valley portion between adjacent protruded portions formed in the center portion thereof is small and that between adjacent protruded portions formed in the peripheral portion thereof is large.

[Detailed Description of the Invention]

[Technical Field to which the Invention belongs]

30 The present invention relates to an improvement of a cleaning tool for cleaning a floor,





carpet, tatami (straw matting) and/or surfaces of furniture, etc. Particularly, the present invention relates to a cleaning tool which is used with a fiber cloth covering a plane of a resilient member thereof to be pressed to an object to be cleaned, said fiber cloth being exchangeable.

[Prior Art]

5 The present applicant has been manufacturing and selling, with favorable comments, cleaning tool each having a handle, a holding plate connected to the handle, a resilient member provided on the holding plate and a thin fiber cloth detachably covering the resilient member. A basic construction of these cleaning tools is disclosed in Utility Model Application Laid-open No. Hei 2-119152 specification. The resilient member of the construction of this prior art has a
10 substantially flat surface which is covered by a disposable fiber cloth.

Such cleaning tool having the above mentioned structure can uniformly clean an object to be cleaned in a case where the object to be cleaned is such as a plastic floor having a flat plane. However, in a case where a surface of the object to be cleaned is uneven in such as a case of a tatami, such cleaning tool having the above mentioned structure is not always capable of
15 collecting dust in recessed portions thereof dependent upon a movement direction of the fiber cloth. Therefore, in order to make a uniform cleaning of the valley portions possible, the inventors of this application have tried various improvements and conducted a number of experiments, resulting in a cleaning tool having a resilient member provided with a number of protruded portions formed on a surface of the resilient member. A patent application was filed
20 on the basis of the latter cleaning tool as Patent Application No. Hei 7-307578.

[Problem to be Solved by the Invention]

A floor surface to be cleaned in a home includes a flat surface provided by a flooring or a plastic material, an uneven surface provided by such as a tatami or a soft surface provided by such as a carpet. It is inconvenient, in order to clean different floor surfaces, to prepare a
25 plurality of different cleaning tools suitable for the respective floor surfaces and use them selectively. Further, such scheme requires an extra cost.

The inventors of this application have tried various improvements on a cleaning tool and conducted a number of experiments thereon in order to uniformly clean by using the single cleaning tool.

30 The present invention was made in view of the background mentioned above and has an



object to provide a cleaning tool which can effectively clean not only an object having a flat surface but also an object such as carpet or tatami having uneven surface.

[Means for Solving the Problem]

5 The present invention is featured by a number of protruded portions formed on a surface of a resilient member of a cleaning tool for collecting dust on a floor surface by covering the resilient member with a thin fiber cloth and operating a handle of the tool so that dust can be uniformly collected correspondingly to unevenness of the floor surface if the floor surface is uneven.

10 That is, in a cleaning tool having a handle, a holding plate connected to the handle, a resilient member mounted on the holding plate and a fiber cloth detachably covering the resilient member, the present invention is featured by that a number of protruded portions each having a pit in a top portion thereof are formed on a surface of the resilient member.

15 In a case where the surface of an object to be cleaned is uneven as in a case of such as tatami or carpet, a number of the protruded portions formed on the surface of the resilient member urge the fiber cloth to fine portions of a bottom of recessed portion of the surface to collect dust therein. When the surface of the object to be cleaned is flat, substantially the whole surface of the fiber cloth contacts with the surface and collects dust uniformly since portions of the fiber cloth on the recessed portions of the resilient member are not pushed inside.

20 In contacting the fiber cloth with the surface to be cleaned, annular edge portions of the pits provided in the top portions of the respective protruded portions are finely deformed correspondingly to a change of the surface of the object to be cleaned to resiliently push out the fiber cloth. Therefore, the fiber cloth abuts against the surface of the object to be cleaned under a suitable pressure and the fiber cloth slides along the surface of the object to be cleaned with the fiber cloth being in substantially an intimate contact therewith, so that it is possible to
25 uniformly collect dust even if there is an unevenness of the surface of the object to be cleaned.

The holding plate and the resilient member take in the form of rectangular plates, respectively, and the protruded portions are arranged on the surface (surface to be in contact with a surface of the object to be cleaned) of the resilient member in lines parallel to a longitudinal direction thereof and in rows parallel to the width direction thereof such that the
30 protruded portions in one of the lines appear in recessed portions provided between adjacent



protruded portions in another line adjacent to the one line, alternately (in zigzag manner) respectively. For example, the resilient member takes in the form of a rectangular shape of 95mm × 250mm and the protruded portions are formed in about 40 lines in the longitudinal direction of the rectangular surface and in about 100 rows in the width direction thereof.

5 The protruded portions are formed such that each of them is substantially triangle in plan view and has a saw-tooth shape in vertical cross section and apexes of the protruded portions in one line are arranged opposite to those in adjacent line alternately. Further, the pits have substantially circular peripheral configurations to form craters. By forming the protruded portions having the mentioned configurations, it is possible to slide the fiber cloth with the
10 protruded portions being in a continuously arranged state even if the sliding direction of the resilient member is changed. Further, by the provision of the pits in the described manner, it is possible to form the protruded portions having suitable softness.

Further, since the surface of the resilient member on which the protruded portions are formed is risen in the center portion with respect to the peripheral portion to make it convex to
15 thereby form a gap in the form of a wedge in the peripheral portion with respect to the surface of the object to be cleaned when the resilient member is made in contact with the surface, dust can be collected in the wedge shaped gap, compressed therein and effectively adsorbed by the fiber cloth thereon. Further, since it is possible to make the fiber cloth in line contact with the surface to be cleaned and to concentrate the pressing force applied from the handle, the dust
20 collecting effect is improved. Further, a width (D_1) of a skirt portion of the protruded portion is large in a center portion thereof and small in a peripheral portion thereof and a width (D_2) of the recessed portion between adjacent protruded portions is small in a center portion thereof and large in a peripheral portion thereof. Therefore, it is possible to make the protruded portions arranged in the peripheral portion of the resilient member flexible enough to easily
25 accommodate the protruded portions to the change of surface to be cleaned, reduce the resistance during sliding and push the fiber cloth finely into the surface to be cleaned by the protruded portions in the peripheral portion, the widths of the skirt portions thereof being small, to thereby eliminate unevenness of wiping.

30 A material of the resilient member is preferably urethane foam having hardness of preferably 20 ~ 40. With such material, it is possible to obtain a desired flexibility of the



resilient member.

[Embodiments of the Invention]

Now, an embodiment of the present invention will be described with reference to the drawings. Fig. 1(a) is a perspective view showing an outer configuration of the embodiment of the present invention and Fig. 1(b) is a perspective view showing a state of use thereof in which a fiber cloth is attached.

This embodiment of the present invention is provided with a handle 1, a holding plate 2 connected to the handle 1 and a resilient member 3 attached to the holding plate 2 and the fiber cloth 4 is detachably attached to the resilient member 3.

direction of, for example, about 250 mm and a size W in a width direction of, for example, about 95 mm, as shown in Fig. 2.

A number of protruded portions 5 are formed on a surface (surface in contact with a surface to be cleaned) of the resilient member 3 as shown in Fig. 3 and a pit 7 is formed in a top portion of each of the protruded portions 5. A diameter of the pit 7 is 1 mm ~ 2 mm and, as shown in Figs. 4 and 5, its pitch P_1 is about 5 mm, $P_2 \approx P_1/2$, a width D_1 of a skirt portion of the protruded portion 5 is 2 mm ~ 4 mm, a width D_2 of a valley between adjacent protruded portions is 1 mm ~ 2 mm and a height H of the protruded portion 5 is 1.3 ~ 1.8 mm.

The protruded portions 5 are arranged in lines in the longitudinal direction and in rows in the width direction of the resilient member 3 such that the protruded portions 5 in one line appear alternately between the protruded portions 5 in another line adjacent to the one line respectively. A configuration of the protruded portion 5 in a plan view is substantially triangular having rounded apex as shown in Fig. 4 and the apexes of the protruded portions in one line are opposite to those of the adjacent line. The protruded portions are a saw-tooth configuration in cross section and the pits 7 in the form of craters are provided in top portions of the saw-teeth, respectively, as shown in Fig. 5. The pits 7 may vary a little in configuration, size and depth due to manufacturing conditions thereof.

A center portion of the surface (surface in contact with the surface to be cleaned) of the resilient member 3 in the longitudinal direction thereof is convex with respect to the peripheral portions thereof to form an inverted U shape as shown in Figs. 6(a) and 6(b). It is effective that a height h of the convex is about 2 mm. Further, the diameter D_1 of the skirt portion of the



protruded portion 5 shown in Fig. 5 is larger in the center portion thereof than in the peripheral portions and the width D_2 of the valley portion between adjacent protruded portions is smaller in the center portion than in the peripheral portions. An envelope line of the protruded portions is also convex as shown in Fig. 6(c).

5 Fig. 7(a) is a disassembled perspective view of the handle according to the embodiment of the present invention, Fig. 7(b) is a disassembled perspective view of a cleaning portion, Fig. 8(a) is a front view showing a configuration of a grip according to the embodiment of the present invention, Fig. 8(b) is a cross section taken along a line B-B in Fig. 8(a), showing an internal structure of the grip, Fig. 8(c) is a partially enlarged cross section showing a structure of a connecting portion, Fig. 8(d) is an end view of the connecting portion looked in a direction
10 shown by an arrow C in Fig. 8(c), Fig. 9(a) is a front view showing a configuration of a connecting pipe according to the embodiment of the present invention, Fig. 9(b) is a partially enlarged cross section showing a structure of the connecting portion, Fig. 9(c) is an end view of the connecting portion looked in a direction shown by an arrow D in Fig. 9(b) and Fig. 9(d) is a
15 partial cross section showing a connecting state of the connecting pipe and the grip.

The handle 1 is constructed with the grip 11 to be gripped during a cleaning operation and three of the connecting pipe 12 to be connected to the grip 11. The grip 11 is provided with a connecting bolt 13 and a bolt holder 14 which holds the connecting bolt 13 and fixed in the grip 11, as shown in Fig. 8.

20 Two ribs 14b are provided on a step portion 14a of the bolt holder 14. The ribs 14b extend in a longitudinal direction and are constructed such that a coupling force is increased by contacting with an inner surface of a stepped edge 15a of a female thread member 15 of the connecting pipe 12 shown in Figs. 9(a) and 9(d).

Further, each of the connecting pipes 12 is provided in one end thereof with the female
25 thread member 15 into which the connecting bolt 13 is screwed and in the other end thereof with a bolt holder 14 and a connecting bolt 13 as shown in Fig. 9(a), similarly to the grip 11. As in the case of the grip 11, the connecting pipe 12 is provided on a step portion 14a of the bolt holder 14 with ribs 14b as shown in Fig. 9(c) and is constructed such that a coupling force with the stepped edge 15a of the female thread member 15 screwed is increased.

30 The cleaning portion is constructed with a pipe adapter 16 constituting a universal joint 6



shown in Fig. 1, a ball shaft 17 rotatably connected to the pipe adapter 16, the holding plate 2 and the resilient member 3, as shown in Fig. 7(b). Four holding portions 2a for fixedly holding the fiber cloth 4 are fixed to the holding plate 2 and a coupling portion 18 for rotatably connecting the holding plate to the ball shaft 17 is formed integrally on the holding plate. Fig. 10(a) shows a configuration and an internal structure of the pipe adapter and Fig. 10(b) is a partial cross section thereof. Further, Fig. 11 shows a configuration and an internal structure of the ball shaft and Fig. 12 shows the cleaning portion when assembled. In the assembled state, the connecting bolt 13 of the handle 1 is screwed into the female thread portion 16a of the pipe adapter 16, so that the handle 1 is rigidly connected to the cleaning portion.

In a rear surface of the resilient member 3, a groove extending along an outer periphery thereof which is fitted in the holding plate 2 is formed and grooves each about 6 mm wide and extending in the longitudinal direction thereof with a predetermined interval are formed in an area of the rear surface inside the peripheral groove, as shown in Fig. 7(b). A frame like land portion formed on a rear surface of the holding plate 2 having a pattern corresponding to these grooves of the rear surface of the resilient member 3 is fitted in the grooves of the rear surface of the resilient member. Incidentally, portions of the rear surface of the resilient member 3 corresponding to the respective holding portions 2a of the holding plate 2 are recessed as substantial circles. Further, minor sides of the holding plates 2 are concave-bevelled.

The handle 1 and the holding plate 2 are rotatably connected each other by the universal joint 6 as shown in Fig. 1 and, when the cleaning is to be performed, both edge portions of the fiber cloth 4 are pushed into the four holding portions 2a of the holding plate 2 and held thereby such that it wraps the surface of the resilient member 3, as shown in Fig. 1(b). Since each of the holding portions 2a is formed with a Y shaped slit and a saw-tooth wave shaped slit crossing the Y shaped slit which are formed such that the teeth are meshed each other as a whole, the fiber cloth 4 pushed into the holding portions 2a is fixed by the meshing. The fiber cloth 4 is detached from the holding portions by pulling out portions of it in the vicinity of the meshing portions and hence easily from the holding plate 2.

The cleaning is performed with the fiber cloth 4 (in this embodiment, unwoven cloth) wrapping the resilient member as shown in Fig. 1(b). Since, when the floor surface is flat, the fiber cloth 4 held is under tension, substantially the whole surface of the fiber cloth 4 is made in



contact with the floor surface and collects dust uniformly. In a case where the floor surface is soft and varies irregularly as in the case of carpet, the protruded portions 5 formed on the surface of the resilient member with fine pitch push the fiber cloth 4 into concave portions of the carpet to collect dust in the concave portions of the carpet.

5 Since each of the protruded portions 5 according to the present invention is formed in the top portion thereof with the pit 7, the peripheries of the protruded portions push the fiber cloth 4 with appropriate resiliency when the fiber cloth 4 contacts with the surface to be cleaned, so that the fiber cloth 4 slides on the surface to be cleaned in a substantially intimate contact with the surface to be cleaned without forming a large gap between the fiber cloth 4 and the surface to be cleaned and uniformly collect dust thereon even when the surface is changed.

10 Further, since fibers are caught by the peripheral portions of the pits 7, the fiber cloth 4 is rigidly held such that, even when the resilient member 3 is moved longitudinally, laterally or obliquely, the fiber cloth 4 can collect dust without shift of the fiber cloth and/or wrinkle thereof.

15 Since the surface of the resilient member 3 on which the protruded portions are formed has the center portion convex with respect to the peripheral portion thereof, a longitudinally extending, small width center area of the fiber cloth 4 thereon contacts with the surface to be cleaned when the resilient member slides on the surface to be cleaned. Therefore, the pressing force given by the handle 1 pushes the fiber cloth 4 in substantial line contact state with respect to the surface to be cleaned to collect dust in the center portion, so that the dust collecting effect is improved and the fiber cloth 4 can more effectively adsorb dust by means of the wedge like air gap formed by the surface to be cleaned and the surface of the resilient member 3. Further, since the area of the fiber cloth 4 which is in contact with the surface to be cleaned is small, the resistance during the sliding operation of the cleaning tool is reduced.

25 The width D_1 of the skirt portion of the protruded portion 5 formed in the peripheral portion of the resilient member and shown in Fig. 6(b) is small compared with that formed in the center portion and the width D_2 of the valley portion is large compared with that formed in the center portion, the flexibility of the protruded portions 5 formed in the peripheral portion of the resilient member is high compared with that formed in the center portion thereof and, therefore, the protruded portions in the peripheral portion can easily accommodate to a

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variation of the surface to be cleaned.

[Effect of the Invention]

Since the pit in the form of a crater is provided in the top portion of each protruded portion, the area of the resilient member which is in contact with the surface to be cleaned, such as a floor surface or a carpet surface, is increased and it is possible to effectively collect dust thereon.

With the provision of the pits in the top portions of the protruded portions, it is possible to keep the top portions flexible suitably, so that it is possible to effectively collect dust on the surface to be cleaned without damage of the surface even when the surface is not flat but has a complex unevenness.

Since the area of the surface of the resilient member from one edge portion of the surface through the center portion thereof to the other edge portion thereof is risen to form a convex configuration, dust can be effectively collected by the fiber cloth in the vicinity of the center portion thereof. Therefore, dust is not concentrated in the edge portions of the fiber cloth and it is possible to effectively use the whole surface of the cloth. Further, since the height of the protruded portion is low in the edge portion of the resilient member and high in the center portion, the concentration of dust in the center portion can be achieved effectively.

[Brief Description of the Drawings]

[Fig. 1]

Fig. 1(a) is a perspective view of an embodiment of the present invention showing an outer configuration of the embodiment and Fig. 1(b) is a perspective view of the embodiment showing the embodiment in use with a fiber cloth being attached.

[Fig. 2]

Fig. 2 is a perspective view of a holding plate and a resilient member of the embodiment of the present invention showing an outer configuration of the holding plate and the resilient member.

[Fig. 3]

Fig. 3 is a partially enlarged perspective view of protruded portions formed on the resilient member of the embodiment of the present invention showing an outer configuration of the protruded portions.



[Fig. 4]

Fig. 4 is a plan view of the protruded portions formed on the resilient member in the embodiment of the present invention showing configurations of the protruded portions.

[Fig. 5]

Fig. 5 is a cross section of the protruded portions formed on the resilient member in the embodiment of the present invention taken along a line A-A in Fig. 4.

[Fig. 6]

Fig. 6(a) is a front view of the resilient member in the embodiment of the present invention showing a rising configuration of a contact surface of the resilient member, Fig. 6(b) is a side view of the same and Fig. 6(c) shows an envelope line of the protruded portions.

[Fig. 7]

Fig. 7(a) is a disassembled perspective view of a handle according to the embodiment of the present invention and Fig. 7(b) is a disassembled perspective view of a cleaning portion of the cleaning tool.

[Fig. 8]

Fig. 8(a) is a front view of a grip according to the embodiment of the present invention showing a configuration thereof, Fig. 8(b) is a cross section taken along a line B-B in Fig. 8(a) showing an internal structure of the grip, Fig. 8(c) is a partially enlarged cross section showing a structure of a connecting portion of the cleaning tool and Fig. 8(d) is a view looked in a direction shown by an arrow C in Fig. 8(c).

[Fig. 9]

Fig. 9(a) is a front view of a connecting pipe according to the embodiment of the present invention showing a configuration thereof, Fig. 9(b) is a partially enlarged cross section of the connecting portion showing a structure thereof, Fig. 9(c) is a view of the connecting portion looked in the direction shown by an arrow D in Fig. 9(b) and Fig. 9(d) is a partially enlarged cross section showing a connecting state of the connecting pipe and the grip.

[Fig. 10]

Fig. 10(a) is a partial cross section of a pipe adapter in the embodiment of the present invention showing a configuration and an internal structure thereof and Fig. 10(b) is a partially cross sectioned side view thereof.



[Fig. 11]

Fig. 11 is a partial cross section of a ball shaft in the embodiment of the present invention showing a configuration and an internal structure thereof.

[Fig. 12]

Fig. 12 is a perspective view of the cleaning portion in the embodiment of the present invention showing an assembled state thereof.

[Description of Reference Numeral]

- 1 handle
- 2 holding plate
- 10 2a holding portion
- 3 resilient member
- 4 fiber cloth
- 5 protruded portion
- 6 universal joint
- 15 7 pit
- 11 grip
- 12 connecting pipe
- 13 connecting bolt
- 14 bolt holder
- 20 14a stepped portion
- 14b protruded rib
- 15 female thread member
- 15a stepped edge
- 16 pipe adapter
- 25 16a female thread portion
- 17 ball shaft