

CLEANING TOOL

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION

5 The present invention relates generally to a cleaning tool attached a cleaning sheet and designed to be used for cleaning a floor, a furniture and so forth. More particularly, the invention relates to a cleaning tool which permits effective use of a surface of the cleaning sheet in wide area.

10 DESCRIPTION OF THE RELATED ART

 A disposable cleaning sheet formed from a non-woven fabric or the like is typically used with attaching on a dedicated cleaning tool.

 It is a typical construction of the cleaning tool with
15 a plate form supporting body and a handle connected to an upper surface of the supporting body. The supporting body has a lower surface located on cleaning work side. The cleaning sheet is loaded on the lower surface. Both side ends of the cleaning sheet are wrapped over the upper surface of the supporting body
20 and secured thereon.

 The cleaning sheet attached on the lower surface of the supporting body is placed in contact with a surface to be cleaned, such as floor surface or the like. Then, by slipping the cleaning sheet on the surface to be cleaned with holding the handle,
25 dust and dirt on the surface to be cleaned are captured by the

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cleaning sheet.

However, since the conventional supporting body has a flat lower surface on the cleaning work side, dust and dirt tend to be accumulated on portions covering edge portions of the flat lower surface among a lower surface area of the cleaning sheet attached on the flat lower surface and are difficult to be captured in an inner side area located inside of the edge portions. Therefore, at which time a large amount of dust and dirt deposit on the portions covering the edge portions, cleaning effect of the cleaning sheet is lowered. Thus, it is not possible to effectively use the entire area of the cleaning sheet.

Particularly, relatively large dust or dirt, such as crumb or the like scattered on the floor tends to easily deposit on the portions covering the edge portions and is difficult to be captured in the inner side portion.

On the other hand, a cleaning tool disclosed in Japanese Patent No. 2981110 is provided with a base body having cushioning property, such as foamed urethane or the like on the cleaning work side of the supporting body. The shape of the surface of the base body is to increase projecting magnitude in stepwise manner toward the center portion in lateral or narrower width direction perpendicular to a longitudinal or wider width direction. On the other hand, Japanese Unexamined Patent Publication No. 2001-299659 also discloses a cleaning tool provided with a cleaning cushion body formed from foamed urethane

or the like on the cleaning work side of the supporting body. The cleaning cushion body is bowed, and the surface thereof has bowed shape gradually increasing projecting magnitude toward the center portion in lateral or narrower width direction perpendicular to longitudinal or wider width direction. Therefore, when the cleaning sheet is attached on the cleaning cushion body and pressed onto the surface to be cleaned, the surface of the cleaning cushion body can be deformed into a flat surface.

10 In the prior art set forth above, the surface of the supporting body in either case is projected at the center portion in the lateral direction. Therefore, when cleaning or wiping is performed with attaching the cleaning sheet on the support body, it is possible to capture dust and dirt on the projecting portion. However, since the projecting magnitude in the longitudinal direction of the supporting body is constant, relatively large dirt can be pushed out by the projecting portion to cause difficulty in effectively capturing such relatively large dirt.

20 Furthermore, in case of the cleaning tool disclosed in Japanese Unexamined Patent Publication No. 2001-299659, if the supporting body is pressed onto the floor as the surface to be cleaned with large force, the cleaning cushion body may be deformed to make the surface thereof flat. As a result, it becomes similar to the case where the supporting body having

flat lower surface is used to make it impossible to effectively use wide area of the cleaning sheet.

On the other hand, in either prior art, since the surface of the supporting body has the projected center portion in the lateral direction perpendicular to the longitudinal direction. However, the projecting magnitude in the longitudinal direction is constant and continuous, the supporting body becomes unstable when the surface on cleaning work side is placed on the floor. Therefore, upon wiping the floor surface, it may cause extreme tilting of the supporting body and cause inversion of the supporting body frontwardly in wiping direction in the worst case unless carefully control a force to be applied on the handle.

SUMMARY OF THE INVENTION

The present invention has been worked out in view of the problems in the prior art set forth above. It is therefore an object of the present invention to provide a cleaning tool which permits effective use of entire surface of a cleaning sheet upon performing wiping operation with attaching the cleaning sheet on a supporting body and facilitates capturing of relative large dirt.

Another object of the present invention is to provide a cleaning tool which is stable upon moving the supporting body along a surface to be cleaned, such as a floor surface or the like and can stably slide the supporting body along the surface

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to be cleaned.

According to the first aspect of the present invention,
a cleaning tool comprises:

a supporting body;

5 a handle connected with the supporting body or formed
integrally with the supporting body,

a cleaning work surface being formed on at least one side
of the supporting body so that a cleaning sheet is attached
thereon,

10 the supporting body having a dimension in a first direction
greater than that in a second direction perpendicular to the
first direction, and having a center portion dividing the
supporting body into halves in the first direction;

on the cleaning work surface, projecting peaks being
15 provided on both side portions distanced by a predetermined
distance in the first direction across the center portion, and
predetermined areas including at least the projecting peaks
being formed from an elastically deformable material.

In the cleaning tool according to the present invention,
20 the cleaning work surface is provided greater projecting
magnitude on opposite sides with smaller projecting magnitude
at the center portion between opposite sides in the first
direction. Therefore, when the surface to be cleaned is wiped
by attaching the cleaning sheet, dirt and dust can be easily
25 captured at the center portion. Also, relatively large dirt,

such as crumb or the like can be captured at the center portion of the cleaning sheet.

On the other hand, the cleaning work side of the supporting body is provided with the projecting peaks on both sides in the first direction to provide superior stability when the
5 the cleaning work side is contacted on the surface to be cleaned. Furthermore, since at least the projecting peaks are elastically deformable, the supporting body may smoothly slide on the floor surface or the like when a working force is applied through
10 the handle.

For example, in a section as taken along a first plane extending in the first direction across the projecting peaks, an intersecting line between the cleaning work surface and the first plane may be a concave curve gradually reducing projecting
15 magnitude from the projecting peaks to the center portion.

With such construction, by adjusting force urging the supporting body onto the floor surface as the surface to be cleaned, area of the region of the cleaning work surface to be deformed into flat shape can be adjusted, and contacting
20 condition between the center portion having smaller projecting magnitude and floor can be adjusted. Accordingly, dirt and dust can be effectively captured in relatively wide area of the cleaning sheet.

In a section taken along a second plane extending in the
25 second direction across the projecting peak, an intersecting

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line between the cleaning work surface and the second plane may be a convex curve gradually increasing projecting magnitude from both side portions of the second plane to an intermediate portion of the second plane. Also, in every positions from the projecting peak to the center portion, an intersecting line between a third plane as taken along the second plane extending in the second direction and the cleaning work surface may be a convex curve gradually increasing projecting magnitude from both side portions of the third plane to an intermediate portion.

10 With the configuration set forth above in the cleaning work surface, when the supporting body is reciprocally moved, the supporting body can be appropriately tilted in both of reciprocating direction so that the front side region of the cleaning sheet in forward movement direction can be dominantly contacted on the surface to be cleaned and the rear side region of the cleaning sheet in reverse movement direction can be dominantly contacted on the surface to be cleaned. Thus, surface of the cleaning sheet can be effectively used.

20 In the alternative, in a section taken along a fourth plane extending in the second direction across the projecting peaks, an intersection line between the cleaning work surface and the fourth plane may be a convex curve gradually increasing projecting magnitude from both side portions of the fourth plane to an intermediate portion and having smaller projecting magnitude at a center portion of the fourth plane.

With the construction set forth above, when the supporting body attached the cleaning sheet is placed on the floor surface, the supporting body can be stable.

In a predetermined region of the supporting body at least including the projecting peaks, a plurality of elastically deformable projections may be provided, and the cleaning work surface may be a virtual plane including tip end surfaces of individual projections.

When the elastically deformable projections are provided on the cleaning work side, the virtual plane can be freely deformed by deformation of individual projections to make the cleaning work surface compliant with the surface to be cleaned. Also, cleaning operation can be performed in stable attitude.

According to the second aspect of the present invention, a cleaning tool comprises:

a handle;

a support located at one end of the handle and having a working surface, on which a cleaning sheet for capturing dirt and dust is attached, lower portion of the support including the working surface being elastically deformable and having an uneven contour in a first direction and having at least one recessed portion at an intermediate position between opposite ends of the support in the first direction, and an uneven contour in a second direction perpendicular to the first direction and having at least one projecting portion at an intermediate

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position between opposite ends of the support in the second direction.

According to the third aspect of the present invention, a cleaning tool comprises:

5 a handle;

a support located at one end of the handle, having a greater dimension in a first direction perpendicular to a cleaning direction along which the support is driven with sliding at least a part thereof on a surface to be cleaned, and a smaller
10 dimension in a second direction parallel to the cleaning direction,

the support having an elastically deformable lower portion having a working surface so configured that one end of the working surface located at rear side in the cleaning direction is placed
15 away from the surface to be cleaned while the support is driven in the cleaning direction with placing the other end of the working surface in contact with the surface to be cleaned, and that the working surface is placed away from the surface to be cleaned at least a portion intermediate between opposite
20 ends in the first direction.

BRIEF DESCRIPTION OF THE DRAWING

The present invention will be understood more fully from the detailed description given hereinafter and from the
25 accompanying drawings of the preferred embodiment of the present

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invention, which, however, should not be taken to be limitative to the invention, but are for explanation and understanding only.

In the drawings:

5 Fig. 1 is a perspective view showing the first embodiment of a cleaning tool according to the present invention in a condition where a cleaning sheet is attached;

 Fig. 2 is a perspective view showing the first embodiment of the cleaning tool in a condition where the cleaning sheet
10 is removed;

 Fig. 3 is a section taken along line III - III of Fig. 2;

 Fig. 4 is a section taken along line IV - IV of Fig. 3;

 Fig. 5 is a section taken along line V - V of Fig. 3;

15 Fig. 6 is a side elevation showing the first embodiment of the cleaning tool in use condition;

 Fig. 7 is a front elevation of use condition of Fig. 6 as viewed in a direction of arrow VII;

 Fig. 8 is a side elevation showing a condition where the
20 cleaning sheet having fibers or strings in free condition is attached on the first embodiment of the cleaning tool;

 Fig. 9 is a front elevation showing the second embodiment of the cleaning tool according to the present invention;

 Fig. 10 is a side elevation of the second embodiment of
25 the cleaning tool of Fig. 9 as viewed from X direction;

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Fig. 11 is a front elevation showing the third embodiment of the cleaning tool according to the present invention;

Fig. 12 is a section of the fourth embodiment of the cleaning tool according to the present invention as taken along a center
5 line;

Fig. 13 is a perspective view showing the fifth embodiment of the cleaning tool and the cleaning sheet according to the present invention;

Fig. 14 is a side elevation of the fifth embodiment of
10 the cleaning tool shown in Fig. 13 as viewed in a direction of arrow XIV; and

Fig. 15 is a front elevation of the fifth embodiment of the cleaning tool shown in Fig. 13 as viewed in a direction of arrow XV.

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DESCRIPTION OF THE PREFERRED EMBODIMENT

The present invention will be discussed hereinafter in detail in terms of the preferred embodiment of a cleaning tool according to the present invention with reference to the
20 accompanying drawings. In the following description, numerous specific details are set forth in order to provide a thorough understanding of the present invention. It will be obvious, however, to those skilled in the art that the present invention may be practiced without these specific details. In other
25 instance, well-known structures are not shown in detail in order

to avoid unnecessary obscurity of the present invention.

Fig. 1 is a perspective view showing the first embodiment of a cleaning tool according to the present invention in a condition where a cleaning sheet is attached, Fig. 2 is a perspective view showing the first embodiment of the cleaning tool in a condition where the cleaning sheet is removed, Fig. 3 is a section taken along line III - III of Fig. 2, Fig. 4 is a section taken along line IV - IV of Fig. 3, Fig. 5 is a section taken along line V - V of Fig. 3, Fig. 6 is a side elevation showing the first embodiment of the cleaning tool in use condition and Fig. 7 is a front elevation of use condition of Fig. 6 as viewed in a direction of arrow VII.

The first embodiment of a cleaning tool 1 has a supporting body 2, on which a cleaning sheet 20 is attached, and a handle 8 connected to the supporting body 2. The supporting body 2 has a lower surface side as cleaning work side 3 and an upper surface side as supporting side 4.

The supporting body 2 is a rectangular shape having an edge extending in a first direction which is referred to as longitudinal direction or X direction and an edge extending in a second direction which is perpendicular to the X direction and referred to as lateral direction or Y direction. A dimension in the first direction is greater than that in the second direction. The second direction (Y direction) is primary sliding direction of the supporting body 2 upon performing cleaning operation.

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On the other hand, the supporting body 2 has longer edges 2a and 2b extending in the first direction (X direction) and shorter edges 2c and 2d extending in the second direction (Y direction).

The supporting body 2 is provided with a supporting plate 5 on the supporting side 4. The supporting plate 5 is formed by injection molding of a synthetic resin as material or by die casting of light alloy as material. On the upper surface of the supporting plate 5, a pair of supporting projections 5a are formed. Between the supporting projections 5a, an intermediate supporting body 6 is supported for pivotal motion about a pivot shaft 6a. A tip end 8a of the handle 8 is bifurcated and respective of bifurcated fractions are located both sides of the intermediate supporting body 6. The tip end 8a of the handle 8 is pivoted about the intermediate supporting body 6 about a pivot shaft 6b. As a result, the handle 8 can be tilted in both of X direction and Y direction.

On the upper surface of the supporting plate 5, retainer members 7 are provided on both sides of the portion where the supporting projections 5a are formed. The retainer members 7 have base ends joined with the supporting plate 5 pivotably about pivot shafts 7a on proximal side of the supporting projections 5a. As shown in Figs. 2 and 3, the retainer members 7 are designed to fall into recessed portions 5b formed on the upper surface of the supporting plate 5. As shown in Fig. 1, when the cleaning sheet 20 is attached, the retainer members

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7 serve as fastening means for securing the edge portions of the cleaning sheet 20 with holding longer edges 22 on the supporting plate 5.

On the cleaning work side 3 of the supporting body 2, a cleaning function member 11 is provided. In the first embodiment, the cleaning function member 11 is integrally formed of an elastically deformable material, and is firmly fixed on the lower surface of the supporting plate 5. The elastically deformable material forming the cleaning function member 11 is formed by expansion molding of foamed urethane, foamed polyethylene, rubber sponge or the like, or of elastomer.

As shown in Figs. 3 to 5, the cleaning function member 11 has a flat back side surface 11b to be firmly secured on the lower surface of the supporting plate 5. On the other hand, a front side surface 11a of the cleaning function member 11 has three-dimensionally varying continuous curve surface. This front side surface 11a serves as a cleaning work surface.

At the center of the rectangular shape of the supporting plate 5, with taking a center line extending perpendicular to the supporting plate 5 as O - O, the front side surface 11a is rotation symmetric shape with respect to the center line O - O. On the other hand, the center line O - O is a center line dividing the supporting body 2 both in the first direction (X direction) and the second direction (Y direction). In Fig. 3, a point where the front side surface 11a and the center line

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O - O intersect is shown as a center portion 12.

Fig. 3 is a section as sectioned along X - Z plane (plane extending in the first direction) including the center line O - O. Fig. 5 is a section as sectioned along Y - Z plane (plane
5 extending in the second direction) including the center line O - O. Fig. 4 is a section as sectioned along Y - Z plane extending through a projecting peak 13 where a thickness of the cleaning function member 11 is the largest.

A shape of contour of the front side surface 11a appearing
10 in the sections of Figs. 4 and 5, is symmetric relative to the X - Z plane extending through the center line O - O.

A contour of the front side surface 11a appearing in the section of Fig. 4 is downwardly convex curve projected downwardly at the maximum magnitude at an intermediate point (the projecting
15 peak 13) between the longer edge 2a and the longer edge 2b, and gradually reducing downwardly projecting magnitude from the intermediate point to the longer edge 2a and the longer edge 2b. Similarly, the contour of the front side surface 11a appearing in the section of Fig. 5, is also downwardly convex
20 curve projected downwardly at the maximum magnitude at an intermediate point (the center portion 12) between the longer edge 2a and the longer edge 2b, and gradually reducing downwardly projecting magnitude from the intermediate point to the longer edge 2a and the longer edge 2b.

25 In the shown embodiment, in the section taken along the

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Y - Z plane at any position in a region from the center portion 12 to the projecting peak 13, the contour of the front side surface 11a appearing in the section is downwardly convex curve projected downwardly at the maximum magnitude at an intermediate point between the longer edge 2a and the longer edge 2b, and gradually reducing downwardly projecting magnitude from the intermediate point to the longer edge 2a and the longer edge 2b.

The contour of the front side surface 11a appearing in the section shown in Fig. 3 is a continuous line from the center portion 12 to respective projecting peaks 13. In Fig. 3, the downwardly projecting magnitude of the contour on the center portion 12 is the smallest and is gradually increased the downwardly projecting magnitude from the center portion 12 toward respective projecting peaks 13 located on both sides. The contour between the projecting peaks 13 is concave curve. On the other hand, between the projecting peak 13 and the shorter edge 2c, the downwardly projecting magnitude of the contour is gradually reduced toward the shorter edge 2c. This is the same in the contour between the projecting peak 13 and the shorter edge 2d.

On the other hand, when the supporting body 2 is sectioned along the X - Z plane parallel to the plane of the section shown in Fig. 3, the contour of the front side surface 11a of the cleaning function member 11 appearing in the section is concave

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curve, in which the downwardly projecting magnitude is the smallest at the same position as the center portion 12 and is gradually increased from the position of the section to respective projecting peaks 13.

5 As shown in Fig. 3, assuming that lengths from the center portion 12 to respective shorter edges 2c and 2d in the first direction (X direction) are L_0 , and the shortest lengths or distances from the center portion 12 to respective projecting peaks 13 are L_1 , L_1 is preferably greater than or equal to $L_0/2$
10 (i.e., $L_0 \times 1/2$) and smaller than or equal to L_0 . Further preferably, L_1 is greater than or equal to $(2/3) \cdot L_0$ (i.e., $L_0 \times 2/3$) and smaller than or equal to L_0 . In the foregoing range, when the front side surface 11a is pressed onto the surface to be cleaned, such as floor surface via the cleaning sheet,
15 attitude of the supporting body 2 can be made stable.

 A height difference H between the center portion 12 and the projecting peak 13 in Z direction is preferably greater than or equal to 1 mm and smaller than or equal to 15 mm, and further preferably greater than or equal to 3 mm and smaller
20 than or equal to 10 mm. If the height difference falls within the foregoing range, when the front side surface 11a is pressed onto the floor surface or the like via the cleaning sheet and is deformed to be flat relative to the projecting peaks 13, an intermediate concave portion may be situated to lightly
25 contact the front side surface of the cleaning sheet with the

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floor surface or the like as the surface to be cleaned, or to place fibers, or strings or yarns projecting from the front side surface of the cleaning sheet between the cleaning sheet and the surface to be cleaned. As a result, in the portion of
5 concave shape, relatively large dirt can be captured on the cleaning sheet.

The cleaning sheet 20 to be attached on the supporting body 2 of the cleaning tool 1 is rectangular shape and is disposable. The cleaning sheet 20 is formed from non-woven
10 fabric, such as spunlaced non-woven fabric or the like for capturing dust and dirt with raised fibers appearing on the surface of the non-woven fabric. In the alternative, with taking the non-woven fabric as base material, a large number of fibers, such as long fibers (filaments) or the like, or strings or yarns
15 spun with fibers may be attached for free motion. Between these fibers or strings or yarns, dust or dirt can be captured.

It should be noted that cleaning sheets disclosed in commonly owned U. S. Patent No. 6,143,393 to Abe et al, U. S. Patent No. 6,245,413 to Kenmochi et al. and U. S. Patent No.
20 6,319,593 to Kenmochi et al. may also be used with the cleaning tool according to the present invention. Disclosures of the above-identified U. S. Patents are herein incorporated by reference.

As shown in Fig. 1, the cleaning sheet 20 is attached
25 on the front side surface 11a of the cleaning function member

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11 on the cleaning work side 3 of the supporting body 2. Shorter edges 21 of the cleaning sheet 20 are oriented in parallel to the shorter edges 2c and 2d of the supporting body 2. The longer edges 22 of the cleaning sheet 20 are wrapped on the supporting side 4 of the supporting body 2. Then, the longer edges 22 of the cleaning sheet 20 are secured as being clamped by the recessed portions 5b of the supporting plate 5 and the retainer members 7.

As shown in Fig. 1, in a condition where the cleaning sheet 20 is attached on the supporting body 2, the cleaning sheet 20 is placed on a surface 25 to be cleaned, such as floor surface. Then, with urging onto the surface 25 to be cleaned through the handle 8, the supporting body 2 is slid on the surface 25 to be cleaned. Then, dust and dirt on the surface 25 to be cleaned can be captured with the surface of the cleaning sheet 20. By urging the supporting body 2 onto the surface 25 to be cleaned through the handle 8, the cleaning function member 11 causes compression deformation. At this time, the cleaning function member 11 causes compression deformation at the portions of the projecting peaks 13, 13. Then, since the front side surface 11a is curved from the projecting peaks 13 to the center portion 12, depression force applied on the handle 8 can be varied to adjust area of the region of the front side surface 11a to be deformed into flat shape.

On the other hand, at the intermediate portion between

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the projecting peaks 13, the front side surface 11a is placed in a condition slightly distant from the surface 25 to be cleaned or in a condition pressed onto the surface 25 to be cleaned with small force via the cleaning sheet 20. Accordingly, the
5 cleaning sheet 20 located at the intermediate portion is situated in a condition where fibers, or strings or yarns on the surface contact with the surface 25 to be cleaned, or in a condition where the surface of the cleaning sheet 20 lightly contacts with the surface 25 to be cleaned. Therefore, relatively large
10 dirt, such as crumb or the like presenting on the surface 25 to be cleaned can be guided to the center portion of the cleaning sheet 20 attached on the front side surface 11a and captured on the surface of the cleaning sheet.

On the other hand, since depression force applied on the
15 handle 8 acts at the center portion of the supporting body 2 and the projecting peaks 13 are provided on both sides of the handle 8 with a given distance L1, the supporting body 2 is stably pressed onto the surface 25 to be cleaned via the cleaning sheet 20. Thus, the supporting body 2 can slide on the surface
20 25 to be cleaned in stable attitude.

Fig. 6 is a side elevation showing condition where the handle 8 is tilted in the direction of arrow Y2 (Y2 direction) and the supporting body 2 is slid on the surface 25 to be cleaned in the direction of arrow Y1 (Y1 direction) with orienting the
25 supporting body 2 in the second direction. Fig. 7 is a front

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elevation as viewed in a direction of arrow VII of Fig. 6.

The front side surface 11a of the cleaning function member 11 provided on the supporting body 2 has a convex curved profile with the largest projecting magnitude at the intermediate point
5 between the longer edges 2a and 2b and plane symmetry on both sides of the intermediate point in Y direction, as shown in Figs. 4 and 5.

Accordingly, when a working force F is applied obliquely to the center portion of the supporting body 2 through the handle
10 8 as shown in Fig. 6, the supporting body 2 takes a tilted attitude descending frontwardly in sliding direction with downwardly orienting the longer edge 2a. At this time, in the portion close to the projecting peaks 13, the front side portion is dominantly urged onto the surface 25 to be cleaned to form flat surfaces
15 (i) with an interval in X direction on the front side surface 11a of the cleaning function member 11 as shown in Fig. 7. The cleaning sheet 20 located below the flat surfaces (i) is firmly contacted with the surface 25 to be cleaned. Since the flat surfaces (i) are located both sides of an application point
20 of the working force F, the attitude of the supporting body 2 become stable, and the supporting body 2 is hardly inverted by further tilting frontwardly from the attitude shown in Fig. 6.

By sliding in Y1 direction in the condition shown in Figs.
25 6 and 7, dirt and dust are dominantly deposited on the surface

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of the cleaning sheet 20 in the flat surfaces (i). On the other hand, in an intermediate portion (ii) located between the flat surfaces (i), fibers and strings or yarns on the surface of the cleaning sheet 20 present in a condition contacting with the surface 25 to be cleaned or the surface of the cleaning sheet 20 is situated in the condition lightly contacting with the surface 25 to be cleaned. Therefore, in the intermediate portion (ii), relatively large dirt, such crumb or the like can be easily captured.

On the other hand, in the condition of Fig. 6, by drawing the handle 8 in Y2 direction opposite to the foregoing, the supporting body 2 is reversed the tilting direction opposite to the tilting direction shown in Fig. 6 and becomes an attitude, in which the longer edge 2b in front side in Y2 direction is oriented downwardly. At this time, the flat portions (i) and the intermediate portion (ii) are formed in the portion of Y2 side of the front side surface 11a of the cleaning function member 11 of the supporting body 2. Then, these portions exhibit cleaning function similar to that upon sliding in Y1 direction.

Accordingly, by alternately sliding the supporting body 2 in Y1 direction and Y2 direction, the entire area of the cleaning sheet 20 covering the front side surface 11a of the cleaning function member 11 can be efficiently used. Furthermore, dirt, dust and further relatively large dirt, such as crumb or the like can be effectively captured.

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Fig. 8 shows a condition where the supporting body 2 of the cleaning tool 1 is attached a cleaning sheet 26 other than the cleaning sheet 20. The cleaning sheet 26 is fabricated by attaching a large number of fibers 28 in free condition on a
5 base material 27 to be attached on the front side surface 11a of the cleaning function member 11. The base material 27 is formed from non-woven fabric containing thermoplastic fibers, and the fibers 28 are formed by opening agglomeration of long fibers or filaments called as TOW. Base portions of bundles
10 of the fibers 28 are heat bonded or fused on the base material 27 for forming the cleaning sheet 26. On the other hand, a large number of strings or yarns spun with the fibers may also be fixed on the surface of the base material 27 for forming the cleaning sheet.

15 Using the cleaning sheet 26, when the front side surface 11a of the cleaning function member 11 is urged onto the surface 25 to be cleaned via the cleaning sheet 26, the fibers 28 or strings or yarns are positioned between the base material 27 and the surface 25 to be cleaned in the portion where the base
20 material 27 is placed distant from the surface 25 to be cleaned, so that relative large dirt, such as crumb or the like can be captured by entwining on the fibers 28 or strings or yarns. On the other hand, dirt entwined on the fibers 28 or strings or yarns may not easily fall down on the surface 25 to be cleaned.

25 Fig. 9 is a front elevation of the second embodiment of

a cleaning tool 101 according to the present invention, and Fig. 10 is a side elevation of the cleaning tool 101 as viewed in the direction of arrow X from the side.

It should be noted that, in the embodiment shown in Figs. 9 and 10, like structural components to those in the first embodiment shown in Figs. 1 to 8 will be identified by like reference numerals and discussion thereof will be eliminated for avoiding redundant disclosure and whereby for keeping the disclosure simple enough to facilitate clear understanding of the present invention.

A supporting body 102 of the second embodiment of the cleaning tool 101 has a cleaning function member 111 mounted on the cleaning work side 3 of the supporting plate 5, to which the handle 8 is connected. In the cleaning function member 111, a plate form base portion 112 and a plurality of projections 113 projecting from the base portion 112 are formed integrally. The cleaning function member 111 is formed of elastically deformable material, such as natural rubber, synthetic rubber, other elastmer or the like. Each individual projection 113 is elastically deformable.

A virtually continuous surface including tip end surfaces of the individual projections 113 of the cleaning function member 111 is taken as a front side surface 111a of the cleaning function member 111. The front side surface 111a forms the cleaning work surface having the same curved surface as the front side surface

11a of the cleaning function member 11 shown in Figs. 1 to 8.

Accordingly, upon performing wiping of the surface 25 to be cleaned with attaching the cleaning sheet 20 on the supporting body 102 of the cleaning tool 101, deforming condition of the cleaning function member 111 and capturing function of dirt and dust are substantially the same as the case where the first embodiment of the cleaning tool 1 is used.

It should be noted that, in the cleaning tool 101 shown in Figs. 9 and 10, since individual projections 113 can be easily deformed, the front side surface 111a can be deformed freely even when the cleaning function member 111 is formed of a material having relatively high durability.

Fig. 11 is a front elevation showing the third embodiment of a cleaning tool 201 according to the present invention.

Even in the embodiment shown in Fig. 11, like structural components to those in the first embodiment shown in Figs. 1 to 8 will be identified by like reference numerals and discussion thereof will be eliminated for avoiding redundant disclosure and whereby for keeping the disclosure simple enough to facilitate clear understanding of the present invention.

In the third embodiment of the cleaning tool 201, the tip end portion 8a of the handle 8 is connected to a supporting body 202. The supporting body 202 is formed by mounting a cleaning function member 211 on the supporting plate 5. The cleaning function member 211 has a central function member 212

formed in a predetermined dimension on both lateral sides in X direction with respect to the center portion 12, and side function members 213 are located on both sides of the central function member 212 in a manner firmly fitted on both sides
5 of the central function member 212.

The central function member 212 has the same sectional shape of Y - Z plane at any position along the X direction. The cross-sectional shape is the same as section of the cleaning function member 11 shown in Fig. 5. On the other hand, the
10 cross-sectional shape of the side function members 213 is the same as the cross-sectional shape of the cleaning function member 11 shown in Fig. 4. The side function members 213 are the same shape as the first embodiment of the cleaning function member 11 shown in Fig. 3 except for the central portion.

15 Therefore, the shape of a front side surface 211a of the cleaning function member 211 has smaller downwardly projecting magnitude in the predetermined range in X direction with taking the center portion 12 as center, as viewed from the front side of Fig. 11. The projecting magnitude in the projecting peaks
20 13 provided in the side function members 213 becomes maximum.

In the third embodiment of the cleaning tool 201, both of the central function member 212 and the side function members 213 are formed of the same elastically deformable material. In the alternative, the central function member 212 may be formed
25 of substantially not deformable material, and the side function

members 213 may be formed of elastically deformable material. In the further alternative, the central function member 212 may be formed of substantially not deformable material, and the side function members 213 may be provided with a large number
5 of elastically deformable projections 113 as shown in Figs. 9 and 10.

Fig. 12 is a section showing the fourth embodiment of a cleaning tool 301 according to the present invention, take along the Y - Z plane including the center line O - O similarly
10 to Fig. 5.

In the shown embodiment, like structural components to those in all of the embodiments shown in Figs. 1 to 11 will be identified by like reference numerals and discussion thereof will be eliminated for avoiding redundant disclosure and whereby
15 for keeping the disclosure simple enough to facilitate clear understanding of the present invention.

A supporting body 302 of the cleaning tool 301 has a cleaning function member 311 mounted on the cleaning work side 3 of the supporting plate 5. The cleaning function member 311 is formed
20 integrally of elastically deformable material the same as the first embodiment of the cleaning function member 11. A curved shape of a front side surface 311a of the cleaning function member 311 has the same shape as that shown in Fig. 3 as viewed from front side of the longer edge 2a. On the other hand, a
25 cross-sectional shape along the Y - Z plane at the center portion

12 is the same as the cross-sectional shape of the cleaning function member 11 shown in Fig. 5.

In respective portions on both sides distanced from the center portion 12 for the distances L1 shown in Fig. 3, projecting
5 peaks 13a, 13b are formed with an interval in Y direction and at positions with the same interval on both sides relative to the center line O - O in Y direction.

In the cleaning tool 301, upon sliding on the surface 25 to be cleaned with attaching the cleaning sheet 20 on the
10 supporting body 302, the cleaning sheet 20 contacts on the surface 25 to be cleaned at the projecting peaks 13a and 13b at four positions. Therefore, attitude of the supporting body 302 becomes stable. Upon sliding the supporting body 302 on the surface 25 to be cleaned in any direction, the supporting body
15 302 is hardly tilted to realize stable sliding.

On the other hand, when the supporting body 302 is urged onto the surface 25 to be cleaned and whereby to cause deformation of the cleaning function member 311, the front side surface 311a is deformed into flat surface at the portions of the four
20 projecting peaks 13a and 13b. On the other hand, area of the flat surface can be adjusted by pressing force applied to the supporting body 302. On the other hand, relatively large dirt can be easily captured between the cleaning sheet 20 and the surface 25 to be cleaned in a region other than the flat surface.

25 On the other hand, in the shown embodiment, dirt and dust

can be captured uniformly over respective portions of the surface of the cleaning sheet 20 attached to the supporting body 302. Therefore, the entire surface of the cleaning sheet 20 can be used effectively.

5 It should be noted that the fourth embodiment of the cleaning function member 311 shown in Fig. 12 may have a large number of elastically deformable projections as shown in Figs. 9 and 10. In the alternative, the cleaning function member 311 may be separated into the central function member and the side
10 function members on both sides of the central function member as shown in Fig. 11.

Fig. 13 is a perspective view showing the fifth embodiment of a cleaning tool 401 according to the present invention, Fig. 14 is a side elevation as viewed in a direction of arrow XIV
15 of Fig. 13 and Fig. 15 is a front elevation as viewed in a direction of arrow XV of Fig. 13.

The cleaning tool 401 has a supporting body 402 connected to a tip end of a handgrip form handle 408. The supporting body 402 has a supporting member 405. On a base end surface of the
20 supporting member 405, a supporting arm 405a is projected integrally. The tip end portion of the handle 408 is connected to the supporting arm 405a for pivotal movement about a pivot shaft 406.

The supporting member 405 is formed into essentially wedge
25 shape configuration in cross section having opposing surfaces

405b which are titled surfaces mating across an acute angle. On respective surfaces 405b, cleaning function members 411 are mounted. The cleaning function member 411 may be any one of the cleaning function member 11 of the first embodiment, the
5 cleaning function member 111 of the second embodiment, the cleaning function member 211 of the third embodiment and the cleaning function member 311 of the fourth embodiment. In Fig. 15, two cleaning function members 411 are the same as the cleaning function member 11 of the first embodiment.

10 As shown in Fig. 13, when the cleaning sheet 20 is attached to the supporting body 402, the cleaning sheet 20 is attached to cover both surfaces 411a of two cleaning function members 411. The longer edges 22 of the cleaning sheet 20 are secured on the back surfaces of the cleaning function members 411 by
15 means of Hook-and-Loop fastener or Velcro fastener, adhesive tape or the like.

In the cleaning tool 401, the surfaces 411a of the cleaning function members 411 are oriented upper side and lower side so that respective surfaces 411a serve as a cleaning work surface
20 to achieve similar cleaning effect to the first and subsequent embodiments. Also, by using the handle 408 in raised position, it becomes possible to perform sweeping operation for sweeping dirt and dust like a broom using the supporting body 402 and the cleaning sheet 20.

25 It should be noted that, while the cleaning function member

in respective embodiments has curved surface configuration to have substantially one projecting peak, it is possible to have the projecting peak with a flat surface of predetermined area.

On the other hand, the cleaning tool of respective
5 embodiments is adapted to perform cleaning of an interior floor surface with attaching the cleaning sheet. Each supporting body has a length of 200 to 300 mm in the first direction (X direction) and a length of 50 to 150 mm in the second direction (Y direction). The supporting body may be elliptic or elongated
10 circular shape in addition to rectangular shape.

It should be noted that the cleaning tool may be in a form where a relatively short handle is integrally formed with the supporting body for performing cleaning operation with one hand.

15 As set forth above, with the present invention, it becomes possible to capture dirt and dust effectively using wide area of the surface of the cleaning sheet with attaching on the supporting body, and to capture relatively large dirt, such as crumb or the like. Furthermore, upon sliding the supporting
20 body along the surface to be cleaned with attaching the cleaning sheet thereon, attitude of the supporting body can be made stable.

Although the present invention has been illustrated and described with respect to exemplary embodiment thereof, it should be understood by those skilled in the art that the foregoing
25 and various other changes, omission and additions may be made

therein and thereto, without departing from the spirit and scope
of the present invention. Therefore, the present invention
should not be understood as limited to the specific embodiment
set out above but to include all possible embodiments which
5 can be embodied within a scope encompassed and equivalent thereof
with respect to the feature set out in the appended claims.

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WHAT IS CLAIMED IS:

1. A cleaning tool comprising:

a supporting body;

a handle connected with said supporting body or formed
5 integrally with said supporting body,

said supporting body having a cleaning work surface on
which a cleaning sheet for capturing dirt and dust is attached,

said supporting body having a greater dimension in a first
direction than in a second direction perpendicular to said first
10 direction, said cleaning work surface being formed from an
elastically deformable material to have two projecting peaks
on opposite ends in said first direction, wherein

in a section taken along a plane perpendicular to said
second direction across said projecting peaks, said cleaning
15 work surface is concavely curved with projecting magnitude
gradually reducing from said projecting peaks to a midpoint
between said projecting peaks in said first direction, and

in every section taken along another plane perpendicular
to said first direction, said cleaning work surface is convexly
20 curved with projecting magnitude gradually increasing from
opposite ends of said cleaning work surface to a midpoint
therebetween in said second direction.

2. A cleaning tool as set forth in claim 1, wherein said
25 supporting body has a plurality of elastically deformable

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projections whose tip end surfaces provide said cleaning work surface.