Cleaning device comprising a support (1) with at least one cleaning surface (2) on which raised cleaning islands (3) are arranged at certain distances (4, A, B, C, D, E, 9) from each other such that the cleaning islands (3) are surrounded on all sides by storage spaces (5) for holding dirt. The size of the storage spaces (5) decreases steadily from at least one edge (6) of the cleaning surface at least to the middle of the cleaning surface (2) in the cleaning direction (7).
CLEANING CLOTH COMPRISING CLEANING ISLANDS

CROSS-REFERENCE TO RELATED APPLICATIONS


FIELD OF THE INVENTION

[0002] The invention relates to a cleaning device comprising a carrier with at least one cleaning surface. Raised cleaning islands are disposed on the cleaning surface in spaced relation to each other. The cleaning islands are surrounded on all sides by storage spaces for holding soil particles.

BACKGROUND OF THE INVENTION

[0003] A cleaning device as described above is made, for example, as a cleaning towel on the cleaning surface of which congruently shaped cleaning islands are disposed in a uniformly distributed pattern. Congruently shaped storage spaces for holding soil particles are disposed around the cleaning islands.

[0004] However, the soil particles that are removed from the surface being cleaned have different sizes, and such soil particles of different sizes cannot be held very effectively by the congruently shaped cleaning islands and the correspondingly shaped storage spaces. Larger soil particles, for example, long hairs, cannot be held in small storage spaces, while fine dust is not retained in large storage spaces. In each of these cases the cleaning result is not very satisfactory.

SUMMARY OF THE INVENTION

[0005] A general object of the invention is providing a cleaning device of the kind described above that is configured so that soil particles of different sizes can be effectively removed from the surface being cleaned and held and retained in the storage spaces.

[0006] To this end, the storage spaces are made steadily smaller starting from at least one edge of the cleaning surface in a wiping direction at least up to the middle of the cleaning surface. It is advantageous if during wiping, at first larger soil particles, for example, long hairs, can be held in the large storage spaces that lie at the front in the wiping direction. Smaller soil particles, for example, dust, pass by the larger storage spaces larger sizes cannot be held very effectively by the congruently shaped cleaning islands and the correspondingly shaped storage spaces. Larger soil particles, for example, long hairs, cannot be held in small storage spaces, while fine dust is not retained in large storage spaces. In each of these cases the cleaning result is not very satisfactory.

[0007] The storage spaces that are adjacent to each other in a direction transverse to the wiping direction can have a uniform size. Because of this configuration, the production of the cleaning device can be manufactured simply and affordably.

[0008] To produce a steady decrease in the size of the storage spaces in the wiping direction at least up to the middle of the cleaning surface, the cleaning islands can be configured to become steadily larger in the wiping direction at least up to the middle of the cleaning surface, starting from at least one edge of the cleaning surface. It is advantageous if the cleaning islands are provided that bind very small soil particles (e.g., fine dust particles) in the islands themselves, in addition to being captured in the small storage spaces that surround the large cleaning islands.

[0009] In order to be able to wipe large, evenly soiled surfaces in the wiping direction and produce a good, uniform cleaning result, only the cleaning islands that are adjacent to each other in the direction transverse to the wiping direction can be configured with a uniform size. With such an arrangement, substantially the same effect as described above is achieved as with the arrangement in which the storage spaces adjacent to each other in the direction transverse to the wiping direction have a uniform size.

[0010] The cleaning surface can be configured with one substantially centrally disposed central cleaning island, which is concentrically surrounded by other cleaning islands. The cleaning islands may be configured and arranged such that the radial distances between the adjacent cleaning islands become steadily larger proceeding in a radial direction towards each edge, starting from the central cleaning island. With such an arrangement, the wiping direction extends in the radial direction with respect to the central cleaning island. Practically independent of the wiping direction, this results in the storage spaces lying around the central cleaning island being smaller than the storage spaces disposed radially further in the direction towards the edge.

[0011] Each of the cleaning islands and/or the central cleaning island can have a substantially round configuration. With such a configuration, the soil particles can easily pass by the cleaning islands without getting caught on them and thus blocking the flow in the direction of the smaller storage spaces.

[0012] The cleaning islands disposed next to each other in a direction transverse to the wiping direction can form an island row. The cleaning islands of the island row can be staggered in the gaps between the cleaning islands of the next island row in the wiping direction. Arranging the cleaning islands that are next in the wiping direction in the gaps between the previous row of cleaning islands can ensure that no unwiped strips will remain on the surface being cleaned if the sizes of the cleaning islands are appropriate matched.

[0013] The distances and/or the radial distances between the adjacent cleaning islands can be 0.1 mm to 50 mm. Such distances are advantageous for forming storage spaces that are well suited for holding ordinary household soil.

[0014] The cleaning islands can cover 1% to 80% of the cleaning surface. More preferably, the cleaning islands can cover 5% to 50% of the cleaning surface. Coverage of up to 50% is sufficient for most uses. Because of the material of which the cleaning islands consist is often quite expensive, such a design is advantageous. Thus, with this configuration, the cleaning device can be made cheaply.

[0015] The cleaning islands can include flock fibers. The use of flock fibers helps achieve a good cleaning performance. However, hand flocking of carrier materials with flock fibers is expensive compared to the carrier material itself. A large portion of the costs associated with flocking comes from the materials, namely the flock fibers and the adhesive that is necessary to affix the flock fibers to the carrier material. Due to the arrangement of the storage spaces and the cleaning
islands, only a comparably small amount of flock fibers is necessary to achieve a good cleaning performance, so the cleaning device can be made cheaply.

The flock fibers of each cleaning island can have different lengths and can be oriented substantially perpendicular to the cleaning surface. For example, a cleaning island can have flock fibers with two different lengths. For example, the lengths can be 1 mm and 3 mm. This type of arrangement provides a further way to produce a three-dimensional structure for soil removal and soil holding. Each cleaning island thus has a more highly structured surface. It was found that when flock fibers of 1 mm and 3 mm are used standard household soil is held on average 23% better than with a cleaning device that has cleaning islands with flock fibers of the same length.

The flock fibers of different lengths can be substantially homogeneously distributed throughout the cleaning island.

The flock fibers of a cleaning island can be formed by viscose fibers and/or polyamide fibers. It is advantageous for the cleaning islands to maintain their three-dimensional flocking structure even in wet cleaning. A flock fiber mixture of viscose and polyamide has good water absorbency properties. The viscose fibers are very water absorbent and would, without the additional use of fibers with a support effect (for example, polyamide fibers), lie against the carrier material in a wet state resulting in a loss of the pronounced three-dimensional structure of the flocking. The fibers of polyamide, and also polypropylene or polyethylene, absorb only small amounts of water and therefore remain in their upright position projecting from the surface of the carrier even in a wet state. Such fibers therefore perform a supporting function for the viscose fibers. In order to achieve this supporting function, a fraction of support fibers ≥20% with respect to the viscose fibers is necessary.

In each case depending on how the cleaning cloth is used, particularly depending on how the surface to be cleaned is made and its material of construction and depending on the kind of soil that is supposed to be removed and held by the cleaning device, it was found to be advantageous if a mixture ratio of 80:20 to 20:80 of viscose fibers to polyamide fibers per cleaning island is used.

The carrier also can be flocked with flock fibers. Preferably, the carrier is a nonwoven material and is made as a towel or sponge. The flocking of the carrier with flock fibers can take place, for example, electrostatically, with the flock fibers affixed generally perpendicularly to the carrier material with one end of the fibers in an adhesive layer. With such a configuration, the carrier with the flocked fibers has a three-dimensional structure with an increased surface area. Because of this increase in surface area, soil can be removed from the surface to be cleaned and held in the storage spaces especially well both in dry cleaning and wet cleaning. An electrostatic flocking has the advantage that it achieves a high flocking density. In order to achieve a sufficient three-dimensionality of the surface structure and to keep the production costs of the mop as low as possible, the coverage of the carrier with the cleaning islands preferably does not exceed 80%.

Two exemplary embodiments of a cleaning device in accordance with the invention are described in more detail below with reference to FIGS. 1 and 2.

FIG. 1 includes a schematic top view of a first exemplary embodiment of a cleaning device in which the storage spaces disposed next to each other in the direction transverse to the wiping direction have the same size. FIG. 1 also includes an enlarged view of a portion of the cleaning cloth.

FIG. 2 includes a schematic top view of a second exemplary embodiment of a cleaning device according to the invention, in which the cleaning surface has only one substantially centrally disposed central cleaning island, which is surrounded by other cleaning islands. FIG. 2 further includes an enlarged view of a portion of the cleaning cloth.

DETAILED DESCRIPTION OF THE INVENTION

Each of FIGS. 1 and 2 shows a top view of a cleaning towel. A carrier 1 of the cleaning towel includes a nonwoven material with raised cleaning islands 3 disposed on the cleaning surface 2 of the carrier 1. The cleaning islands 3 are surrounded on all sides by storage spaces 5, where both the cleaning islands 3 themselves as well as the storage spaces 5 can hold soil particles.

In the illustrated embodiment, the distances A, B, C, D, E, 9 between the adjacent cleaning islands 3 are between 0.1 mm and 50 mm, with the cleaning islands 3 covering about 50% of the cleaning surface 2.

The cleaning islands 3 include flock fibers. The flock fibers of each cleaning island 3 have different lengths, in order to be able to make available more surface for holding soil. In the illustrated embodiment, the flock fibers of each cleaning island 3 include viscose fibers and polyamide fibers, where the mixture ratio of viscose fibers to polyamide fibers for each cleaning island 3 is about 50:50.

In the illustrated embodiment, the storage spaces 5 become steadily smaller in the wiping direction 7 up to the middle of the cleaning surface 2, starting from at least one edge 6 of the cleaning surface 2. Also, the cleaning islands 3 become steadily larger in the wiping direction 7 up to the middle of the cleaning surface 2, starting from at least one edge 6 of the cleaning surface 2.

A first exemplary embodiment of a cleaning towel is shown in FIG. 1. The storage spaces 5, which surround the cleaning islands 3 on all sides, become steadily smaller in the wiping direction 7 starting from edge 6. In addition, the cleaning islands 3 become steadily larger in the wiping direction 7 starting from the edge 6.

When the cleaning towel is moved in the wiping direction 7, coarse soil particles like hairs or crumbs first arrive at the large storage spaces 5, while finer soil particles like dust or pollen pass by the larger storage spaces 5 at the small cleaning islands 3 and are held in the smaller storage spaces 5. Fine dust particles are held not only in the storage spaces 5, but also in the cleaning islands 3 themselves.

Sets of the cleaning islands are disposed next to each other in a direction transverse to the wiping direction 7 so as to form an island row. A plurality of adjacent island rows 10 extending transverse to the wiping direction 7 are provided on the cleaning cloth. The cleaning islands 3 of each island row 10 are staggered in the gaps of the cleaning islands 3 of the next island row 10 in the wiping direction 7. With this arrangement, when wiping in the wiping direction 7, no unwiped strips remain on the surface being cleaned.

The cleaning towel of FIG. 1 has two wiping directions 7.1 and 7.2. The wiping direction 7.1 extends from edge 6.1 up to the middle of the wiping towel, and the wiping direction 7.2 extends from edge 6.2, likewise to the middle of
the cleaning towel. The function of the cleaning towel is accordingly connected with the wiping direction.

[0032] The reverse side of the cleaning towel, not shown here, can also be flocked with flock fibers like the illustrated cleaning surface 2. Alternatively, the reverse side of the cleaning towel can be flocked in a manner different from the illustrated cleaning surface 2.

[0033] The cleaning surface 2 of FIG. 2 is designed differently from the cleaning surface 2 of FIG. 1. The entire cleaning surface 2 consists of one pattern of cleaning islands 3 in which the cleaning surface 2 has only one centrally disposed central cleaning island 8, which is concentrically surrounded by other cleaning islands 3.

[0034] In contrast to the cleaning towel shown in FIG. 1, the cleaning towel of FIG. 2 has not just two wiping directions 7, but rather a plurality of wiping directions 7.1, 7.2, 7.3, 7.4, and 7.5, each of which extends in the radial direction with respect to the central cleaning island 8. The radial distances 9 between the cleaning islands 3 that are next to each other in the radial direction become steadily larger in the direction of each edge 6.1, 6.2, 6.3, and 6.4 of the cleaning surface 2, starting from the central cleaning island 8. The flocking used in the cleaning islands 3 can be the same as used in the embodiment of FIG. 1. Additionally, the coverage with which the cleaning islands 3 cover the cleaning surface 2 can be the same as the embodiment of FIG. 1.

1-21. (canceled)

22. A cleaning device comprising: a carrier with at least one cleaning surface on which a plurality of raised cleaning islands are disposed in spaced relation to each other, each cleaning island being surrounded by storage spaces for holding soil, wherein the storage spaces become steadily smaller in a wiping direction starting from at least one edge of the cleaning surface and extending at least up to a middle of the cleaning surface.

23. The cleaning device as in claim 22, wherein the cleaning islands are arranged into a plurality of rows each extending in a direction transverse to the wiping direction, the storage spaces that are arranged adjacent to each other in the direction transverse to the wiping direction having a uniform size.

24. The cleaning device as in claim 22, wherein the cleaning islands become steadily larger in the wiping direction starting from at least one edge of the cleaning surface and extending at least up to the middle of the cleaning surface.

25. The cleaning device as in claim 24, wherein the cleaning islands are arranged into a plurality of rows each extending in a direction transverse to the wiping direction, the cleaning islands that are arranged adjacent to each other in the direction transverse to the wiping direction having a uniform size.

26. The cleaning device as in claim 22, wherein the cleaning surface has a substantially centrally disposed central cleaning island that is concentrically surrounded by other cleaning islands.

27. The cleaning device as in claim 26, wherein adjacent cleaning islands are spaced a radial distance from each other that becomes steadily larger in directions starting from the central cleaning island and extending towards each edge of the cleaning surface.

28. The cleaning device as in claim 22, wherein each of the cleaning islands is substantially round.

29. The cleaning device as in claim 22, wherein the cleaning islands are arranged in a plurality of rows each extending in a direction transverse to the wiping direction and wherein the cleaning islands of each row are staggered in gaps between the cleaning islands of the next island row in the wiping direction.

30. The cleaning device as in claim 22, wherein the distance between adjacent cleaning islands is 0.1 mm to 50 mm.

31. The cleaning device as in claim 22, wherein the cleaning islands cover 1% to 80% of the cleaning surface.

32. The cleaning device as in claim 22, wherein the cleaning islands cover 5% to 50% of the cleaning surface.

33. The cleaning device as in claim 22, wherein the cleaning islands comprise flock fibers.

34. The cleaning device as in claim 33, wherein at least some of the flock fibers of each cleaning island have different lengths and wherein the flock fibers of each cleaning island are disposed perpendicular to the cleaning surface.

35. The cleaning device as in one of claims 34, wherein each cleaning island has some flock fibers that are approximately 1 mm in length and some flock fibers that are approximately 3 mm in length.

36. The cleaning device as in one of claim 34, wherein the flock fibers are substantially homogeneously distributed to form the cleaning islands.

37. The cleaning device as in claim 33, wherein the flock fibers of each cleaning island include viscose fibers and polyamide fibers.

38. The cleaning device as in claim 37, wherein the mixture ratio of viscose fibers to polyamide fibers of each cleaning island is between 80:20 and 20:80.

39. The cleaning device as in claim 22, wherein the carrier is flocked with flock fibers.

40. The cleaning device as in claim 22, wherein the carrier comprises a nonwoven material.

41. The cleaning device as in claim 22, wherein the carrier is a towel.

42. The cleaning device as in claim 22, wherein the carrier is a sponge.

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