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Declarations under Rule 4.17:

— *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*

— *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

Published:

— *with international search report (Art. 21(3))*

(54) Title: A CLEANING TOOL WITH UPSTANDING FIBERS

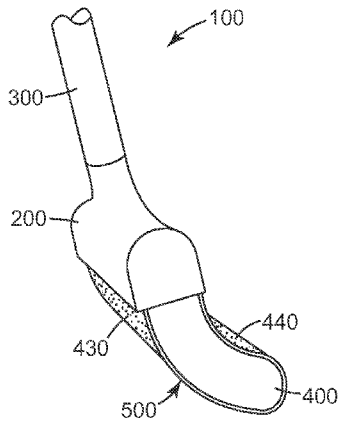


Fig. 1

(57) Abstract: A cleaning tool is disclosed that includes a wiping body at least a portion of which is covered by a plurality of upstanding fibers for effectively sweeping both large and small particles and dust. In one embodiment, a cleaning tool comprises a backing, a handle connected to the backing, a wiping body connected to the backing at a connected end, and a cleaning material. The wiping body forms a first wiping side and a second wiping side, opposite the first wiping side. The wiping body further comprises a length extending from the backing to a free end of the wiping body, a width extending from a first edge to a second edge, and a thickness extending between the first wiping side and second wiping side. The width is greater than the length. The width and length are each at least three times greater than the thickness. The cleaning material comprises a plurality of upstanding and outwardly extending short fibers on the first wiping side and second wiping side of the wiping body.

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A Cleaning Tool with Upstanding Fibers

Background

The present disclosure relates to a cleaning tool with upstanding fibers. In particular, the present disclosure relates to a cleaning tool with a wiping body at least a portion of which is covered by a plurality of upstanding fibers.

Long handled brooms are used for gathering dirt, dust, or debris from floors. However, even with sweeping the debris into the dust pan, often a small amount of the debris pass through the bristles and remain on the floor. The broom itself also can become very dirty and entangled with hair and dust.

Summary

A cleaning tool is disclosed that includes a wiping body at least a portion of which is covered by a plurality of upstanding fibers for effectively sweeping both large and small particles and dust. In one embodiment, a cleaning tool comprises a backing, a handle connected to the backing, a wiping body connected to the backing at a connected end, and a cleaning material. The wiping body forms a first wiping side and a second wiping side, opposite the first wiping side. The wiping body further comprises a length extending from the backing to a free end of the wiping body, a width extending from a first edge to a second edge, and a thickness extending between the first wiping side and second wiping side. The width is greater than the length. The width and length are each at least three times greater than the thickness. The cleaning material comprises a plurality of upstanding and outwardly extending short fibers on the first wiping side and the second wiping side of the wiping body.

In one embodiment, the wiping body is a solid material from the first wiping side to the second wiping side. In one embodiment, the wiping body is a solid material from the first edge to the second edge. In one embodiment, the wiping body is a solid material from the connected end to the free end. In one embodiment, the wiping body is a solid material from the connected end to the free end and from the first edge to the second edge. In one embodiment, the wiping body flexibly connects at the connected end. In one embodiment, the wiping body can flex such that the first wiping side and second wiping side are parallel with the surface being cleaned.

In one embodiment, the width is at least two times greater than the length. In one embodiment, the width and length are each at least five times greater than the thickness.

In one embodiment, the cleaning material comprises a substrate containing the plurality of upstanding and outwardly extending short fibers. In one embodiment, the cleaning material is permanently secured to the wiping body. In one embodiment, the cleaning material wraps from the connected end of the first wiping side around the free end to the connected end of the second wiping side. In one embodiment, the cleaning material entirely covers the wiping body.

Brief Description of the Drawings

FIG. 1 is a perspective view an embodiment of a floor cleaning tool;

FIG. 2 is a front view of the floor cleaning tool of FIG. 1;

FIG. 3 is an enlarged side view of the floor cleaning tool of FIG. 1.

While the above-identified drawings and figures set forth embodiments of the invention, other embodiments are also contemplated, as noted in the discussion. In all cases, this disclosure presents the invention by way of representation and not limitation. It should be understood that numerous other modifications and embodiments can be devised by those skilled in the art, which fall within the scope and spirit of this invention.

The figures may not be drawn to scale.

Detailed Description

FIG. 1 is a perspective view an embodiment of a floor cleaning tool 100. FIG. 2 is a front view of the floor cleaning tool 100 of FIG. 1. FIG. 3 is an enlarged side view of the floor cleaning tool 100 of FIG. 1.

The floor cleaning tool 100 comprises a backing 200, a handle 300, a wiping body 400 and a cleaning material 500. The backing 200 is generally rigid and secures on a first end 210 with the handle 300 and on a second end 220 with the wiping body 400. The handle 300 is permanently or removably connected to the backing 200. For floor cleaning, the handle 300 is typically a long handle. However, in one embodiment, the cleaning tool 100 may have a short handle extending from the backing 200. The backing 200 and handle 300 each may be made from plastic, wood, metal, or composite material that will provide structural stability to the cleaning tool 100.

The wiping body 400 includes a connected end 405 secured to the backing 200 and a free end 410, opposite the connected end 405, which is wiped over the surface to be cleaned. The wiping body extends from the connected end 405 at the backing 200 to the free end 410 to form a first wiping side 430 and a second wiping side 440, which is opposite the first wiping side 430. In one embodiment, each wiping side 430, 440 is generally planar. The wiping body includes a first edge 415 and second edge 420, opposite the first edge 415.

The wiping body 400 forms a length 450, width 460, and thickness 470. The length 450 is a distance extending from the connected end 405 to the free end 410. The width 460 is a distance extending from the first edge 415 to the second edge 420. The thickness 470 is a distance separating the first wiping side 430 from the second wiping side 440.

Overall the wiping body 400 forms a broom shape, as opposed to a flat mop shape. Therefore, the length 450 and width 460 are much greater than the thickness 470. In one embodiment, the width 460 and length 450 are each at least three times greater than the thickness 470. In one embodiment, the width 460 and length 450 are each at least five times greater than the thickness 470. In one embodiment the width 460 and length 450 are each at least 10 times greater than the thickness 470. Also, to form a broom shape that is more effective at sweeping over large surfaces, the width 460 is greater than the length 450. In one embodiment, the width 460 is at least two times greater than the length 450.

The wiping body 400 flexibly connects at the connected end 405. In one embodiment, the wiping body 400 can flex such that the first wiping side 430 or second wiping side 440 are parallel with the surface being cleaned. This flexing gives a large surface area of contact between the respective first wiping side 430 or second wiping side 440 and the surface being cleaned.

In one embodiment, the wiping body 400 comprises solid material that is a continuous section of material. In one embodiment, the wiping body 400 comprises a solid material from the first wiping side 430 to the second wiping side 440. In one embodiment, the wiping body 400 is a solid material from the first edge 415 to the second edge 420. In one embodiment, the wiping body 400 is a solid material from the connected end 405 to the free end 410. In one embodiment, the wiping body 400 is a solid material from the connected end 405 to the free end 410 and from the first edge 415 to the second edge 420.

Exemplary materials for the wiping body 400 include all types of foam, porous rubber, silicon, synthetics, synthetic foams, formed polyester, cellulose materials, and sponge materials. Specific exemplary materials or material substrates include polyether or polyester, low or high density, small, large or twin pore sizes, closed or open cell, non or flame retardant, flexible or semi rigid, plain, melamine or post treated impregnated foams, and the like. Also, neoprene, natural rubber, SBR, butyl, butadiene, nitrile, EPDM, ECH, polystyrene, polyethylene, polypropylene, EVA, EMA, metallocene resin, polyurethane, PVC, blends of any of the above, and the like. Natural, cellulose-based, and synthetic sponges can be used. Synthetic sponges can be constructed of porous rubber, synthetic foam, other plastic and rubber derivatives, and the like, for example.

A wiping body 400 that is a solid and continuous material is able to gather large amounts of debris because the solid material does not allow much, if any, material to pass though during cleaning. The solid, continuous material typically has sharp edges that are able to reach into corners and pass along walls well.

The stiffness of the solid, continuous material aids in gathering up the debris from the floor. The stiff material will resist against the sweeping action that a user is applying to the cleaning tool 100 and press more firmly against the surface being cleaned. In one embodiment, the wiping body 400 that comprises a sponge has a durometer (Shore 00) of at least 10. In another embodiment, the wiping body 400 that comprises a sponge has a durometer (Shore 00) of at least 20. Other suitable materials for the wiping body 400 include plastics that form a squeegee-like blade. In one embodiment, the wiping body 400 that comprises a blade has a durometer (Shore A) of less than 100. In another embodiment, the wiping body 400 that comprise a blade has a durometer (Shore A) of less than 80.

In another embodiment, the wiping body 400 comprises a plurality of bristles or strips extending from the backing 200. Suitable materials for the bristles or strips include strips of cellulose sponge, synthetic sponge, or natural and/or polymeric bristles.

The cleaning material 500 is applied to the wiping body 400 and is used for cleaning or wiping a surface. The cleaning material 500 comprises a plurality of upstanding fibers 520. In one embodiment, the upstanding fibers 520 further comprise additional fibers projecting outward for each upstanding fiber 520. In one embodiment, the cleaning material 500 comprises a substrate 510 from which the fibers 520

project. The cleaning material 500 may be reusable, disposable, or semi-disposable and may be removably or permanently secured to the wiping body 400.

The cleaning material substrate 510, if provided, may be a film, woven, knitted, or nonwoven cloth formed from natural, synthetic, or a combination of natural and synthetic fibers or filaments. In one embodiment, the fibers 520 are short and in one embodiment are less than 10 mm. In one embodiment, the fibers 520 are less than 5 mm. In one embodiment, the fibers 520 are longer than 1 mm.

In one embodiment, the cleaning material 500 covers at least the first wiping side 430 and second wiping side 440. In one embodiment, the cleaning material 500 wraps from the first wiping side 430 around the free end 410 to the second wiping side 440. In one embodiment, the cleaning material 500 entirely covers the wiping body 400.

To use the cleaning tool 100, a user holds the handle 300 and with a pulling or sweeping motion glides the wiping body 400, covered by the cleaning material 500, over the surface being cleaned. The cleaning material 500 gathers debris. Because the cleaning material 500 includes a plurality of short, upstanding fibers, the cleaning material 500 is effective at gathering small particles and dust. The cleaning material 500 is more efficient at sweeping debris as compared to a bristled broom because it has many more fibers in contact with the surface being cleaned. A typical exemplary cleaning material 500 may have 300,000 or more fibers in contact with the surface being cleaned, whereas a typical broom may have only 2,000 to 8,000 fibers. Even for typical bristled brooms with higher fiber content, during cleaning many of the fibers are not in contact with the surface being cleaned.

The pulling motion of sweeping is also advantageous because debris can be pulled out of corners and away from walls instead of the pushing motion of mopping where debris is pushed into corners. In embodiments where the wiping body 400 is flexible, pressure can be applied to the cleaning tool 100 to press the wiping body 400 towards the surface being cleaned, such as shown in FIG. 1. After the dirt, dust, and debris has been gathered, the wiping body 400 with the attached cleaning material 500 can sweep the gathered dirt and dust into a dust pan.

The wiping body 400 with attached cleaning material 500 includes two cleaning surfaces, the first wiping side 430 and second wiping side 440, which is opposite the first wiping side 430, to maximize the amount of available surface area for gathering dirt, dust, and debris.

Although specific embodiments of this invention have been shown and described herein, it is understood that these embodiments are merely illustrative of the many possible specific arrangements that can be devised in application of the principles of the invention. Numerous and varied other arrangements can be devised in accordance with these principles by those of ordinary skill in the art without departing from the spirit and scope of the invention. Thus, the scope of the present invention should not be limited to the structures described in this application, but only by the structures described by the language of the claims and the equivalents of those structures.

What is claimed is:

1. A cleaning tool comprising:

a backing;

a handle connected to the backing;

a wiping body connected to the backing at a connected end, the wiping body forming a first wiping side and a second wiping side, opposite the first wiping side;

wherein the wiping body further comprises a length extending from the backing to a free end of the wiping body, a width extending from a first edge to a second edge, and a thickness extending between the first wiping side and second wiping side;

wherein the width is greater than the length;

wherein the width and length are each at least three times greater than the thickness;

a cleaning material comprising a plurality of upstanding and outwardly extending short fibers on the first wiping side and second wiping side of the wiping body.

2. The cleaning tool of claim 1, wherein the wiping body is a solid material from the first wiping side to the second wiping side.

3. The cleaning tool of any one of the preceding claims, wherein the wiping body is a solid material from the first edge to the second edge.

4. The cleaning tool of any one of the preceding claims, wherein the wiping body is a solid material from the connected end to the free end.

5. The cleaning tool of any one of the preceding claims, wherein the wiping body is a solid material from the connected end to the free end and from the first edge to the second edge.

6. The cleaning tool of any one of the preceding claims, wherein the wiping body flexibly connects at the connected end.

7. The cleaning tool of any one of the preceding claims, wherein the wiping body can flex such that the first wiping side and second wiping side are parallel with the surface being cleaned.

8. The cleaning tool of any one of the preceding claims, wherein the wiping body is a sponge.

9. The cleaning tool of any one of the preceding claims, wherein the width is at least two times greater than the length.

10. The cleaning tool of any one of the preceding claims, wherein the width and length are each at least five times greater than the thickness.

11. The cleaning tool of any one of the preceding claims, wherein the cleaning material comprises a substrate containing the plurality of upstanding and outwardly extending short fibers.

12. The cleaning tool of any one of the preceding claims, wherein the cleaning material is permanently secured to the wiping body.

13. The cleaning tool of any one of the preceding claims, wherein the cleaning material wraps from the first wiping side around the free end to the second wiping side.

14. The cleaning tool of any one of the preceding claims, wherein the cleaning material entirely covers the wiping body.

15. The cleaning tool of any one of the preceding claims, wherein the fibers are less than 10 mm.

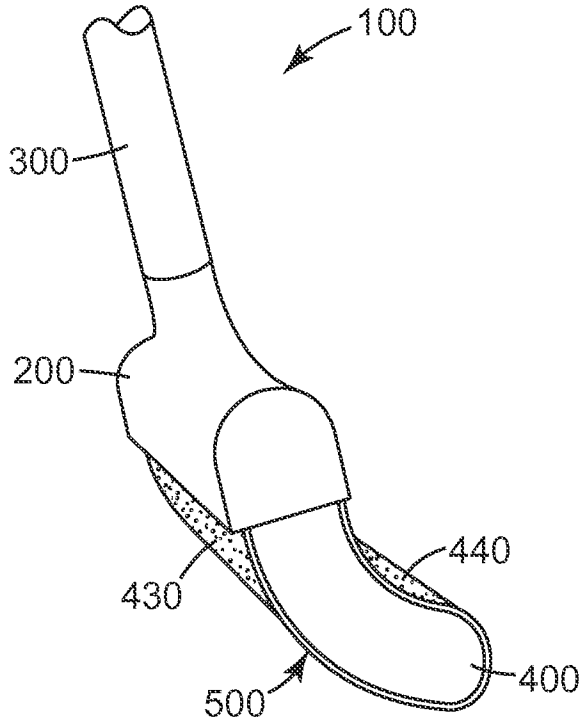


Fig. 1

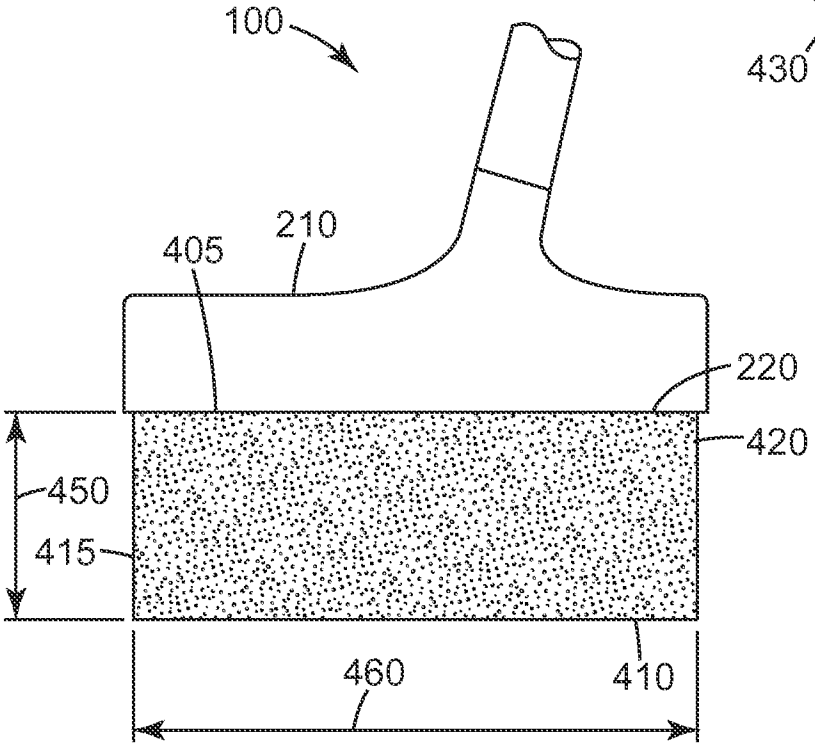


Fig. 2

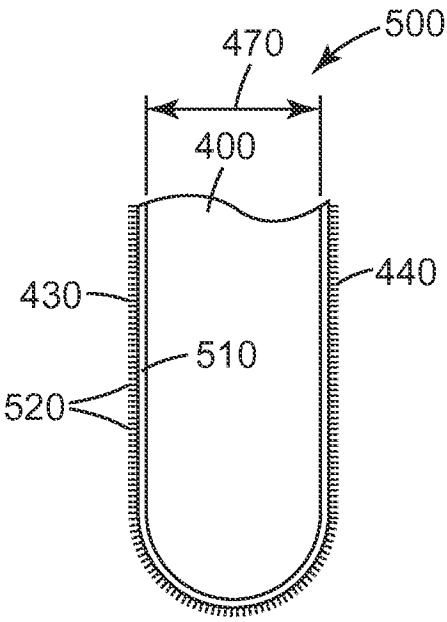


Fig. 3

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2013/073472

A. CLASSIFICATION OF SUBJECT MATTER

A47L 13/16(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A47L 13/16; A47L 13/10; A47K 7/02; A47L 13/46; A47L 13/20

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Korean utility models and applications for utility models
Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
eKOMPASS(KIPO internal) & Keywords: cleaning, tool, backing, handle, body, length, width, thickness, fiber

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2011-0146018 A1 (LLOYD S. VASILAKES et al.) 23 June 2011 See abstract, paragraphs [0012]-[0026], claim 13 and figures 1-2.	1-3
Y	JP 05-048859 U (UNITIKA LTD.) 29 June 1993 See abstract, paragraph [0007], claim 2 and figure 2.	1-3
A	JP 2000-316773 A (THE CLOROX COMPANY) 21 November 2000 See abstract, paragraph [0017], claims 1, 3 and figure 3.	1-3
A	JP 2007-135666 A (KAO CORP.) 07 June 2007 See abstract, paragraphs [0012]-[0015] and figures 1-2.	1-3
A	KR 10-2009-0126314 A (UNI CHARM CORPORATION) 08 December 2009 See abstract, paragraphs [0051]-[0065] and figures 1-3.	1-3

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents,such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
18 March 2014 (18.03.2014)	**19 March 2014 (19.03.2014)**

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Form PCT/ISA/210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2013/073472

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☒ Claims Nos.: 4-15
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required addtional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of any additional fees.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/US2013/073472

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2011-0146018 A1	23/06/2011	CN 102131435 A	20/07/2011
		EP 2312986 A1	27/04/2011
		EP 2312986 A4	24/08/2011
		JP 2011-526806 A	20/10/2011
		MX 2011000103 A	22/02/2011
		US 8549690 B2	08/10/2013
		WO 2010-002580 A1	07/01/2010
JP 05-048859 U	29/06/1993	None	
JP 2000-316773 A	21/11/2000	None	
JP 2007-135666 A	07/06/2007	JP 4675218 B2	20/04/2011
KR 10-2009-0126314 A	08/12/2009	CN 101646376 A	10/02/2010
		CN 101646376 B	21/12/2011
		EP 1974646 A2	01/10/2008
		EP 1974646 A3	09/06/2010
		EP 1974646 B1	30/10/2013
		JP 2008-253294 A	23/10/2008
		JP 5048376 B2	17/10/2012
		US 2008-0235890 A1	02/10/2008
		US 8186001 B2	29/05/2012
		WO 2008-120686 A1	09/10/2008