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- (71) **Applicant:** HENKEL AG & CO. KGAA [DE/DE]; Henkelstr. 67, 40589 Düsseldorf (DE).
- (72) **Inventors:** PATIL, Ketan; Heinestraße 3, 40764 Langenfeld (DE). HEBERLEIN, Walter; Fallgasse 1/15, 1060 Wien (AT). KRAUS, Ingrid; Grünberger Weg 20, 40627 Düsseldorf (DE). EISSA, Hesham; The Greens, Alnakheel 3B Building, Flat 106, Dubai (AE). ALWAKEL, Shaimaa; Jumerirah village circle 2, Park corner building, Apartment 307, Dubai (AE). DAOUD, Amr; Dubai sports City, Elite 4, Dubai (AE). PEINE, Andreas; Ickerswarder Str. 174, 40589 Düsseldorf (DE).

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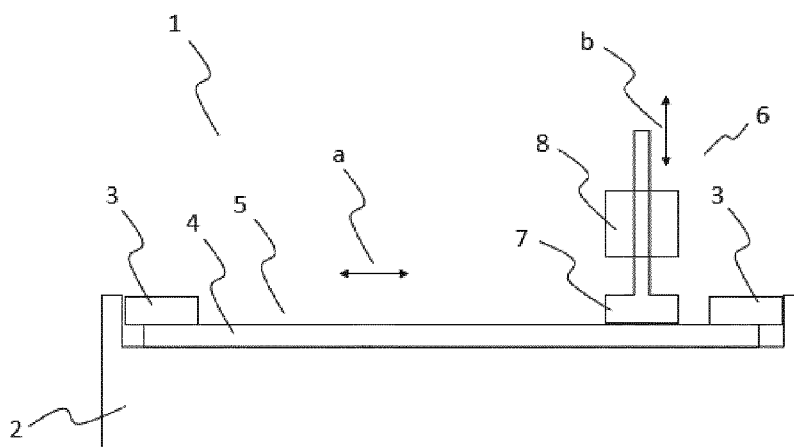
(54) **Title:** METHOD AND EQUIPMENT FOR TREATING A FABRIC

Fig. 1

(57) **Abstract:** The present invention concerns a method for treating a fabric with a fabric treatment equipment, the equipment comprising a wash basin for holding washing liquor, a mechanical treatment means for treating the stains, wherein the method comprises the steps of: providing the fabric; fixing the fabric to the washbasin with holding means; positioning the mechanical treatment means so that it is able to contact the fabric; adding the laundry treatment liquor to the wash basin; optionally soaking the fabric in the liquor for a pre-determined period of time; repetitively applying the mechanical treatment means to the fabric, submitted to the liquor, for a pre-defined number of times. The invention also concerns an equipment (1) for treating fabric according to the method above.

„Method and Equipment for Treating a Fabric“

The present invention concerns a method for treating a fabric with mechanical treatment means. It further concerns a machine for applying the method.

For long time, fabrics are being washed with suitable laundry detergent compositions. However, some stains require further treatment of the fabric, which usually consists of scrubbing the fabric with a brush. The mechanical application done with the brush removes tougher parts of the stain and helps the distribution of the detergent on the stained part of the fabric. Such treatment is very often done by hand, wherein the person treating the fabric can adjust the number of strokes and/or the pressure applied to the fabric during the strokes, depending on the type of the stain or on the degree of staining. However, there is a tendency of applying a relatively high pressure and a large number of strokes, even though that would not mean that the results of stain removing are improved in relation to a lower number of strokes or lower pressure. Thus, sometimes the fabric may even get damaged while the stain is not yet sufficiently removed. Also, since the manual application of the mechanical treatment is very irregular from stain to stain, it is very difficult to compare the efficacy of detergent formulation suitable for such treatments.

It is thus objective of the invention to provide a means and method for applying mechanical treatment means onto a fabric in a reproducible manner. It is a further object of the invention to provide a method of determining the effect of a fabric treatment, particularly a method for determining the optimal conditions for the mechanical treatment to a fabric, such as number of strokes and pressure, for a determined laundry detergent.

The problem is solved by a method for treating a fabric according to claim 1, and by an equipment according to claim 9. The dependent claims concern further developments of the invention.

The invention concerns a method for treating a fabric with a fabric treatment equipment. The equipment comprises a washbasin for holding washing liquor, a holding means for fixing the fabric at a pre-defined position, and a mechanical treatment means for treating the stains. The term treatment means used in the present invention means mechanical treatment means. The method comprises a step of providing the fabric. The fabric is fixed to the washbasin with holding means. The mechanical treatment means is positioned so that it is able to contact the fabric. A laundry treatment liquor is added to the washbasin. The method then comprises the step of repetitively applying the mechanical treatment means to the fabric, submitted to the liquor, preferably at the pre-defined positions, for a pre-defined number of times. Optionally, the step of soaking the fabric in the liquor for a pre-determined period of time can be done at any time, preferably before starting the stroking.

Alternatively or in addition to the liquor, a treatment aid can be used for treating the textile. The treatment aid is preferably a gel, paste, powder, or granulate. This kind of preferred aid can be applied to a certain position, for example, directly to a stain on the textile. The treatment aid can act

on the textile in a chemical and/or mechanical way. Preferably, the treatment aid works to treat the fabric in conjunction with the mechanical treatment means. More preferably, the treatment aid is used to treat the fabric before the step of adding the laundry treatment liquor, thus pre-treating the fabric.

In a preferred embodiment, the holding means is a mask comprising pre-defined openings. The pre-defined opening correspond to pre-defined positions, which positions will receive treatment. A suitable fabric, e.g. with a set of stains, can be fixed such that each opening of the mask has a corresponding stain. Preferably, the step of fixing the fabric with the holding means comprises adjusting the fabric such that a position on the fabric, such as of pre-determined stains on the fabric, correspond to mask openings.

In the present invention, it is preferred that the pressure applied by the mechanical treatment means to the fabric is individually adjusted at the pre-defined positions. Therefore, it is possible to make comparative tests of fabric treatment on a single fabric, were the pressure or the number of strokes is the only variable between the pre-defined positions.

In a preferred embodiment, the pressure applied at one of the pre-defined positions is proportional to the magnitude of a force applied to a part of mechanical treatment means, the part corresponding to that pre-defined position. The force can be applied by a weight. Thus, different weights can be used to apply different pre-defined forces leading to different pre-defined pressures at different positions of the pre-determined positions.

In a preferred embodiment, the mechanical treatment means is adjusted in such a manner that different pressures are simultaneously applied at least two of the pre-defined positions by the mechanical treatment means.

It is envisaged that the mechanical treatment means is adjusted in such a manner that on at least one position of the pre-defined positions the mechanical treatment means does not contact the fabric, this can be used to provide a reference, i.e., a position in which there is no mechanical treatment.

The invention also foresees a method of determining the effect of a fabric treatment, this comprises the steps of

- i) treating the fabric with a treatment method according to the present invention;
- ii) after step i), measuring a remission value with a stain monitor;
- iii) comparing the remission value with a comparative value.

The comparative value can be a value measured at a reference position, or also a value measured at another time, such as a standard value.

Further, the present invention relates to an equipment suitable for the method of treating a fabric as describe herein. The equipment comprises:

- a washbasin for holding washing liquor;
- a mask with pre-defined openings for fixing a fabric comprising a plurality of defined stains at pre-defined positions corresponding to the mask opening;
- a mechanical treatment means for treating the stains.

It is preferred that the mechanical treatment means is configured to simultaneously treat a fabric at least two of the pre-defined positions. This allows for comparative tests, wherein all but one parameter can be kept identical for different positions, e.g. the only variable could be different pressure or different stain.

The mechanical treatment means is preferably configured such that different pressures can be applied simultaneously on at least two of the pre-defined positions.

It is preferred that a force applying means for applying force to the mechanical treatment means is configured in such a way that different forces can be applied simultaneously on different parts of the mechanical treatment means, each part corresponding to different pre-defined positions. Consequently different pressures can be applied, especially if the mechanical treatment means have identical contact area at each part to be contacted to the fabric (e.g. equal brushes).

In a preferred embodiment, the mechanical treatment means is able to be lifted such that it does not contact the fabric on at least one of the pre-defined positions.

In any of the embodiments of the invention, it is advantageous that the mechanical treatment means comprises a plurality of brushes. Preferably wherein at least two, preferably each, of the brushes are independent from each other. Independency means in this case, that each brush can be configured for at least one different parameter, such as for example: different pressure, different height.

A brush as used in the present invention can be any conceivable brush which is able to exert a pre-treatment on a fabric fixed to a basin according to the invention. Different kinds of brushes can be used for the invention, such as with straight, or with conical bristles, with different kinds of bristles on the same brush. Also elastic protuberances having the most different geometries can be used, which are not necessarily bristles, such as circles, dots, lines, other forms, or mixtures thereof.

One preferred kind of brush is a tapered brush, comprising at least one tapered side, preferable two tapered sides opposed to each other. The brush is preferably positioned such that the at least one tapered side is in direction of movement (for example, path "a" in Figures 1 and 2). The brush may also be tapered from all sides. Also a tapered round cross section brush is envisaged. A tapered brush can be used to accelerate a treatment test on a textile, since it can better spread a treatment aid on the textile, while a non-tapered brush would brush off the treatment aid from the textile.

Summary of Figures

Fig.1 shows schematic drawing of the lateral, internal, view of an equipment according to the invention;

Fig.2 shows a schematic view from the top of an equipment according to the invention.

Figure 1 is an exemplary schematic drawing of an equipment according to the invention, used to exemplify the details of the equipment. Fig. 1 shows a lateral cut view of equipment 1 with a main part providing a basin 1 for holding a fabric 4. The basin 2 is suitable to receive laundry liquor. The fabric 4 is kept at a fixed position in relation to the basin by the mask 3. The mask 3 has openings, of which one opening 5 is shown. The mask 3 is configured and arranged such that the opening 5 corresponds to the treatment means 6. The treatment means 6 is configured to apply mechanical treatment to the fabric 4 at the position corresponding to opening 5 via a corresponding part 7, which is preferably a brush. The part 7 can move along the path "a" and exert a certain pre-determined pressure to the fabric, for example by applying a certain force to the part. The part 7, such as a brush can preferably have an adjustable vertical position "b", which can be adjusted independently.

Figure 2 shows a top view of a basin 2 according to the invention. A fabric 4 is being held in place to the basin 2 by the mask 3. The mask 3 has openings (5a,5b,5c,5d,5e), wherein the number of openings could be 2 or more. Obviously, through the whole invention, the mask could be formed as multiple parts, but a single piece as depicted is easier to handle. The openings (5a,5b,5c,5d,5e) have corresponding parts (7a,7b,7c,7d,7e) of the treatment means, these can be brushes. In figure 2, the treatments means can move together as a single block or each part (7a,7b,7c,7d,7e) can move independently. The movement for treatment of the fabrics is in direction "a". Each part (7a,7b,7c,7d,7e) can exert a pre-determined pressure on the fabric, this pressure can be adjusted independently. Single parts can be lift up, e.g. for providing a reference without treatment.

With the present invention it is possible to test the efficacy of mechanical treatment of stains, and the effect on mechanical treatment on the fabric. The invented method and setup allows for measurements of different variables while a reference can be measured at the same time. Due to the basin, it is possible to simulate main washing loads in addition to the mechanical treatment, by using washing liquor.

Claims

1. A method for treating a fabric with a fabric treatment equipment, the equipment comprising:
 - a wash basin for holding washing liquor;
 - a mechanical treatment means for treating the stains;wherein the method comprises the steps of:
 - providing the fabric;
 - fixing the fabric to the washbasin with holding means;
 - positioning the mechanical treatment means so that it is able to contact the fabric;
 - adding the laundry treatment liquor to the wash basin;
 - optionally soaking the fabric in the liquor for a pre-determined period of time;
 - repetitively applying the mechanical treatment means to the fabric, submitted to the liquor, for a pre-defined number of times.
2. A method for treating a fabric according to claim 1, wherein the holding means is a mask comprising pre-defined openings.
3. A method for treating a fabric according to previous claim 2, wherein the step of fixing the fabric with the holding means comprises adjusting the fabric such that a position of pre-determined stains on the fabric correspond to mask openings;
4. A method according to any of the previous claims, wherein the pressure applied by the mechanical treatment means to the fabric is individually adjusted at the pre-defined positions.
5. A method according to claim 4, wherein the pressure at one of the pre-defined positions is proportional to the magnitude of a force applied to a part of mechanical treatment means, the part corresponding to that pre-defined position.
6. A method according to claim 4 or 5, wherein the mechanical treatment means is adjusted in such a manner that different pressures are simultaneously applied at least two of the pre-defined positions by the mechanical treatment means.
7. A method according to any of the claims 4 to 6, wherein the mechanical treatment means is adjusted in such a manner that on at least one position of the pre-defined positions the mechanical treatment means does not contact the fabric, thus providing a reference.

8. A method of determining the effect of a fabric treatment according to any of the previous claims, comprising:
 - i) treating the fabric according to a method as in any of the previous claims;
 - ii) after step i), measuring a remission value with a stain monitor;
 - iii) comparing the remission value with a comparative value.
9. An equipment (1) for treating fabric according to the method of any of previous claims, the equipment comprising
 - a wash basin (2) for holding washing liquor;
 - a mask (3) for fixing a fabric (4), the mask comprising pre-defined openings, the openings (5a,5b,5c,5d,5e) defining pre-defined positions, which positions can correspond to stains on the fabric;
 - a mechanical treatment means for treating the stains (6).
10. An equipment (1) as in claim 9, wherein the mechanical treatment means (6) is configured to simultaneously treat a fabric at least two of the pre-defined positions.
11. An equipment as in any of claims 9 or 10, further comprising a force applying means for applying force to the mechanical treatment means in such a way that different forces can be applied simultaneously on different parts of the mechanical treatment means, each part corresponding to different pre-defined positions.
12. An equipment as in any of claims 9 to 11 wherein the mechanical treatment means is configured such that different pressures can be applied simultaneously on at least two of the pre-defined positions.
13. An equipment as in any of claims 9 to 12, wherein the mechanical treatment means is able to be lifted such that it does not contact the fabric on at least one of the pre-defined positions.
14. An equipment as in any of claims 9 to 13, wherein the mechanical treatment means comprises a plurality of independent brushes (7a,7b,7c,7d,7e).

Figures

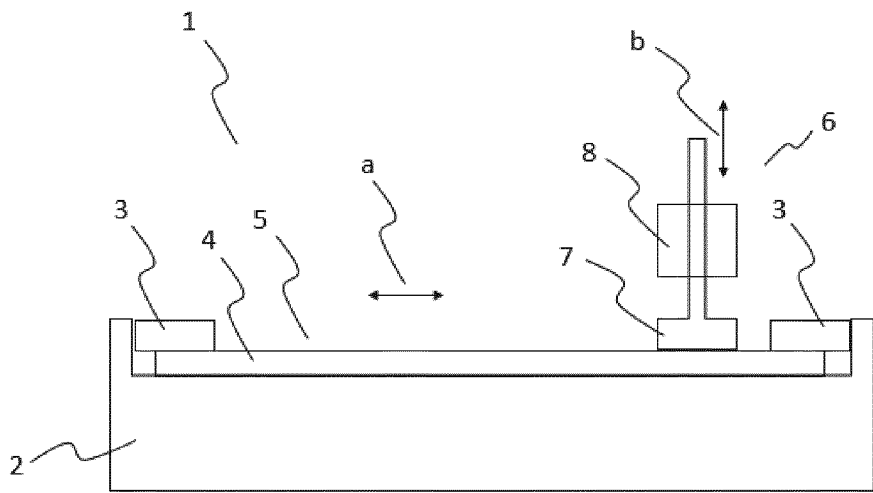


Fig. 1

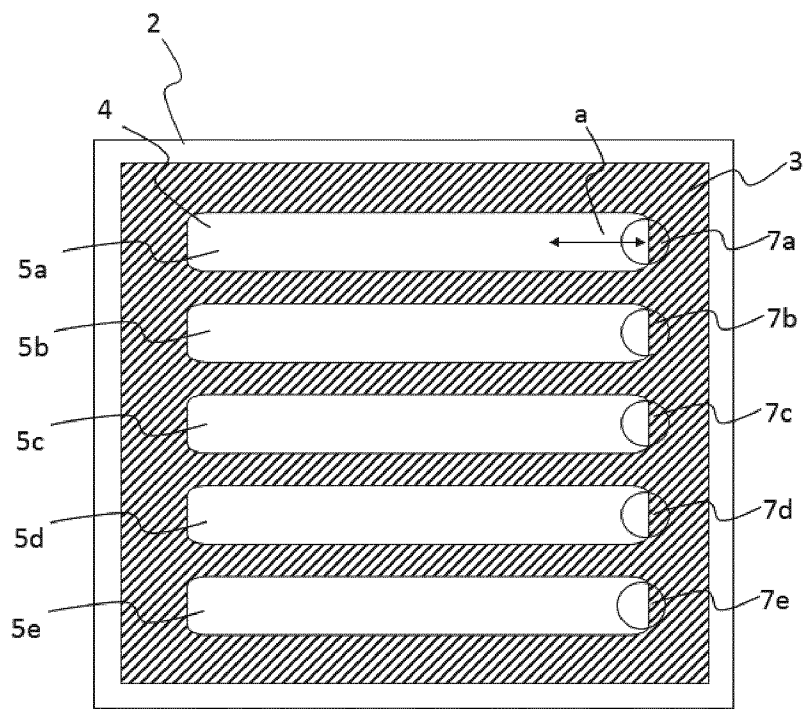


Fig. 2

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2016/063655

A. CLASSIFICATION OF SUBJECT MATTER
INV. D06G1/00 D06F9/00
ADD.

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)
D06G D06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 1 511 514 A (FRANKLIN LEE F) 14 October 1924 (1924-10-14) page 1, line 39 - page 2, line 48; figures 3-5	1-14
X	US 131 327 A (FRIEDRICH BEZNER) 17 September 1872 (1872-09-17) page 1 - page 2; figures 1-3	1
A	WO 2009/133244 A1 (WEST HEAT RAUMA OY [FI]; KUNNAS RISTO [FI]; LAHTINEN ARVO [FI]; MATULA) 5 November 2009 (2009-11-05) claim 1; figure 1	1-14
A	US 2005/160773 A1 (HWANG YONG KOO [US]) 28 July 2005 (2005-07-28) paragraphs [0006] - [0008]; figure 1 -/--	1-14



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

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Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040,
Fax: (+31-70) 340-3016

Authorized officer

Iamandi, Daniela

INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2016/063655

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 2000 218246 A (INOUE TORAO; DAIICHI BISO KK; HARA MICHIO; NOMOTO YOSHITAKA; MORI MASA) 8 August 2000 (2000-08-08) abstract; figures 1-12 -----	1-14

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2016/063655

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