A cleaning device, provided with a floor plate for fastening a cleaning cloth and a section extending along at least one edge of the floor plate, which section is provided with at least one outlet aperture, wherein a feed hose for steam is provided which connects to the at least one section, which feed hose is connectible to a steam generator.
CLEANING DEVICE AND METHOD

[0001] The invention relates to a cleaning device for surfaces.

[0002] For the cleaning of surfaces, it is known to make use of a floor mop. Such a cleaning device usually comprises a floor plate attached to a handle, on which floor plate a cleaning cloth can be secured. With the aid of the handle, the floor plate with cleaning cloth can be moved over a surface so as to take up dirt. Such cleaning devices are for instance marketed by P&G under the brand name of Swiffer®. Such cleaning devices have only a limited cleaning action.

[0003] Further, it is known to make use of steam for heating a surface, whereby dirt which has been loosened by means of the steam can be extracted by means of a suction device. Such cleaning devices are for instance marketed by the firm of ‘Enviroclean®’ as Siel SPIERA 2000. Such cleaning devices also have only a limited cleaning action.

[0004] For improvement, it has previously been proposed to blow steam through a cloth. In this way, however, no optimal cleaning is achieved either.

[0005] The object of the invention is to provide a cleaning device for cleaning surfaces.

[0006] In particular, the object of the invention is to provide a cleaning device by which a good cleaning of various surfaces can be obtained.

[0007] A cleaning device according to the invention is characterized in that use is made of steam in combination with a cleaning cloth, whereby during use the steam is applied directly to the surface, before the cloth is moved over the respective surface. In this way, the advantage is achieved that a variety of cleaning cloths can be used, for instance cloths used on standard floor mops of the type described in the opening paragraph hereof, while the cleaning action of the steam is not adversely affected. Further, the advantage is achieved that an optimal cleaning surface of the cleaning cloth is obtained. As the cleaning device, during use, can be connected to a steam generator, a particularly large surface can be covered with the cleaning device, while the cleaning device itself can be made of relatively simple and light design. Cleaning cloths for a cleaning device according to the invention preferably comprise microfibers. Preferably, microfibers are combined with other types of fibers or microfibers are exclusively used in the cleaning portion of the cleaning cloth. In this way, surprisingly, precisely in combination with steam, a particularly good cleaning action is obtained, especially in the case of greasy surfaces. Without wishing to be bound by any theory, this seems to be the result of an emulsifying action of the steam and the grease, which emulsion adheres particularly well to the microfiber. In this way, still better cleaning is obtained.

[0008] In a cleaning device according to the invention, preferably a section is provided which extends at a short distance from a circumferential edge of the floor plate and a cleaning cloth secured thereon or thereto, in particular a long side thereof. The section is preferably at least longer than half of the length of the respective edge and, more particularly, has at least approximately the same length. In the section, apertures are provided for transmitting steam. These apertures are preferably arranged in a row, approximately next to each other, but may also be staggered with respect to each other. The apertures jointly extend preferably over at least half of the length of the respective edge and preferably substantially throughout the length, so that steam can be applied to the surface to be cleaned in a relatively equally distributed manner, distributed along the full respective length of the cleaning cloth, at least floor plate.

[0009] The apertures are preferably provided such that, during use, they extend at a small distance above the surface to be cleaned, so that the steam needs to travel only a small distance from the aperture to that surface. As a result, the heat and force of the steam are substantially preserved.

[0010] In an advantageous further elaboration, the floor plate is connected with a handle, in particular so as to be capable of swiveling, while the section is preferably detachably connected with the floor plate. The feed hose extends from the section through and/or alongside the handle to the end remote from the floor plate. There, coupling means are provided, by which the feed hose is connected, or can be connected, to a supply hose. Preferably, the supply hose can be uncoupled from the feed hose, so that the cleaning device can be used both with and without steam.

[0011] Advantageous in particular is the use of a rapid coupling for coupling the feed hose and the supply hose.

[0012] A floor plate can be made of flat design and be provided, at an underside, with coupling or adhesive means for a cleaning cloth, for instance designed as Velcro. However, the floor plate can also be of different design, for instance divisible, as is known per se from practice, such that opposite ends of the floor plate can be inserted into pockets of a cleaning cloth. Also, the cleaning cloth may be provided with elastic means for attachment on and/or to the floor plate. Cleaning cloths for use with a cleaning device according to the invention preferably have a substantially rectangular shape with a closed cleaning surface, without openings. In this way, an integral uniform cloth is obtained which has a large cleaning surface.

[0013] The invention further relates to an assembly of a cleaning device, in particular according to the invention, and a steam generator, mutually coupled by a supply hose.

[0014] The invention furthermore relates to a method for cleaning surfaces utilizing steam.

[0015] In a method according to the invention, steam is applied directly onto a surface to be cleaned, immediately prior to moving the cleaning cloth, in particular a cleaning cloth comprising at least microfibers, over that surface. In this way, a particularly simple, efficient and hygienic manner of cleaning is obtained.

[0016] In an advantageous embodiment, furthermore, at least the feed hose is held at a distance from the surface which is to be cleaned and/or has been cleaned. This simply prevents the cleaned surface being soiled again by the feed hose, while, conversely, the feed hose is prevented from being soiled by contact with an as yet uncleansed portion of the surface. As a result, transfer of dirt can be prevented still better, so that a still more hygienic manner of cleaning can be obtained. To this end, the feed hose can be suspended at least partly from a device arranged for that purpose, for instance attached to a wall, window frame or door frame or standing free in the space with the or each surface to be cleaned.
In the subclaims, further advantageous embodiments of the invention are described. To clarify the invention, embodiments of the invention will be described in more detail with reference to the drawing.

In the drawing:

FIG. 1 shows in perspective top plan view a portion of a cleaning device according to the invention, in particular a floor plate with steam section;

FIG. 1A shows in bottom plan view a portion of a floor plate with cleaning cloth and steam section;

FIG. 2 shows schematically a coupling between a cleaning device according to the invention and a supply hose of a steam generator;

FIG. 3 shows schematically an assembly of a cleaning device according to the invention, coupled to a steam generator and a device for keeping hoses of this assembly, in particular a supply hose, off a surface which is to be cleaned or has been cleaned;

FIG. 4 shows schematically in perspective top plan view a floor plate with steam section according to an alternative embodiment; and

FIG. 5 shows a floor plate with steam section according to FIG. 4, viewed from a bottom side.

In the drawing, only exemplary embodiments are shown and described, which should not be construed as limiting. The same or corresponding parts have the same or corresponding reference numerals.

FIG. 1 shows a top plan view of a portion of a cleaning device 1, in particular a floor plate 2 coupled to a handle 3 via a swivel joint 4. Such a floor plate and swivel joint are known per se from practice and will not be further described here, in so far as the description is not relevant for a proper understanding of the invention. The floor plate 2 has a substantially rectangular shape, with two long sides 5 having a length L and two short sides 6 having a width B. Further, it has a top side 7 and an underside 8, which are both substantially flat. In the embodiment shown, the floor plate is in one piece in the sense that it is not divisible. However, within the invention, any known floor plate can be used, for instance also a divisible, swiveling floor plate as is known from practice and is offered, for instance, by the firm of Wiko.

In the exemplary embodiment shown, against the underside 8 of the floor plate 2 a cleaning cloth 10 is arranged, which comprises microfibers in a cleaning surface 11 which, during use, is held against a surface 12 to be cleaned. This cleaning surface 11 of the cloth 10 can be made up entirely of microfibers but may also comprise alternately microfibers and other fibers, for instance cotton fibers. The fibers can have any desired structure and/or composition and/or length and/or implant density.

Along a long side 5 of the floor plate 2, at a relatively small distance d therefrom, extends a section 13 which, in the exemplary embodiment shown, is a tubular metal section which, at an underside 14 operatively facing the surface 12 to be cleaned, is provided with a series of apertures 15. These apertures 15, when the cloth 10 has been placed by the cleaning surface 11 thereof on the surface 12 to be cleaned, are at a small distance e from that surface 12 to be cleaned. The distances d and e are chosen such that relatively little heat and energy are lost, as will be described hereinafter. In FIG. 1A, from the bottom side 8, a portion of the plate 2 with a portion of the cloth 10 is shown, with the section 13 with apertures 15. A Velcro® portion is visible adjacent a corner of the plate 2.

The section 13 is connected with the top side 7 of the floor plate 2, preferably via a detachable connection 16, in such a manner as not to hinder fastening of the cloth 10, also when the latter is secured over the short ends 6 of the floor plate 2 with for instance known insertion pockets (not shown). To that end, for instance an insert socket, a bolt and (wing) nut joint, a bayonet catch or a form closure can be used. Other connections known per se can also be used. In the exemplary embodiment shown, the section 13 is substantially formed by a somewhat C-shaped bent tube which has been secured by two opposite ends 17A, 17B onto the top side 7 by means of clips 18. At one end 17A, the section is closed by a stopper 19, while at the other end 17B a flexible coupling hose 20 is attached. Through the handle 3 extends a feed hose 21, from a point near the coupling 4 into or beyond the opposite upper end 22 of the handle 3. Provided at the upper end 22 is a coupling 23, which will be described hereinafter.

The flexible coupling hose 20 is part of the feed hose 21, as shown, or is connected thereto through a suitable coupling (not shown). The coupling hose 20 has a length and flexibility such that the handle 3 can perform all movements of the handle 3 relative to the floor plate 2 enabled by the swivel joint 4, without the coupling hose 20 being pulled loose, squeezed or otherwise closed or damaged. Through the coupling hose 20, during use, steam can be introduced into the section 13 to be discharged through the apertures 15.

As appears from FIG. 3, in the coupling 23, the feed hose 21 is detachably coupled with a supply hose 24 which is connected with a steam generator 25, known per se. Such generators are known from practice and suitable to produce steam at a high temperature and pressure for a prolonged time (for instance half an hour, an hour, or longer). The steam produced can be passed via the supply hose 24 to the feed hose 21. On the handle 3, preferably a shut-off is provided to open and close the supply hose at desired. Incidentally, it is also possible, of course, to provide a control on the handle or at a different position, by which, preferably wirelessly, a valve on the steam generator can be operated and/or the steam generator can be switched on and off, for supplying steam through the apertures 15 as desired.

As shown in FIG. 2, the coupling 23 can be a rapid coupling with a male part 27 and a female part 28, which parts are a water-tight mutual fit. Such couplings for coupling hoses are sufficiently known from practice. At least one suspension device 26 is provided, by which the supply hose 24 between the coupling 23 and the steam generator 25 can be supported so as to remain clear of the surface 12, preferably before as well as after cleaning of the surface 12. This prevents mutual soiling and dirt transfer by the device, at least by the hose, from a space to another surface. This enables still more hygienic cleaning. As shown, the suspension device 26 may be suspended from a ceiling 29, window frame, door frame, furniture or the like, but may also be placed on a support 30. A plurality of suspension devices 26 may be provided. As a consequence, the length of the supply...
hose 24 can be considerably longer than the length of the handle 3, for instance more than twice as long. The length can be chosen such that the cleaning device can be moved through a whole space, for instance a kitchen, room, restaurant, hospital ward or other space. The supply hose can be tens of meters, if desired, wholly or partly supported by the suspension device(s).

[0033] The distances d and e are preferably chosen such that during use, between the apertures 15 and the surface 12 to be cleaned, substantially no cooling and energy loss of the steam occurs, at least none occurs to an extent significant for the cleaning action. The distance d is for instance a few millimeters, as is the distance e. These distances are preferably of the order of magnitude of the thickness of the floor plate 2 and/or the thickness of the cleaning cloth 10.

[0034] In FIGS. 4 and 5, an alternative embodiment of a floor plate 2 with steam section 13 according to the invention is shown, in which the same or corresponding parts have the same or corresponding reference numerals. This embodiment will be described chiefly in so far as it differs from that according to FIGS. 1-3.

[0035] The floor plate 2 is for instance designed as described above in conjunction with FIGS. 1-3. The steam section 13 in this embodiment is likewise designed as a hollow tubular section which is provided with apertures 15 at the underside. A hose 20 is connected with the section 13 for the supply of steam. In this embodiment, the section 13 extends not only substantially along one, in particular a long side 5 such as a longitudinal front edge, but also along a short side or lateral side 6, again at a relatively short distance e therefrom. The distances e and e can be chosen as desired, and can be equal, but may also differ. In the embodiment shown, the section 13 extends over a distance along the short side 6 that is greater than the length B thereof, while apertures 15 are preferably provided both before and behind the floor plate (viewed in the direction of the width B). The free end 17A is closed, for instance by a stopper or by pinching, and is secured to the top side of the floor plate 2.

[0036] As in this embodiment apertures 15 are provided both along a long and along a short side, the advantage is achieved that also places that are more difficult to access can be accessed with this cleaning device. Thus, the floor plate can be moved laterally, so that narrow openings, for instance between a wall and a piece of furniture, can be entered with the cleaning device, for a thorough cleaning. Naturally, the steam section can also extend along more sides, while the floor plate can also have a shape other than rectangular. Of course, combinations of the embodiments shown, or parts thereof, are also possible, while a floor plate with steam section according to FIGS. 4 and 5 can also be used in a device according to FIG. 3.

[0037] A cleaning device 1, at least assembly 31 with such cleaning device, can be used as follows.

[0038] The cleaning device 1 is coupled to the supply hose 24, which is preferably suspended from one or more suspension devices 26. On the floor plate 2, a cleaning cloth 10, preferably with microfibers, is fitted, for instance with Velcro, insertion pockets, clamping means on the plate 2 or the like. Next, the steam generator 25 is switched on and the cleaning cloth is moved with its cleaning surface 11 over the surface 12 to be cleaned. During this movement, steam is sprayed via the apertures 15 onto the surface 12 in front of the cleaning cloth. Dirt is thereby detached from the surface 12 and thereupon taken up by at least the fibers, in particular microfibers of the cloth 10. In particular, grease or greasy substances are loosened by the steam and converted into a kind of emulsion which can be taken up by microfibers particularly well. Periodically, the cloth 10 is replaced with a clean cloth. The cloth can in each case be chosen depending on the surface 12 to be cleaned. In certain cases, the cleaning device can also be used without steam. The coupling 23 can then be disconnected and, if desired, the section 13 can even be wholly or partly removed.

[0039] It has been found that with a method and device according to the invention, large surfaces can be cleaned particularly well and readily so, in particular also in industrial environments such as institutional homes, hospitals, the catering industry, public buildings and the like, also in sanitary rooms such as lavatories and in kitchens and dining halls.

[0040] The invention is not limited in any way to the embodiments shown in the description and drawings. Many variations thereon are possible within the framework of the invention outlined by the claims. Thus, instead of a mobile steam generator, a fixed installation for generating steam can be used. The supply hose and the feed hose may be integrated. The supply hose may be led along the outside of the handle. The floor plate and handle may be designed differently and mutually coupled differently. Also, the floor plate can be made of exchangeable design, so that depending on the surface to be cleaned the most suitable floor plate can be chosen.

1. A cleaning device, provided with a floor plate for fastening a cleaning cloth and a section extending along at least one edge of the floor plate, which section is provided with at least one outlet aperture, wherein a feed hose for steam is provided which connects to said at least one section, which feed hose is connectible to a steam generator.

2. A cleaning device according to claim 1, wherein said section extends at a distance from said at least one edge, outside said floor plate.

3. A cleaning device according to claim 1, wherein the floor plate has an underside which, at least in a position of use, is relatively flat, while said at least one aperture in said section is situated at a small distance above a plane defined by said underside.

4. A cleaning device according to claim 1, wherein the floor plate is substantially rectangular and wherein said section extends at least along a long side of said floor plate.

5. A cleaning device according to claim 1, wherein the floor plate is connected with a handle so as to be capable of swiveling, and the feed hose extends at least partly through and/or alongside said handle.

6. A cleaning device according to claim 5, wherein adjacent an end of the handle remote from the floor plate, a coupling is provided for coupling the feed hose with a supply hose of a steam generator.

7. A cleaning device according to claim 1, wherein said section is connected with a top side of the floor plate by means of a coupling device, such that the section is detachable from the floor plate.

8. A cleaning device according to claim 1, wherein the floor plate is provided at an underside thereof with adhesive
means for temporarily adhering a cleaning cloth, in particular a cloth comprising microfibers.

9. A cleaning device according to claim 1, wherein at an underside of the floor plate a cleaning cloth is provided comprising microfibers.

10. An assembly of a cleaning device according to claim 1 and a steam generator, wherein the cleaning device is connected with the steam generator via a supply hose.

11. An assembly according to claim 10, wherein the length of the supply hose between the steam generator and the feed hose is greater than the length of a or the handle connected to the floor plate.

12. An assembly according to claim 10, wherein a suspension device is provided for operatively supporting the supply hose above a surface to be cleaned.

13. An assembly according to claim 10, wherein the supply hose is detachably coupled or can be detachably coupled to the feed hose, in particular using a rapid coupling.

14. A method for cleaning surfaces using steam, wherein from a steam generator, steam is supplied to a section along an edge of a floor plate, next to a cleaning cloth provided on the floor plate, such that the steam is blown from said section onto a surface to be cleaned, near an edge of said cleaning cloth.

15. A method according to claim 14, wherein as cleaning cloth a cloth is used having microfibers therein.

16. A method according to claim 14, wherein during cleaning of a surface the supply hose and the feed hose are held at a distance from the cleaned surface.

17. A method according to claim 14, wherein using the steam, grease of the surface to be cleaned is emulsified and thereupon taken up by a cleaning cloth which is moved over the surface.

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