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(54) **ARTICLE FOR HOUSEHOLD OR INDUSTRIAL CLEANING MANUFACTURED IN YARN OF PLAITED TYPE**

(57) The present invention relates to an article for household or industrial cleaning (30) that is characterized by comprising one or more flexible elements intended to come into contact with a surface to be cleaned and that is further characterized in that said flexible elements comprise a yarn of plaited type (5).

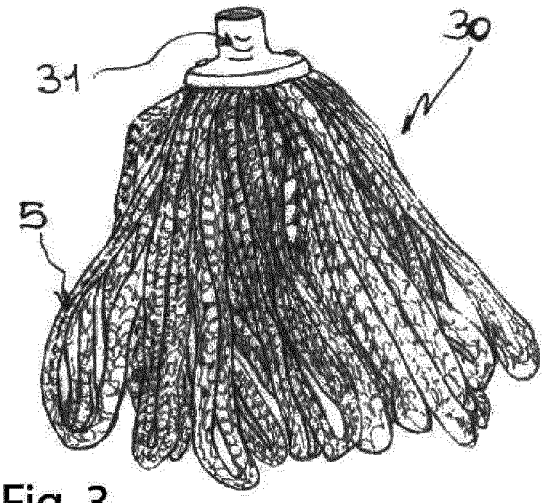

Fig. 3

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Description

[0001] The present invention relates to an article for household or industrial cleaning manufactured in yarns of plaited type.

[0002] Currently, the market offers articles for cleaning, such as mops and fringes for industrial or household use, the cleaning part of which is composed of strips of nonwoven fabric, or of twisted or gimped yarns, of various dimensions, weights and compositions.

[0003] However, these products have some drawbacks such as, in the case of articles for cleaning floors manufactured in nonwoven fabric, mediocre cleaning efficacy in all points of the floor, in particular in corner areas, due to the rigidity of the structure provided by the nonwoven fabric.

[0004] Articles manufactured with twisted or gimped yarns, as described in the patent EP 1362544, although being softer with respect to products manufactured with nonwoven fabric, are not very efficient due to the high wear to which they are subject, which causes a loss of the spiral structure with consequent disintegration of the product, which must then be replaced resulting in an increase in costs.

[0005] The production of articles for household or industrial cleaning comprising flexible elements intended to come into contact with the surface to be cleaned in which said flexible elements are produced with a fabric of knitted type is also known. In particular, the fabric in the articles in question is constituted by a single weft or warp element, which is produced on looms and machines whose main production unit is a needle that enables curvilinear weaves formed by stitches extending in transverse direction in weft fabrics, or stitches extending in vertical direction in warp fabrics. In this way, it is possible to obtain strips of fabric (both with weft knitting machines and with warp knitting machines) which are wound onto bobbin format or reel format tubes and are used to manufacture mops, plates, fringes, brushes, brooms and other articles for cleaning.

[0006] Articles for household or industrial cleaning of this type, although representing improvements with respect to known articles, still have some problems of wear that over time cause fraying and similar drawbacks.

[0007] It would therefore be desirable to obtain articles for household or industrial cleaning capable of being effective on any surface to be treated, which reach every point of these surfaces and which are not subject to rapid wear.

[0008] Another object of the present invention is therefore to produce an article for household or industrial cleaning comprising very light and efficient materials with a high absorbent capacity, capable of cleaning any surface in any point, without becoming rapidly worn.

[0009] A further object of the present invention is to produce articles for household or industrial cleaning that are very light and voluminous with respect to conventional materials used in the production of articles for cleaning.

[0010] In accordance with the present invention, the aforesaid objects are achieved by means of an article for household or industrial cleaning comprising one or more flexible elements intended to come into contact with the surface to be cleaned characterized in that said flexible elements comprise a yarn of plaited type.

[0011] Using an article according to the present invention it is possible to obtain systems for household or industrial cleaning that perform their functions optimally and that have the advantage of not becoming rapidly worn, and in particular that are not subject to phenomena of breaking and fraying over time, or in which these phenomena are greatly reduced and delayed with respect to articles of known type, for example produced in nonwoven fabric.

[0012] Moreover, the systems for household or industrial cleaning according to the present invention have the advantage of easily absorbing dirt, retaining the dust and impurities of the surfaces to be cleaned, easily reaching all points, including corners, gaps and recesses.

[0013] A further advantage is provided by the fact that the articles for household or industrial cleaning according to the present invention can be produced very easily and at limited costs.

[0014] In an embodiment of an article for household or industrial cleaning according to the present invention said flexible elements comprise thread plaits.

[0015] In a further embodiment of an article for household or industrial cleaning according to the present invention said flexible elements comprise a string with reinforcement core.

[0016] Advantageously, an article for household or industrial cleaning according to the present invention can be produced with a yarn of plaited type that is manufactured with needle plaiting machines, for example with circular machines or with circular machines for cut yarn. In a further embodiment of an article for household or industrial cleaning according to the present invention said yarn plaits are manufactured with cords.

[0017] By way of example, an article for household or industrial cleaning according to the present invention can be constituted by:

- mops;
- fringes
- dry fringes
- plates
- brushes
- brooms

[0018] In the case in which said article for household or industrial cleaning belongs to the plate family, said plates can advantageously be formed by a flat textile support comprising one or more threads of a plastic material and a Velcro receptive part.

[0019] For example, said flat textile support comprises a single or double looped fabric with weft and warp in conventional materials and polypropylene (PP) loop.

[0020] Once again in the case in which said article for household or industrial cleaning belongs to the plate family, said plates can advantageously comprise strips of yarn that are attached to said flat textile support with the tufting method or with normal stitching.

[0021] Further characteristics and advantages of the present invention will be apparent from the description of preferred, but not exclusive, embodiments of an article for household or industrial cleaning, set forth below.

[0022] The term article for household or industrial cleaning according to the present invention is meant as a tool adapted to remove dirt present on surfaces of any material and size and which performs its function through the rubbing of one or more parts of which it is composed against the surface to clean.

[0023] The cleaning action can take place both with the aid of water and products for removing dirt from floors, for examples soaps or detergents, and through the simple action of removing the dirt that is retained by the system of flexible elements that comprise the yarn of plaited type produced in conformity with the present invention.

[0024] Further characteristics and advantages of the present invention will be more apparent from the description of some preferred, but not exclusive, embodiments, illustrated by way of nonlimiting example in the accompanying figures, wherein:

Fig. 1 shows an example of plaited yarn to be used in an article for household or industrial cleaning according to the present invention, manufactured with a needle plaiting machine;

Fig. 2 shows an example of round cord with microfiber reinforcement core to be used in an article for household or industrial cleaning according to the present invention, manufactured with a needle plaiting machine;

Fig. 3 shows an embodiment of an article for household or industrial cleaning according to the present invention, in particular a closed loop mop, produced with yarn plaits produced with a needle plaiting machine;

Fig. 4 shows the assembly of a closed loop mop produced with yarn plaits produced with the needle plaiting machine represented in Fig. 3;

Fig. 5 shows a second embodiment of an article for household or industrial cleaning according to the present invention, in particular a plaited fringe for cleaning floors;

Fig. 6 shows a further embodiment of an article for household or industrial cleaning according to the present invention, in particular a rigid fringed plate with closed loop plaits manufactured with the tufting method or stitched;

Figs. 7a-7e show a diagram of a production mechanism of a round cord with microfiber core to be used in an article for household or industrial cleaning according to the present invention, produced with a needle plaiting machine.

[0025] For the objects of the present invention, the term plaited yarn means a plait constituted by a single element, which is made with needle plaiting machines whose main production unit is a needle that enables curvilinear weaves formed by stitches extending in vertical direction.

[0026] The structure of an article according to the present invention comprises a plaited yarn produced with a needle plaiting machine. Figs. 1 and 2 show an example of knitted plait 10, hereinafter called plait, and an example of round cord with core 20, hereinafter called cord with core.

[0027] This cord, which forms the cleaning part of the articles described above, is manufactured with plaits or cords of various width assembled, for example, with plastic caps 31 and 32, as described below. This allows rapid assembly of the articles to be produced with a saving of production times and costs.

[0028] Figs. 7a, 7b, 7c, 7d and 7e show some elements of the production mechanism of the plaited yarn, where it is possible to note the thread guides 105-109 mounted on the disc 110 that feed the latch needles 101-104 mounted on a tube 100 that rotates alternately first in clockwise and then in counter-clockwise direction.

[0029] The bindings that characterize the different types of plaited yarn produced with a needle plaiting machine are produced through the simultaneous movement of the threads 200-203 and of the needles 101-104, mounted on a needle tube 100, which form the plaiting machine. With the present machine it is possible to produce a plait with core 205 composed of multiple yarns 204.

[0030] The knitted plaited yarn is produced with one or more interconnected threads that run in a vertical direction with respect to the simultaneous or sequential operation of the needles used. In the case of plaiting machines using needles sequentially, the plaited yarn is formed through the single movement of latch needles and of the rotation of the tube.

[0031] To produce cord with inner reinforcement 205 the thread guide 109 mounted on the disc 110 has a central hole into which the pack of reinforcement threads is inserted 204.

[0032] Figs. 7a - 7e show how the stitches are formed to produce the yarn. In Fig. 7a, the tube 100 houses the latch needles 101, 102, 103, 104 that bind the threads together through the thread guides 105, 106, 107, 108 mounted on the plate 110.

[0033] In Fig. 7b, the tube 100 rotates taking the threads coming from a creel outside the machine onto the needles to be able to create stitches.

[0034] In Fig. 7c, the needles are lowered to create the knot and produce the yarn plait. To produce cords with reinforcement core 20 it is necessary to use a pack of yarns 204 that by means of the thread guide 109 are inserted into the cord produced by the threads.

[0035] Figs. 7d and 7e show the movements of the needles and of the tube to create the bindings of the plaits.

[0036] The cords thus obtained with the needle plaiting

machine are wound on bobbin format tubes, or in boxes and are used to manufacture mops, plates, fringes, brushes, brooms and other articles for cleaning. For the objects of the present invention, the term mop is meant as an article both for household and industrial cleaning 30, as illustrated in Figs. 3 and 4. This article is composed of a support in two parts, namely a bell-shaped part 31 for housing the handle coupling, and a fork-shaped part 32 that, inserted into specific housings in the bell-shaped part, retains the textile support 5 that forms the cleaning part of the mop.

[0037] For the objects of the present invention, the term plate means an article both for household and industrial cleaning 50, illustrated for example in the accompanying Fig. 6, that is composed, for example, of a plait 5, as illustrated in Fig. 1, attached on a flat textile support.

[0038] This support advantageously has two lateral pockets 51 that are adapted to house a plastic or metal support onto which a handle is attached. For the objects of the present invention the flat textile support can be a loop type Velcro fabric adapted to couple to the plastic or metal support to which a handle is attached.

[0039] For the objects of the present invention, the term fringe means an article both for household and industrial cleaning 40, illustrated for example in the accompanying Fig. 5, which is composed, for example, of a plurality of textile support plaits 5, as illustrated in Fig. 1, or of round cords with core 20, as illustrated in Fig. 2.

[0040] The plaits 5 or the cords 20 are joined in one or more points so as to create a flat mass of fabric. This flat mass, assembled with a related handle, allows cleaning of surfaces of large size such as the floors of shopping malls.

[0041] Both the plates 50 and the fringes 40 can be of dry type, i.e. which do not require water and detergent to perform their cleaning function, or of wet type, which require the use of water and/or detergents adapted for the removal of dirt.

[0042] With regard to the manufacture of mops 30, the yarn plaits 5 are assembled with conventional closed loop assembly techniques, and if necessary, cut or trimmed in the free portion so as to form a mop 30 with cut yarn.

[0043] The same process is carried out for producing plates 50 and fringes 40 used for removing dust or solid materials from floors.

[0044] Differently, with regard to the production of plates 50 or rigid fringes 40, the yarn plaits 5 or the cords 20 are topstitched to the surface of a flat textile support, such as a warp knit fabric, through the use of tufting technology or simply by stitching.

[0045] To prevent the loops formed by the fabric topstitched as described from being easily pulled out, a single loop or double loop fabric, with weft and warp in conventional materials and polypropylene (PP) loop that, after having been topstitched or stitched, is heated to a temperature at which the PP softens, is also used as flat support.

[0046] After solidification of the polymer, the support remains rigid and the loops formed by topstitching the strips of fabric are retained solidly by the polymer, preventing the topstitched fabric from being pulled out and ruining the fringed plate.

[0047] The rigid plates can also be produced on a Velcro receptive rigid base to the smooth part of which the yarn plaits are stitched in strips so as to produce a soft surface consisting of plaits adapted to clean large areas.

[0048] All the articles for household or industrial cleaning produced according to the present invention can be manufactured both with cut loop or closed loop yarn plaits.

[0049] The materials used, individually or in combination, to produce the yarn plaits according to the present invention, indicated with the international abbreviation according to the standard DIN 60.001, are as follows:

- yarns in natural fibers, organic CO/CO, KL, LI, HA, JU, RA, SI, AB, CC, Bamboo, Wood fiber, Fiber obtained from soya, Corn fiber;
- yarns in animal fibers, WO, Wv, WL, WG, WU, WK, WN, WA, WM, WS, WY, HR, HS, HZ, SE, ST;
- yarns in chemical fibers derived from natural polymers, CV, CMD, CLY, CUP, CA, CTA, PES, PE, PP, PVAL;
- yarns in chemical fibers derived from synthetic polymers, EL, ED, PTFE, PAN, MAC, PA, AR, CLF, PES, PE, PP, PVAL;
- yarns derived from inorganic substances, GF, CF, MTF;
- antibacterial and/or bactericidal yarns;

[0050] On the basis of the description provided, other characteristics, modifications or improvements are possible and evident to a person skilled in the art. These characteristics, modifications and improvements should therefore be considered a part of the present invention. In practice, the materials used and the contingent dimensions and forms can be any, according to requirements and to the state of the art.

Claims

1. An article for household or industrial cleaning (30, 40, 50) **characterized by** comprising one or more flexible elements intended to come into contact with a surface to be cleaned and further **characterized in that** said flexible elements comprise a yarn of plaited type (5, 20).

2. The article for household or industrial cleaning (30, 40, 50) according to claim 1, **characterized in that** said flexible elements comprise thread plaits (5).

3. The article for household or industrial cleaning (30, 40, 50) according to claim 1 or 2, **characterized in that** said flexible elements comprise a cord (20) with

reinforcement core.

4. The article for household or industrial cleaning (30, 40, 50) according to one or more of the preceding claims, **characterized in that** said yarn of plaited type (5, 20) is manufactured with needle plaiting machines, for example circular machines or circular machines for cut yarn.

5. The article for household or industrial cleaning (30, 40, 50) according to one or more of the preceding claims, **characterized in that** said yarn plaits are manufactured in cords.

6. The article for household or industrial cleaning (30, 40, 50) according to one or more of the preceding claims, **characterized in that** said article is selected in the group constituted by:

- mops;
- fringes
- dry fringes
- plates
- brushes
- brooms

7. The article for household or industrial cleaning (30, 40, 50) according to claim 6, **characterized in that** said plates are formed by a flat textile support comprising one or more threads of a plastic material and a Velcro receptive part.

8. The article for household or industrial cleaning (30, 40, 50) according to claim 7, **characterized in that** said flat textile support comprises a single or double looped fabric with weft and warp in conventional materials and polypropylene (PP) loop.

9. The article for household or industrial cleaning (30, 40, 50) according to claim 7, **characterized by** comprising strips of yarn that are attached to said flat textile support with the tufting method or with normal stitching.

10. The article for household or industrial cleaning (30, 40, 50) according to one or more of the preceding claims, **characterized in that** said yarn of plaited type (5, 20) is constituted by at least one material selected in the group constituted by:

- yarns in natural fibers, preferably organic CO/CO, KL, LI, HA, JU, RA, SI, AB, CC, bamboo, wood fiber, fiber obtained from soya, corn fiber;
- yarns in animal fibers, preferably WO, Wv, WL, WG, WU, WK, WN, WA, WM, WS, WY, HR, HS, HZ, SE, ST;
- yarns in chemical fibers derived from natural polymers, preferably CV, CMD, CLY, CUP, CA, CTA, PES, PE, PP, PVAL;
- yarns in chemical fibers derived from synthetic polymers, preferably EL, ED, PTFE, PAN, MAC, PA, AR, CLF, PES, PE, PP, PVAL;
- yarns derived from inorganic substances, preferably GF, CF, MTF;
- antibacterial and/or bactericidal yarns.

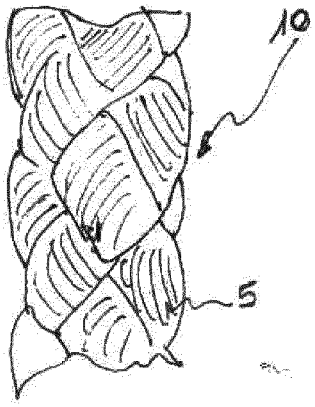

Fig. 1

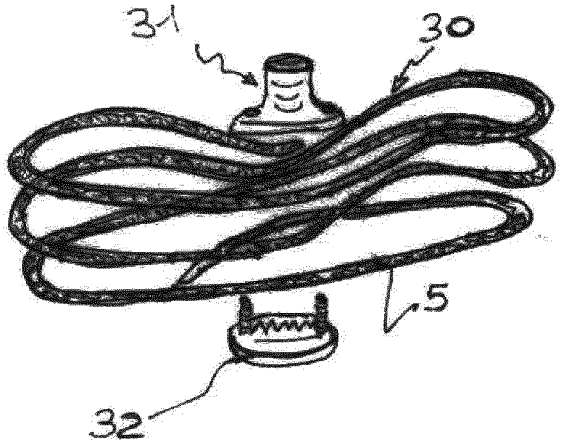

Fig 4

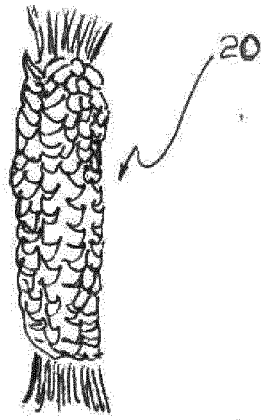

Fig. 2

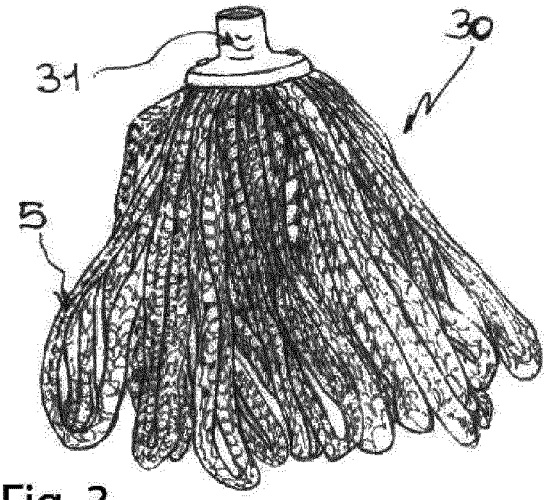

Fig. 3

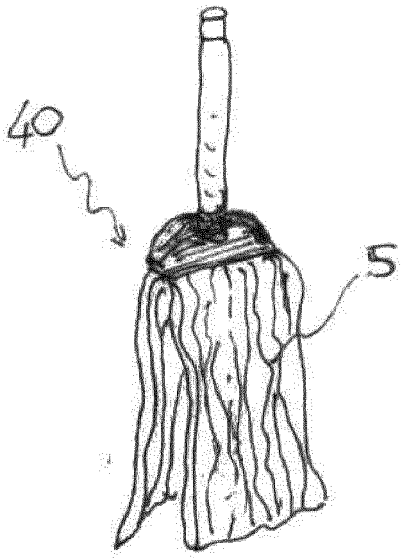

Fig. 5

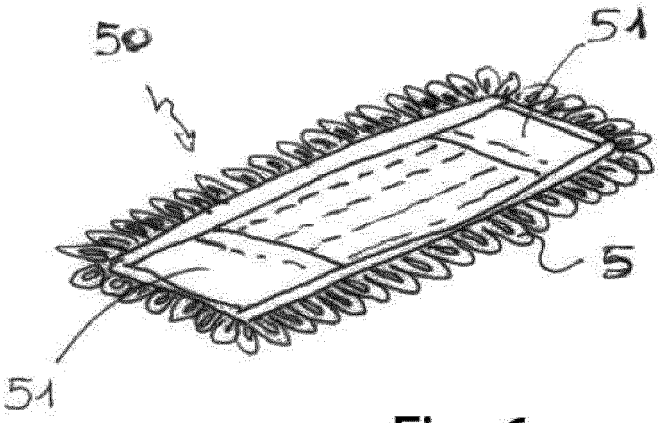

Fig. 6

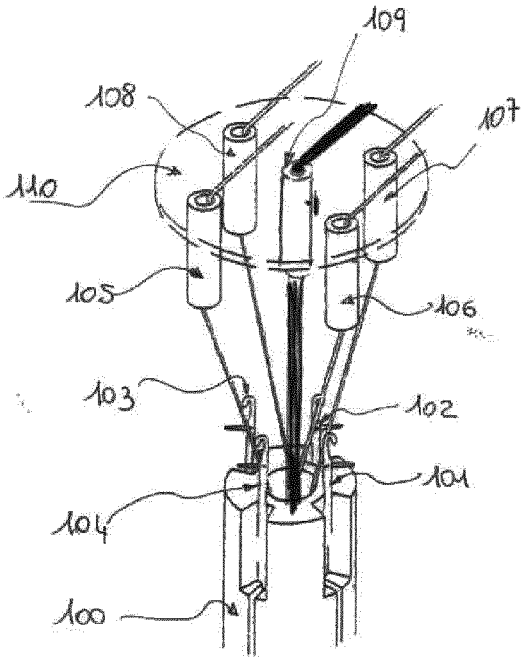

Fig. 7a

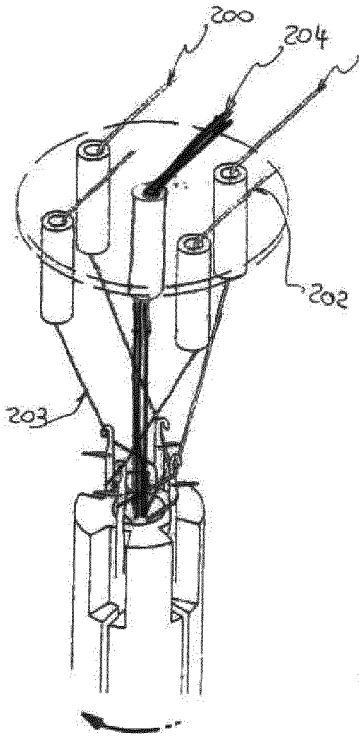

Fig. 7b

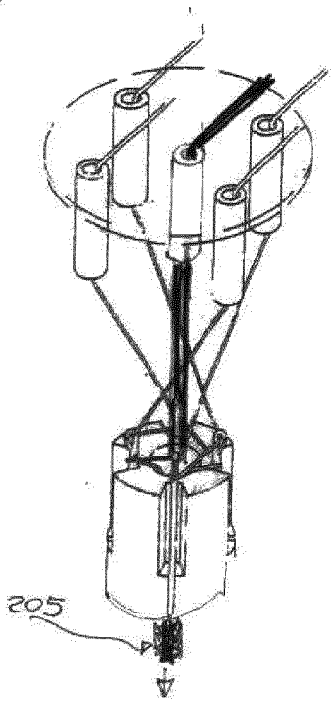

Fig. 7c

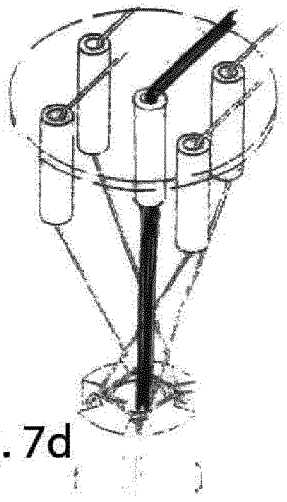

Fig. 7d

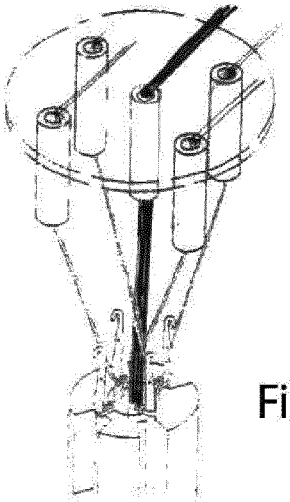

Fig. 7e

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EUROPEAN SEARCH REPORT

Application Number
EP 19 16 0298

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	9 July 2019	Finzel, Jana

CATEGORY OF CITED DOCUMENTS

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