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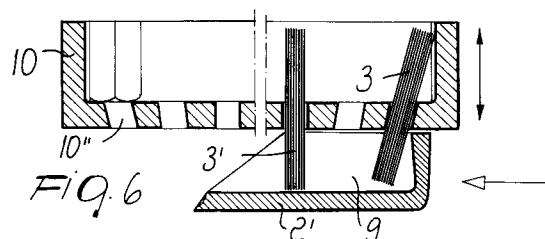
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(54) **Process for manufacturing a natural-bristle broom head and broom thus obtained.**

(57) A process for manufacturing a natural-bristle broom head and to a broom thus obtained ; the process comprises an automatic production line in which multiple semifinished heads (2), provided with containment sides, are prepared upstream, said heads (2) being orientated so that their bristle containment surface faces upwards, in order to receive, after being filled with glue (9), a mass of bristles (3) in tufts which are preliminarily uniformly distributed inside overlying templates (10), said templates (10) being subsequently removed once the glue has set (9), obtaining a finished head.



The present invention relates to a process for manufacturing a natural-bristle broom head and to a broom thus obtained.

The invention is particularly but not exclusively used in the field of equipment for the predominantly manual cleaning of enclosed spaces.

Brooms are known in the current state of the art. Originally the broom could be composed of an operating handle, generally made of wood, and of a bundle of plant fibers which was rigidly coupled to the end of said handle. A kind of broom based on the above described system is still used extensively nowadays, with particular reference to the traditional sorghum broom. This broom also uses plant fibers but, differently from the preceding ones, it can use an appropriate support or sheath for the fibers, now made of plastics, on which the end of a handle can also be engaged. Since in this case the sorghum bundle is very long with respect to a normal broom, it is stitched several times transversely and anchored according to empirical techniques to the plastic support by means of staples or similar stitchings and other more or less valid systems.

While the previously described type of broom is in limited use, since it is meant for roughly finished surfaces that are particularly affected by dirt and in any case for work in which it is frequently in contact with liquids, the conventional broom is more common: to be clear, this is the broom that we use every day to clean surfaces for example in houses and offices. This second generation of broom has evolved considerably not only in its aesthetics but also in some components such as the handle and the supporting head, while the surface meant to collect dust has instead been neglected. More specifically, this broom is composed of a handle which is fixed or telescopically extendable and is provided with an adjustment and locking ring as well as with a supporting head for the bristles, which are exclusively synthetic. The structure of the semifinished head generally has a substantially rectangular shape with rounded edges; on one side it is flat, and on the other side it has a protruding bush inside which it is possible to coaxially insert the end of a handle, providing the necessary connection. Currently, in a typical process for the automatic manufacture of finished heads the semifinished heads advance on a same plane along an advancement line to undergo first of all a drilling step, which affects the entire flat surface thereof that lies opposite to the connection, and then the step of anchoring of the bristles to the support by means of an appropriate multiple-head stapling machine. Even more specifically, tufts of synthetic bristles are picked up mechanically and inserted in each instance in the individual dead holes formed previously, compressing the tufts to such an extent as to bend the end at least as much as the depth of the hole, then finally centrally applying a retention staple that anchors to the bottom of the hole,

astride the tuft of bristles.

Numerous drawbacks can be observed in the above described solution. First of all, the fact should be mentioned that this solution requires a rather complex manufacturing process, with considerable difficulty in setting up currently existing machines and with constant maintenance, especially as regards the insertion needle. For this reason, too, it requires long production times and markedly high costs. Furthermore, the stapling system that is used does not ensure sufficient anchoring of the bristle to the support, and in the course of time causes first of all the loss of individual bristles and then gradually the loss of the entire tuft. Furthermore, due to the material used, currently existing brooms certainly do not have a thick appearance, but instead appear sparse, and also do not clean surfaces effectively. Finally, in the course of time synthetic fibers can change their structure, assuming distorted and excessively divergent shapes, making it substantially impossible to use them.

Finally, paintbrushes are known; although they are intended for entirely different purposes, they are part of the state of the art and as such are to be mentioned. In particular, paintbrushes too use a handle which is short instead of being long and on the end of which a particular bristle anchoring structure is associated; in this case, however, the bristles are natural. Differently from brooms, paintbrushes have a thick appearance, especially perimetricaly, and can have bristles of different lengths. Finally, the process for manufacturing paintbrushes is still currently predominantly manual, particularly as regards the step for preparing for the insertion of the tufts of bristles on the support that is associated with the handle.

The aim of the present invention is also to obviate the above drawbacks.

This aim and other objects are achieved with the present invention as characterized in the appended claims, solving the described problems by means of a process for manufacturing a natural-bristle broom head and of a broom thus obtained, which comprises an automatic production line in which multiple semifinished heads, provided with containment sides, are prepared upstream and are orientated so that their bristle containment surface faces upwards, so as to receive, after being filled with glue, a mass of bristles in tufts which are initially uniformly distributed inside overlying templates, said templates being subsequently removed once the glue has set, obtaining a finished head.

In this manner, various advantages are achieved by means of the considerable creative contribution, whose effect is an immediate technical advancement. First of all, in addition to being extremely soft on surfaces, a highly qualitative product is obtained, since the natural bristles give the broom a better ability to collect dust and thus to clean without deforming the

structure of the tufts. For example, in order to revive the tufts it is sufficient to impregnate the bristles with water, obtaining a fully revived broom. Other advantages can be found in the distribution of the bristles, which by being perimetricaly divergent allow a more effective cleaning action. Said bristles, by virtue of the particular coupling system, are stably anchored to the head and thus remain always perfectly functional, without thinning or losing hair on the treated surfaces. Finally, as regards the process, it would be particularly functional, avoiding complicated equipment and cycles and ensuring good production capability in extremely acceptable times. To conclude, one obtains a product that is excellent from a qualitative point of view and also has a pleasant appearance.

This advantage and others will become apparent from the following detailed description of preferred embodiments, with the aid of the accompanying schematic drawings, the details of which must be understood as being merely non-limitative examples.

Figure 1 is a front view of the end of a broom provided with a head with natural bristles;

figure 2 is a plan view of an overturned head on which the bristles must be anchored;

figure 3 is a sectional view of the head of figure 2, taken along the plane X-X;

figure 4 is again a sectional view of the overturned head of figure 2, taken however along the plane Y-Y;

figure 5 is a perspective view of a template for distributing the bristles within a seat formed in the head shown in the preceding figures;

figure 6 is, finally, a schematic view of a possible sequence of operation, wherein the template, shown in cross-section, is placed above a head, which is shown partially and is already filled with glue, in order to embed the ends of the bristles distributed by the overlying template.

Also with reference to the figures, a broom A is composed first of all of a handle 1 and of a head 2 below which natural bristles 3 are associated; said bristles are of the type obtained from swine. The shape of the head 2 is substantially rectangular, with rounded ends and edges. The head has, on one side, a bush 4 for connection to the handle 1; said bush is internally provided with a female thread to accommodate the end of the handle which is obviously male. On the opposite side, the head 2 is perimetricaly provided with a containment shoulder or side 5 whose side is not perpendicular to the base 6 of said head but is slightly inclined inward. Slots 7 are provided along the base 6, and they, too, form a dovetail seat, specifically two parallel seats which have the same dimensions. A slot 8 is also formed centrally, and its walls 8' are not perpendicular and form, at least for a significant extent, a dovetail shape which however, in this case, by affecting the parallel slots 7, forms a ring and corresponds to the base perimeter of the con-

necting bush 4.

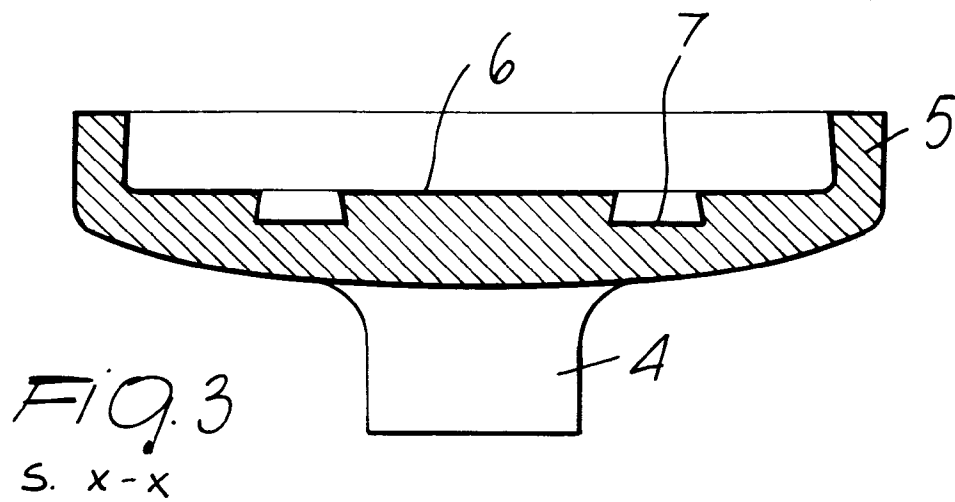
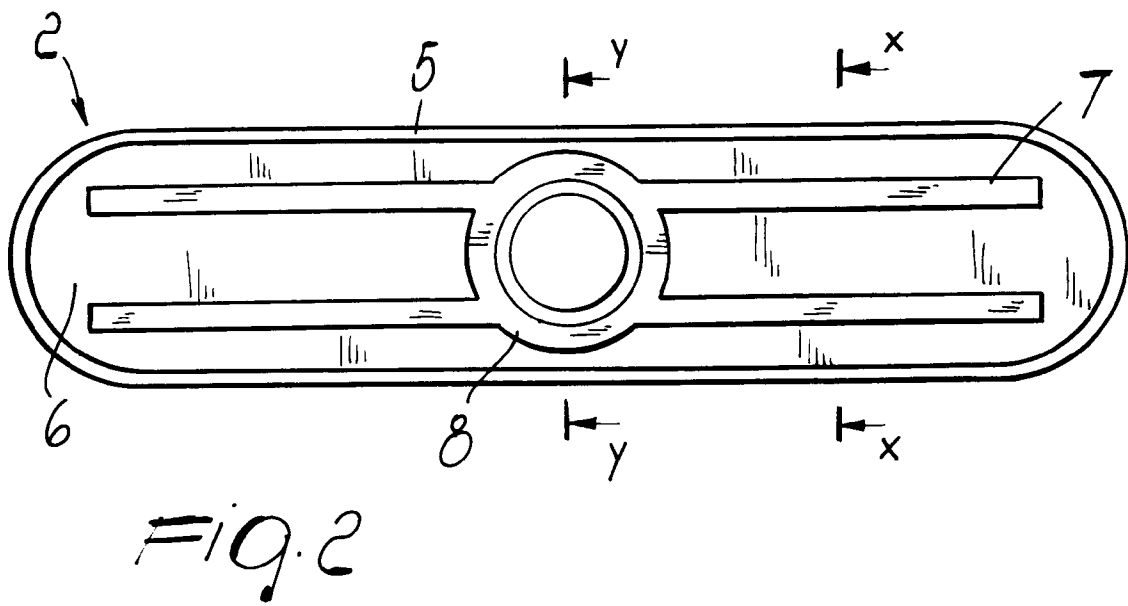
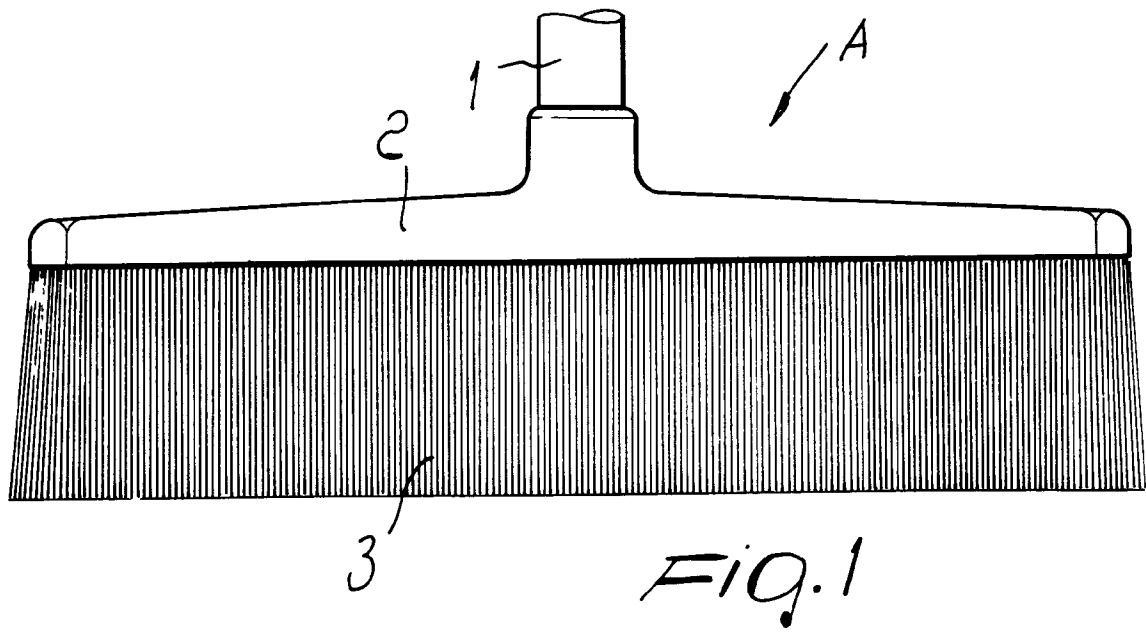
A process can consist in providing multiple inverted heads 2 which are preliminarily arranged on a same plane and are subjected, along an advancement line, to a first step which consists in pouring inside each head an adhesive 9, for example epoxy resins or polyurethane, which are kept below the rim of the head 2. At the same time, on an adjacent line, bristles 3 are vertically and randomly inserted inside a series of templates 10. Each template 10 is essentially constituted by a substantially rectangular box-like structure which has four containment walls and a base 10'. Multiple holes 10'' of constant diameter are formed on the entire surface of said base 10'. The arrangement and configuration of the rows of holes 10'' is such as to have diagonally arranged holes along the perimeter of the base 10', distributed in a substantially concentric manner with an inclination angle that gradually decreases from the outside towards the inside of the base 10' until exactly perpendicular holes 10'' are obtained centrally with respect to the base. The purpose of the holes 10'' is to allow a correct distribution of the bristles 3 as regards their arrangement and inclination, since it is known that the working surface of the broom A must allow to reach the tightest spaces by offering divergent initial bristles 3. More specifically, in a preferred solution the sides of a template 10 can have grooves 11 which are formed along the inner surface and would have the purpose of facilitating the bristles 3 in remaining upright. Once the loose bristles 3 have been inserted in the templates 10, the templates are vibrated in a particular manner, allowing clustering into tufts and uniform distribution in bundles of bristles 3 which pass through the holes 10'' and are retained by them. More particularly, the templates 10, by being raised, allow each group of bristles 3 to protrude with its lower end 3' beyond the base 10' of said template, at least matching the height of the containment sides of a head 2.

At this point the templates 10 are raised and placed above the heads 2', embedding the ends 3' of the bristles 3 in the underlying glue 9. Once said glue has set, the templates 10 are removed, leaving the bristles 3 perfectly distributed on the head 2, which is thus finished. Of course, the bristles 3 that have remained inside the template 10 are finally recovered and returned upstream of the production cycle.

Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the scope of each element identified by way of example by such reference signs.

Claims

1. Process for manufacturing a natural-bristle broom head and broom thus obtained, characterized in that a production cycle requires the upstream preparation of multiple supports, said supports, covered with glue, being suitable to receive, by virtue of collection and distribution means, a mass of bristles in tufts which are preliminarily uniformly distributed inside said supports, which are subsequently removed once the glue has set, obtaining finished products. 5
2. Process according to claim 1, characterized in that the supports for the bristles consist of semifinished heads provided with containment sides, said heads being orientated so that their bristle containment surface lies upwards, in order to receive, after being filled with glue, a mass of bristles in tufts, said bristles being initially uniformly distributed inside overlying templates, said templates being then removed once the glue has set, thus obtaining a finished head. 10 15 20
3. Process according to claims 1 and 2, characterized in that a line for processing the heads (2) and a line for feeding the bristles (3) are arranged so that they are logically coordinated and interacting; wherein a cycle consists in: 25
 - subjecting, in the first line, multiple overturned semifinished heads (2) arranged on a same plane beforehand to a step for filling each head with glue (9) which is maintained below the rim of said head (2), and in then preparing for a step for receiving the bristles (3); 30
 - while in the second line the bristles (3) are inserted vertically and randomly inside a series of vibrating templates (10) which subsequently affect said heads (2) by being moved simultaneously; 40
 - and finally, providing a step for receiving the bristles (3), wherein the templates (10) are raised and placed above the heads (2'), embedding the ends (3') of the bristles (3) in the underlying glue (9), until said glue has set, said templates being then removed and returned upstream of a production cycle. 45 50
4. Process and broom according to the preceding claims, characterized in that the head (2) has, on one side, a bush (4) for connection to the handle (1), whereas on the opposite side it is perimetrically provided with a containment side (5) which rises from a substantially flat base (6). 55
5. Process and broom according to the preceding claims, characterized in that said containment side (5) is not perpendicular to the base (6) of said head (2), and wherein slots (7, 8) are formed on said base (6), the cross-section of said slots resembling a dovetail seat.
6. Process and broom according to claim 5, characterized in that a slot (8) with non-perpendicular walls (8') at least partially forms a dovetail-like shape but in this case, by affecting the parallel slots (7), extends in a ring-like shape and is proximate to the base perimeter of the connecting bush (4).
7. Process according to the preceding claims, characterized in that each template (10) is essentially constituted by a box-like structure which has containment sides and a base (10') on which multiple holes (10'') are formed over the entire surface.
8. Process according to claim 7, characterized in that the arrangement and configuration of the rows of holes (10'') is such that diagonal holes are arranged perimetrically with respect to the base (10') and are substantially distributed concentrically, the inclination angle of said holes decreasing gradually from the outside towards the inside of the base (10') until perpendicular holes are obtained centrally with respect to the base.
9. Process according to claims 7 and 8, characterized in that along the inner surface, the sides of a template (10) can have adjacent and perpendicular grooves (11).
10. Process according to the preceding claims, characterized in that once the loose bristles (3) have been inserted in the templates (10), said templates are vibrated in a particular manner, allowing clustering into tufts and uniform distribution in bundles of bristles (3) which pass through, and are retained in, the holes (10'').
11. Process according to the preceding claims, characterized in that said templates (10), by being raised, allow each group of bristles (3) to protrude with its lower end (3') beyond the base (10') of said template, this protrusion matching at least the height of the containment sides of a head (2).
12. Broom according to any one of the preceding claims, characterized in that it is composed of a handle (1) and of a head (2) below which natural bristles (3) are associated, said bristles being of the type obtained from an animal.



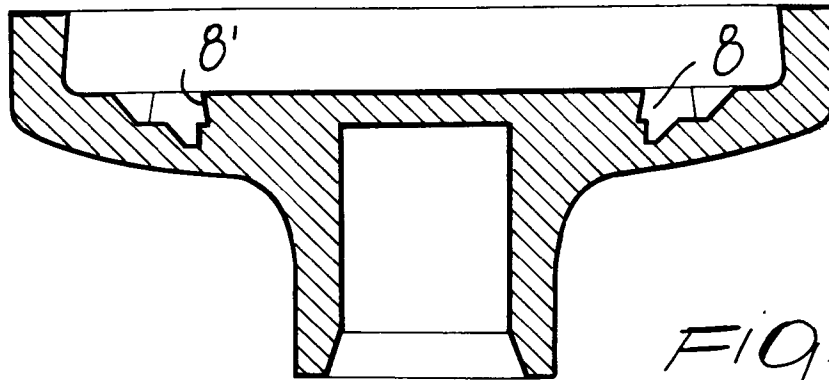


FIG. 4
S. Y-Y

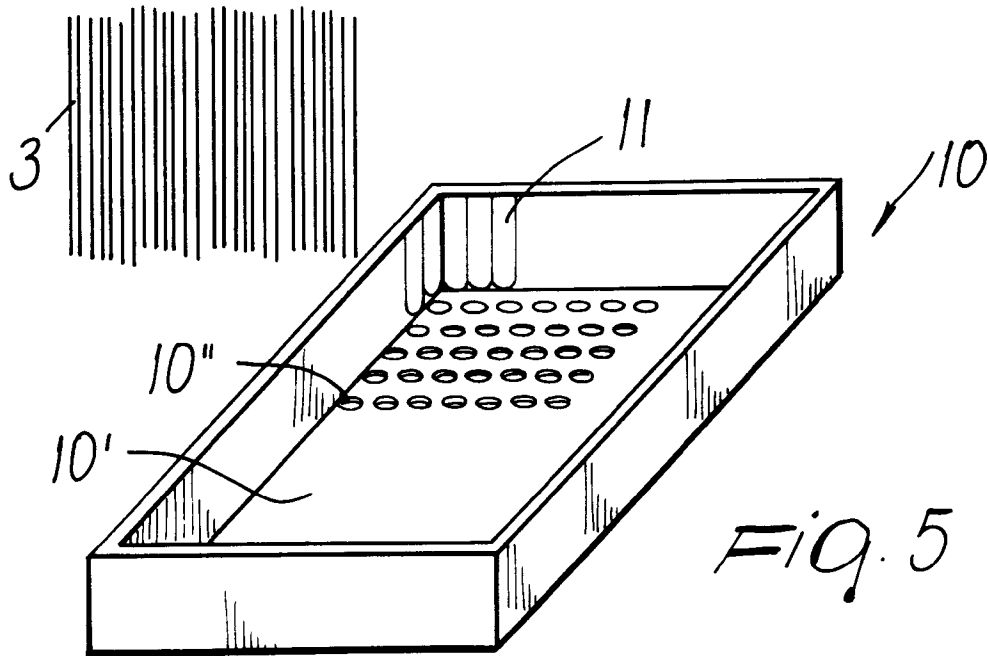


FIG. 5

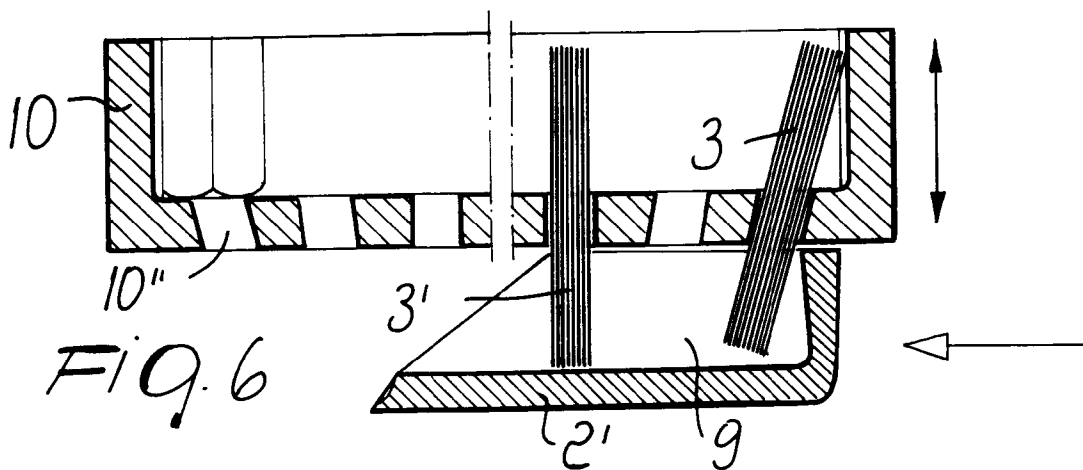


FIG. 6



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 94 11 2064

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X Y	CA-A-1 185 640 (PORTER) * page 6, line 28 - page 13, line 5; figures *	1,2,4,12 3,5,6,10	A46D3/04 A46B3/02
Y	FR-A-2 335 177 (SELLE) * page 2, line 30 - page 3, line 41; figures *	3,10	
Y	CH-A-178 182 (VON ARX & CIE.) * the whole document *	5,6	
A	CH-A-178 183 (VON ARX & CIE.) * the whole document *	1,5	
A	DE-A-26 36 023 (NEWARK BRUSH CO.) * page 6, paragraph 1; figures *	1,7	
A	DE-A-16 32 373 (JOH. KLEINWEFERS SÖHNE) * page 4, paragraph 1 - page 5, paragraph 1; figures 1-4 *	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			A46D A46B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 23 November 1994	Examiner Ernst, R
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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