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(54) Expandable curler

(57) An expandable curler (1) by which the hair winding no longer requires a particular skill, because the strain imparted by the curler to the hairs no longer depends on the strain applied by the operator throughout the winding operation, and wherein possible differences in strain caused by the humidity or by the drying are compensated by the curler, which consequently expands or contracts itself, comprises a curler body split in two or more rigid longitudinal sectors (2, 3) forming together a winding surface (4, 5) receiving an amount of wound hairs in a contracted configuration; locking means (9, 10) of said sectors (2, 3) in said contracted configuration; and elastic means (8), housed inside said sectors (2, 3), apt to apply on said sectors (2, 3) a predetermined elastic force expanding the winding surface 4, 5) and determining a strain state at the wound hairs until the reaching of a balance between inner elastic force and strain applied to the wound hairs, when said locking means (9, 10) are deactivated.

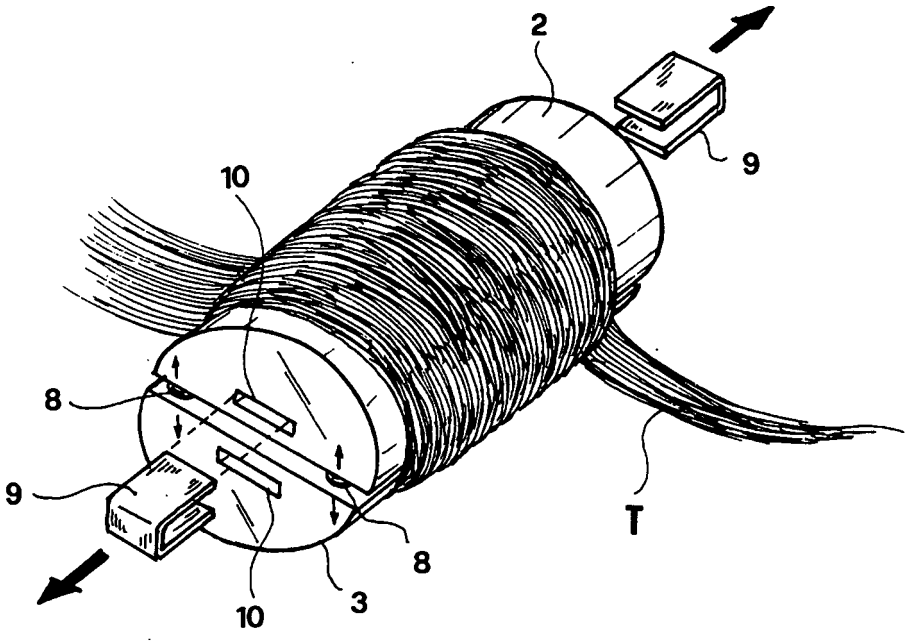

FIG.4B

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Description

[0001] The preset invention is related to a curler of the expandable kind, generally used for curling the hairs either of a head hair, i.e. a braid, or possibly of a wig or a hair extension system as well.

[0002] The known expandable curlers generally involve a curler body having an external surface apt to receive wound hairs to be curled, dry or wet.

[0003] In the art, some examples of curlers are known, wherein the volume thereof can be modified. For instance, US 5,020,552 A and US 3,707,155 A disclose curler device to wind and curl hairs having a collapsible cylindrical external surface.

[0004] In US 3,707,155 A, the collapsibility is determined by the extraction of a rigid member from an external hose with flexible walls. In such a way, the hairs wound and tightened on the external surface of the hose can be released, to deposit a curling agent on the hairs, which are then tightened again.

[0005] Instead, US 5,020,552 A discloses a curler having a tubular structure split in two half-shell movable from an expanded configuration to a retracted configuration and vice versa, thanks to an internal mechanical device. In such a way, the hairs are wound when the curler is expanded, while the curler is then more easily extracted from the curls, when it is arranged in a retracted configuration.

[0006] In any case, the two above mentioned curlers have two working configurations clearly distinct to each other: an expanded configuration and a retracted configuration. Another curler similar to the latter ones is disclosed in Japanese patent application No. JP 2000-060628 A.

[0007] Instead, Japanese patent application No. JP 2001-037528 A discloses a curler wherein the resilient tubular structure thereof is compressed by the hairs very tightly wound therearound. In this way, the curler structure partly restores the strain imparted to wind the hairs as elastic strain stretching and tightening the wound hairs.

[0008] However, the use of a similar kind of curler is very uncomfortable for the user, whose hairs are subjected to a strong and even painful strain through the winding thereof. Further, the strain provided by the curler to the hairs is forcedly very limited. Another curler, having a working very similar to that of the latter, is disclosed in Japanese patent application No. 2005-026354 A.

[0009] Through all the above described curlers, the strain applied to the hairs throughout the curling is determined by the strain imparted by an operator in the winding operation, hence by his physical strength, notwithstanding the discomfort suffered by the user. It is understood that an operator with less skill, or with more or less strength in his hands, could subject the hairs to a different strain from curl to curl, and from user to user, thus obtaining results even remarkably different to each other.

[0010] Another element which could influence the curling and make unpredictable the results of the use of the curler is the resilience of the hairs, which varies from user to user and depends on the humidity condition of the hairs too. As a matter of fact, a wet hair becomes more resilient and the resilience variation is different from hair to hair. Hence, hairs wound around a curler and subsequently wetted, or vice versa, may be subject to even remarkable variations in strain, which may, in some cases, almost thwart the curling effect and, in other cases, damage the hair structure for the excessive applied strain.

[0011] The amount of hairs on the braid to be wound and the thickness thereof also influence the strain applied to the hairs in the winding operation. It is understood that the hairs outside the winding, according to the operator's skill, may be subjected either to a greater or to a lesser strain with respect to the inner hairs. This may render the curling uneven and prevents the achievement of full-bodied swirls, well defined and uniform.

[0012] Finally, the heating conditions may also vary the resilience of hairs and thus the strain state thereof, and the same for the chemical treatments to which the hairs are subjected while they are wound.

[0013] The technical problem underlying the present invention is to provide an expandable curler able to obviate to the drawbacks mentioned with reference to the state of the art.

[0014] Such a problem is solved b yan expandable curler comprising a curler body split in two or more rigid longitudinal sectors forming together a winding surface receiving an amount of wound hairs in a contracted configuration, **characterized in that** it comprises locking means of said sectors in said contracted configuration and elastic means, housed inside said sectors, apt to apply on said sectors a predetermined elastic force expanding the winding surface and determining a strain state at the wound hairs until the reaching of a balance between inner elastic force and strain applied to the wound hairs, when said locking means are deactivated.

[0015] With the above defined curler, the hair winding no longer requires a particular skill, because the strain imparted by the curler to the hairs no longer depends on the strain applied by the operator throughout the winding operation. Further, possible differences in strain caused by the humidity or by the drying are compensated by the curler, which consequently expands or contracts itself. Ultimately, the curler expansion can transmit a strain state even through a remarkable braid thickness.

[0016] More advantages and changes to the above defined invention will be disclosed by the description of an embodiment of expandable curler, provided to an exemplificative and non limitative purpose with reference to the annexed drawings, wherein:

- Figure 1 shows a partially sectioned perspective view of an expandable curler according to the invention in an expanded configuration;

- Figure 2 shows a perspective view of the curler of Figure 1 in a contracted configuration;
- Figures 3A and 3B show cross-sections of the curler of the preceding figures, in an expanded (3A) and contracted (3B) configuration respectively, according to lines A-A e B-B of Figures 1 and 2 respectively; and
- Figures 4A and 4B illustrate, through respective perspective views, the use of the curler of Figures 1 and 2.

[0017] With reference to the figures, an expandable curler is indicated by 1 as a whole. It comprises a curler body determined by the matching of two half-shells 2, 3 embodying rigid longitudinal sectors, two in the present case, in which the curler body is split.

[0018] However, it is understood that the curler body can be split in a number of longitudinal sectors even greater than two.

[0019] The half-shells 2, 3 also determine a substantially cylindrical winding surface, defined by the curved free surfaces 4, 5 of the two half-shells, opposite to the inner surfaces 6, 7 of the two half-shell, intended to be matched to each other.

[0020] In the present embodiment, the shape of the curler body is cylindrical with a circular section, but it is understood that various shapes are possible, even conical, as long as they provide a winding surface apt to receive wound hairs.

[0021] On said surface 4, 5 means for retaining hairs may be provided, e.g. pliers means, spring means (not shown) or unevenness on the surfaces, like corrugated profiles or pins creating a comb effect keeping the hairs locked in their wound configuration. However, it has to be noted that the hairs can be locked wound by a superimpositions of coils wound at the start around the curler body. In such a case, smooth free surface may ease the sliding of hairs on them without damages.

[0022] Inside said half-shell 2, 3, the curler 1 comprises elastic means provided for applying on the half-shells 2, 3, i.e. the above sectors, an elastic force pulling them apart and expanding the winding surface produced by them.

[0023] In the present embodiment, such elastic means comprises four helical springs 8 arranged between the inner surfaces 6, 7 of the half-shells 2, 3 at the angular points of the inner surfaces.

[0024] It is understood that any elastic member, apt to apply an elastic force pulling said sectors, in which the curler body is split, apart and expanding the winding surface could be considered fit for this purpose.

[0025] For instance, helical springs with axis perpendicular to the longitudinal development of the curler may be replaced by a leaf spring or coil spring whose end coils act on the inner curved surface of the half-shells 2, 3. Alternatively, the half-shell 2, 3 may house inside a compressed elastic member, e.g. an elongated sponge or foam rubber member, appropriately shaped to expand itself to pull said half-shells 2, 3 apart.

[0026] Moreover, means for preventing the disengagement of the half-shells 2, 3 may be provided, e.g. a spin-plug arrangement between the half-shells determining an end stop, corresponding to the maximum expansion of the curler 1. Otherwise, as in the present embodiment, the springs 8 themselves can be connected to the half-shells 2, 3 to prevent their disengagement. Alternatively, the curler can have a closed external envelope, possibly water-proof to protect the inside of the curler, limiting the expansion of the two half-shells 2, 3 introducing a maximum extension corresponding to the maximum volume of the envelope.

[0027] Further, the curler 1 comprises means for docking the sectors, in which it is split, in a contracted configuration, wherein the winding surface is minimal and wherein the half-shells of the present embodiment are matched against each other, in opposition to the elastic force keeping them apart.

[0028] It is understood that so many other variations are possible for said docking means. In the present embodiment, such locking means comprises a pair of clamps 9 which may be inserted, at each end of the curler, into suitable notches or seats 10 formed in said half-shells 2, 3.

[0029] Among the possible alternatives, a single clamp may be cited, longitudinally extending across the curler body, two or more non-elastic rings or two rigid caps, apt to be fitted on the curler body ends, a cord possibly inserted in suitable holes formed at each curler ends, which can be knotted to lock the curler body in a contracted configuration and then loosened to release it, a locking lever mechanism and so on.

[0030] Preferably, said docking means can act on the opposite ends of the curler, to assure the contraction thereof, along the whole length thereof.

[0031] Said elastic means are provided to establish a strain state into the wound hairs until the reaching of a balance between inner elastic force and strain applied to the wound hairs, when said locking means are deactivated.

[0032] The working of the elastic means 8 and of the docking means 9, 10 will appear in greater detail form the description of the procedure according to which the curler has to be used.

[0033] In connection with Figures 4A and 4B, at the beginning the docking means 9, 10 are activated in opposition to the inner elastic force of the elastic means 8 trying to expand the curler from the inner.

[0034] In such contracted configuration, a braid T is winded around the curler 1, the braid T being dry or wet, treated, pre-treated or even to be treated and so on. The hairs are locked on the winding surface 4, 5 of the curler 1 by superimposition of the first coils of the braid (Figure 4A).

[0035] The operation of winding can be carried out im-

parting any strain to the wound hairs. The size, i.e. the length and the thickness of the braid T can be any. At the winding end, the hairs can be locked by any kind of conventional clip.

[0036] Then, the operator can deactivate the docking means, in this embodiment extracting the clamps 9 from their seats 10. In this way, the internal elastic means is activated, the elastic force thereof being pre-determined by the elastic constant of the spring or of the springs inside the curler 1.

[0037] Thus, the curler 1 expands until the reach of a balance between the inner elastic force and the strain applied to the wound hairs. Hence, if the hairs have been tightly tightened, the expansion is minor, and if the winding is loose, the expansion is greater. In both cases, at the end the hairs are subjected to the same strain.

[0038] If, in the winding, the hairs are subjected to a modification of the elasticity thereof, e.g. because the hairs are wetted, dried or chemically treated, the curler adjust itself to the new hair elasticity.

[0039] At the end of the treatment, the curler can be manually compressed, and the locking means can be re-activated, in the present embodiment by inserting again the clamps 9 in their seats 10. The contraction of the curler 1 hence can ease the unwinding of the braid T at the end of the treatment.

[0040] It is understood that the operator can select among a set of curlers having different inner elastic constants, to apply more or less strain to the hairs, according either to the treatment to be carried out or to the wished effect.

[0041] Further, it is understood that the achievement of a given strain state depends only on the selected elastic constant, but not on the operator's skill. Therefore, the operator may have less skill in this kind of treatments.

[0042] Obviously, through this set, sizes, i.e. length and diameter, of the different curler may vary and the elastic force thereof, i.e. the power to strain the wound hairs, can be easily identified by a particular colour and/or a pattern formed on the winding surface.

[0043] The above described curler 1 can be easily made in inert material, not chemically interacting with the hair, suitable for a mass production, e.g. by molding. The selected material can be plastic or metallic, e.g. aluminium. In the latter case, the curler may house also heating means, to be activated during the hair treatment for drying or to set the curled shape thereof.

[0044] In the embodiment here described, the expansion occurs by mutual pulling-apart of the longitudinal sectors, but it is understood that the same result may be achieved through a mutual relative rotation of the sectors around a longitudinal axis. The rotation may determine the overall expansion of the winding surface by an internal cam profile guiding the longitudinal sectors and/or by a peculiar shape of each sector.

[0045] To the above disclosed expandable curler a man skilled in the art, to meet further and contingent needing, may introduce several additional changes or variants, all of them in any case falling within the protection scope of the present invention, as defined by the annexed claims.

Claims

1. Expandable curler (1) comprising a curler body split in two or more rigid longitudinal sectors (2, 3) forming together a winding surface (4, 5) receiving an amount of wound hairs in a contracted configuration, **characterized in that** it comprises locking means (9, 10) of said sectors (2, 3) in said contracted configuration and elastic means (8), housed inside said sectors (2, 3), apt to apply on said sectors (2, 3) a predetermined elastic force expanding the winding surface 4, 5) and determining a strain state at the wound hairs until the reaching of a balance between inner elastic force and strain applied to the wound hairs, when said locking means (9, 10) are deactivated.

2. Curler (1) according to claim 1, wherein the curler body is determined by the matching of two half-shells (2, 3) forming said rigid longitudinal sectors.

3. Curler (1) according to claim 1, wherein the winding surface is substantially cylindrical.

4. Curler (1) according to claim 1, wherein the curler body comprises means for retaining the heir in their winded configuration.

5. Curler (1) according to claim 1, wherein the elastic means comprises helical springs (8) inside said sectors (2, 3).

6. Curler (1) according to claim 1, wherein the curler body comprises means for preventing the disengagement of said sectors (2, 3).

7. Curler (1) according to claim 1, wherein the locking means (9, 10) acts on the opposite ends of the curler body, to ensure the contraction along the whole length thereof.

8. Curler (1) according to claim 1, wherein the curler body is made of inert material, plastic or metallic.

9. Curler (1) according to claim 1, wherein the curler body comprises heating means, to be activated during the hair treatment either to dry or to or to set the curled shape thereof.

10. Curler (1) according to claim 1, wherein the expansion of the winding surface (4, 5) occurs by mutual polling apart of the longitudinal sector (2, 3).

11. Curler (1) according to claim 1, wherein said sectors

(2, 3) expand the winding surface (4, 5) by mutual relative rotation of the sectors (2, 3) around a longitudinal axis with respect to an internal cam profile guiding the longitudinal sectors (2, 3) and/or by a peculiar shape of each sector (2, 3).

12. Set of curlers (1) as defined in any of the preceding claims, wherein the elastic means has different elastic constants, to apply more or less strain on the hairs according either to the treatment to be carried out or to the wished effect.

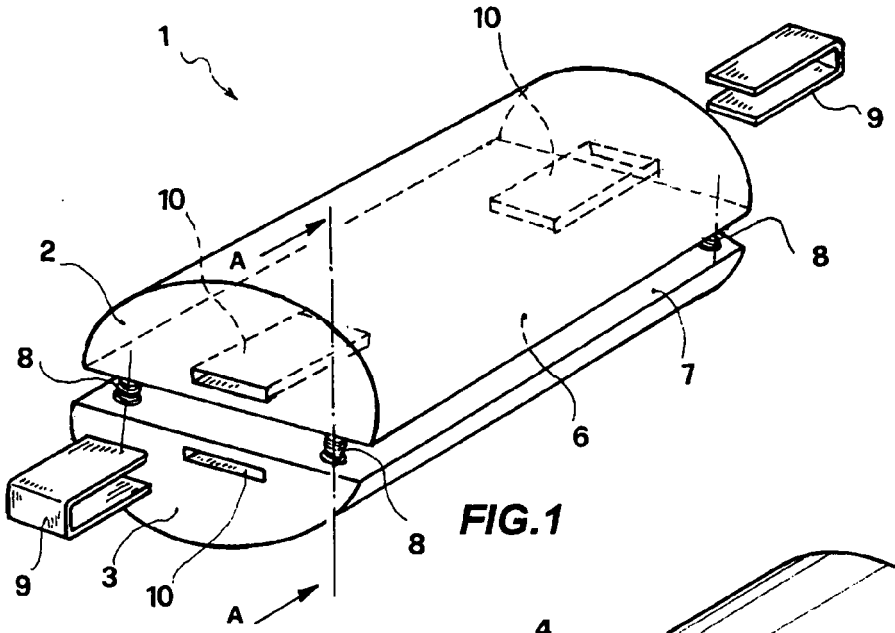

FIG.1

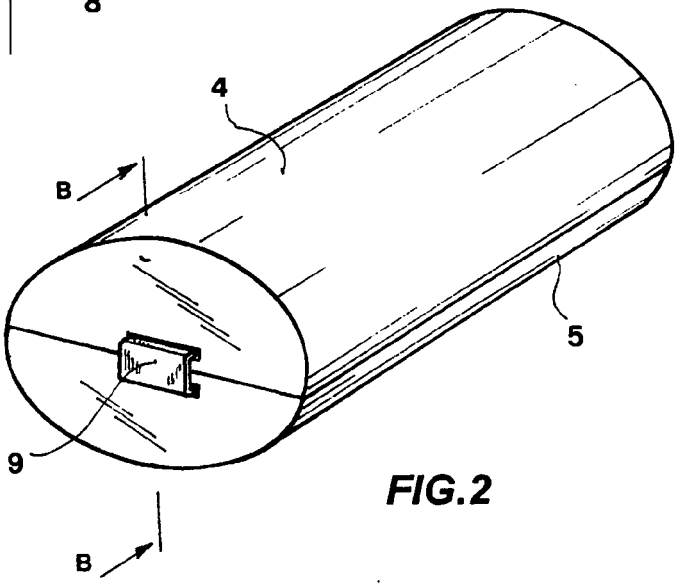

FIG.2

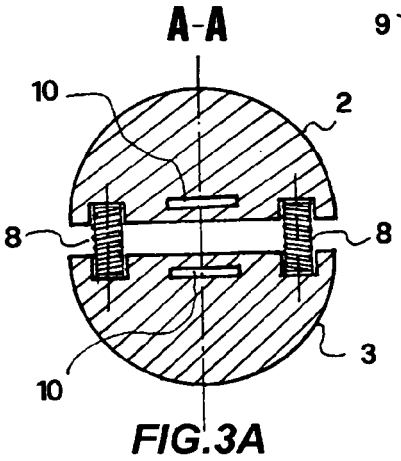

FIG.3A

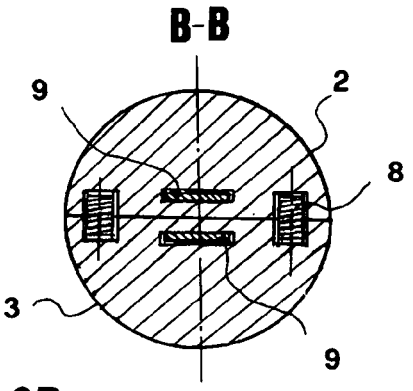

FIG.3B

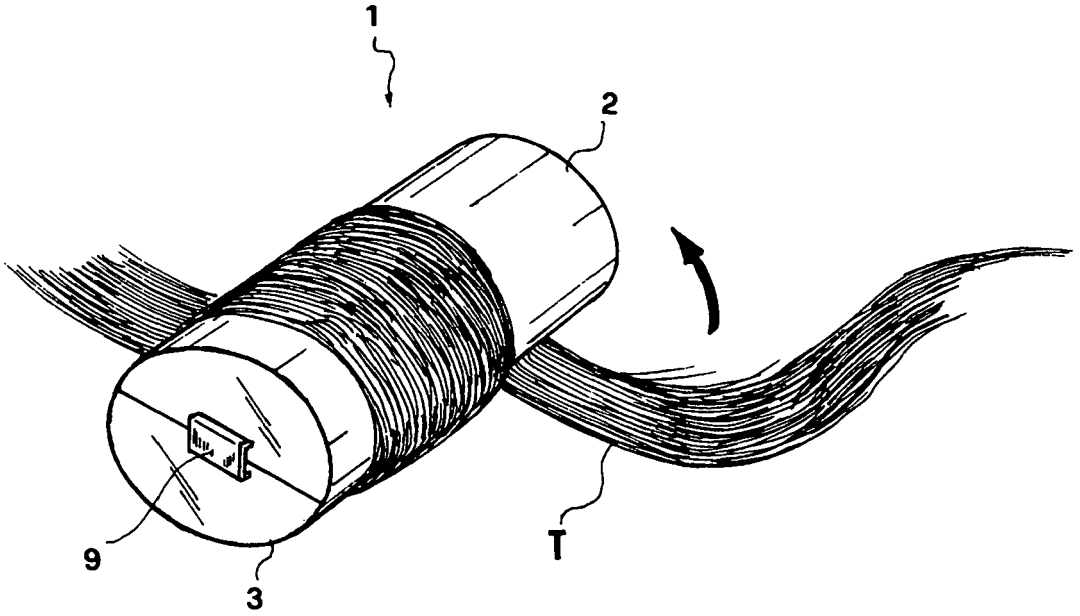

FIG.4A

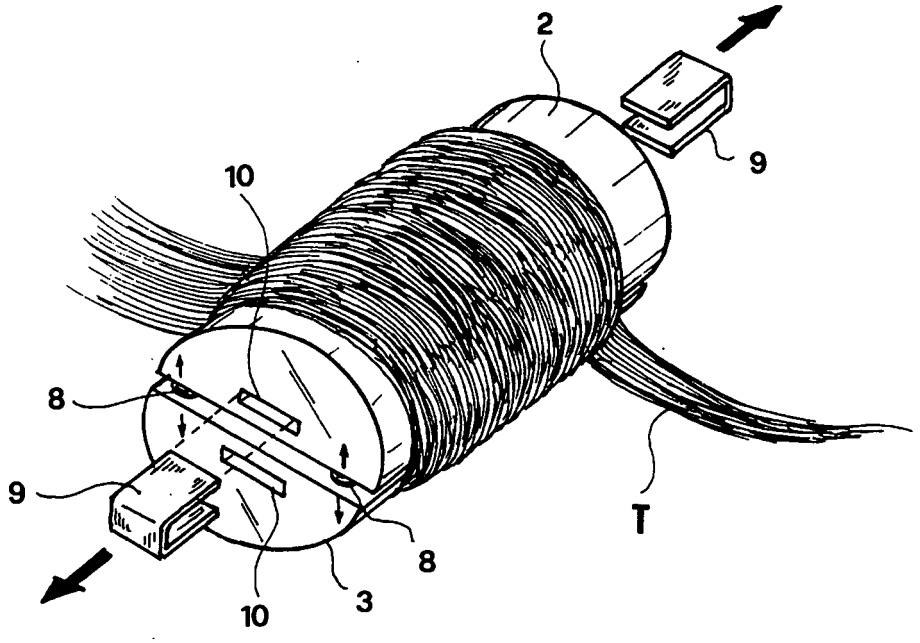

FIG.4B

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EUROPEAN SEARCH REPORT

Application Number
EP 08 42 5414

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
D,A	US 5 020 552 A (HOLLENBERG DETLEF [DE] ET AL) 4 June 1991 (1991-06-04) * column 6 - column 7; figures 1-5,11 *	1-12	INV. A45D2/20 A45D2/24
A	US 3 583 409 A (RIOS ROBERT) 8 June 1971 (1971-06-08) * column 2; figures *	1-12	ADD. A45D2/36
A	WO 2006/025442 A (KIKUBOSHI CORP [JP]; TAKEHANA MIKI [JP]) 9 March 2006 (2006-03-09) * abstract; figure 9 *	1-12	

TECHNICAL FIELDS SEARCHED (IPC)

A45D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	11 December 2008	Dinescu, Daniela

CATEGORY OF CITED DOCUMENTS

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EPO FORM 1503 03.82 (P04C01)

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11-12-2008

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5020552 A	04-06-1991	DE 3544275 A1	23-04-1987
		DE 8535210 U1	15-01-1987
		EP 0219783 A2	29-04-1987
		US 4856542 A	15-08-1989
US 3583409 A	08-06-1971	NONE	
WO 2006025442 A	09-03-2006	JP 2006068081 A	16-03-2006

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 5020552 A **[0003] [0005]**
- US 3707155 A **[0003] [0004]**
- JP 2000060628 A **[0006]**
- JP 2001037528 A **[0007]**
- JP 2005026354 A **[0008]**