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(54) **Laundry unit**

(57) Laundry unit (1) for washing fabrics, clothes and the like, comprising a basin (2) for receiving the product to be washed and forced motion means (4) for the water contained in the basin (2) during washing (Figure 1).

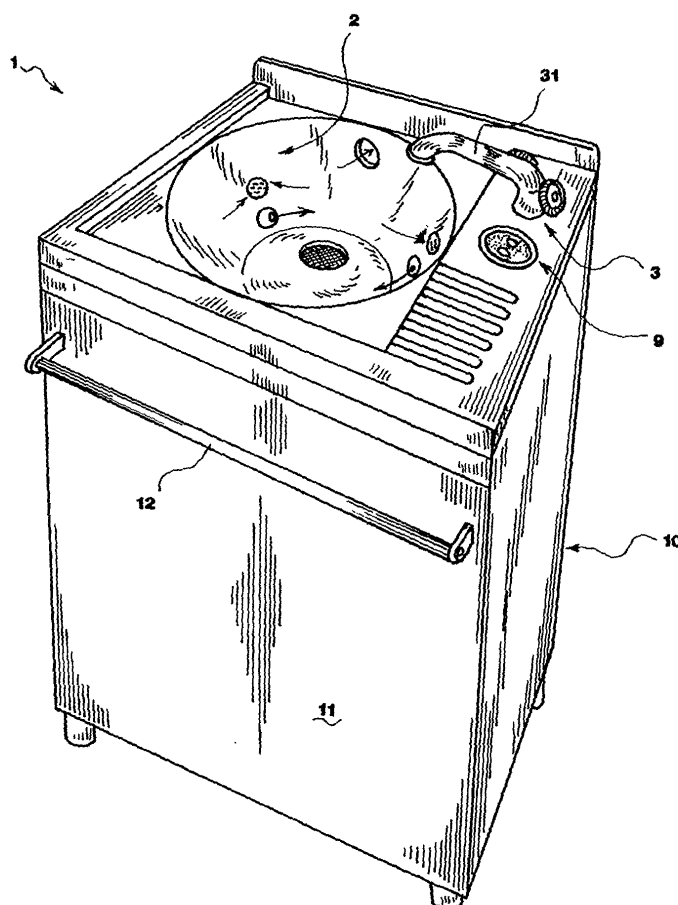


fig.1

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Description

[0001] The present invention relates to a laundry unit for washing fabrics, clothes and the like.

[0002] The evolution of raw materials for the production of clothes and yarns led to the making of articles of clothing of improved quality, which however are often quite delicate, hence requiring particular care during washing. In particular, some article typologies require, so that their properties be left unaltered, exclusively a manual washing or a manual prewashing and a subsequent washing in a washing machine according to necessarily delicate programs.

[0003] More specifically, the manual washing or prewashing commonly comprises first of all a step of so-called 'soaking' in which the article of clothing is left immersed in a suitable solution of water and detergent, and subsequently several steps of manual rinsing thereof. These washing steps can also provide an operator's rubbing action, aimed at fostering the elimination of specific stains. However, said rubbing should be performed with great care, so as to avoid causing permanent deformations of the fabric caused by a brisk manual action.

[0004] Hence, overall the manual washing of articles of clothing and of fabrics in general, though necessary in many cases, requires time and care, besides from it being very toilsome for the operators performing it.

[0005] Moreover, it should be added that the manual washing requires anyhow the operator to remain with hands and arms immersed in water for lengthy periods of time and to be exposed to the aggressive chemical agents often contained in detergents and in the detergent solutions employed in washing, like e.g. chlorine water.

[0006] The technical problem underlying the present invention is that of providing a laundry unit allowing to overcome the drawbacks mentioned above with reference to the known art.

[0007] Such a problem is solved by a laundry unit according to claim 1.

[0008] According to the same inventive concept, the invention further provides a washing method according to claim 19.

[0009] Preferred features of the present invention are present in the dependent claims thereof.

[0010] The present invention provides some relevant advantages. First of all, the provision of forced motion means for the water contained in the basin of the laundry unit allows to attain an effective and concomitantly delicate washing of the article of clothing, with no need of a manual action, and, above all, of a rubbing action, by a operator.

[0011] In particular, the laundry unit enables to carry out a step of 'dynamic' soaking, i.e. it enables to attain a circulation of the washing water and therefore of the product to be washed, which is dragged into motion by water itself. This greatly enhances the effectiveness of the soaking step, and furthermore reduces the times required to attain the desired result.

[0012] Moreover, these same motion means enables to effectively carry out the rinsing of said article, always with no need of an operator's intervention.

[0013] The laundry unit of the invention enables anyway the operator to monitor the development of the soaking and rinsing steps, and to manually intervene at will on the article at any one washing step. Anyhow, in principle the invention enables to entirely avoid a operator's intervention, and, in some cases, even of making without a post-prewashing delicate washing in a washing machine.

[0014] Moreover, end results being equal, the washing according to the invention generally requires smaller quantities of detergent, by virtue of the remarkable contribution to the cleansing action provided by the dynamic action of the circulating water. Accordingly, a lesser environmental impact of the washing itself is attained as well.

[0015] Other advantages, features and the modes of employ of the present invention will be made apparent in the following detailed description of some embodiments thereof, given by way of example and not for limitative purposes. It will be made reference to the figures of the annexed drawings, wherein:

Figure 1 shows a perspective view of a first embodiment of a laundry unit according to the present invention;

Figure 2 shows a perspective view of some internal components of the laundry unit of Figure 1;

Figure 3 shows a top plan view of the laundry unit of Figure 1;

Figure 4 shows a longitudinal sectional view of a component of the laundry unit of Figure 1; and

Figure 5 shows a perspective view of a detail of the laundry unit of Figure 1.

[0016] Referring initially to Figure 1, a laundry unit for fabrics, clothes and the like according to the present invention is generally indicated with 1.

[0017] The laundry unit 1 first of all comprises a basin or tank 2 apt to receive the product to be washed.

[0018] As it is apparent in Figure 3, in the present embodiment, the basin 2 has a substantially rounded-corner octagonal contour when observed in a plan view, and in particular it is defined by a base 21 and by a side surface 22 having eight faces, each of which implementing a substantially vertically developing sidewall of the basin itself.

[0019] Of course, the base 21 has a drain hole 23 formed thereon.

[0020] Preferably, the base 21 has a slight inclination with respect to the horizontal plane, so as to foster the outflow of the water towards said drain hole 23 at the emptying of the basin 2 itself.

[0021] Always in the present embodiment, the basin 2 is made of ABS (Acrylonitrile Butadiene Styrene) and it is obtained from ABS plates by thermoforming processes.

[0022] Of course, variant embodiments may provide the basin 2 to be made of different materials, e.g. stainless steel, apt to resist the aggressive action of some chemical solutions, optionally employed in soaking steps, without incurring permanent damage.

[0023] To the basin 2 there can also be associated fittings like, e.g.: a solid wood board, preferably removably coupled to the remaining structure of the laundry unit 1, holding the double function of rubbing plane and of supporting plane; an overflow system; and a drain-trap.

[0024] Further referring to Figures 1 and 3, the laundry unit 1 also comprises means 3 for supplying water to the basin 2, typically consisting of a tap 31 and of further conventional-type hydraulic components associated thereto.

[0025] The basin 2 is supported on a frame 10 in form of a piece of furniture, and in particular of a cabinet provided with a door 11 having a handle 12.

[0026] In the present embodiment, the furniture 10 is made of postformed laminate panels on a waterproof hardboard support. Of course, the structure of the frame 10 can also be made of a synthetic material, so as to optionally install the laundry unit 1 outdoors, exposed to atmospheric agents. However, the frame 10 is susceptible of various embodiments, also to adapt it to the various rooms apt to house the laundry unit 1.

[0027] Since the hereto-introduced components are of conventional type and already present in known laundry units, a further description thereof will be omitted.

[0028] Referring now also to Figure 2, the laundry unit 1 according to the invention further comprises forced motion means 4 of the water contained in the basin 2 during washing.

[0029] In the present embodiment, the means 4 comprises a plurality of water inlet ports, each indicated by 5, and a corresponding plurality of water outlet ports, each indicated by 6.

[0030] A pair of such water inlet ports and water outlet ports 5 and 6 is shown in greater detail in Figures 4 and 5.

[0031] Said water inlet ports 5 and water outlet ports 6 are located in pairs at the sidewalls forming the surface 22 of the tank 2. In particular, in the present example they are on a water inlet port 5 and water outlet port 6 vertically aligned onto alternate walls, the water outlet port 6 being located above the respective water inlet port 5.

[0032] Moreover, each water inlet port 5 has a respective axis of delivery 51 thereof, i.e. a main direction of water delivery, located so as to be substantially tangential with respect to the corresponding sidewall of the basin 2.

[0033] It will be understood that said location of the water outlet ports above the water inlet ports is to be understood as purely by way of example. In particular, a variant embodiment provides an inverted location, i.e. that the water outlet ports be located below the water inlet ports. Advantageously, the latter arrangement allows a more effective outflow to/from the pump at the activation of the forced motion means according to the invention.

[0034] The forced motion means 4 further comprises an electric pump 7 and a hydraulic circuit 8 for connecting the latter to the water inlet ports 5 and to the water outlet ports 6.

[0035] Purely by way of example, hereinafter the specifications of a suitable pump are reported.

Maximum positive displacement	110 l/min
Number of revolutions	2800 rpm
Head	16 m
Electrical input	0.53 kW
Voltage and power supply	2.7 A - 220 V - 50 Hz

[0036] In particular, the hydraulic circuit 8 provides a high-pressure hydraulic path 81 connecting the water inlet ports 5 to the pump 7 and a low-pressure hydraulic path 82 connecting the water outlet ports 6 to the pump 7. In the specific implementation considered here, such paths 81 and 82 provide a tube bundle construction, as it is schematically illustrated in Figure 2, and in particular:

- a polypropylene hose connecting the water inlet ports 5, secured thereto by elastic straps or the like;
- a polypropylene hose connecting the water outlet ports 6, secured thereto by elastic straps or the like;
- a low-pressure hose for delivering the water taken by the outlet circuit to the pump 7; and
- a high-pressure hose at the outlet from the pump 7 for inletting the water in the circuit of the water inlet ports 5.

[0037] The laundry unit 1 further comprises interface means 9 operable by a user to activate the forced motion means 4, and in particular a control panel, it also indicated by 9, provided with suitable on/off push buttons for activating/deactivating the means 4. The internal mechanical and electrical components of the forced motion means 4 and of the

interface means 9 are housed within the frame 10.

[0038] Moreover, the laundry unit 1 is provided with conventional mains-connecting means, in order to power-supply the forced motion means 4 and the interface means 9.

[0039] The modes of employ of the laundry unit 1 will hereinafter be illustrated with reference to the figures introduced hereto.

[0040] First of all, it will be appreciated that the installation modes of the laundry unit 1 do not differ from those of known-art laundry units, apart from the mere need to connect it to the mains, hence a further description thereof will be omitted.

[0041] To wash clothes, fabrics and the like, a user introduces them in the basin 2, water-filling the latter by means of the tap 31.

[0042] Having inserted the detergent or in general the chemical agent for treating the water-immersed cloth or the like, the user can activate the forced motion means 4 by means of the control panel 9. This determines a continuous circulation of the water from the basin to the pump and vice versa, via the water inlet ports 5 and the water outlet ports 6.

[0043] The specific arrangement of the water inlet ports 5 and of the axes of delivery 51 thereof causes the water in the basin 2 to be induced into a substantially rotary motion, dragging the products to be washed therewith. This rotary motion of the water and of the products facilitates the in-depth washing of the latter, and anyhow decreases the times required to attain the desired washing result. In other words, the positioning of the water inlet ports 5 is related to the optimisation of the operation of the laundry unit 1, which is to be capable of emitting water jets apt to strike the product immersed in the water of the basin 2 and to drag said product into rotation, thereby providing an effective washing or prewashing thereof by means of the movement caused by the momentum of the water delivered by the water inlet ports 5. The positioning of the tangential axis of the water inlet port 5 with respect to the side surface of the basin 2 generates the vortex responsible for dragging the product into rotation.

[0044] Once the dynamic soaking has ended, the user can deactivate the means 4, drain the water present in the basin 2, fill the latter with clean water and reactivate the means 4 so as to foster the product rinsing. This step of draining and filling the basin 2 can be repeated several times, so as to foster the complete rinsing of the product.

[0045] A variant embodiment may provide an automatic deactivation of the means 4 when the water level in the basin 2 drops, and/or, vice versa, an automatic activation thereof as soon as the water level reaches that of the water inlet ports 5 and of the water outlet ports 6.

[0046] It will be appreciated that the continuous motion of the water and of the product dragged thereby prevents the formation of stagnant pockets of water and detergent which may stain the product.

[0047] The present invention is susceptible of several embodiments and variants alternative to the hereto-disclosed ones, some of which will summarily be illustrated hereinafter with reference to the sole aspects differentiating them from what has been illustrated hereto.

[0048] First of all, to the abovedescribed basic model there may be associated various additional components in order to broaden the range of possible employs of the laundry unit. E.g., the interface means could also comprise means for selecting an activation time interval for the forced motion means, i.e. a user-programmable timer.

[0049] Moreover, the forced motion means may comprise means apt to reverse the sense of the rotary motion of the water in the basin, and therefore of the products received therein, in order to more effectively wash the latter.

[0050] Moreover, according to an embodiment simplified with respect to the aboveillustrated one, the laundry unit can also provide a single water inlet port and a corresponding single water outlet port.

[0051] Moreover, in principle the water outlet ports and the water inlet ports could also be located on the bottom, i.e. onto the base 21, instead that on the sidewalls of the basin.

[0052] The invention has been hereto described with reference to preferred embodiments thereof. It is understood that other embodiments might exist, all falling within the concept of the same invention, and all comprised within the protective scope of the claims, which follow.

Claims

1. A laundry unit (1) for washing fabrics, clothes and the like, comprising:

- a basin (2) apt to receive the product to be washed; and
- supplying means for supplying water to said basin (2),

characterised in that it further comprises

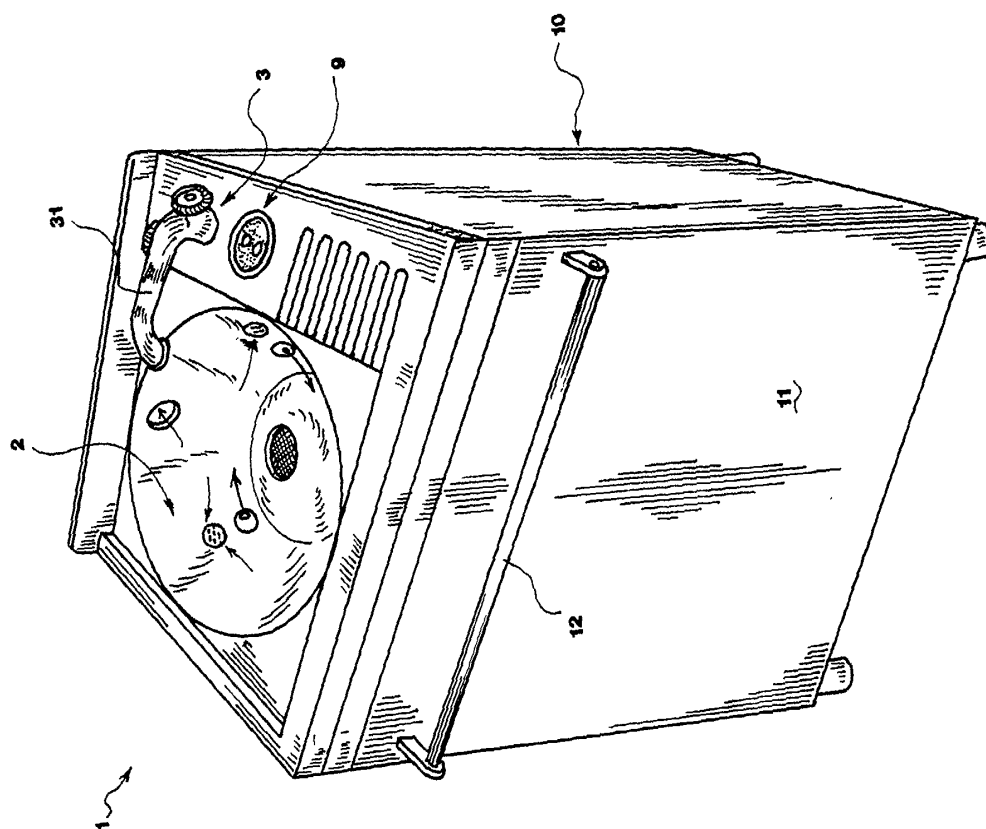
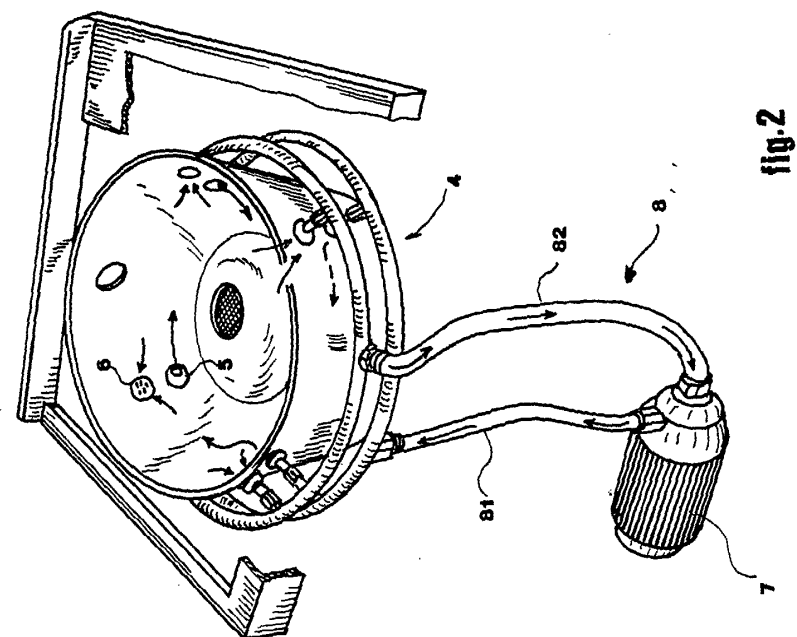
- forced motion means (4) for moving the water contained in said basin (2) during washing.

2. The laundry unit (1) according to claim 1, wherein said forced motion means (4) are apt to induce a substantially rotary movement of the water contained in said basin (2) during washing.
- 5 3. The laundry unit (1) according to claim 1 or 2, wherein said forced motion means (4) comprises at least one water inlet port (5) and at least one respective water outlet port (6) located at said basin (2).
4. The laundry unit (1) according to the preceding claim, wherein said at least one inlet port (5) is located at the side surface (22) of said basin (2).
- 10 5. The laundry unit (1) according to claim 3 or 4, comprising at least one inlet port (5) located at the bottom (21) of said basin (2).
6. The laundry unit (1) according to any one of the claims 3 to 5, wherein said forced motion means (4) comprises a plurality of water inlet ports (5).
- 15 7. The laundry unit (1) according to the preceding claim, wherein the inlet ports (5) of said plurality are located at various sidewalls of said basin (2).
8. The laundry unit (1) according to claim 6 or 7, wherein each inlet port (5) of said plurality is located so as to provide a main direction of water delivery which is substantially tangential with respect to the surface (22) of said basin (2).
- 20 9. The laundry unit (1) according to any one of the claims 3 to 8, wherein said forced motion means (4) comprises a plurality of water outlet ports (6).
- 25 10. The laundry unit (1) according to any one of the claims 3 to 9, wherein each water inlet port (5) is located substantially vertically aligned to a respective water outlet port (6).
11. The laundry unit (1) according to any one of the claims 3 to 10, wherein said forced motion means (4) comprises a pump (7), a high-pressure hydraulic path (81) connecting said water inlet port or ports (5) to said pump (7) and a low-pressure hydraulic path (82) connecting said water outlet port or ports (6) to said pump (7).
- 30 12. The laundry unit (1) according to any one of the preceding claims when dependent from claim 2, wherein said forced motion means (4) comprises means apt to reverse the sense of the rotary motion of the water contained in said basin (2) during washing.
- 35 13. The laundry unit (1) according to any one of the preceding claims, comprising interface means (9) operable by a user to activate said forced motion means (4).
14. The laundry unit (1) according to the preceding claim, wherein said interface means (9) comprises selection means for selecting an activation time interval of said forced motion means (4).
- 40 15. The laundry unit (1) according to any one of the preceding claims, comprising a rubbing plane associated with said basin (2).
16. The laundry unit (1) according to the preceding claim, wherein said rubbing plane is removably connectable thereto.
- 45 17. The laundry unit (1) according to any one of the preceding claims, comprising a support piece of furniture (10) for supporting said basin (2).
18. The laundry unit (1) according to the preceding claim, wherein said support piece of furniture realizes a cabinet (10).
- 50 19. A washing method for washing fabrics, clothes and the like, comprising the steps of:
 - providing a laundry unit (1) according to any one of the preceding claims;
 - 55 - carrying out the washing under soaking, causing a forced movement of the water contained in said basin (2) by means of said forced motion means (4).
20. The method according to the preceding claim when dependent from claim 12, wherein said step of soaking provides

a periodical reversing of the sense of motion of the water produced by said forced motion means (4).

21. The method according to claim 19 or 20, comprising a step of rinsing carried out causing a forced movement of the water contained in said basin (2) by said forced motion means (4).

22. The method according to the preceding claim when dependent from claim 12, wherein said step of rinsing provides a periodical reversing of the sense of motion of the water produced by said forced motion means (4).



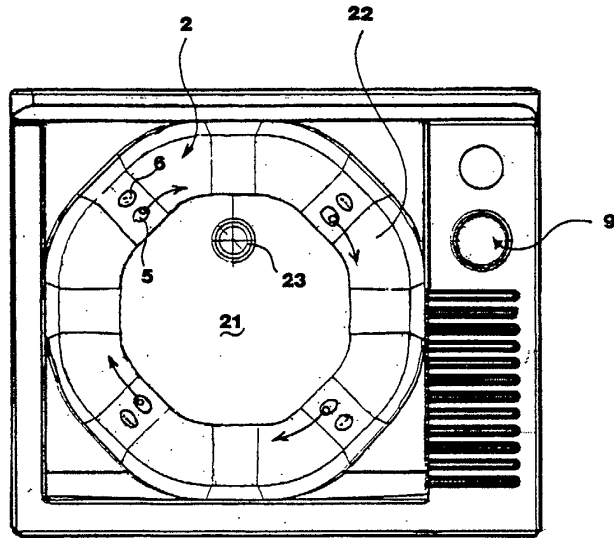


fig.3

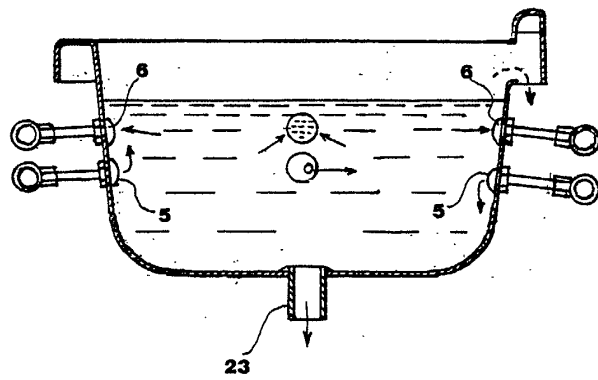


fig.4

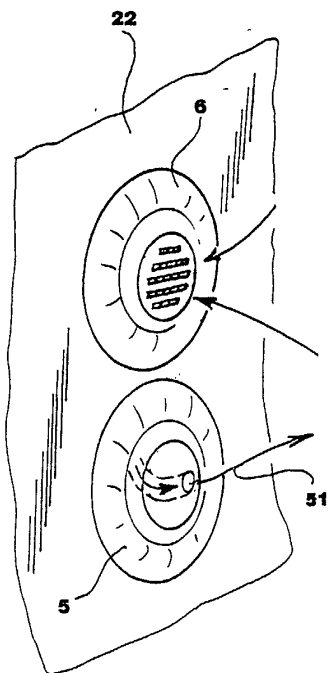


fig.5



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EUROPEAN SEARCH REPORT

Application Number
EP 02 42 5630

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.7)
X	US 6 289 530 B1 (ADAMS KATHERINE R ET AL) 18 September 2001 (2001-09-18) * the whole document *	1-9, 11, 13, 15, 19, 21	D06F17/04 D06F1/00 E03C1/048
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A	FR 2 539 152 A (ARREDAMENTI MONTEGRAPPA SPA) 13 July 1984 (1984-07-13) * the whole document *	1, 15, 16	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			D06F E03C
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 19 November 2003	Examiner Norman, P
CATEGORY OF CITED DOCUMENTS		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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**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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19-11-2003

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