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(54) **Top-loading washing machine with a drum equipped with a single door flap**

Von oben beschickbare Waschmaschine mit einer mit einzigen Tür ausgerüsteten Trommel

Machine à laver à chargement par le haut dont le tambour est équipé d'un portillon à un seul battant

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Description

[0001] The present invention relates to a top-loading washing machine having a drum with a peripheral wall formed with an opening for the passage of the laundry, said opening being provided with a door adapted to close such opening.

[0002] The drum of the majority of top-loading washing machines has a door made by two flaps adapted to partially overlap one another and hingedly mounted on opposite rims of the drum opening by means of springs adapted to bias them towards their open position. Such door flaps are provided respectively with hooks and engagement openings cooperating with one another for locking the flaps in their closed position.

[0003] Such way of construction, for instance shown in EP-A-657573 has the disadvantage that the user has to manipulate two flaps, after having opened the outer lid of the machine that gives access to the drum. Since the user has often one hand already used for carrying a container with the laundry, it is clear that the two flaps door system is not optimal for the user. Another disadvantage of this known door is that it is not very easy to be handled by the user, since the spring-loaded flaps can require damping means for avoiding a too quick and uncontrolled opening of the door, such uncontrolled movement of flaps being noisy. Furthermore, the presence of hooks can also hurt the user.

[0004] A top-loading washing machine having a door in a single piece is disclosed in EP-A-869212 in which the door is pivotally mounted to the spin drum so as to pivot about the centre axis of rotation of the drum. Even if this solution does simplify the way in which the door is opened by the user, nevertheless this system is quite complex, expensive and needs a proper balancing of the door.

EP-A-0959169 and EP-A-0681050 disclose a top-loading machine where the simple piece door is hinged to the drum. Also GB 134659 A and DE 1815020 U disclose simple piece doors for top loading machines in which the door is provided with spring loaded latches.

US-A-3226961 discloses a washing machine according to the preamble of claim 1.

According to the present invention, the above disadvantages are overcome thanks to the features listed in the appended claims.

[0005] In the washing machine according to the invention the door of the drum comprises a single flap having a first end hingedly mounted on a first rim of the opening. Snap-engagement means for locking and unlocking the door are provided between a second end of the flap, opposite to its first end, and a second rim of the opening. In this way the user has to handle only one flap.

[0006] Moreover, such kind of door can be easily opened automatically once the user has manually opened the outer lid of the machine.

[0007] The snap-engagement means comprise a latch element slidable on the second end of the flap and hook elements on the corresponding second rim.

[0008] The absence of hooks results also in a less dangerous design for the user, who does not run the risk of being hurt during the opening of the door.

[0009] The invention will be explained in the following description on the basis of an example of embodiments shown in the drawings in which:

- Figure 1 shows a perspective view of a partially sectioned tub of a top-loading washing machine according to the present invention,
- Figure 2 is a perspective view of the drum of the washing machine shown in figure 1,
- Figure 3 is a top view of a portion of the door drum in a closed configuration,
- Figure 4 is a view similar to figure 3 in which a cover is removed in order to show the snap-engagement mechanism,
- Figures 5 is a cross sectional view along line V-V of figure 3 (configuration of the door immediately before the activation of the snap-engagement mechanism), and
- Figure 6 is a cross sectional view similar to figure 5 in which the locked configuration of the door is shown.

[0010] With reference to the drawings, a top-loading clothes washing machine comprises a tub 10 that is adapted to be suspended in a frame (not shown). In the tub 10 a drum 12 having a horizontal axis is rotatably mounted and it is provided, on its peripheral cylindrical wall 12a, with an opening 14 for loading and unloading clothes items.

[0011] The drum 12 comprises also two opposing end walls 12b, and the opening 14 has two opposite rectilinear rims 14a and 14b respectively. In the embodiment shown in the drawings, a door 16 made by a single curved flap is hinged to a first rim 14a of the opening 14, and springs 18 are coaxially mounted on the hinge in order to bias the door 16 towards its open position shown in figure 1.

[0012] The second rim 14b of the opening 14 is provided with a plurality of mushroom-shaped pins 20 projecting outside the drum. Each pin 20 has a base portion 20a fixed to the drum, and an enlarged tapered end portion 20b, adapted to cooperate with corresponding holes 22a provided in a sliding latch 22 carried by an edge 16a of the door 16. The latch 22 is slidably mounted in a seat 24 defined by the wall of the door and by a cover 26 fixed in 28 to the door (figure 3). For sake of clarity the cover 26 is not shown in figures 1 and 4. The cover 26 present a plurality of dome portion 26a in correspondence to the position of the holes 22a, and it has the main function to avoid any entanglement of laundry items with the pins 20 during loading and unloading of the drum 12. Between the wall of the door 16 and the latch 22 there is provided an axial spring 30 which urges the latch toward a side end position, as shown in figure 4. The latch 22 is also provided with a trigger 32 sliding in a corresponding slot

of the cover 26 in order to allow the user to slide the latch 22 against the action of the spring 30.

[0013] The closure of the door 16 is very easy for the user. He has only to urge the door 16 against the actions of the springs 18 up to a position shown in figures 4 and 5, where the latch 22 is in contact with the tapered end portions 20b of the pins 20. A further small rotation of the door 16 urged by the user causes a snap-engagement of the pin 20 in the corresponding holes 22a of the latch 22 (as shown in figure 6). In this configuration the washing machine can start its washing program. For opening the door 16 the user needs only to act on the trigger 32 so that the latch 22 is disengaged from the pins 20. The springs 18 do the rest.

[0014] In another embodiment of the invention, the latch 22 is provided with an end E which can be driven automatically by a device (not shown) in order to open automatically the door once the user open the lid of the washing machine. Such device can be mechanical (for instance driven by the opening movement of the lid) or electromechanical (for instance driven by a switch that senses when the lid is opened by the user).

Claims

1. A top-loading washing machine, having a drum (12) with a peripheral wall (12a) formed with an opening (14) for the passage of the laundry, said opening (14) being provided with a door adapted to close such opening, said door comprising a single flap (16) with a first end hingedly mounted on a first im (14a) of said opening, there being provided snap-engagement means (20, 22) between the flap (16) and the drum (12) for locking the door,
   characterised in that said snap-engagement means comprise a latch element (22) on a second end (16a) of the flap (16) and hook elements (20) on a corresponding second rim (14b) opposite to the first rim (14a), the latch element (22) being slidably mounted on the flap (16) in a direction substantially parallel to the axis of the drum and comprising a plurality of openings (22a) adapted to cooperate with said hook elements (20), spring means (30) being provided between the latch element (22) and the flap (16) in order to allow the snap-engagement with the hook elements (20) when the door (16) is closed.

2. A top-loading washing machine according to claim 1, **characterised in that** the latch element (22) is provided with a trigger portion (32) adapted to be driven by the user in order to allow the door opening.

3. A top-loading washing machine according to claim 1 or 2, **characterised in that** it comprises means for automatically driving the snap-engagement means (20, 22) in order to open the door (16).

Patentansprüche

1. Toplader-Waschmaschine, die eine Trommel (12) mit einer umfänglichen Wand (12a) aufweist, welche mit einer Öffnung (14) für den Durchtritt von Wäsche ausgebildet ist, wobei diese Öffnung (14) mit einer Tür versehen ist, die dazu angepasst ist, eine derartige Öffnung zu verschließen, und wobei die Tür eine einzelne Klappe (16) mit einem ersten Ende umfasst, die an einem ersten Rand (14a) der Öffnung befestigt ist, und wobei dort Einschlapp-Eingriffselemente (20, 22) zwischen der Klappe (16) und der Trommel (12) zur Verriegelung der Tür vorgesehen sind, **dadurch gekennzeichnet, dass** die Einschnapp-Eingriffselemente ein Schnappelement (22) am zweiten Ende (16a) der Klappe (16) und Hakenelemente (20) an dem korrespondierenden zweiten Rand (14b) gegenüber dem ersten Rand (14a) aufweisen, wobei das Schnappelement (22) gleitbar an der Klappe (16) in einer Richtung im Wesentlichen parallel zur Achse der Trommel befestigt ist und eine Vielzahl von Öffnungen (22a) aufweist, die dazu angepasst sind, mit den Hakenelementen (20) zusammenzuwirken, wobei Federelemente (30) zwischen dem Schnappelement (22) und der Klappe (16) vorgesehen sind, um einen Einschnapp-Eingriff mit den Hakenelementen (20) dann zu ermöglichen, wenn die Tür (16) verschlossen ist.

2. Toplader-Waschmaschine (1), **dadurch gekennzeichnet, dass** das Einschnappelement (22) mit einem Abzugabschnitt (32) versehen ist, der dazu angepasst ist, vom Anwender betrieben zu werden, um die Türöffnung zu ermöglichen.

3. Toplader-Waschmaschine gemäß den Ansprüchen 1 oder 2, **dadurch gekennzeichnet, dass** es Mittel zum automatischen Antreiben der Einschnapp-Eingriffselemente (20, 22) umfasst,um die Tür (16) zu öffnen.

Revendications

1. Machine à laver à chargement par le haut, ayant un tambour (12) comprenant une paroi périphérique (12a) formée avec une ouverture (14) pour le passage du linge, ladite ouverture (14) étant munie d'une porte adaptée pour fermer cette ouverture, ladite porte comprenant un battant unique (16) avec une première extrémité montée de manière articulée sur un premier rebord (14a) de ladite ouverture, des moyens d'enclenchement (20, 22) étant prévus entre le battant (16) et le tambour (12) pour verrouiller la porte, **caractérisée en ce que** lesdits moyens d'enclenchement comprennent un élément de verrouillage (22) sur une deuxième extrémité (16a) du battant (16) et des éléments de crochet (20) sur un

deuxième rebord correspondant (14b) opposé au premier rebord (14a), l'élément de verrouillage (22) étant monté de manière coulissante sur le battant (16) dans une direction sensiblement parallèle à l'axe du tambour et comprenant une pluralité d'ouvertures (22a) adaptées pour coopérer avec lesdits éléments de crochet (20), les moyens de ressort (30) étant agencés entre l'élément de verrouillage (22) et le battant (16) afin de permettre l'enclenchement avec les éléments d'accrochage (20) lorsque la porte (16) est fermée.

2. Machine à laver à chargement par le haut selon la revendication 1, **caractérisée en ce que** l'élément de verrouillage (22) est muni d'une partie de déclenchement (32) adaptée pour être entraînée par l'utilisateur afin de permettre l'ouverture de la porte.

3. Machine à laver à chargement par le haut selon la revendication 1 ou 2, **caractérisée en ce qu'**elle comprend des moyens pour entraîner automatiquement les moyens d'enclenchement (20, 22) afin d'ouvrir la porte (16).

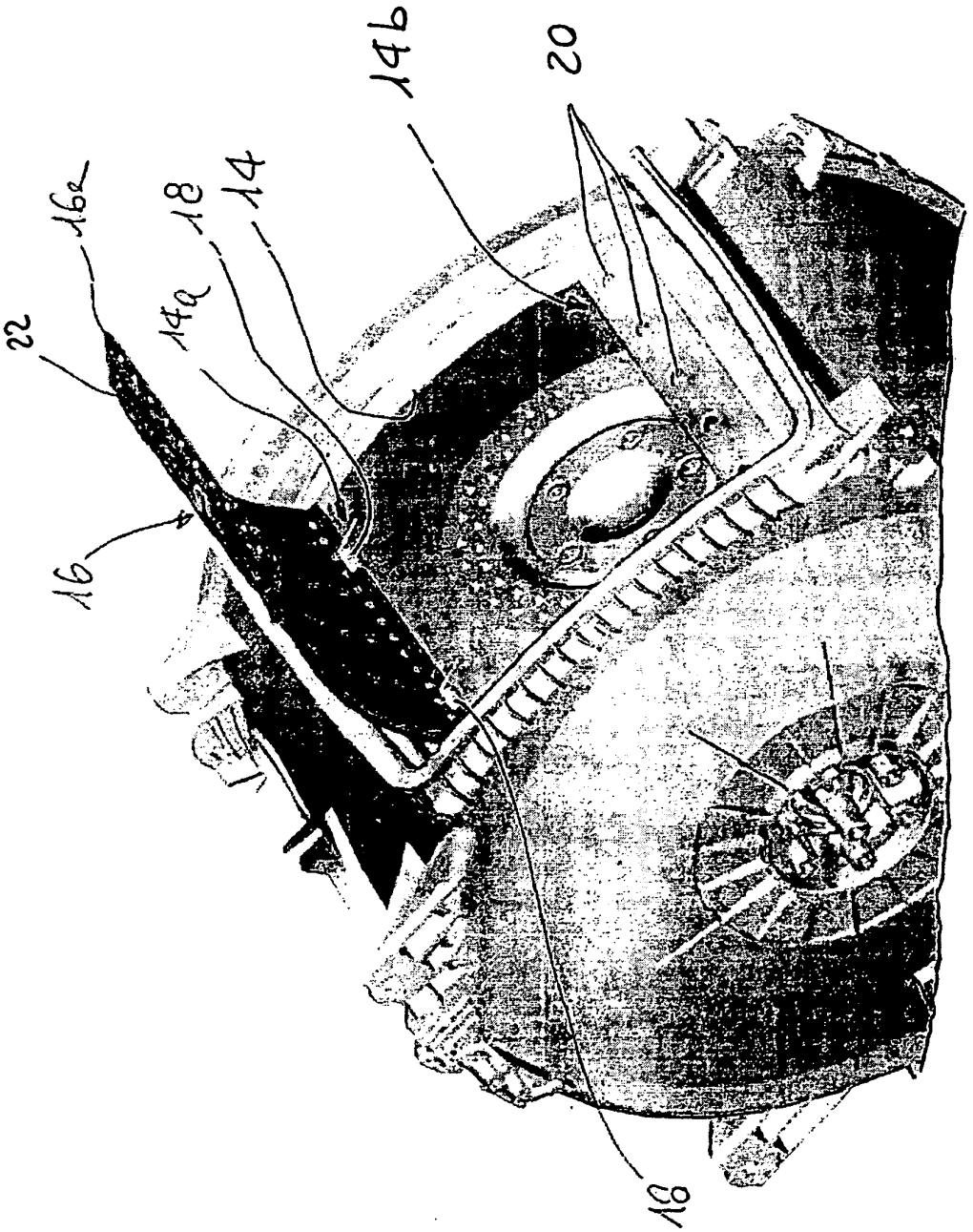

Fig.1

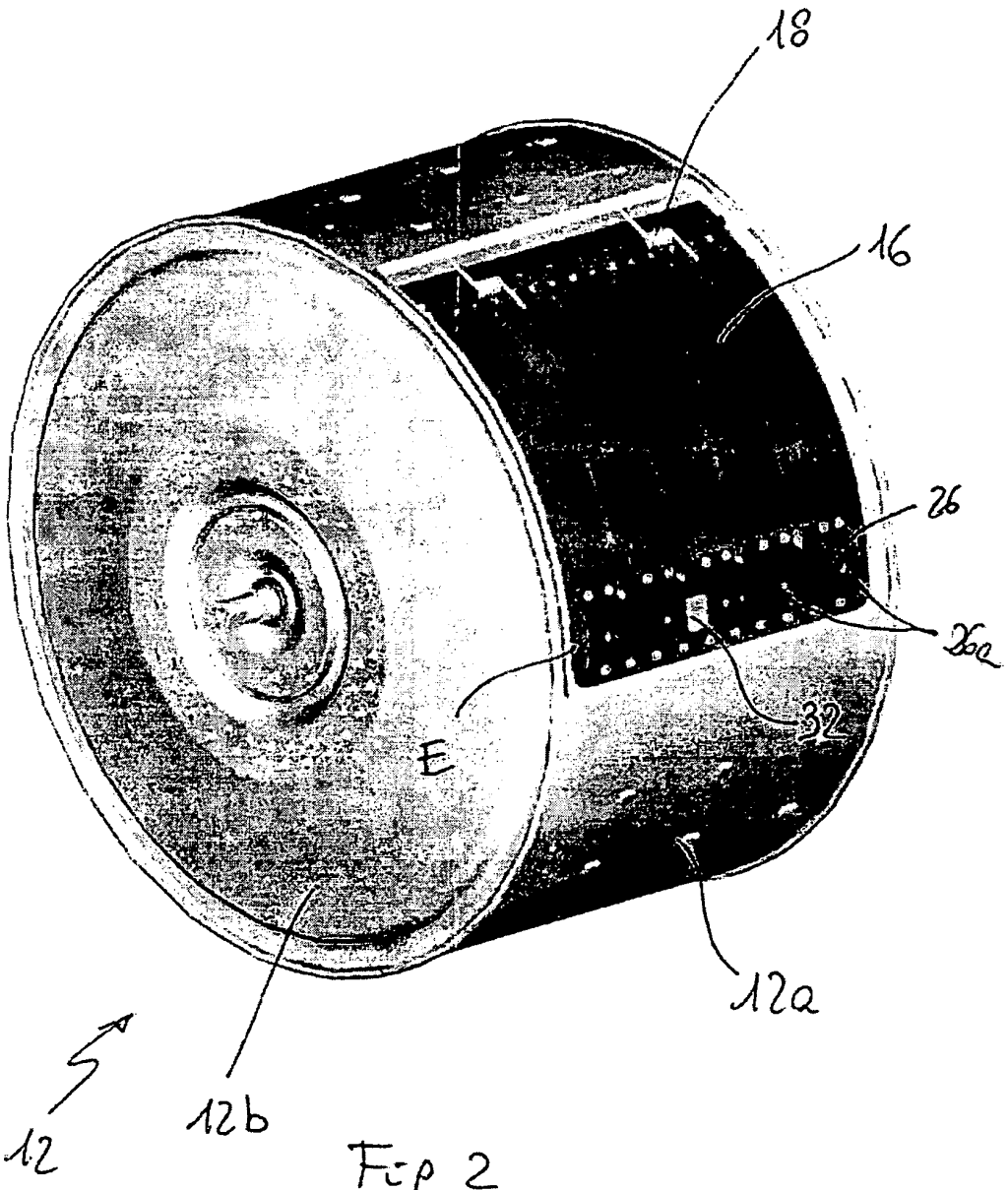

Fig. 2

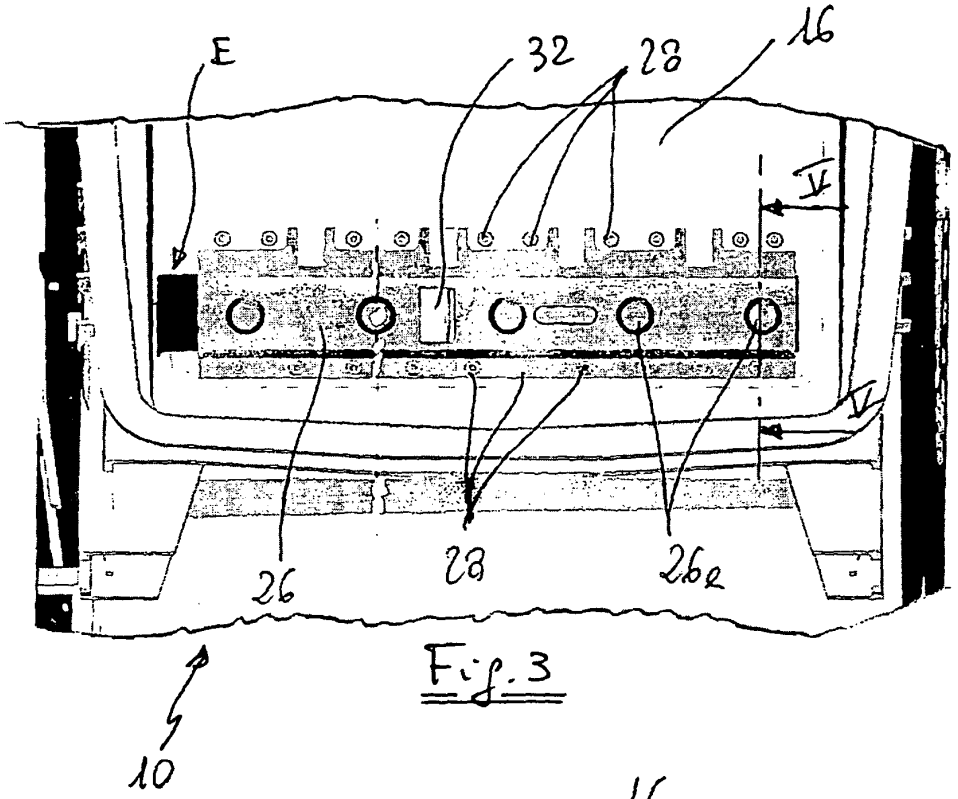

Fig. 3

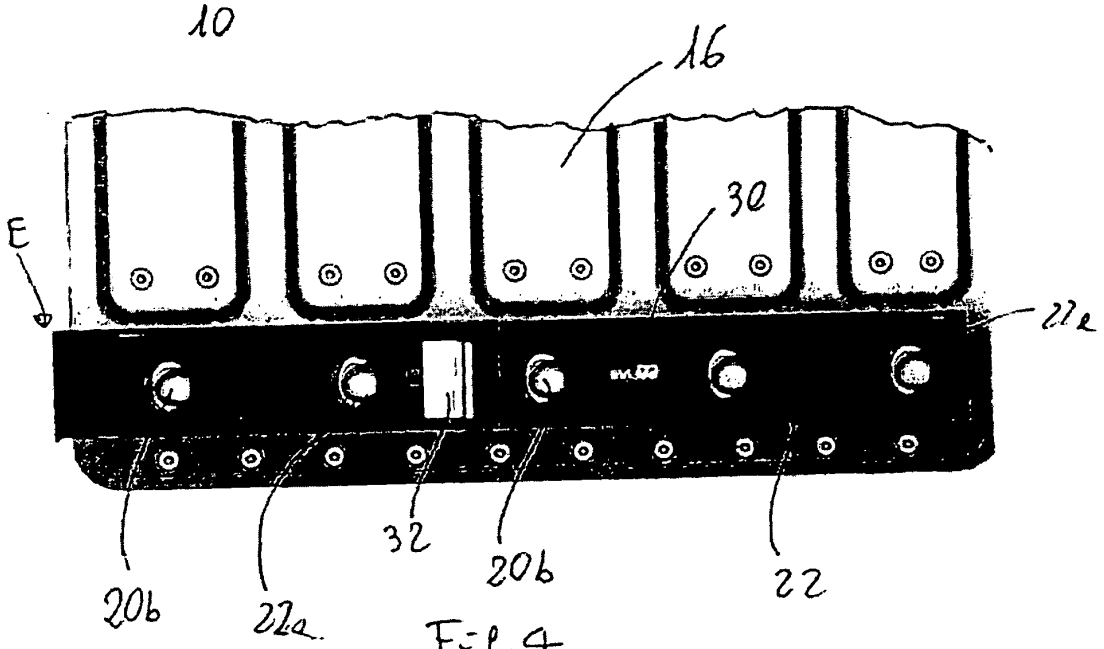

Fig. 4

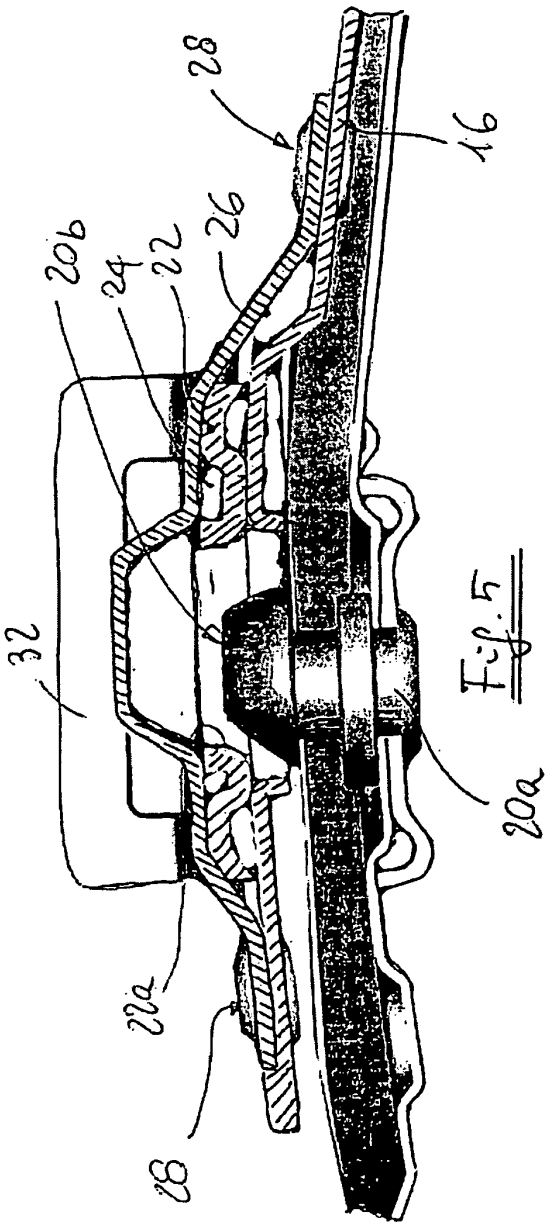

Fig. 5

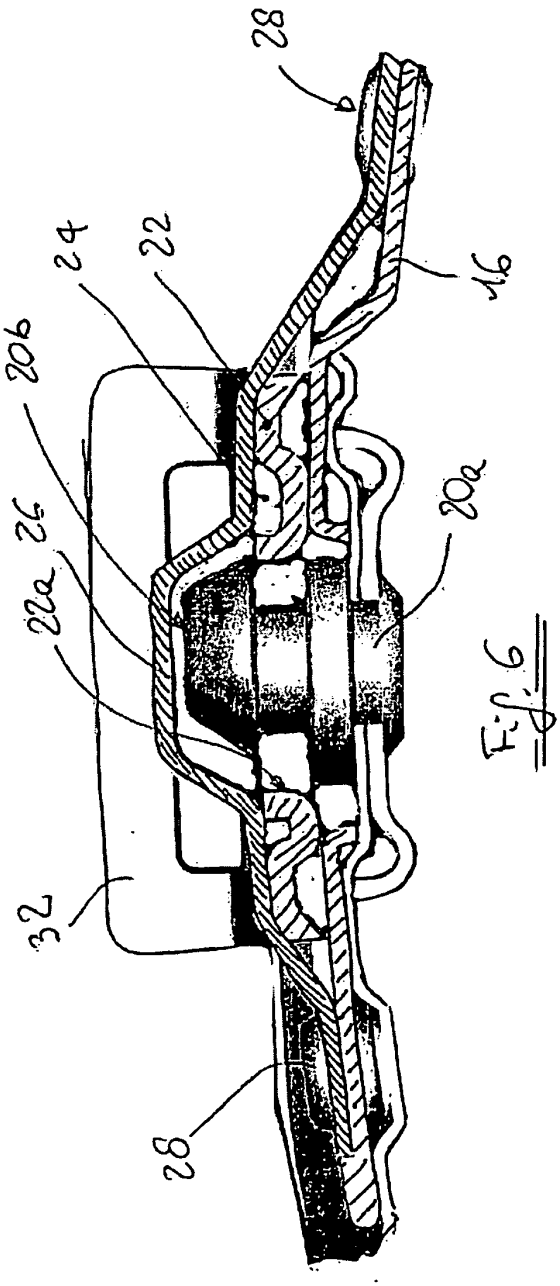

Fig. 6

REFERENCES CITED IN THE DESCRIPTION

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