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(54) **Washing drum for laundry washing machines of the top-loading type.**

(57) A washing drum for laundry washing machines of the top-loading type is provided with door flaps (9, 10) adapted to partially overlap one another and resiliently hinged on opposite edges of a drum opening (6).

The door flaps are provided respectively with an opening (18) and a cylindrical element (13) cooperating with one another for ensuring interengagement of the door flaps and locking thereof in the closed position.

In their closed position, moreover, the door flaps are laterally seated on corresponding longitudinal edges (24) of the drum opening (6).

EP 0 120 388 A1

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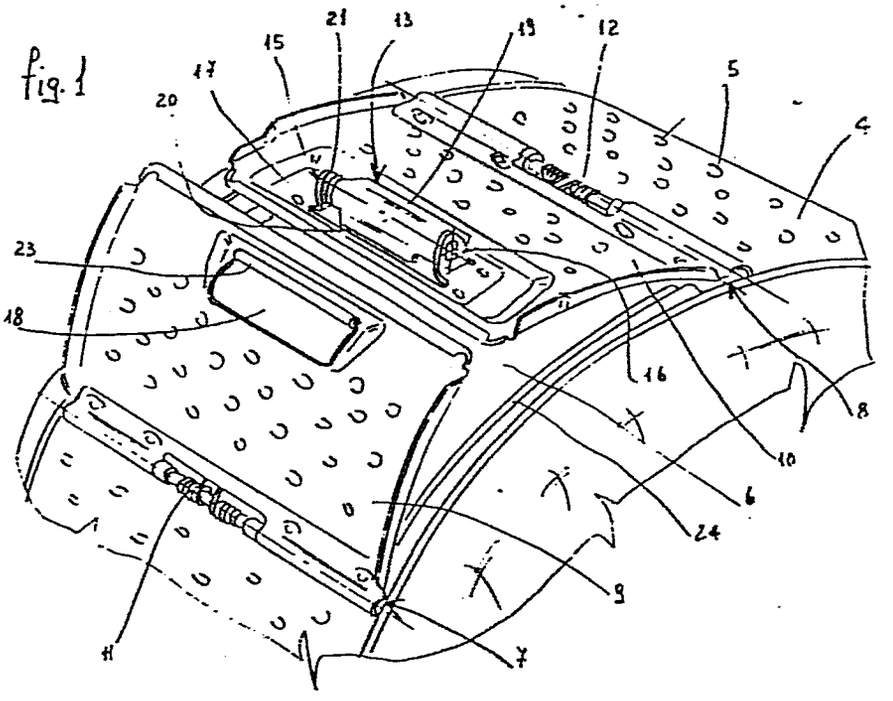
fig. 1



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Washing Drum for Laundry Washing Machines of the Top-Loading Type

Description

The present invention relates to a washing drum for laundry washing machines of the top-loading type, and in particular to a locking device for the door flaps of a washing drum adapted to reliably prevent said door flaps from opening during rotation of the drum.

Conventional laundry washing machines of the top-loading type contain a washing drum mounted for rotation about a horizontal axis, the peripheral wall of such drum being formed with an opening for introducing and extracting the laundry therethrough.

Hingedly mounted on opposite edges of the opening are two door flaps each cooperating with a spring biasing it towards a raised position away from the opening.

From this raised position, in which the opening is accessible for the introduction and extraction of laundry, the door flaps may be displaced to a lowered position in which they are engaged with one another by means of suitable locking devices, so as to close said opening and to permit the drum to be rotated.

The described door flaps are designed so as to ensure their reliable locking interengagement during rotation of the drum, particularly when the latter rotates at the centrifuging speed.

If in the latter case the door flaps would accidentally open, such opening would result in serious damage to the drum, the housing and/or the internal components of the washing machine.

Tc prevent such opening of the door flaps from occurring, washing drums of this type are provided with door flap locking devices which are, however, of complicated construction and rather cumbersome in use, consisting as they do of latches, bolts or the like carried by one of the door flaps and adapted to be brought into snap engagement with complementary rods or similar elements secured to the longitudinal edges of the drum opening for retaining the door flaps in the partially overlapping closed position.

It is an object of the present invention to eliminate the described shortcomings by providing a washing drum having door flaps of the type specified above and provided with a structurally simple locking device effective to ensure reliable interengagement of the door flaps in the closed position. In particular, the door flaps of the washign drum according to the invention are seated in their closed position on corresponding longitudinal edges of the drum opening, said edges being recessed with respect to the peripheral surface of the drum in the manner described in applicant's Italian Patent Application No. 45704-A/83.

This arrangement is effective during rotation of the drum to avoid the formation of gaps between the door flaps and the opening of the drum into which the laundry might otherwise penetrate, so that the danger of the laundry becoming damaged is avoided.

These and other objects are achieved according to the invention by a washing drum particularyl for laundry washing machines of the top-loading type, comprising a peripheral wall formed with an opening for the passage of the laundry, said opening being provided with two oppositely disposed door flaps adapted to partially overlap one another and hingedly mounted on opposite edges of said opening by means of springs adapted to bias them towards their open position, said door flaps in their closed position being seated on the longitudinal edges of said opening.

According to the invention, a washing drum of this type is characterized in that one of said door flaps is provided with means resiliently rotatable about a fixed transverse shaft and adapted to accomplish closure of said door flaps by a simple latching action and at the same time to ensure locking of said door flaps in their closed position.

The characteristics and advantages of the invention will become more clearly evident from the following description of an exemplary embodiment with reference to the accompanying drawings, wherein:

fig. 1 shows a partial perspective view of a washing drum according to the invention with its door flaps raised to a half-opened position,

fig. 2 and 3 show partial longitudinal sectional views of the drum shown in fig. 1 with door flap locking means in two different operative positions.

With reference to fig. 1 there is shown a part of a washing drum according to the invention adapted to be mounted in a laundry washing machine of the top-loading type for rotation about a horizontal axis. The drum is composed of a peripheral wall 4 formed with perforations 5 and a pair of (not shown) end walls connected to the peripheral wall in a per se known manner.

Peripheral wall 4 is formed with at least one opening 6 of preferably rectangular shape for the introduction and extraction of the laundry.

Hingedly mounted on oppositely located transverse edges 7 and 8 of opening 6 are respective door flaps 9 and 10 adapted to partially overlap one another in the closed state and being of arcuate configuration over their entire width, so that in the closed position of the door flaps the profile thereof does not project beyond the circular profile of the drum.

Adjacent the hinged mounting of each door flap 9 and 10 there is provided at least one torsion spring 11 and 12, respectively adapted to bias the associated door flap upwards in the direction of its open position.

The door flaps are formed with perforations for the passage of washign liquid into and out of the washing drum, and provided with resilient means adapted to ensure their interengagement and at the same time their locking in the closed position.

According to the invention, the resilient means comprise a substantially cylindrical element 13 mounted for oscillating rotation about a fixed transverse shaft 14 supported by a pair of brackets 15 and 16 integrally connected to a flat plate member 17 secured to door flap 10 adjacent the free end thereof.

Cylindrical element 13 and brackets 15 and 16 are of a size enabling them to pass through a complementary opening 18 formed in the free end portion of the other door flap 9 in the interengagement position of the two door flaps.

In particular, cylindrical element 13 is formed with two elongate projections 19 and 20 angularly spaced from one another, the function of said projections being described hereinafter. In addition, cylindrical element 13 is surrounded by at least one torsion spring 21 adapted to bias element 13 in the rotational direction indicated by arrow A in fig. 2 so as to maintain projections 19 and 20 in the position shown in this figure.

Further rotation of cylindrical element 13 in the direction of arrow A is prevented by engagement of the edge of projection 20 with the outer surface of flat plate member 17.

Projection 19 on its part is formed with an arcuate portion 22adapted to engage a corresponding raised edge portion 23

formed along the major side of opening 18 adjacent the free end of door flap 9, this engagement being brought about in the closed position of door flaps 9 and 10.

The door flaps are moreover dimensioned so that in their closed position as described they are seated on the longitudinal edges 24 of drum opening 6, said longitudinal edges being recessed with respect to the peripheral surface of the drum in the manner described in applicant's Italian Patent Application No. 45703-A/83, filed on 2-16-1983.

This arrangement is effective to prevent the door flaps from being displaced towards the interior of the drum and to avoid the formation of a gap between the door flaps and the drum opening whereinto the laundry might otherwise penetrate. As a result, any danger of the laundry being damaged is eliminated.

Opening the door flaps requires cylindrical element 13 to be manually rotated about shaft 14 in the direction opposite to the biasing action of spring 21 so as to disengage arcuate portion 22 of projection 19 from raised edge 23 of openign 18 while at the same time raising projection 20 out of contact with the outer surface of flat plate member 17 (cf. fig. 3).

In this manner cylindrical element 13 may be rotated to a position in which projection 19 engages an edge portion 25 of flat plate member 17.

After having been unlocked in the above described manner, the door flaps may be released, permitting them to be raised to their open position by the respective springs 11 and 12.

According to the invention, the washing drum may of course be designed in a different manner, having for instance only a single door flap instead of two door flaps as described above. In this case, the single door flap is to be dimensioned so as to completely cover the drum opening in its

closed position.

Adjacent its free edge portion, the single door flap would be formed with an opening adapted to receive therein a cylindrical locking element of the same construction as described above and secured to the peripheral wall of the drum adjacent the edge of the drum opening.

The above described lockign device is of simple construction and effective to ensure reliable latching and at the same time locking of the door flaps (or a single door flap) in the closed position, thus eliminating the need for a hook-and-opening system as employed in known constructions.

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Washing Drum for Laundry Washing Machines of the Top-Loading Type

Patent Claims

1. A washing drum particularly for washing machines of the top-loading type, comprising a peripheral wall formed with an opening for the passage of the laundry, said opening being provided with two oppositely disposed door flaps adapted to partially overlap one another and hingedly mounted on opposite edges of said opening by means of springs adapted to bias them towards their open position, said door flaps being seated in their closed position on the longitudinal edges of said opening, characterized in that one (10) of said door flaps is provided with means (13) resiliently rotatable about a fixed transverse shaft (14) and adapted to accomplish closure of said door flaps (9, 10) by a simple latching action and at the same time to

ensure locking of said door flaps in the closed position.

2. A washing drum according to claim 1, characterized in that said resiliently rotatable means comprise a cylindrical element (13) adapted to be introduced into a corresponding opening (18) formed in the other door flap (9) and provided with a first and a second projection (19, 20) angularly spaced from one another, said projections (19, 20) being adapted in the locked position of said door flaps (9, 10) to cooperate respectively with a corresponding raised peripheral edge (23) of said opening (18) and with the peripheral surface of the door flap (10) supporting said cylindrical element (13), said cylindrical element (13) being also displaceable to a further position in which said projections (19, 20) are disengaged respectively from said raised edge (23) and from said peripheral surface, for permitting said door flaps (9, 10) to be opened.

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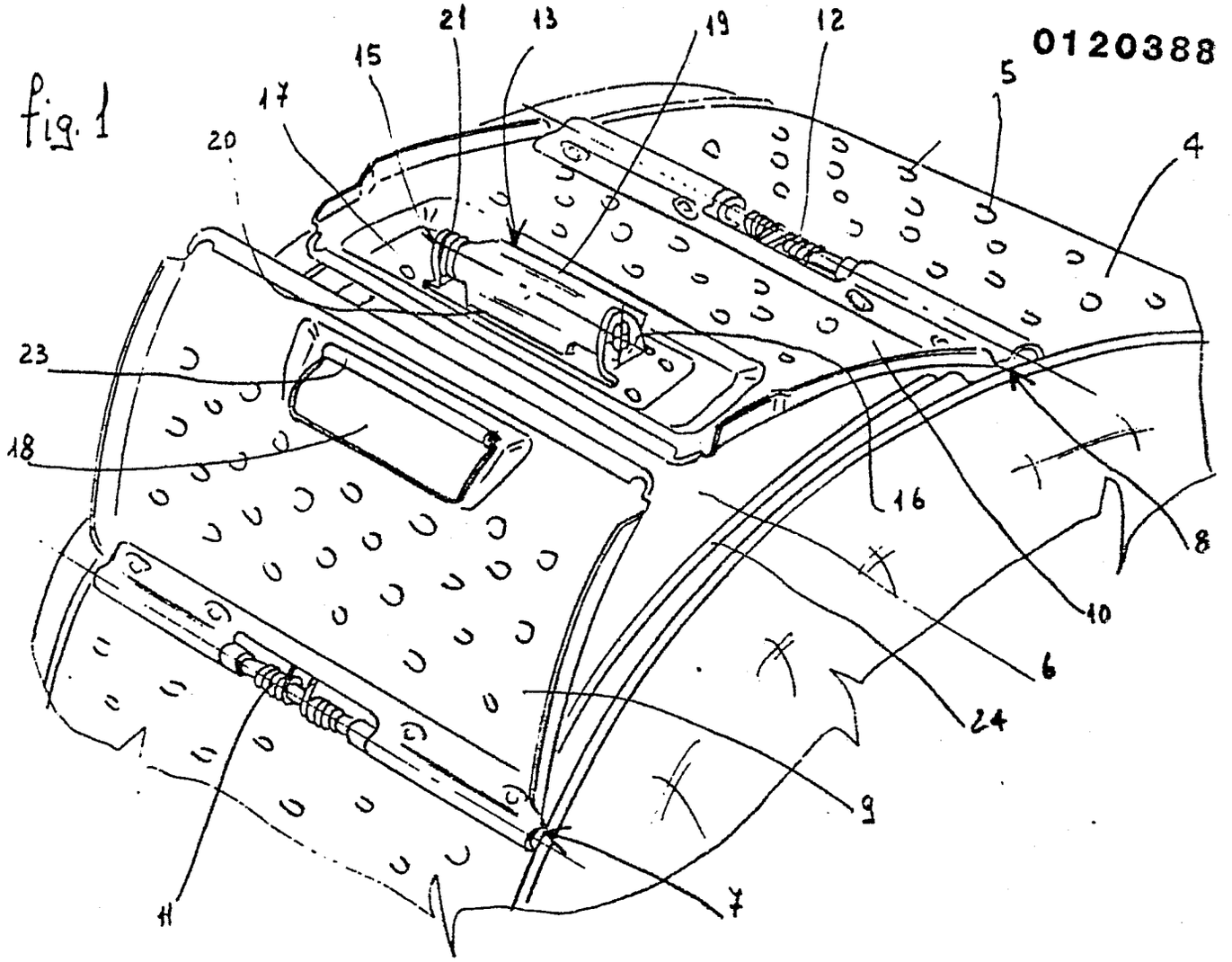
fig. 1



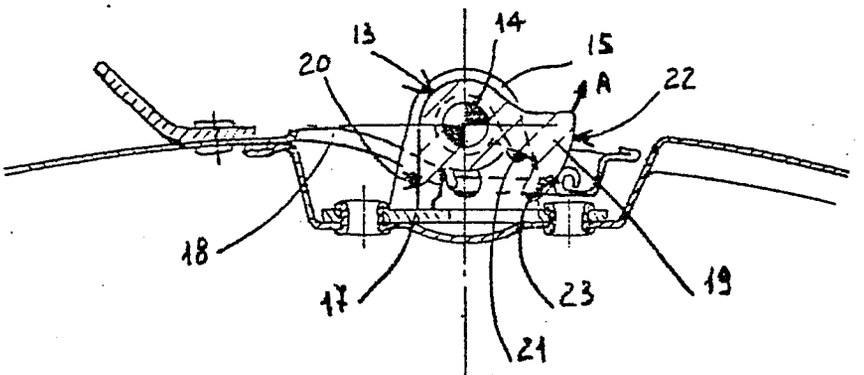


fig. 2

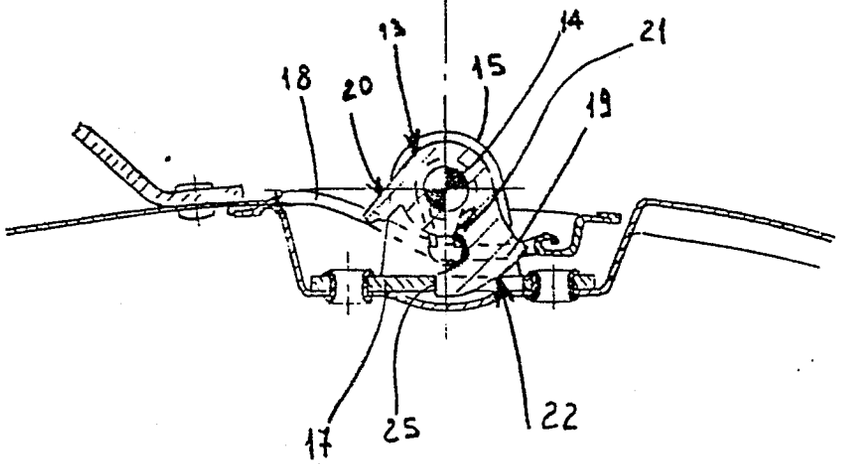


fig. 3

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EUROPEAN SEARCH REPORT

0120388
Application number

EP 84 10 2692

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. ³)
X	FR-A-2 442 292 (ESSWEIN) * Page 3, lines 29-36; pages 4,5 *	1	D 06 F 37/10
A	US-A-2 088 915 (MANCHESTER) * Page 2, right-hand column, lines 46-75; page 3, left-hand column, right-hand column, lines 1-31 *	1,2	
A	FR-A-1 126 668 (VERZINKEREI ZUG) * Whole document *	1	
A	DE-A-2 648 116 (LICENTIA) * Figures; claims *	1	TECHNICAL FIELDS SEARCHED (Int. Cl. ³)
A	DE-A-2 649 341 (LICENTIA) * Figure; claims *	1	D 06 F
A	DE-A-2 649 342 (LICENTIA) * Figure; claims *	1	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	25-05-1984	D HULSTER E.W.F.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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A : technological background
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D : document cited in the application
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