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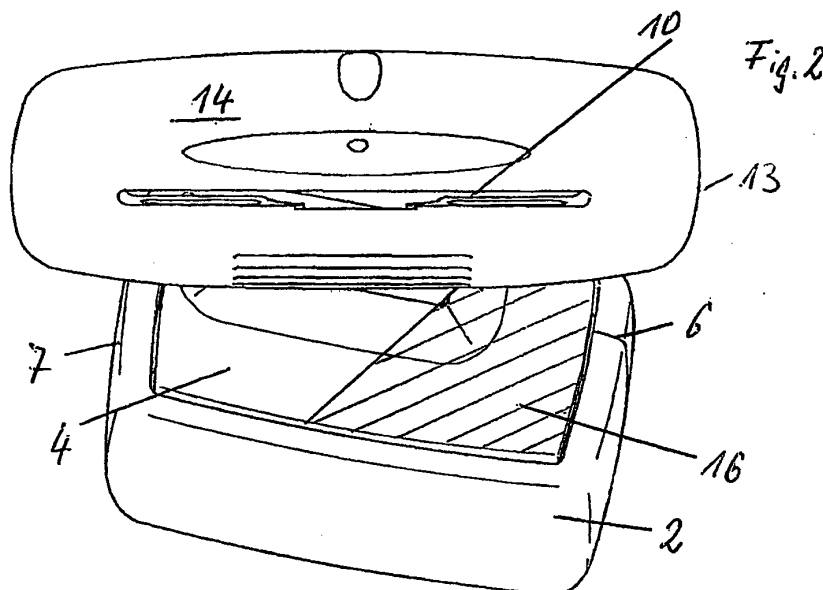
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- Claims filed after the date of filing of the application (Rule 68(4) EPC).
- This application was filed on 23-11-2015 as a divisional application to the application mentioned under INID code 62.

(54) **BUCKLE FOR A SAFETY BELT**

(57) A buckle 1 for a safety belt, comprising a latching mechanism which is disposed in a buckle housing 2 and provided for a tongue 3 which is connected to the safety belt, a slot-shaped aperture 5 for inserting the tongue 3 into the latching mechanism, and a pushbutton 4 provided in the buckle housing 2 and having a pushbutton surface on which pressure is exerted in order to release the tongue 3 from the latching mechanism, the slot-shaped aperture 5 being formed by a peripheral recess in the pushbutton 4 and an adjacent housing surface of the

buckle housing 2, or by a recess on the inner side of the housing and the edge of the pushbutton 4, wherein the slot-shaped aperture 5 is spaced apart further at its one aperture end 8 from a housing side 6 defining the width of the buckle housing 2 than the other aperture end 9 from an opposite housing side 7 defining the width of the buckle housing 2, and the tongue 3 having an eyelet 10 with which the safety belt is connected to the tongue where the eyelet is disposed at an angle of twist relative to the side surfaces of the tongue.



Description

[0001] The invention relates to a buckle for a seat belt according to the preamble of claim 1.

[0002] Such a buckle is known from GB 1 406 864 A and comprises a latching mechanism which is disposed in a buckle housing and provided to latch onto a tongue which is connected to the safety belt, a slot-shaped aperture which allow insertion of the tongue into the latching mechanism, and a pushbutton with which the latching mechanism can be opened to release the tongue. The slot-shaped aperture is disposed in not centered manner in the buckle housing and at a distance from the pushbutton.

[0003] US patent 6,202,269 and US patent 6,266,855 describe buckles having the statutory requirements specified in ECE R16, which stipulates that the pushbutton in the buckle housing must have a specific width not less than 15 mm. The thickness of the housing in such buckles is approximately 30 mm and the width is 50 mm. Due to the center console in motor vehicles, particularly in passenger vehicles, being made increasingly wide by the inclusion of functional elements, the available construction spaces between the sides of the seats and the lateral outer walls of the center console are reduced.

[0004] The object of the invention is to provide a buckle of the kind initially specified, in which the buckle housing is reduced in size while maintaining the prescribed actuation width of the pushbutton, and specifically in which the thickness of the buckle housing is reduced.

[0005] This object is achieved by the features of claim 1.

[0006] In the invention, the aperture for the tongue is spaced apart further at its one aperture end from one housing side defining the width of the buckle housing than the other aperture end is spaced apart from the opposite housing side defining the width of the buckle housing.

[0007] In the surface region of the pushbutton where the aperture end is spaced further apart from the side of the housing, the width of the pushbutton may be 15 mm, as stipulated, thus providing a sufficiently large actuation area on the pushbutton for actuating the latter in order to release the tongue from the latching mechanism. The buckle housing may be embodied in thinner form and have a thickness of approximately 20 mm to 24 mm. This makes it possible to provide a surface of approximately 4.5 cm² in pushbutton area. The buckle housing advantageously has a uniform thickness across its entire width.

[0008] The aperture for the tongue may be formed by a peripheral recess in the pushbutton and an adjacent housing surface, or by a recess in the housing wall and an adjacent edge of the pushbutton.

[0009] In addition to the asymmetric shape of the pushbutton or housing, an eyelet with which the safety belt is connected to the tongue may be advantageously disposed with an angle of twist relative to the side surfaces of the tongue. When the tongue is inserted into the latch-

ing mechanism, a side surface of an eyelet member that includes the eyelet is oriented towards the surface region of the pushbutton where the aperture end is spaced further apart from the housing side defining the width of the housing. The angle of twist is selected such that it matches the ergonomic path of the lap and shoulder belt. The angle of twist is approximately 10°. This angle of twist is the angle between horizontal middle lines of the tongue and the eyelet. A vertical middle line of the eyelet or eyelet member may also have an angle of inclination relative to a vertical middle line of the tongue, in order to obtain a better match with the ergonomic path of the lap and shoulder belt when worn. As a result, the fingers used to open the buckle are automatically guided onto the wider surface region of the pushbutton. Reliable operation of the buckle even in the dark is assured when the user's hand slides downwards along the shoulder belt and is automatically guided onto the actuation area of the pushbutton at its widest point.

[0010] The thickness of the buckle housing can be reduced by up to 10 mm, while the width of the buckle housing can be approximately 54 mm.

[0011] Embodiments of the invention shall now be described in detail with reference to the Figures, in which

Fig. 1 shows a buckle for a safety belt that is an embodiment of the invention, seen at an angle from above in perspective view;

Fig. 2 shows the buckle housing in Fig. 1, with the tongue inserted;

Fig. 3 shows a plan view of the tongue, with the angled eyelet member;

Fig. 4 shows a view of the tongue at an angle from the side, with the angled eyelet member;

Fig. 5 shows a view of the tongue from the front;

Fig. 6 shows a view of the tongue from the back;

Fig. 7 shows another embodiment of the invention.

[0012] The embodiments shown in the Figures pertain to a buckle 1 for a safety belt, in particular a safety belt in a passenger vehicle. The buckle has a buckle housing 2 in which there is disposed a latching mechanism like the one known from US patent 6,202,269 B1 or US patent 6,266,855 B1, for example. Buckle housing 2 may be formed of one or of several parts, or specifically of two parts. On the top side of the buckle housing, there is a pushbutton 4 and a slot-shaped aperture 5 for inserting a tongue 3 connected to the safety belt. When tongue 3 is inserted into slot-shaped aperture 5, it is latched by the latching mechanism in buckle housing 2. A latch in the latching mechanism engages in familiar manner with a latching aperture 15 in tongue 3. In the latched state,

tongue 3 is held in the latched position against the force of an ejector spring.

[0013] To release tongue 3 from the latching mechanism, pressure is manually exerted on pushbutton 4, thus causing pushbutton 4 to be pressed towards the interior of buckle housing 2, whereupon the latching engagement in the latching aperture is released, and tongue 3 is ejected from buckle housing 2 by the action of the ejector spring.

[0014] In the embodiment shown in Fig. 1, the surface of pushbutton 4 is asymmetrical. As a result of this asymmetrical design, a widened actuation area 16 is created on the pushbutton surface above slot-shaped aperture 5. This widened actuation area is achieved by slot-shaped aperture 5 being spaced apart further at its one aperture end 8 from a housing side 6 defining the width of the buckle housing 2 than the other aperture end 9 from the opposite housing side 7 defining the width of the buckle housing. Actuation area 16, shown by hatching in Fig. 1 and having a width B conforming to regulations, is obtained as a result. Width B may be 15 mm. In the region of slot-shaped aperture 5, the width of the pushbutton surface is less. Due to slot-shaped aperture 5 being shifted asymmetrically in the direction of housing side 7, it is possible for actuation area 16 between aperture end 8 and housing side 6 to have adequate dimensions. In this way, a buckle housing 2 can be formed which has a thickness of approximately 20 mm to 24 mm and a width from housing side 6 to housing side 7 of approximately 54 mm. The thickness of buckle housing 2 is uniform across its entire width. In the embodiment shown, slot-shaped aperture 5 is formed by a recess in pushbutton 4 and an adjacent housing surface. To facilitate insertion of the tongue, the pushbutton surface is beveled towards aperture 5.

[0015] In the embodiment shown in Figure 7, aperture 5 is disposed asymmetrically in a recess of the lateral housing wall, as in Figure 1, and is defined by an edge region of pushbutton 4. In this embodiment also, actuation area 16 is formed between aperture end 8 and housing side 6.

[0016] An eyelet 10, with which the safety belt (not shown in further detail) is connected in familiar manner to tongue 3, is disposed at an angle of twist V relative to side surfaces 11 and 12 of tongue 3 (Figure 3). Said angle of twist V is formed between horizontal middle lines extending through tongue 3 and an eyelet member 13 which includes eyelet 10.

[0017] As a result of this angling of eyelet member 13 relative to the side surfaces of tongue 3, a guide surface for guiding fingers in the direction of actuation area 16 when actuating pushbutton 4 is formed on a side surface 14 when the tongue is inserted (Fig. 2). In addition to actuation area 16 shown by hatching, an adjacent part of the pushbutton surface beside slot-shaped aperture 5 is also available for exerting pressure on pushbutton 4, as indicated in Fig. 2 by the slanting lines in actuation area 16.

[0018] If necessary, eyelet member 13 may also have an angle of inclination relative to a vertical middle line of tongue 3, should this provide a better match, depending on the specific installation conditions, with the path of the shoulder belt, as can be seen from Figures 5 and 6.

[0019] When installing the buckle in the motor vehicle, actuation area 16 produced on the top end of the buckle due to the asymmetrical arrangement of aperture 5 is disposed towards the rear, when viewed along the longitudinal axis of the vehicle. The buckle is preferably installed laterally on the inner sides of the two front seats in the vehicle.

[0020] The invention is further described by the following embodiments, wherein:

Embodiment 1: A buckle (1) for a safety belt, comprising a latching mechanism which is disposed in a buckle housing (2) and provided for a tongue (3) which is connected to the safety belt, a slot-shaped aperture (5) for inserting the tongue (3) into the latching mechanism, and a pushbutton (4) provided in the buckle housing (2) and having a pushbutton surface on which pressure is exerted in order to release the tongue (3) from the latching mechanism, the slot-shaped aperture (5) being formed by a peripheral recess in the pushbutton (4) and an adjacent housing surface of the buckle housing (2), or by a recess on the inner side of the housing and the edge of the pushbutton (4), characterized in that the slot-shaped aperture (5) is spaced apart further at its one aperture end (8) from a housing side (6) defining the width of the buckle housing (2) than the other aperture end (9) from an opposite housing side (7) defining the width of the buckle housing (2).

Embodiment 2: The buckle (1) for a safety belt with the features of embodiment 1, wherein the buckle housing (2) has a uniform thickness across its entire width.

Embodiment 3: The buckle (1) for a safety belt with the features of embodiment 1 or 2, wherein an eyelet (10) with which the safety belt is connected to the tongue (3) is disposed at an acute angle of twist V relative to the side surfaces (11, 12) of the tongue (3).

Embodiment 4: The buckle (1) for a safety belt with the features of embodiment 1, 2 or 3, wherein one side surface (14) of an eyelet member (13) having the eyelet (10) is oriented towards the surface region (actuation area (16)) of the pushbutton (4) where the aperture end (8) is spaced further apart from the housing side (6) defining the width of the housing.

Embodiment 5: The buckle (1) for a safety belt with the features of embodiment 3 or 4, wherein at least the side surface (14) of the eyelet member (13) is disposed at angle of twist V to the side surface (11,

12) of the tongue (2, 3).

Embodiment 6: The buckle (1) for a safety belt with the features of any of the embodiments 1 to 5, where-
in a widened actuation area (16) ensuing from the
asymmetrical arrangement of the aperture (5) is dis-
posed on the rear portion of the pushbutton (4) when
the buckle is installed in a motor vehicle.

List of reference signs

[0021]

- 1, buckle
- 2 buckle housing
- 3 tongue
- 4 pushbutton
- 5 slot-shaped aperture
- 6 housing side
- 7 housing side
- 8 aperture end
- 9 aperture end
- 10 eyelet
- 11 side of the tongue
- 12 side of the tongue
- 13 eyelet member
- 14 side of the eyelet member
- 15 latching aperture
- 16 actuation area

lines extending through tongue (3) and an eyelet
member (13) which includes eyelet (10).

- 2. The buckle according to claim 1,
characterized in that the buckle housing (2) has a
uniform thickness across its entire width.
- 3. The buckle according to any of claims 1 to 2,
characterized in that one side surface (14) of the
side surfaces at the front and back sides of the eyelet
member (13) having the eyelet (10) is oriented to-
wards an actuation area (16) of the pushbutton (4)
when the tongue (3) is inserted into the latching
mechanism.
- 4. The buckle according to any of claims 1 or 3,
characterized in that at least the side surface (14)
of the eyelet member (13) is disposed at angle of
twist V to the side surfaces (11, 12) at the front and
back sides of the tongue (3).
- 5. The buckle according to any of claims 1 to 4, **char-
acterized in that** a widened actuation area (16) is
disposed on the rear portion of the pushbutton (4)
when the buckle is installed in a motor vehicle.

Claims

- 1. A buckle (1) for a safety belt, comprising a latching
mechanism which is disposed in a buckle housing (2)
and provided to latch onto a tongue (3) which is
connected to the safety belt, a slot-shaped aperture
(5) provided to allow insertion of the tongue (3) into
the latching mechanism, and a pushbutton (4) pro-
vided in the buckle housing (2) and having a push-
button surface on which pressure is exerted in order
to release the tongue (3) from the latching mecha-
nism, the slot-shaped aperture (5) is formed by a
peripheral recess in the pushbutton (4) and an ad-
jacent housing surface of the buckle housing (2), or
by a recess of a lateral housing wall and an adjacent
edge of the pushbutton (4),
wherein the slot-shaped aperture (5) through which
the tongue (3) meets the latching mechanism is
asymmetrical within the buckle housing (2) and is
positioned closer to one housing side (7) than to the
other housing side (6) defining the width of the buckle
housing (2) along the length of the slot-shaped ap-
erture (5), and wherein
an eyelet (10), with which the safety belt is connected
to tongue (3), is disposed at a angle of twist V relative
to side surfaces (11) and (12) of tongue (3), said
angle of twist V is formed between horizontal middle

Fig. 1

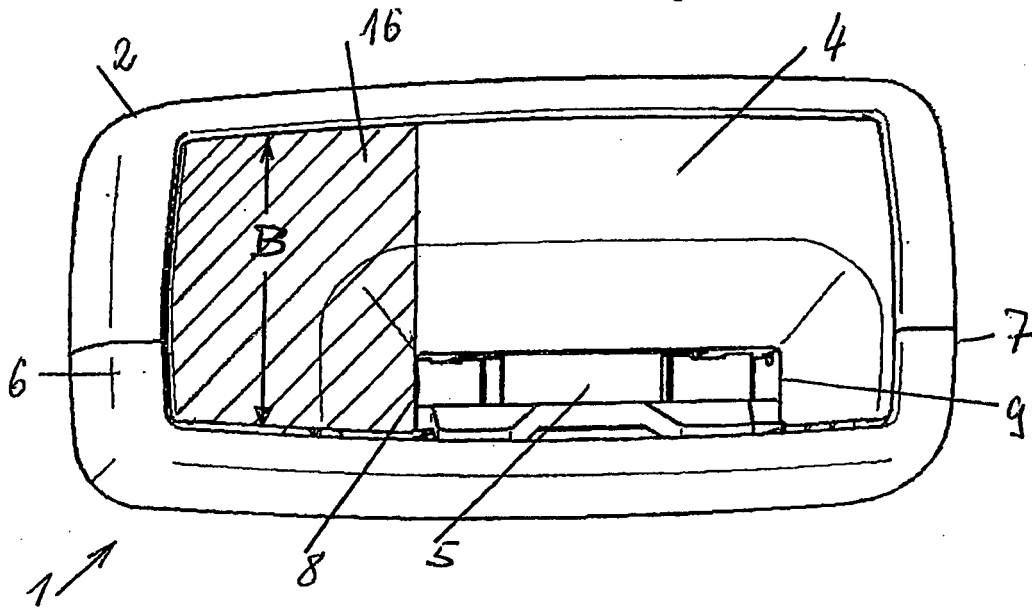
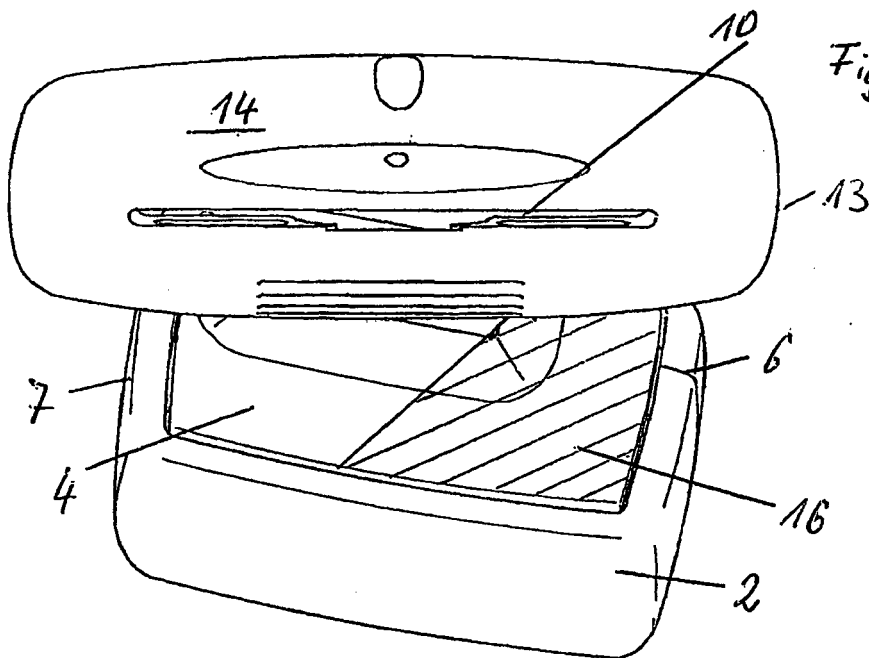
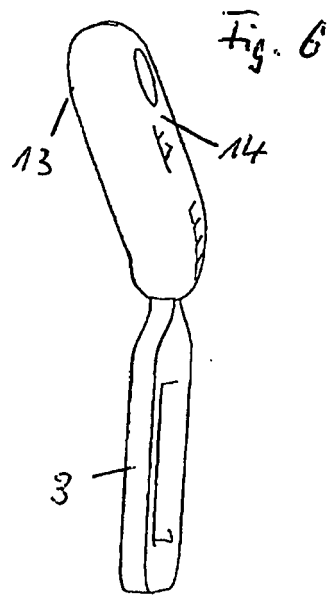
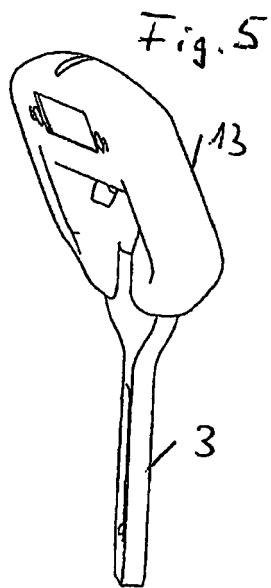
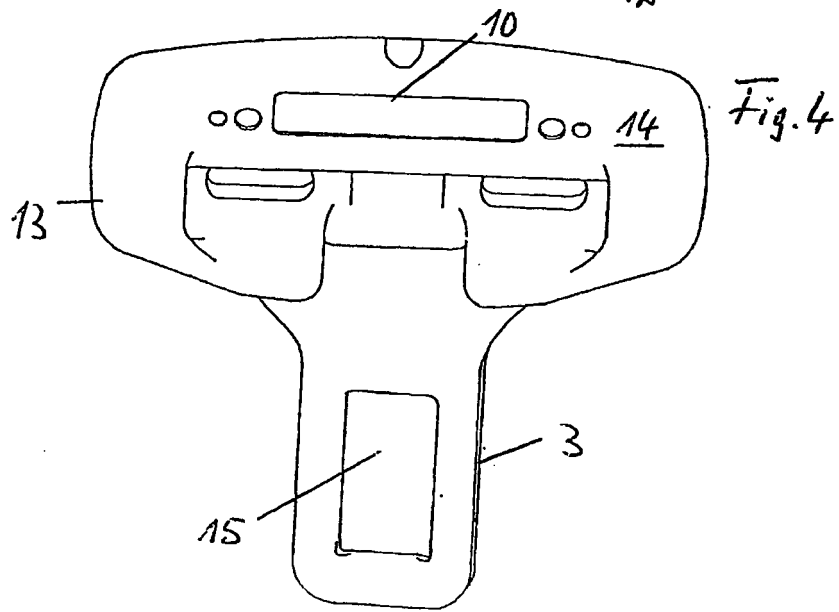
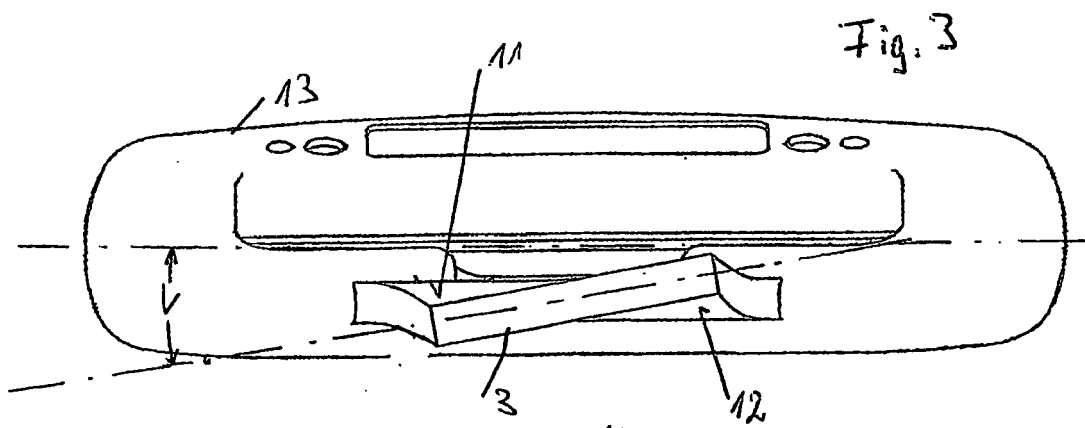
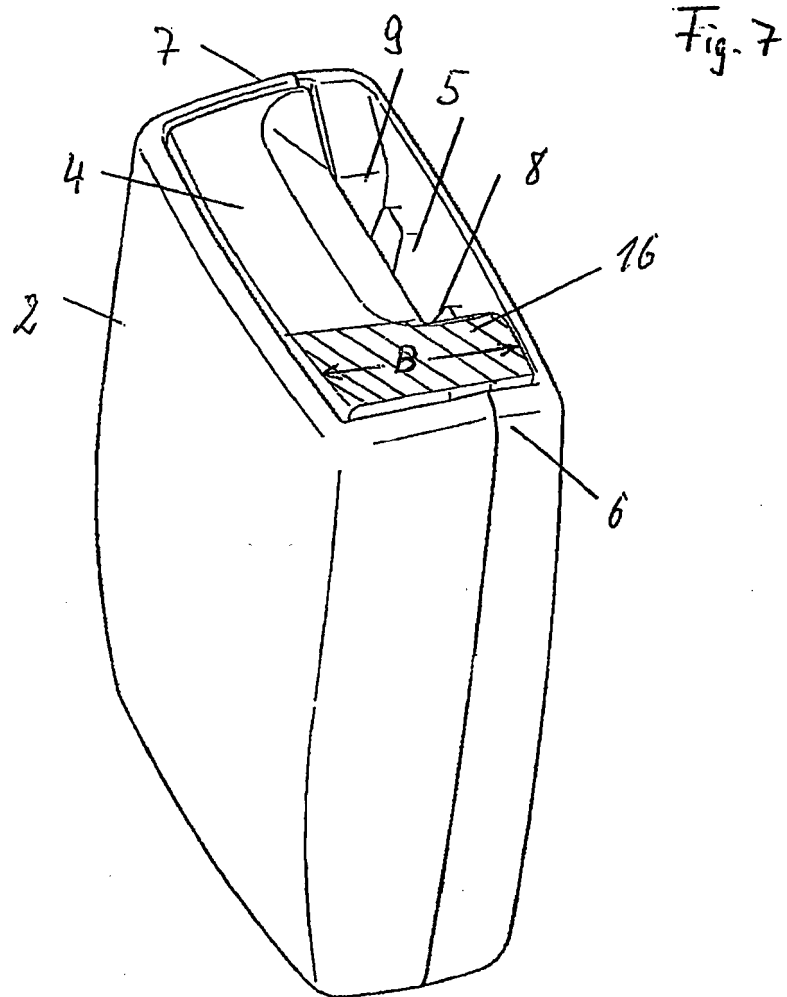


Fig. 2









EUROPEAN SEARCH REPORT

Application Number
EP 15 19 5908

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A,D	GB 1 406 864 A (CENTER AB) 17 September 1975 (1975-09-17) * page 2, line 83 - line 130; figure 4 *	1-5	INV. A44B11/25
A	WO 90/09747 A (ELECTROLUX KLIPPAN) 7 September 1990 (1990-09-07) * figure 4 *	1-5	
A	US 2009/179412 A1 (GRAY MARK F [US] ET AL) 16 July 2009 (2009-07-16) * figures 1,2 *	1-5	
			TECHNICAL FIELDS SEARCHED (IPC)
			A44B
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 18 April 2016	Examiner Simpson, Estelle
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			

EPO FORM 1503 03/02 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 15 19 5908

5 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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18-04-2016

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB 1406864 A	17-09-1975	DE 2250173 A1	19-04-1973
		FR 2156400 A1	25-05-1973
		GB 1406864 A	17-09-1975
		IT 966327 B	11-02-1974
		JP S4849126 A	11-07-1973

WO 9009747 A	07-09-1990	GB 2248268 A	01-04-1992
		WO 9009747 A1	07-09-1990

US 2009179412 A1	16-07-2009	NONE	

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

- GB 1406864 A **[0002]**
- US 6202269 B **[0003]**
- US 6266855 B **[0003]**
- US 6202269 B1 **[0012]**
- US 6266855 B1 **[0012]**