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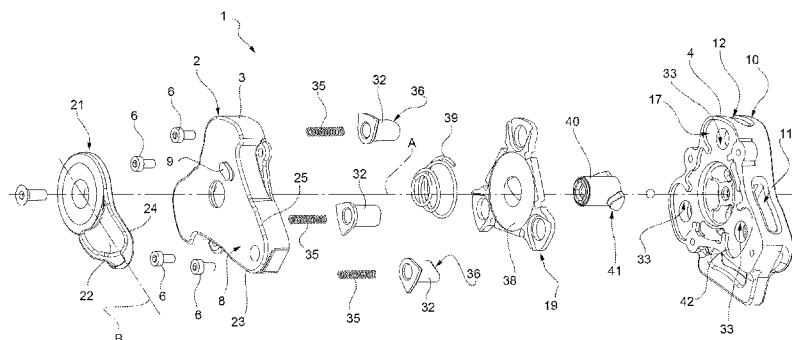
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(54) Title: SEAT BELT BUCKLE, IN PARTICULAR FOR RACING VEHICLES

FIG. 1



(57) Abstract: A seat belt buckle (1), in particular for racing vehicles, has a casing (2) with four connection points for connecting respective branches of a seat belt; three of the connection points are defined by two top slots (12) and one bottom slot (11) having respective inlets formed in a peripheral surface (10) of the casing (2); the casing (2) houses a coupling mechanism (19) for retaining respective tabs (15) inside the slots (11, 12), and supports a lever (21) having a radial arm (22), which is located on a bottom portion (23) of the casing (2) and is rotatable manually about an axis (A) to release the coupling mechanism (19); the bottom slot (11) is aligned, in a direction parallel to the rotation axis of the lever (21), with the rest position of the lever (21); and the fourth connection point is defined by an opening (31) located alongside the bottom portion (23), on the opposite side to the inlet of the bottom slot (11).

SEAT BELT BUCKLE, IN PARTICULAR FOR RACING VEHICLES

TECHNICAL FIELD

The present invention relates to a seat belt
5 buckle, in particular for racing vehicles, to which the
following description refers purely by way of example,
without losing generality.

BACKGROUND ART

As is known, automotive standards require that
10 motor vehicles be equipped with seat belts connected
directly or indirectly to the vehicle body, at so-called
anchoring points, to hold the driver in the driver's
seat in the event of a crash.

In racing vehicles, the various branches of the
15 seat belt must immobilize the driver's shoulders,
pelvis, and possibly also the legs, and may be connected
to one another at a single point - normally located in
front of the driver's torso, at the height of the pelvis
- by a buckle, which is common to and provides for
20 releasing all the branches of the seat belt
simultaneously.

In the solution described in EP1514490, which
corresponds to the preamble in Claim 1, the buckle
comprises a casing housing a releasable coupling
25 mechanism and defining five openings in which to insert
and lock respective tabs, each fixed to the end of a

respective branch of the seat belt.

The buckle casing is also fitted with a manual release lever for releasing the coupling mechanism rapidly from all the tabs, and so enabling the driver,
5 in an emergency, to free himself easily from the seat belt holding him in the driver's seat.

The lever is shaped and sized to project from the buckle casing, but, when actually driving the vehicle, should be prevented from contacting and being
10 accidentally rotated by the driver's legs, and so accidentally releasing the seat belt. To prevent this from happening, the solution described in EP1514490 provides for a guard which fits over the end of the lever when this is in the rest position. The guard has a
15 tab identical to those fitted to the branches of the seat belt, and which fits inside one of the five openings in the casing.

A need is felt to simplify the known solution described above, and in particular to reduce its size
20 and therefore weight, and preferably also the number of component parts, but without affecting the efficiency and dependability of the buckle and the degree of protection provided by the seat belt.

DISCLOSURE OF INVENTION

25 It is an object of the present invention to provide a seat belt buckle, in particular for racing vehicles,

designed to achieve the above goals.

According to the present invention, there is provided a seat belt buckle, in particular for racing vehicles, as defined in Claim 1.

5 BRIEF DESCRIPTION OF THE DRAWINGS

To better understand the present invention, a preferred, non-limiting embodiment of the present invention will be described by way of example with reference to the attached drawings, in which :

- 10 • Figure 1 shows an exploded view in perspective of a preferred embodiment of the buckle according to the invention; and
- Figure 2 shows a larger-scale view of a component part of the Figure 1 buckle, together with a tab
- 15 fixed in a manner not shown to a branch of a seat belt.

BEST MODE FOR CARRYING OUT THE INVENTION

Number 1 in Figure 1 indicates as a whole a seat belt buckle, in particular for racing vehicles. Buckle 1

20 comprises a casing 2, in turn comprising a front body 3 and a rear base 4 arranged one onto the other along an axis A and fixed one to the other, preferably by means of screws 6. More specifically, body 3 has a flat front face 8 perpendicular to axis A and comprising a

25 projection 9.

Casing 2 has a peripheral surface 10 provided with

three openings defining respective inlets of a bottom slot 11 and of two top slots 12, which in use are engaged by respective tabs 15 (only one shown partly in Figure 2) fixed, in known manner not shown, to the ends
5 of respective branches of a seat belt.

Body 3 and base 4 together define a cavity 17, which houses a coupling mechanism 19 designed to retain tabs 15 releasably inside slots 11, 12, as described in more detail below.

10 Coupling mechanism 19 is connected to a lever 21, which is located, and preferably rests, on face 8, and is hinged to casing 2 so as to be rotatable manually about axis A from a rest position. As it rotates, lever 21 releases coupling mechanism 19 from all of tabs 15
15 simultaneously. The limit stops governing rotation of lever 21 are preferably defined by projection 9: for example, the rear face, not shown, of lever 21 has an arc-shaped groove engaged by projection 9.

Lever 21 comprises a radial arm 22, which, when
20 lever 21 is in the rest position, extends downwards in a vertical direction B and is located on a bottom portion 23 of casing 2. When lever 21 is in the rest position, the outline or perimeter 24 of radial arm 22, viewed parallel to axis A, preferably lies completely within
25 the outline or perimeter 25 of bottom portion 23. In other words, when lever 21 is in the rest position,

radial arm 22 does not project from peripheral surface 10, thus preventing accidental release of coupling mechanism 19.

Bottom portion 23 is elongated in direction B, and
5 is lobe-shaped or triangular with a rounded vertex, when viewed parallel to axis A.

With reference to Figure 2, the inlet of slot 11 is formed on a side 26 of base 4, and defines for respective tab 15 an insertion direction 28 which is
10 non-radial with respect to axis A and directed towards the opposite side 27 of base 4. Bottom portion 23 is relatively narrow, so slot 11 is formed in a position which, in a direction parallel to axis A, is aligned with radial arm 22 when lever 21 is in the rest
15 position.

Side 27 faces a cross member 29, which is fixed with respect to casing 2 and serves to attach the end of another branch of the seat belt. In other words, cross member 29 and side 27 define an opening 31 in which to
20 insert and loop said branch about cross member 29. Opening 31, the two slots 12 and slot 11 thus define four seat belt connection points.

Cross member 29 is preferably formed in one piece with base 4.

25 With reference to Figure 1, coupling mechanism 19 comprises three retaining pins 32, which are guided by

respective seats 33 to slide, parallel to axis A, between a lowered position, in which they engage respective holes 34 in tabs 15 (Figure 2) to retain tabs 15 inside respective slots 11, 12, and a raised position, in which tabs 15 are free to slide out.

Retaining pins 32 are pushed into the lowered position by respective springs 35, and at their rear ends have respective inclined surfaces 36 facing the inlets of respective slots 11, 12. Inclined surfaces 36 serve to raise retaining pins 32 in opposition to springs 35, when tabs 15 are inserted forcefully inside respective slots 11, 12. Once the tabs are inserted, springs 35 click retaining pins 32 into holes 34 to lock tabs 15 in place.

The seat 33 associated with slot 11 is located substantially in the centre of bottom portion 23, i.e. extends along an axis lying in a centreline plane defined by axis A and direction B.

Coupling mechanism 19 also comprises a plate 38, which is guided inside cavity 17 and is translated axially by rotation of lever 21 and by the thrust exerted by a spring 39 interposed between plate 38 and body 3. For example, lever 21 is fixed to a shaft 40, which extends along axis A, through body 3, and into cavity 17, and is connected to plate 38 by a cam and cam follower transmission 41 to lift plate 38 towards body 3

when lever 21 moves out of the rest position. More specifically, plate 38 moves retaining pins 32 simultaneously into their raised positions to release holes 34.

5 According to one aspect of the present invention, buckle 1 has no ejector devices, which means tabs 15 are not expelled from slots 11, 12 when holes 34 are released. In buckle 1, it is the tension exerted by the branch of the seat belt on cross member 29 that detaches
10 buckle 1 from the other branches of the seat belt, and so extracts tabs 15 from respective slots 11, 12.

With reference to Figure 2, according to a preferred aspect of the present invention, seats 33 are formed in a wall 42 formed in one piece with base 4, and
15 which defines the bottom of cavity 17 on one side, and a front face of slots 11, 12 on the other.

As regards slots 12, these are formed in base 4, in a top portion 43, which is symmetrical with respect to said centreline plane, and is preferably shaped to form
20 two lobes.

The advantages of buckle 1 will be clear from the above description. In particular, the position of slot 11 and the presence of opening 31 greatly reduce the size of bottom portion 23 and therefore the weight of
25 buckle 1. The three-lobed design of casing 2 also provides for reducing the material, and therefore

weight, of top portion 43. And the action of the seat belt on bottom portion 23 is nevertheless balanced by virtue of the positions of cross member 29 and slot 11.

The shape of bottom portion 23 obviously provides
5 for permanently guarding radial arm 22 against accidental operation.

Because cross member 29 and/or wall 42 are/is formed in one piece with base 4, and there are no devices for ejecting tabs 15, buckle 1 has a relatively
10 small number of component parts.

The design and structure of buckle 1 in no way impair driving comfort, operation and safety of the seat belt, or the dependability of buckle 1 itself.

Clearly, changes may be made to buckle 1 as
15 described and illustrated herein without, however, departing from the protective scope of the present invention, as defined in the attached Claims.

More specifically, top portion 43 may be shaped differently and/or the insertion directions of tabs 15
20 inside slots 11, 12 may differ slightly from those illustrated by way of example.

CLAIMS

1) A seat belt buckle (1), in particular for racing vehicles; the buckle comprising :

5 a) a casing (2);

b) four connection points for connecting respective branches of a seat belt; a first, second, and third connection point being defined by two top slots (12) and one bottom slot (11) having respective inlets
10 formed in a peripheral surface (10) of said casing (2);

c) a coupling mechanism (19) for releasably retaining respective tabs (15) inside said slots (11, 12); and

d) a lever (21) located on a front face of said casing (2) and rotatable about an axis (A) from a rest
15 position to release said coupling mechanism (19); said lever (21) comprising a radial arm (22), which is located on a bottom portion (23) of said casing (2) when the lever (21) is in the rest position;

20 the buckle being characterized in that said bottom slot (11) is formed in said bottom portion (23) in a position which, in a direction parallel to said axis (A), is aligned with the rest position of said lever (21); a fourth connection point being defined by an opening (31)
25 located alongside said bottom portion (23), on the opposite side to the inlet of said bottom slot (11).

2) A buckle as claimed in Claim 1, characterized in that said coupling mechanism (19) comprises, for said bottom slot (11), a retaining pin (32), which slides in a direction parallel to said axis (A) and lies in a vertical centreline plane of said casing (2).

3) A buckle as claimed in Claim 1 or 2, characterized in that, viewed parallel to said axis (A), the outline of said bottom portion (23) encloses the perimeter of said radial arm (22) when the lever (21) is in the rest position.

4) A buckle as claimed in any one of the foregoing Claims, characterized in that said opening (31) is defined by a cross member (29) formed in one piece with a component part (4) of said casing (2).

5) A buckle as claimed in Claim 4, characterized in that said slots are formed in a base (4) of said casing (2); said component part being defined by said base (4).

6) A buckle as claimed in any one of the foregoing Claims, characterized in that said casing (2) comprises a front body (3) and a base (4) defining said slots (11, 12); the coupling mechanism (19) comprising, for each said slot (11, 12), a respective retaining pin (32) guided parallel to said axis (A) by a perforated portion; said perforated portion being formed in one piece with said base (4).

7) A buckle as claimed in any one of the foregoing

Claims, characterized in that said casing (2) comprises a top portion (43) shaped to form two lobes, each associated with a respective top slot (12).

8) A buckle as claimed in any one of the foregoing
5 Claims, characterized in that said base (4) has no devices for ejecting the tabs.

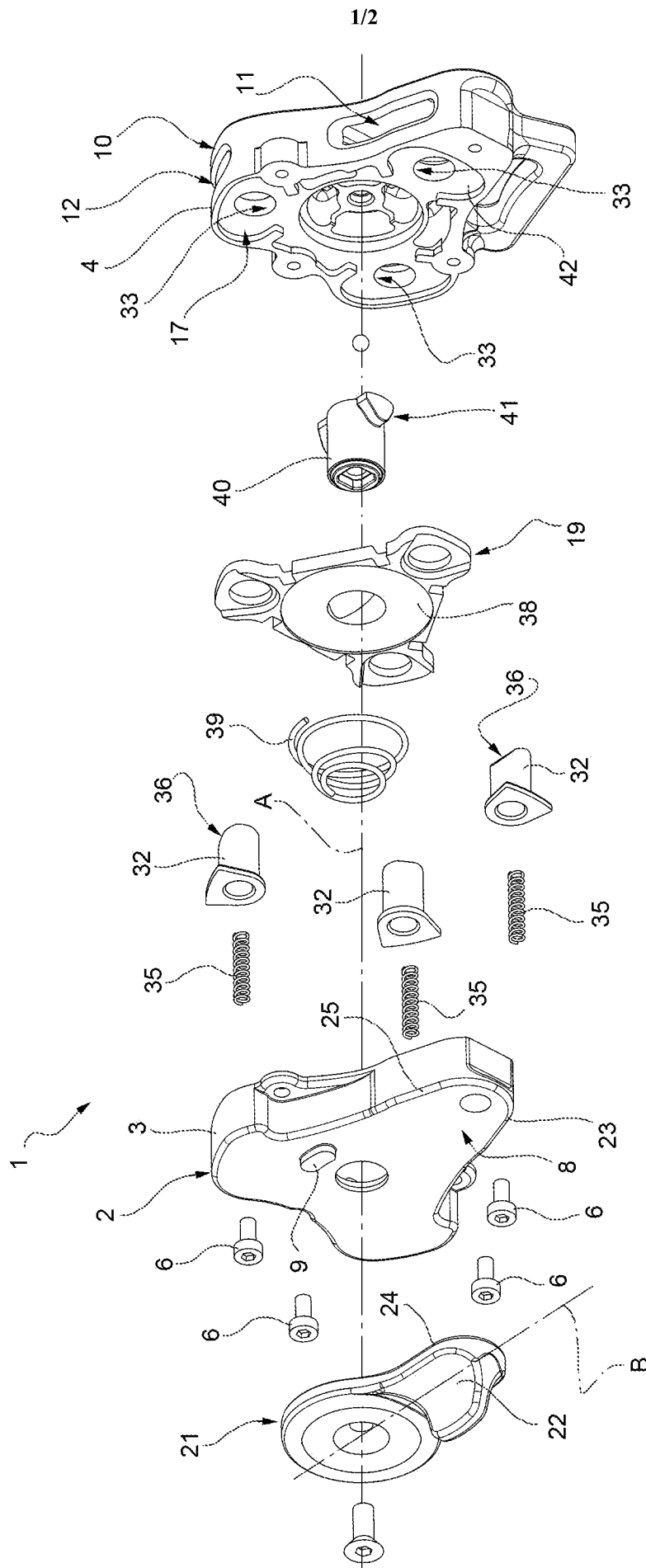
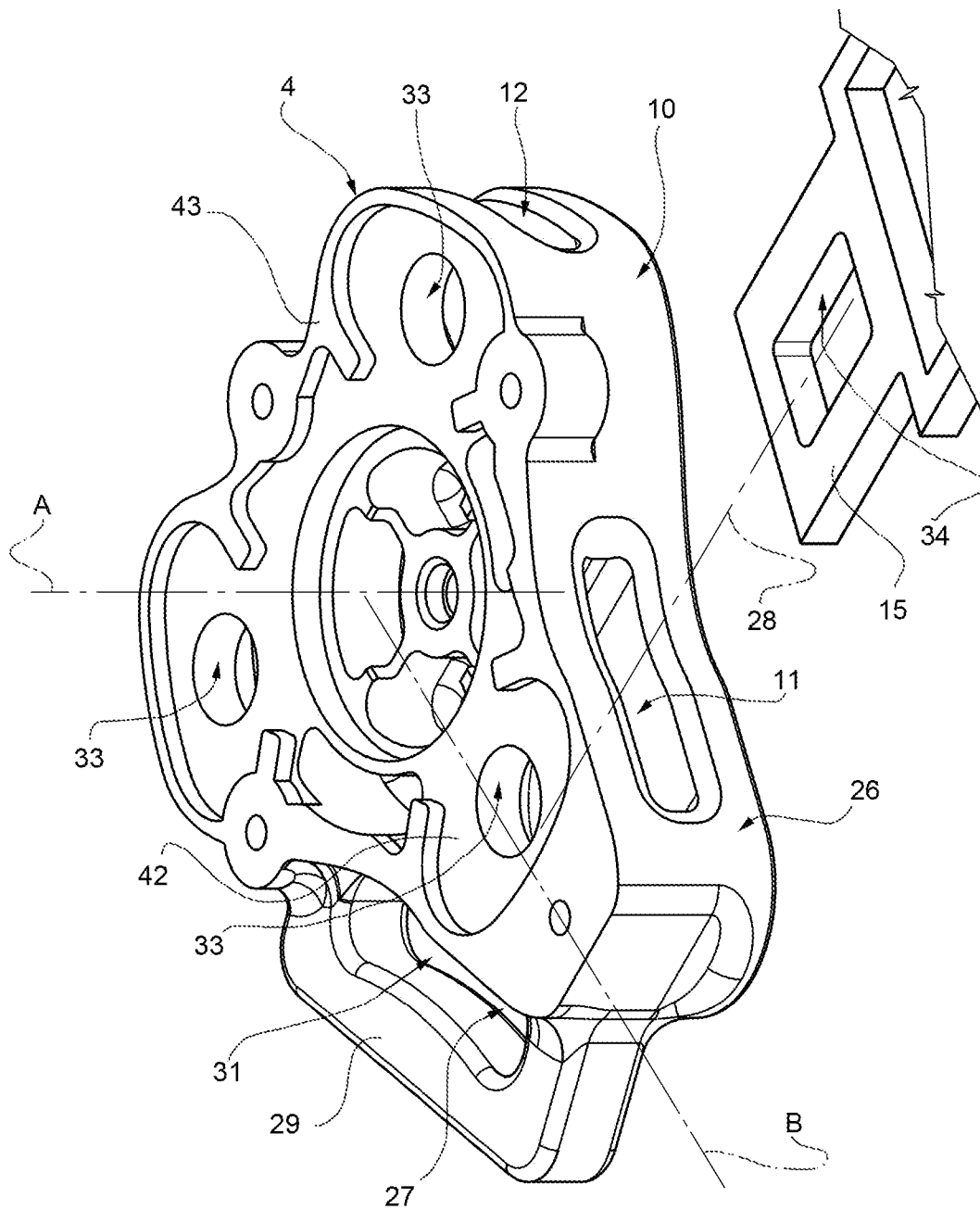


FIG. 1

FIG. 2



INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2013/054895

A. CLASSIFICATION OF SUBJECT MATTER
INV. A44B11/25
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A44B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EP0-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 1 514 490 A2 (BELT & BUCKLE S R L [IT] SABELT SPA [IT]) 16 March 2005 (2005-03-16) column 2; figure 1 -----	1-8
A	DE 20 2011 050313 U1 (TAIWAN RACING PRODUCTS CO [TW]) 22 September 2011 (2011-09-22) abstract; figure 1 -----	1
A	GB 895 482 A (HARLEY PATENTS INT; FRANK BERNARD HARLEY) 2 May 1962 (1962-05-02) figures -----	1

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Further documents are listed in the continuation of Box C.

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See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2013/054895

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