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(54) **Title:** BINDING FOR THE REVERSIBLE FIXING OF SNOW GEAR, SUCH AS SNOWSHOES, SKIS AND THE LIKE, TO CORRESPONDING SHOES OR CORRESPONDING ACCESSORIES FOR SHOES, SUCH AS CRAMPONS, NON-SLIP OVERSHOES, AND THE LIKE

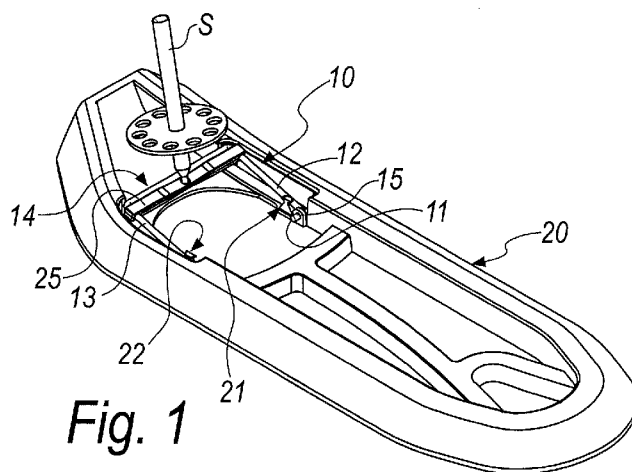


Fig. 1

(57) **Abstract:** A binding (10) for the reversible fixing of snow gear, such as snowshoes and skis, to corresponding shoes or corresponding accessories for shoes, such as crampons, non-slip overshoes and the like, which comprises two opposite coaxial coupling pins (11), each of which is supported at one end of an arm (12, 13) of an elastic coupling fork (14), each one of the coupling pins (11) being adapted to pass through a corresponding through hole (15) which is defined in a corresponding bracket mounting element (16), in order to insert reversibly part of its tip (17) in a corresponding additional coupling hole (18) defined in a snow accessory such as a crampon (19), or defined in a shoe such as a ski boot (219), the bracket mounting elements (16) being intended to be fixed to a snowshoe (20) or to a ski (220), the arms (12, 13) of the elastic fork (14) being divaricated, during their downward rotary motion about the pins (11), by respective wedge-shaped elements (21, 22) on which the arms of the elastic fork are arranged so as to slide, the divarication of the elastic fork (14) causing the uncoupling between each one of the tips (17) of the coupling pins (11) and the corresponding coupling hole (18), with consequent disengagement of a piece of snow gear from an associated accessory for shoes or of a ski from a boot.



BINDING FOR THE REVERSIBLE FIXING OF SNOW GEAR, SUCH AS SNOWSHOES, SKIS AND THE LIKE, TO CORRESPONDING SHOES OR CORRESPONDING ACCESSORIES FOR SHOES, SUCH AS CRAMPONS, NON-SLIP OVERSHOES, AND THE LIKE

5 The present invention relates to a binding for the reversible fixing of snow gear, such as snowshoes and skis, to corresponding shoes or corresponding snow accessories for shoes, such as crampons, non-slip overshoes, and the like.

Currently, in the field of snow gear, such as snowshoes, snowshoes
10 that also have built-in ice crampons are catching on increasingly.

Crampons in fact are an accessory that must be present in case of an excursion on foot on mixed terrains, i.e., terrains comprising stretches on soft snow and stretches on hard snow and ice.

However, it is uncomfortable to walk with snowshoes on stretches
15 without soft snow.

Currently, however, snowshoes provided with ice crampons in which the snowshoe part can be detached manually and quickly from the crampon part are not known.

The aim of the present invention is to provide a binding for the
20 reversible fixing of snow gear, such as snowshoes and skis, to corresponding shoes or corresponding accessories for shoes, such as crampons, non-slip overshoes, and the like, that makes it possible to bind quickly a snowshoe to a crampon in an easy and intuitive manner.

Within the scope of this aim, an object of the invention is to devise a
25 binding for snow gear that can be applied similarly also in order to bind in a reversible manner a ski, of the cross-country or ski-mountaineering type, to a corresponding boot.

Another object of the invention is to devise a binding that is easy to provide and fit.

30 Another object of the invention is to devise a binding that is safe and

reliable, both in terms of performance and in terms of accident prevention.

Another object of the invention is to provide a binding for the reversible fixing of snow gear, such as snowshoes and skis, to corresponding shoes or corresponding accessories for shoes, such as
5 crampons, non-slip overshoes, and the like, that can be manufactured with known systems and technologies.

This aim and these and other objects which will become better apparent hereinafter are achieved by a binding for the reversible fixing of snow gear, such as snowshoes and skis, to corresponding shoes or
10 corresponding accessories for shoes, such as crampons, non-slip overshoes and the like, characterized in that it comprises two opposite coaxial coupling pins, each of which is supported at one end of an arm of an elastic coupling fork, said coupling pins being adapted to pass through
corresponding holes defined in a corresponding bracket mounting element,
15 in order to insert reversibly part of its tip in a corresponding hole defined in a snow accessory such as a crampon, or defined in a shoe such as a ski boot, said bracket mounting elements being intended to be fixed to a snowshoe or to a ski, the arms of said elastic fork being divaricated, during their
downward rotary motion about said pins, by respective wedge-shaped
20 elements on which said arms of the elastic fork are arranged so as to slide, the divarication of said elastic fork causing the uncoupling between each one of the tips of the pins and the corresponding hole, with consequent
disengagement of a piece of snow gear from an associated accessory for shoes or of a ski from a boot.

25 Further characteristics and advantages of the invention will become better apparent from the description of eight preferred but not exclusive embodiments of the binding according to the invention, illustrated by way of non-limiting example in the accompanying drawings, wherein:

Figure 1 is a view of a snowshoe equipped with a binding according
30 to the invention in a first embodiment;

Figure 2 is a view of a technical shoe with an ice crampon, adapted for fixing with a binding according to the invention, mounted thereon;

Figure 3 is a view of a detail of Figure 1;

Figure 4 is a top view of a portion of the binding according the
5 invention in its first embodiment, in the configuration for opening the binding;

Figure 5 is a transverse sectional view of the binding, in the open configuration, on a snowshoe, with the crampon in position for coupling;

Figure 6 is a top view of a portion of the binding according to the
10 invention in its first embodiment, in the configuration for closing the binding;

Figure 7 is a transverse sectional view of the binding, in the closed configuration, on a snowshoe, with the crampon coupled;

Figure 8 is a perspective view of a binding according to the invention
15 used for coupling a snowshoe to a crampon;

Figure 9 is a perspective view of an non-slip overshoe adapted to be
used with a binding according to the invention;

Figure 10 is a perspective view of a binding according to the invention, in a second embodiment, used for coupling a snowshoe to the
20 non-slip overshoe of Figure 9;

Figure 11 is a perspective view of a binding according to the invention in a third embodiment, for cross-country skis;

Figure 12 is a bottom perspective view of a cross-country ski boot adapted for coupling with the binding of Figure 11;

Figure 13 is a transverse sectional view of the binding of Figure 11,
25 coupled to the boot of Figure 12;

Figure 14 is a perspective view of a ski equipped with a binding according to the invention;

Figure 15 is a perspective view of a binding according the invention
30 in a fourth embodiment;

Figure 16 is a different perspective view of the binding of Figure 15;

Figure 17 is a perspective view of a binding according to the invention in a fifth embodiment;

Figure 18 is a perspective view of a binding according to the invention in a sixth embodiment;

Figure 19 is a perspective view of a binding according to the invention in a seventh embodiment;

Figures 20 and 21 are views of an eighth embodiment of a binding according to the invention.

With reference to the figures, a binding for the reversible fixing of snow gear, such as snowshoes and skis, to corresponding shoes or corresponding accessories for shoes, such as crampons, non-slip overshoes, and the like is generally designated by the reference numeral 10.

The binding 10 has the characteristic of comprising two opposite coaxial coupling pins, only one of which, designated by the numeral 11, is visible in the figures by way of example, each pin being supported at one end of an arm 12 and 13, respectively, of an elastic coupling fork 14.

The coupling pins 11 are adapted to pass through corresponding through holes 15, which are defined in a corresponding bracket mounting element 16, in order to insert reversibly part of their tip 17 in a corresponding coupling hole 18 defined in a snow accessory such as a crampon 19.

Figure 1 illustrates a snowshoe 20 of the type, for example, provided by molding plastic material, which is provided with the binding 10, while Figure 2 shows a boot S provided with crampons 19 with predefined coupling holes 18.

An equivalent hole 218 is described hereinafter as provided in a shoe such as a ski boot 219.

The bracket mounting elements 16 are therefore to be fixed to a snowshoe 20, as shown in Figures 3 to 7, or, as a further example, to a ski

220, as in Figures 11 and 13.

The arms 12 and 13 of the elastic fork 14 are designed to be divaricated, during their downward rotary motion about the pins 11, by respective wedge-shaped elements 21, 22 on which the arms 12 and 13 of
5 the elastic fork 14 are arranged so as to slide.

As clearly shown by Figures 4 to 7, the divarication of the elastic fork 14 causes the uncoupling between each one of the tips 17 of the engagement pins 11 and the corresponding engagement hole 18, with consequent disengagement of a piece of snow gear from an associated accessory for
10 shoes, for example the disengagement of a snowshoe 20 from a crampon 19, or of a ski from a boot, as better described hereinafter.

In the first embodiment of the invention, to be understood obviously as a non-limiting example of the invention, the wedge-shaped elements 21, as well as 22, are constituted by a portion of a frustum 23, as clearly shown
15 in Figure 3, with a wider head 24, which is adapted to interrupt the rising stroke of the elastic fork 14, which occurs due to the tendency of the elastic fork 14 to restore its own non-divaricated configuration.

Operation of the binding 10 according to the invention is as follows.

Once the bracket mounting elements 16, for example L-shaped bodies
20 as in Figures 3 to 6, have been fixed to the equipment involved, for example the snowshoe 20, with the elastic fork 14, and once the corresponding wedge-shaped elements 21 and 22 have been fixed proximate to the bracket mounting elements 16, by pushing forward and downward the elastic fork 14, the arms 12 and 13 of the elastic fork 14 are made to slide against the
25 frustum-like portions of the wedge-shaped elements 21 and 22, toward the base of the frustum-like portions, and this causes the mutual spacing of the ends of the arms 12 and 13 and therefore the partial extraction of the pins 11 from the respective through holes 15 defined in the bracket mounting elements 16.

30 In this configuration of the elastic fork 14, the crampon 19 is arranged

with respect to the snowshoe 20 so that by releasing the elastic fork 14, now pressed forward and downward, the arms 12 and 13 of the elastic fork return elastically to their base configuration as in Figures 6 and 7, with the pins 11 arranged so as to pass completely through the corresponding through holes 15 on the respective bracket mounting elements and with the tips 17 of the pins arranged so as to rest on the complementarily shaped coupling holes 18, which have a taper that is substantially equal to the taper of the tips 17, without however passing through the same coupling holes 18.

This configuration is for coupling the crampon 19 to the snowshoe 20, and at the same time, due to the mating between the frustum-shaped tips 17 and the complementarily shaped corresponding coupling holes 18, the safety disengagement of the crampon 19 from the snowshoe 20 is ensured in case of excessive relative torsional stress, in order to protect the integrity of the user's foot.

The binding 10 according to the invention is provided with means for adjusting the stiffness of the elastic fork 14.

In the first embodiment of the binding 10 according to the invention, the means for adjusting the elasticity of the elastic fork 14 are constituted by a transverse stiffening bar 25 arranged between the two arms 12 and 13 of the elastic fork 14.

The stiffening bar 25 is provided with through holes 26 at the ends for the passage of the arms 12 and 13 of the elastic fork 14.

In the present constructive example, the stiffening bar 25 is constituted by two half-shells made of plastic material, an upper half-shell 25a and a lower half-shell 25b, which are shaped so that once they are coupled they arrange themselves so as to surround the arms 12 and 13 with their ends, defining the through holes 26.

It should be understood that the stiffening bar 25 can also be provided in other similar and equivalent manners.

The operation of the stiffening bar 25 entails that by performing a

translational motion of the bar 25 along the two arms 12 and 13 of the elastic fork 14, a greater or lesser resistance to disengagement on the part of the pins 11 in the corresponding seats, which are the coupling holes 18 in the crampon 19, is obtained.

- 5 The stiffening bar 25, in its lowest position, i.e., closest to the ends of the fork 14, makes it possible to obtain a locking of the snowshoe to the crampon such as to prevent safety disengagement, i.e., a substantially stable locking.

Further equivalent embodiments of the means for adjusting the
10 stiffness of the elastic fork 14 are better illustrated hereafter.

Figure 9 exemplifies a snow accessory which is different from a crampon and is specifically an non-slip overshoe 127.

The non-slip overshoe 127 has a spiked sole and is designed to be worn by a boot S in the same manner as an ice crampon.

- 15 The non-slip overshoe 127, which should not be understood to be part of the invention, is provided with holes 118 in the inner part which are shaped complementarily with respect to the tips of pins 111 of an elastic fork 114 of a binding 110 according to the invention, which is associated with a snowshoe 120, as described above for the first embodiment of the
20 binding 10.

Figure 11 shows a binding according to the invention in a third embodiment, designated therein by the numeral 210.

The binding 210 has a bracket mounting element 216, which is fixed to a cross-country ski 220.

- 25 The ends of the elastic fork 214 are bent symmetrically outward so as to define two opposite pins 211, whose tips 217 are designed to enter partially the corresponding holes 218 defined at the toe of the cross-country ski boot 219, as in Figures 12 and 13.

The wedge-shaped elements 221 and 222 are defined on the same
30 bracket mounting element 216.

The wedge-shaped elements 221 and 222 comprise a portion with an internal surface which is inclined and a folded upper stroke limiting tab 224 for the elastic fork 214.

The stiffening bar 225 is present in this embodiment as well.

5 Figure 14 illustrates a binding according to the invention in a fourth embodiment, designated therein by the numeral 310, mounted on a ski for ski-mountaineering.

As clearly shown in Figure 15, the binding 310 provides a bracket mounting element 316 which is constituted by a U-shaped lamina on the
10 lateral wings of which there are both the holes 315 for the pins 311 and the wedge-shaped elements 321 and 322 defined by contoured studs which are provided from the inside outward on the lateral wings.

The binding according to the invention, in any of its embodiments 10, 110, 210, 310, can be provided with means 328 for reversible locking of the
15 elastic fork 314 in the open configuration of the binding.

The reversible locking means 328 are exemplified, as in Figure 16, by a locking tooth 329 supported by a flexible bar 330, which also supports a concave body 331, which is open upward and is adapted to accommodate the tip of a ski pole in order to cause the bar 330 to flex to disengage the
20 central portion 332 of the elastic fork 314 from its locking configuration below the tooth 329.

Figure 17 illustrates a fifth embodiment of the binding according to the invention, designated therein by the numeral 410.

In this embodiment, the bracket mounting element 416 is provided
25 on its wings only with the holes 415, while the wedge-shaped elements 421 and 422 extend from a laterally adjacent semicylindrical block 433 and 434 respectively.

Figure 18 illustrates a binding according to the invention in a sixth embodiment, designated therein by the numeral 510.

30 In this sixth embodiment, the means for adjusting the stiffness of the

elastic fork 514 are constituted by an elastic traction element 535, the ends of which are fixed to the opposite arms 512 and 513 of the elastic fork.

The traction elastic element, for example a helical spring as in Figure 18, is to be understood as being placeable, with coupling systems of the known type, more or less near the pins 511 of the elastic fork 514, according to the stiffness thereof that one wishes to obtain.

Figure 19 is a view of a binding according to the invention in a seventh embodiment, designated therein by the numeral 610.

The binding 610 is characterized in that the elastic fork is constituted by the two arms 612 and 613 and by the stiffening bar 615, therefore without the central portion that joints the two arms.

The stiffening bar, where present, or the central portion 532 of the elastic fork, is provided with a hole, or a recess or an opening, such as for example the opening 537 of Figure 18 or the recess 636 of Figure 19, designed to accommodate the tip of a ski pole R, as in Figure 1, for opening the binding.

Figures 20 and 21 illustrate an eighth embodiment of the binding according to the invention, designated therein by the numeral 710.

The peculiarity of this embodiment resides in that the binding 710 also has means 738 for the stable locking of the binding in a closed configuration.

In the example described herein, which obviously is non-limitative of the invention, the reversible means 738 for the stable locking of the binding are defined by a hook-shaped tab 739 which is defined proximate to a corresponding wedge-shaped element 721 and 722.

The hook-shaped tab 739 is arranged so that the opening faces downward and is shaped so as to accommodate by removable interlocking a corresponding lateral arm 712 and 713 of the fork 714, which is conveniently pulled manually upward for a few degrees of rotation.

The hook-shaped tab 739 has

- a mouth part 740 for the arm 712 or 713, which defines with the opposite portion 741 of the same hook-shaped protrusion a narrow section for retention of the arm 712 or 713 in the stable locking configuration,
- and an adjacent overhanging central part 742, which defines with the facing portion 741 of the same hook-shaped tab a wider section for accommodation for the arm 712 or 713 in the stable locking configuration.

In practice it has been found that the invention fully achieves the intended aim and objects.

In particular, the invention has devised a binding for the reversible fixing of snow gear, such as snowshoes and skis, to corresponding shoes or corresponding accessories for shoes, such as crampons, non-slip overshoes, and the like, that makes it possible to couple quickly a snowshoe to a crampon, in an easy and intuitive manner.

Moreover, the invention has devised a binding for snow gear that can be applied likewise also in order to couple reversibly a cross-country or ski-mountaineering ski to a corresponding boot.

Moreover, the invention has devised a binding that is easy to provide and fit.

Furthermore, the invention has provided a binding that is safe and reliable both in terms of performance and in terms of accident prevention.

Moreover, the invention has devised a binding for the reversible fixing of snow gear, such as snowshoes and skis, to corresponding shoes or corresponding accessories for shoes, such as crampons, non-slip overshoes, and the like, that can be manufactured with known systems and technologies.

The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims; all the details may further be replaced with other technically equivalent elements.

In practice, the materials used, as well as the contingent shapes and

dimensions, may be any according to requirements and to the state of the art.

The disclosures in Italian Patent Application No. PD2011A000025, from which this application claims priority, are incorporated herein by
5 reference.

Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the interpretation of each
10 element identified by way of example by such reference signs.

CLAIMS

1. A binding (10) for the reversible fixing of snow gear, such as snowshoes and skis, to corresponding shoes or corresponding accessories for shoes, such as crampons, non-slip overshoes and the like, characterized in that it comprises two opposite coaxial coupling pins (11), each of which is supported at one end of an arm (12, 13) of an elastic coupling fork (14), each one of said coupling pins (11) being adapted to pass through a corresponding hole (15) which is defined in a corresponding bracket mounting element (16), in order to insert reversibly part of its tip (17) in a corresponding coupling hole (18) defined in a snow accessory such as a crampon (19), or defined on a shoe such as a ski boot (219), said bracket mounting elements (16) being intended to be fixed either to a snowshoe (20) or to a ski (220), the arms (12, 13) of said elastic fork (14) being divaricated, during their downward rotary motion about said pins (11), by respective wedge-shaped elements (21, 22) on which said arms of the elastic fork are arranged so as to slide, the divarication of said elastic fork (14) causing the uncoupling between each one of the tips (17) of the coupling pins (11) and the corresponding coupling hole (18), with consequent disengagement of a piece of snow gear from an associated accessory for shoes, or of a ski from a boot.

2. The binding according to claim 1, characterized in that said wedge-shaped elements (21, 22) are constituted by a portion of a frustum (23) with a wider head (24), which is adapted to interrupt the rising stroke of the elastic fork (14).

3. The binding according to one or more of the preceding claims, characterized in that said pins (11) have frustum-shaped tips (17), which are adapted to enter complementarily shaped corresponding holes (18) defined in the crampon (19).

4. The binding according to the preceding claims, characterized in that it is provided with means for adjusting the elasticity of the elastic fork

(14).

5 5. The binding according to claim 4, characterized in that said means for adjusting the stiffness of the elastic fork (14) are constituted by a transverse stiffening bar (25), which is arranged between the two arms (12, 13) of the elastic fork (14), the translational motion of said stiffening bar (25) along the two arms (12, 13) of the elastic fork (14) adjusting the resistance to release on the part of the pins (11) in the corresponding seats that are the holes (18) in the crampon (19).

10 6. The binding according to one or more of the preceding claims, characterized in that said snow accessory is an non-slip overshoe (127), provided with holes (118), in the inner part, which are shaped complementarily with respect to the tips of pins (111) of a fork (114) which is associated with a snowshoe (120).

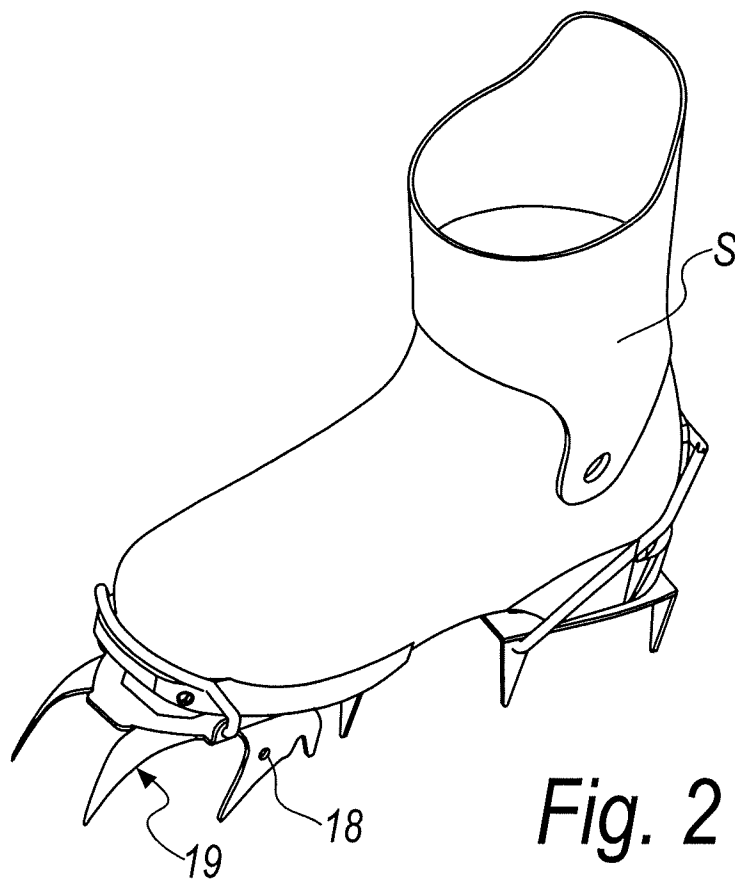
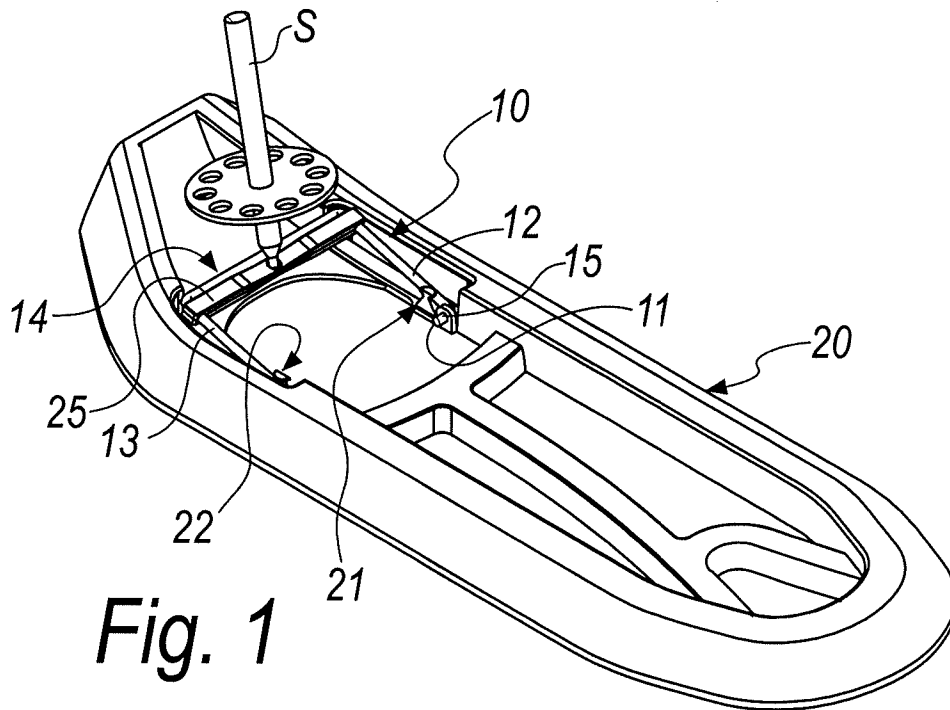
15 7. The binding according to one or more of the preceding claims, characterized in that the elastic fork (214) has its ends bent symmetrically outward so as to define two opposite pins (211) whose tips (217) are designed to enter partially the corresponding coupling holes (218) defined at the toe of a boot (219).

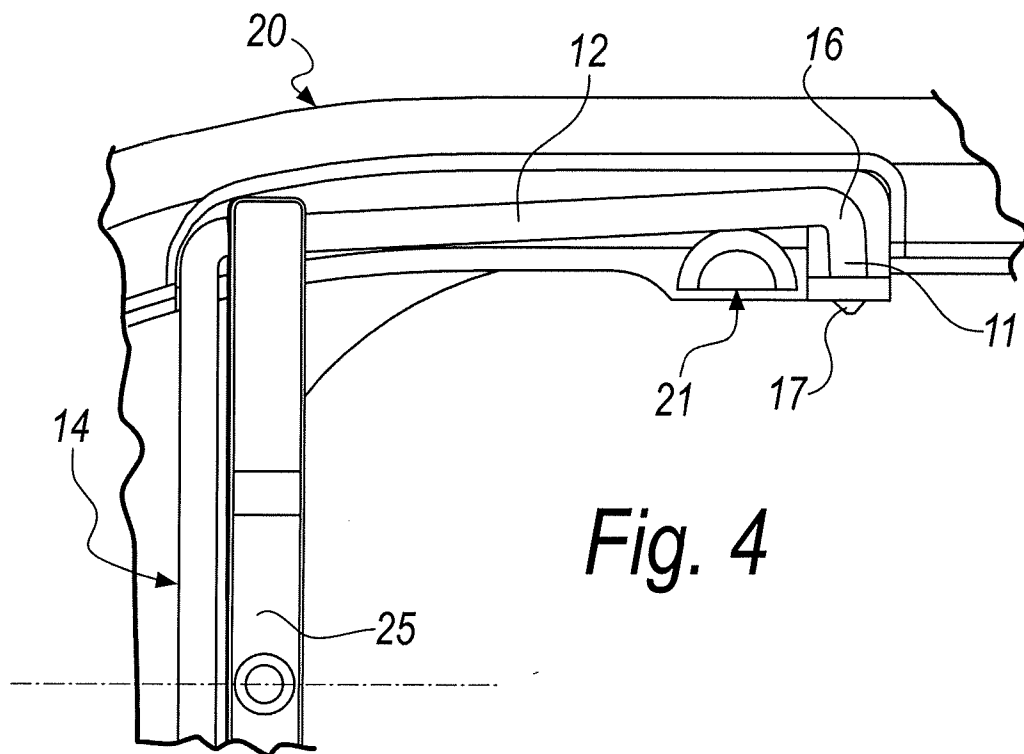
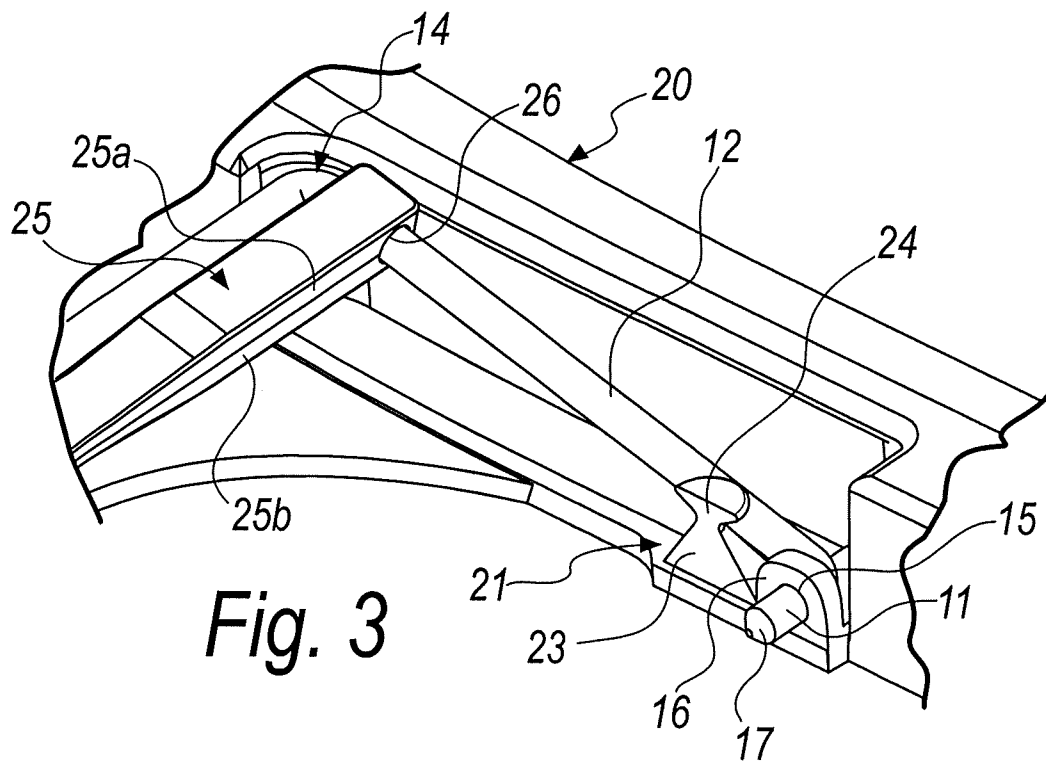
20 8. The binding according to the preceding claims, characterized in that said wedge-like elements (221, 222) appear defined on the same bracket mounting element (216), said wedge-shaped elements (221, 222) comprising a portion with an internal surface which is inclined and a folded upper stroke limiting tab (224) for the elastic fork (214).

25 9. The binding according to one or more of the preceding claims, characterized in that said bracket mounting element (316) is constituted by a U-shaped lamina on the lateral wings of which there are both the holes (315) for the pins (311) and the wedge-shaped elements (321, 322) defined by contoured studs which are provided from the inside outward on said lateral wings.

30 10. The binding according to one or more of the preceding claims,

characterized in that it has reversible means (738) for the stable locking of said binding in the closed configuration.





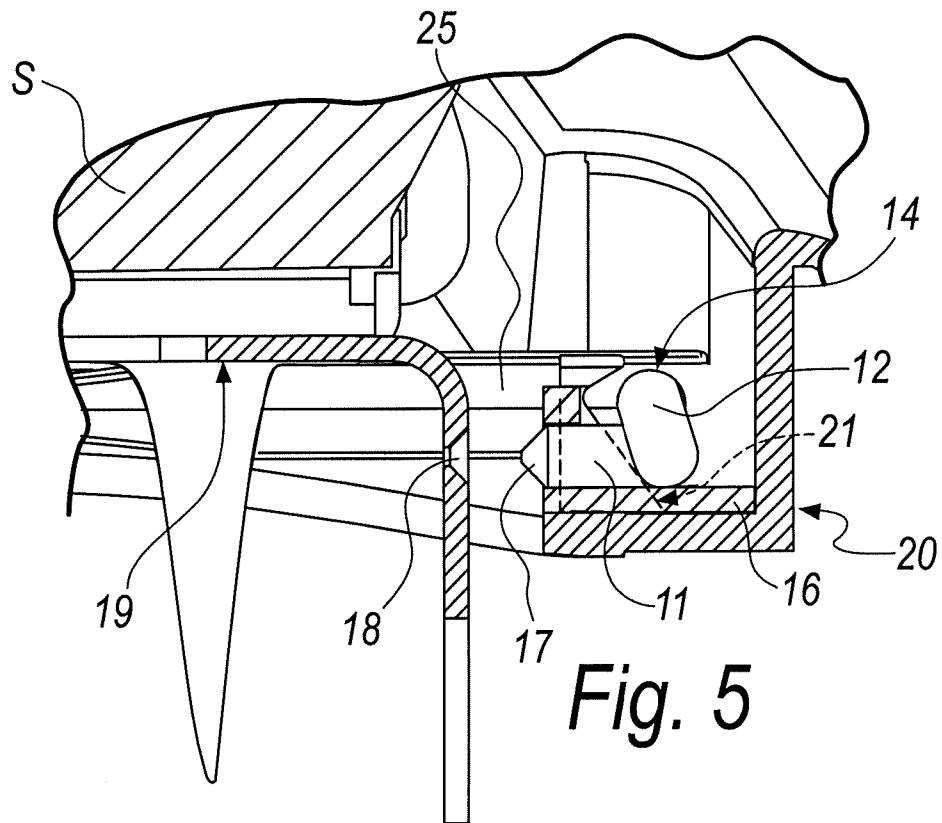


Fig. 5

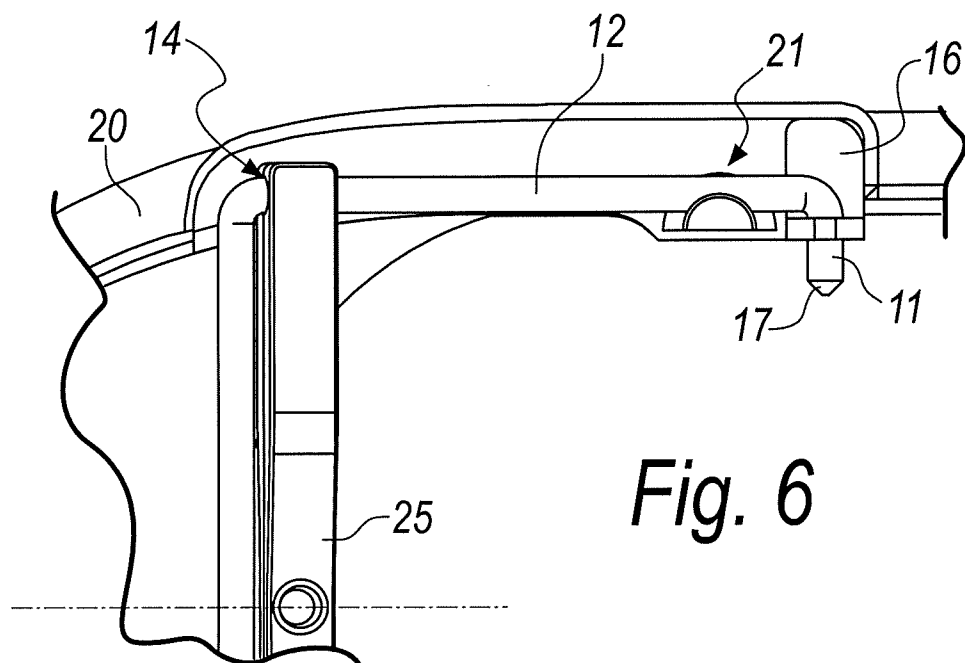
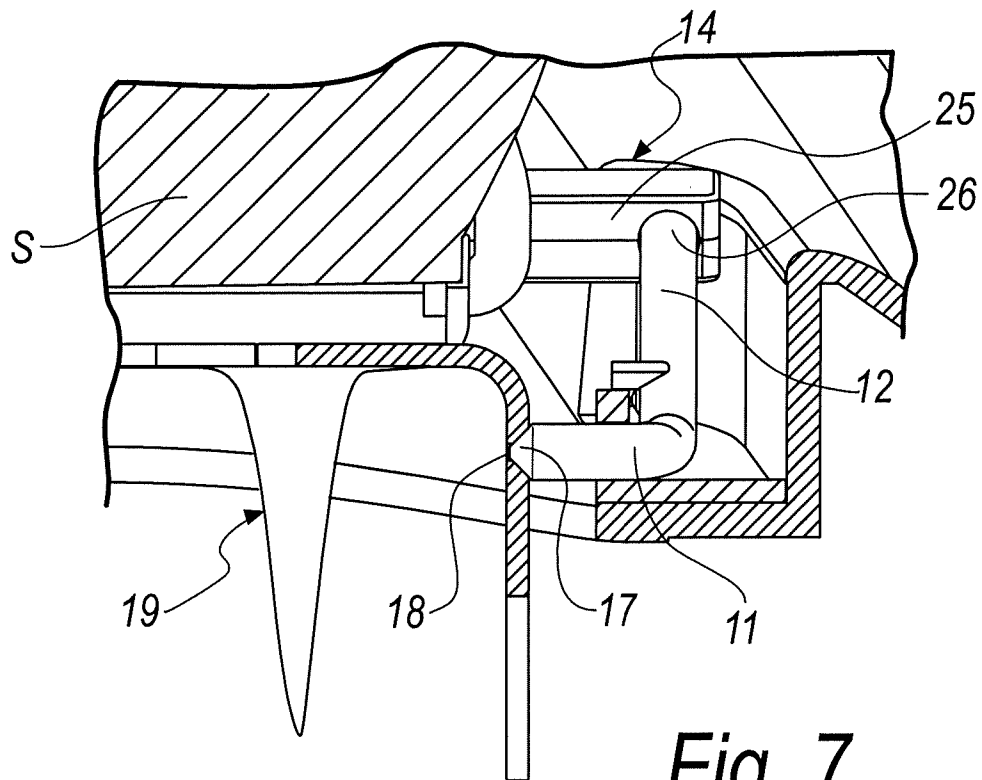
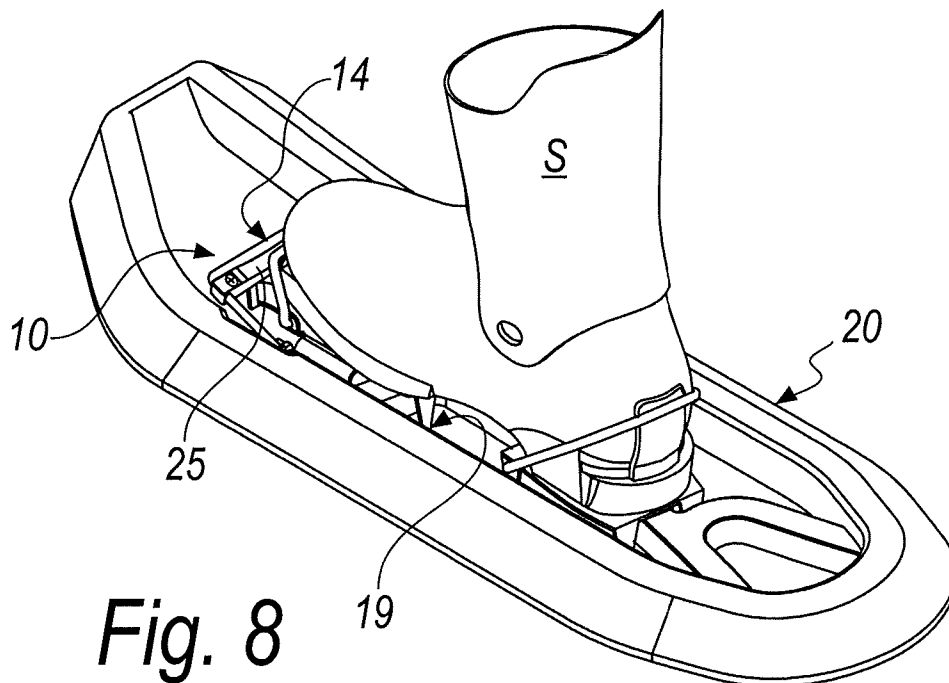
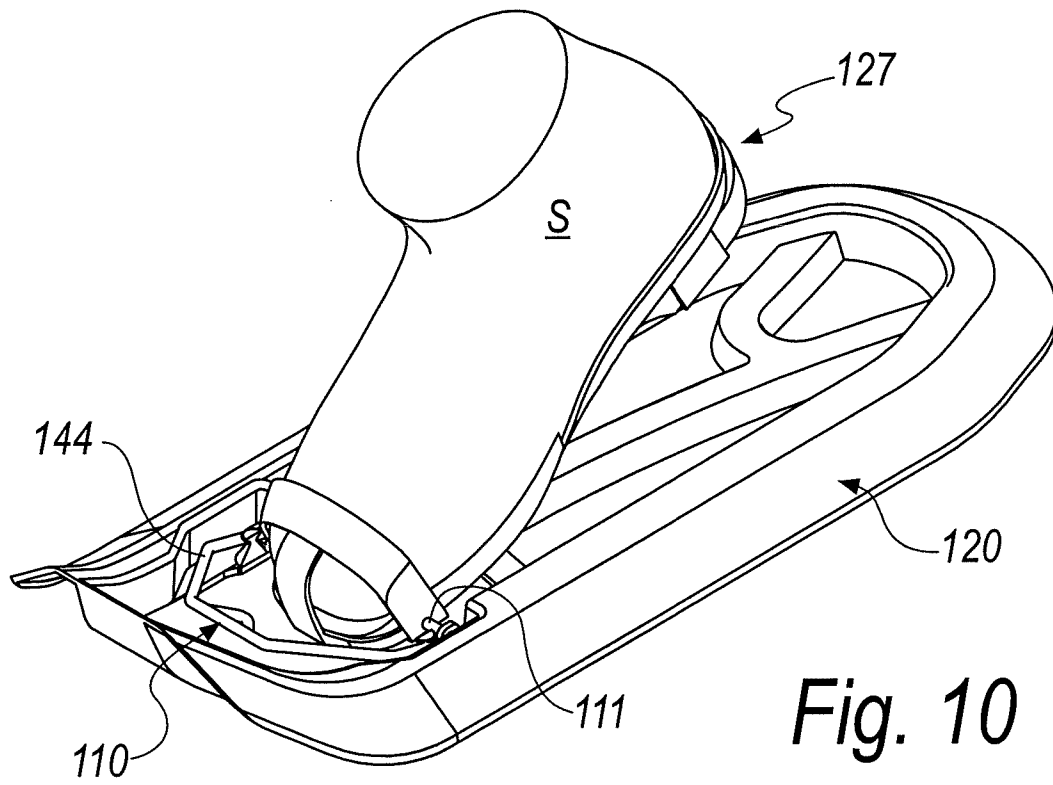
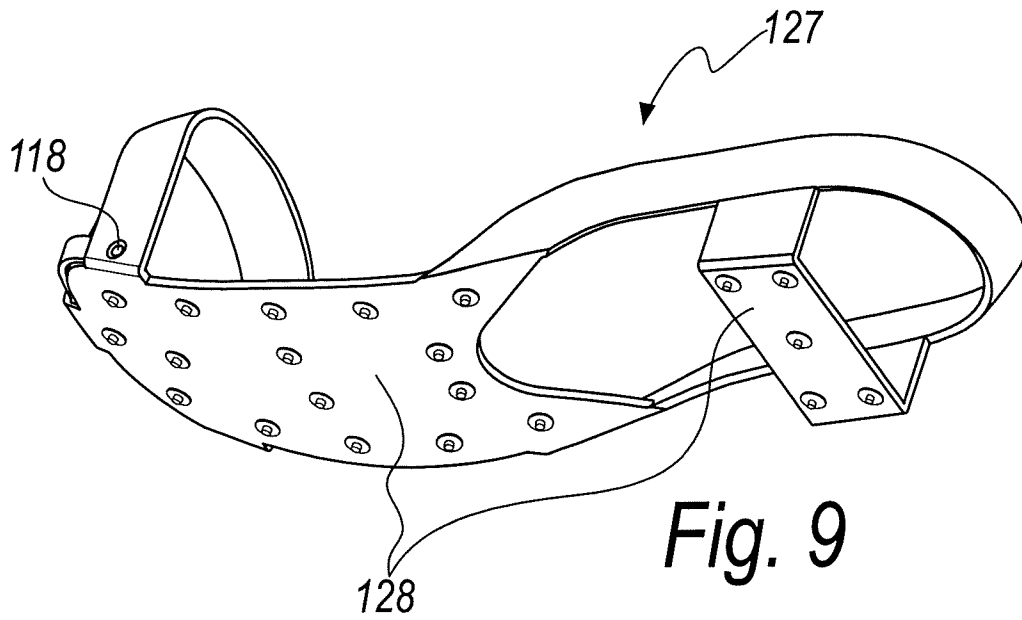
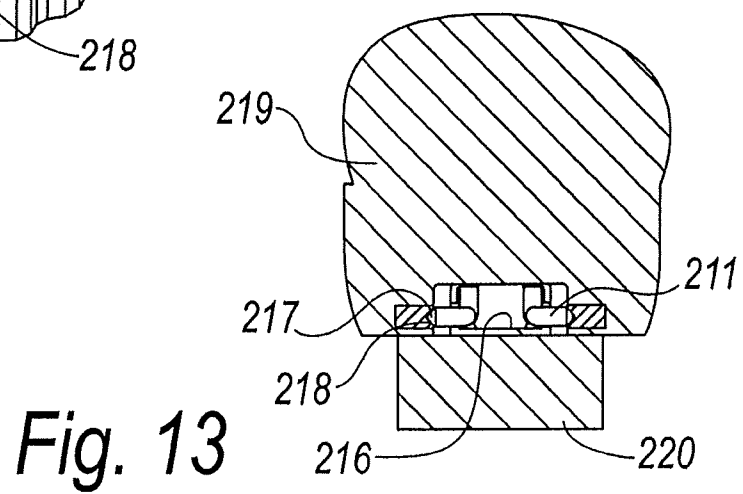
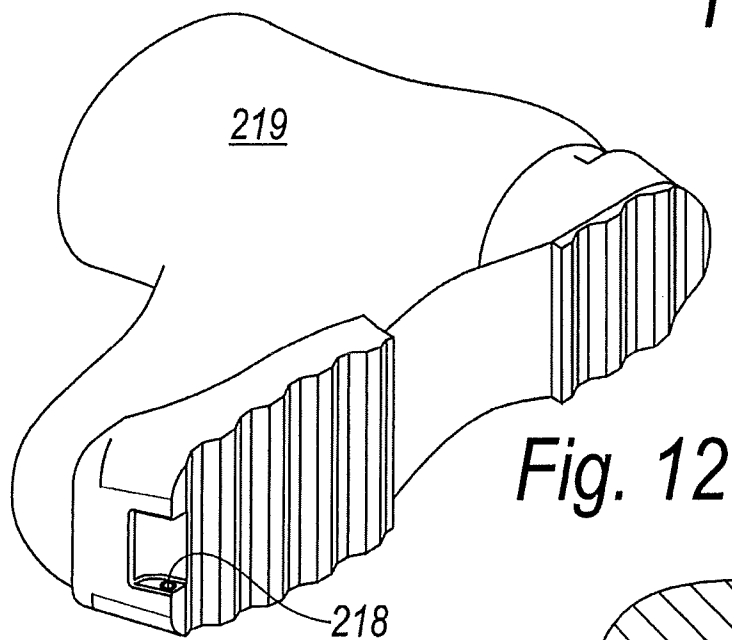
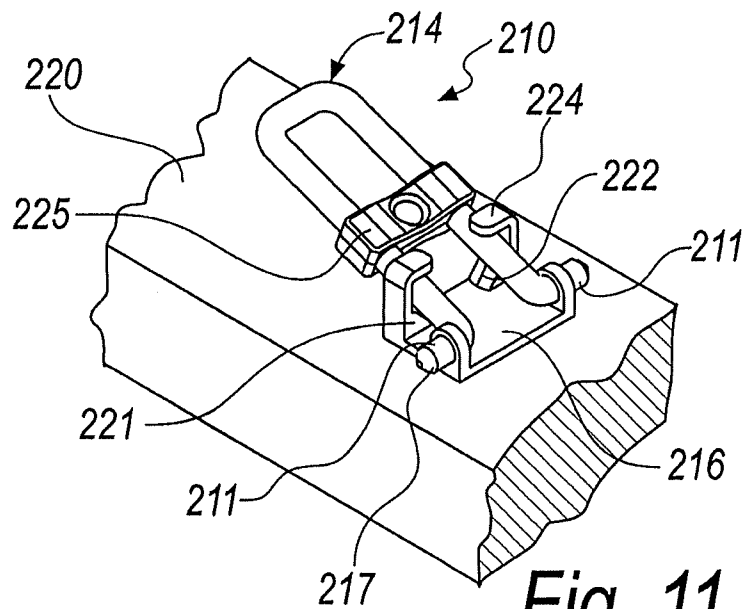


Fig. 6

*Fig. 7**Fig. 8*





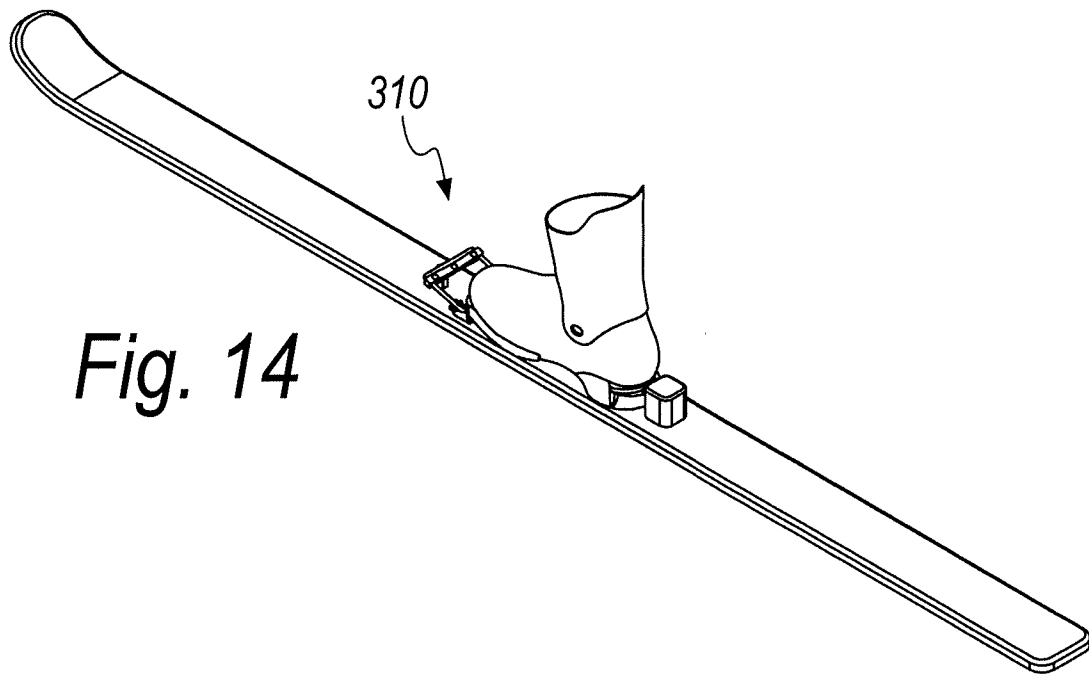


Fig. 14

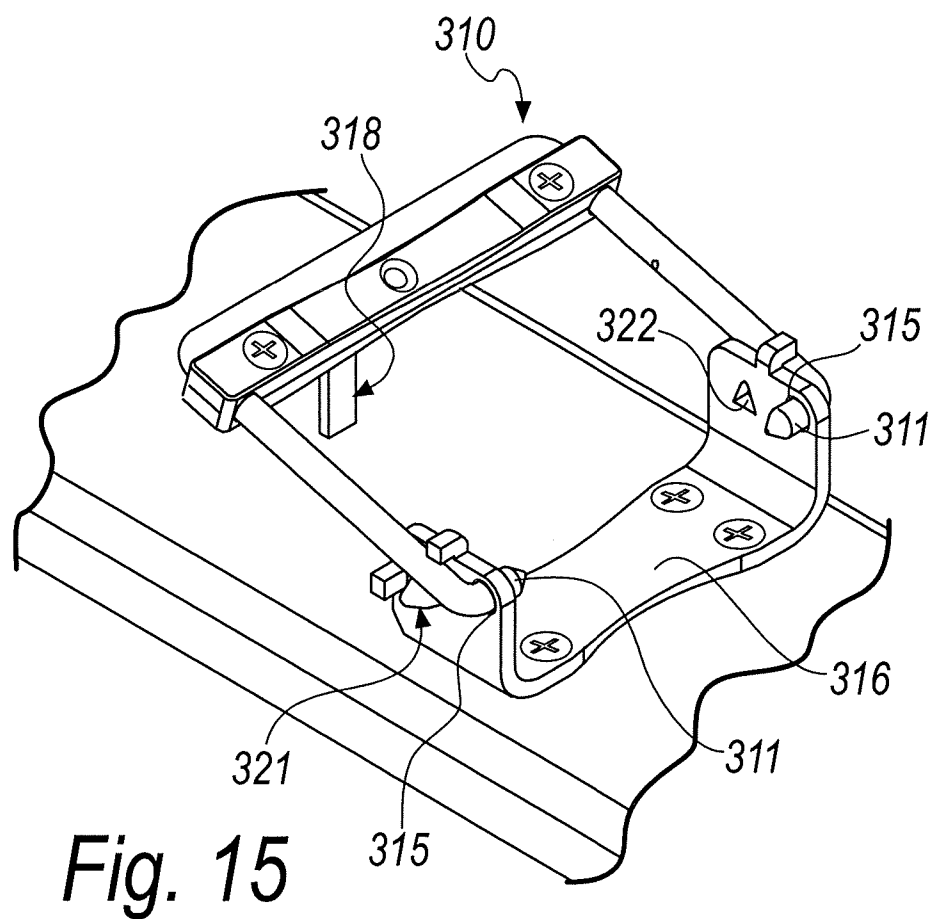
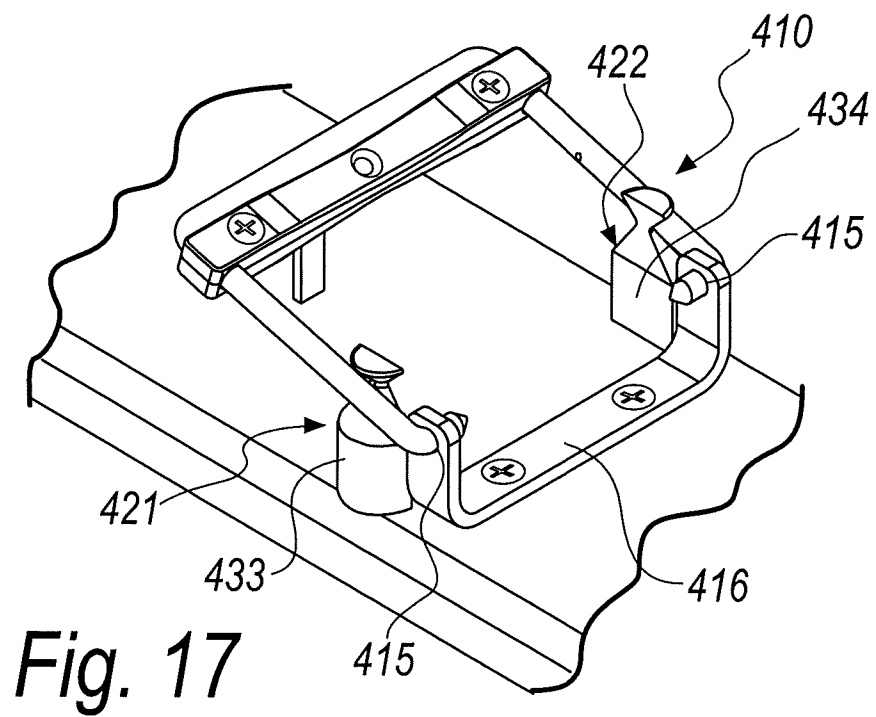
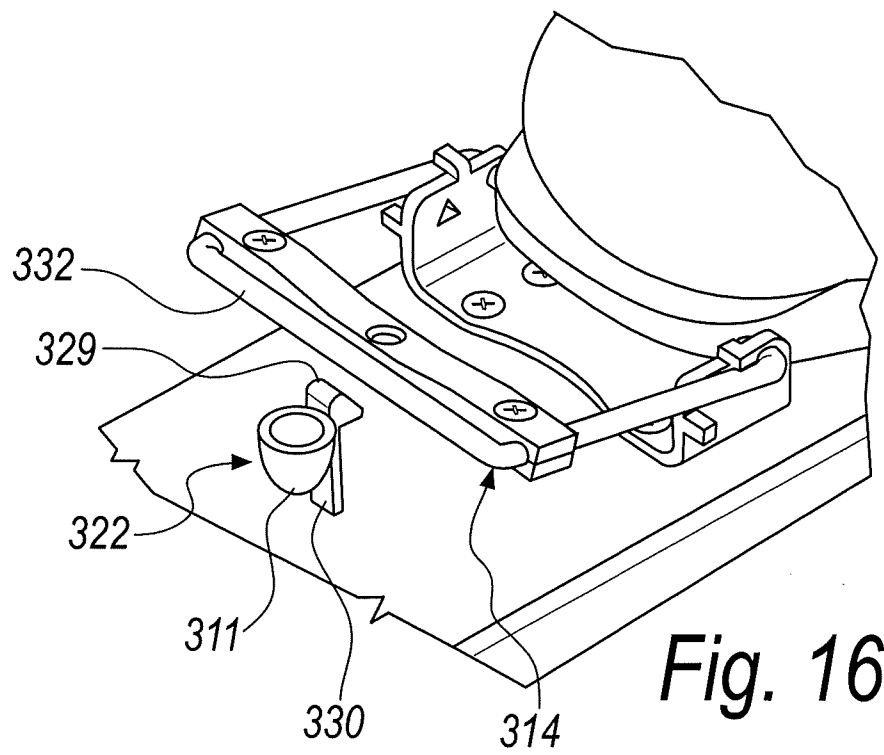
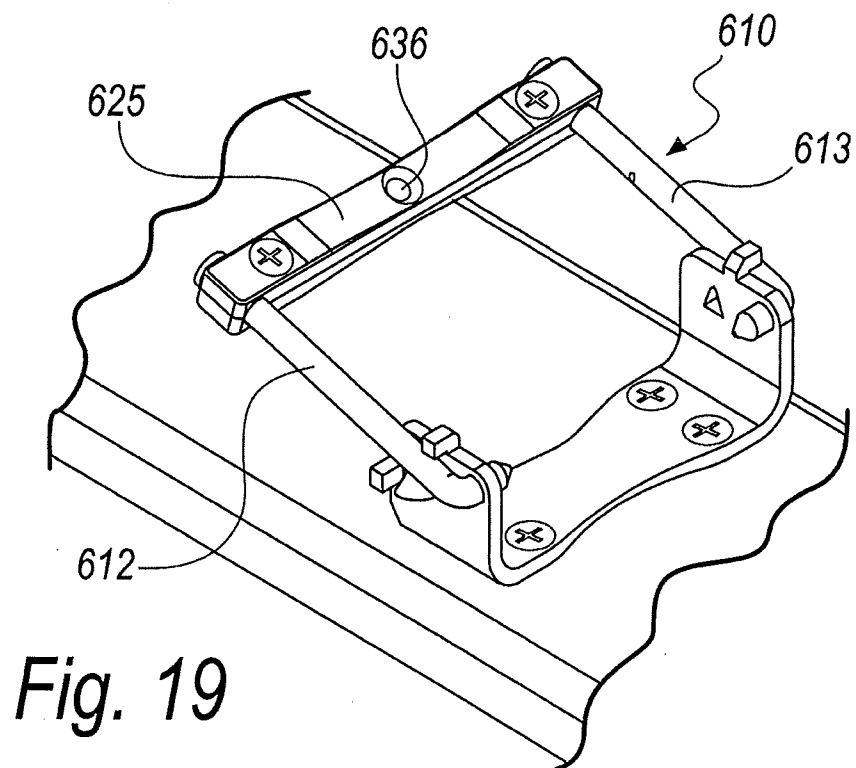
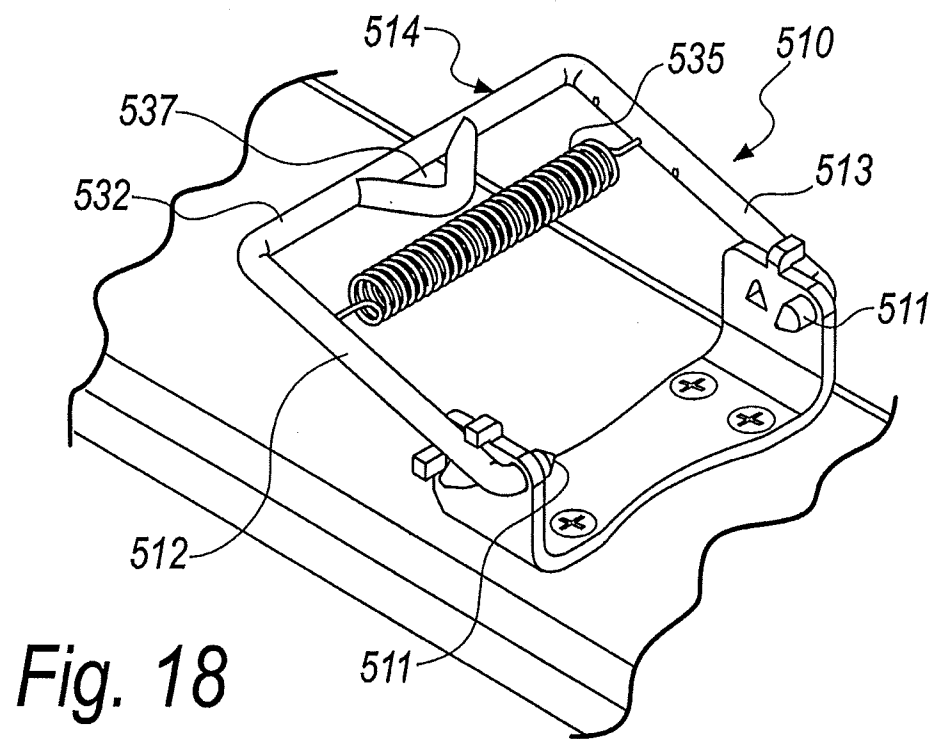
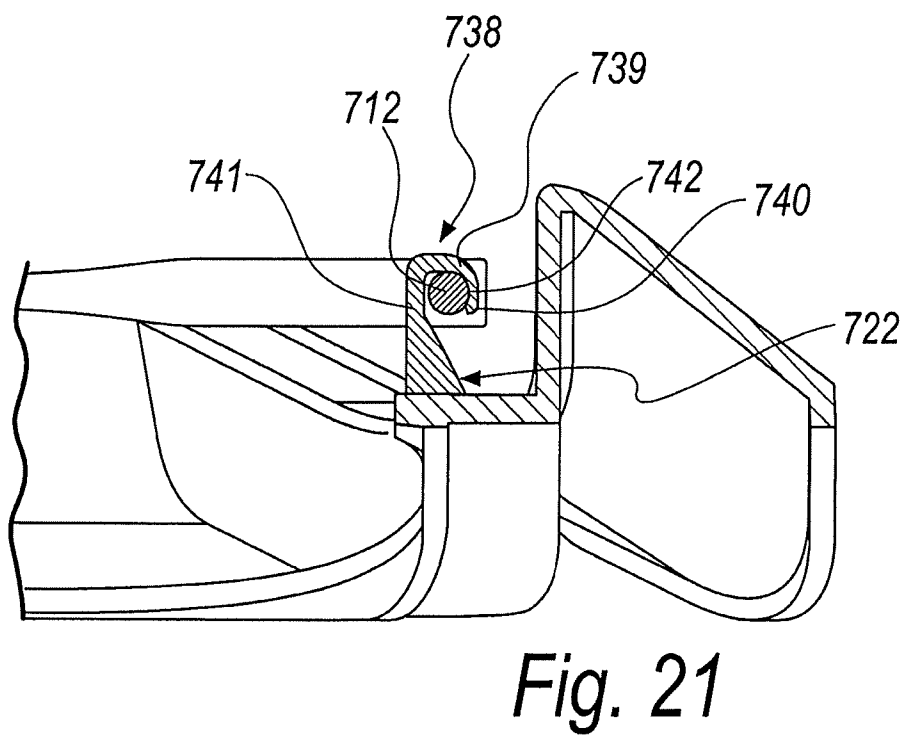
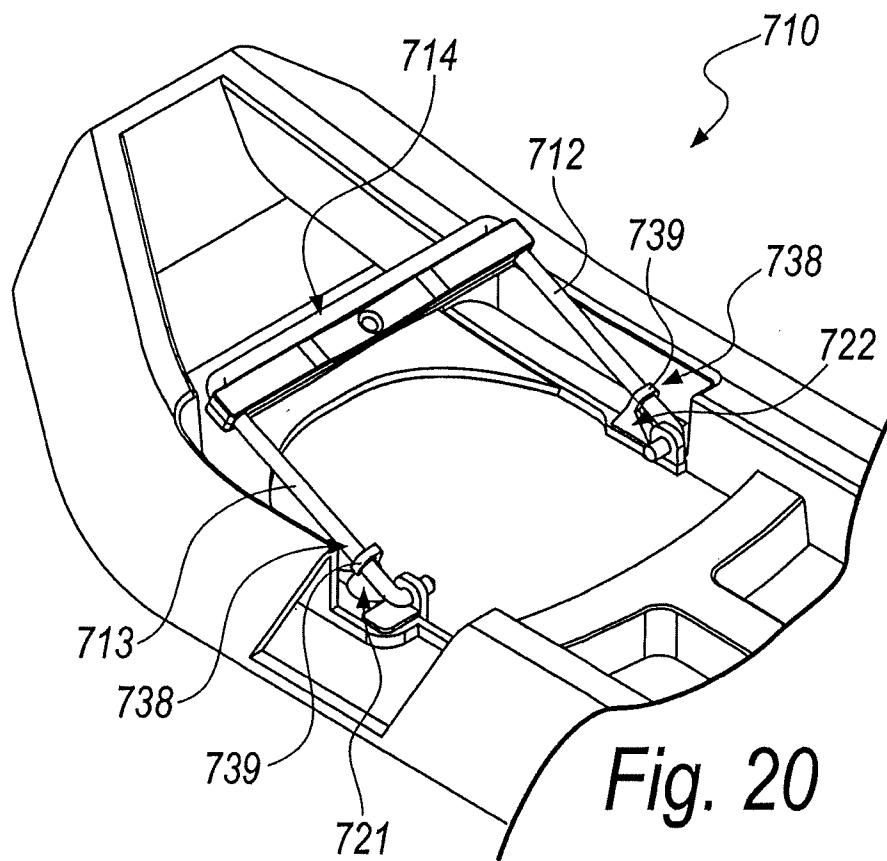


Fig. 15







INTERNATIONAL SEARCH REPORT

International application No

PCT/IB2012/050440

A. CLASSIFICATION OF SUBJECT MATTER

INV. A43C15/06 A63C13/00
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)

A43C A63C

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	WO 00/62636 A1 (WARNER CHARLES BENTLEY [US]) 26 October 2000 (2000-10-26) page 5, lines 7-20; claims; figures -----	1-10
A	US 2008/263902 A1 (CHARTRAND DANIEL [CA] ET AL) 30 October 2008 (2008-10-30) paragraphs [0042], [0054]; claims; figures -----	1-10
A	US 3 344 538 A (WILLIAM MASSICOTTE) 3 October 1967 (1967-10-03) claims; figures -----	1-10



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

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"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

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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

Date of the actual completion of the international search

14 May 2012

Date of mailing of the international search report

23/05/2012

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2012/050440

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
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			EP 2142026 A1	13-01-2010
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			US 2010307029 A1	09-12-2010
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