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(54) **Title**: DEVICE FOR MAKING A SECTIONED SKI

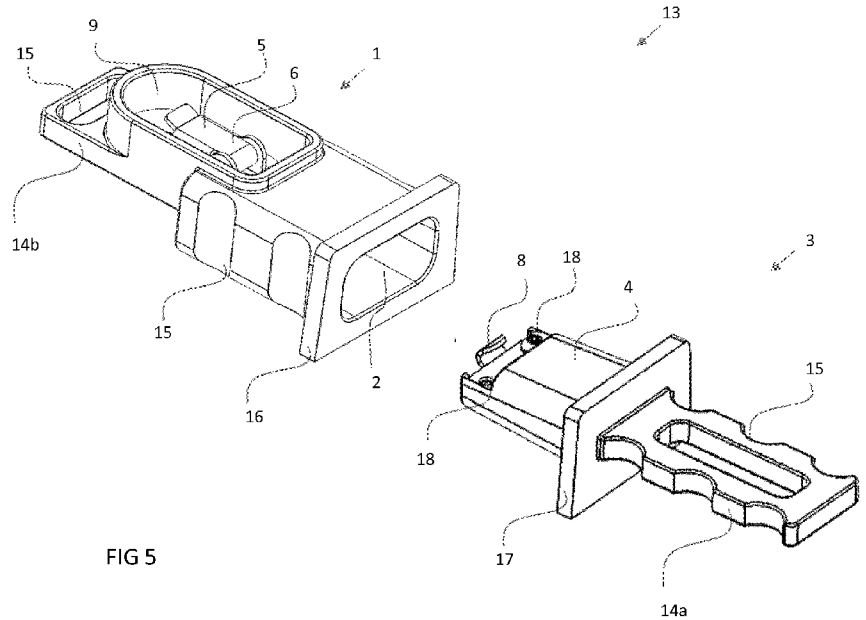


FIG 5

(57) **Abstract**: It is provided a device 13 for producing a sectioned ski 10 comprising a recess part 1 comprising a recess 2, a tongue part 3 comprising a wedge-shaped tongue 4, said device 13 having a fastening mechanism 5 for pulling tongue 4 into the recess 2 and reversibly attaching the tongue 4 to the recess part 1 characterized by that the tongue part 3 has a fixing member 14a for permanently fastening the tongue part 3 into the cross section of a ski.

DEVICE FOR MAKING A SECTIONED SKI

Technical field

This invention relates to a sectioned ski and a device for obtaining a sectioned ski.

Prior art

Skis, in particular cross country skis, are about 2 m long and are difficult to transport. When transported with a car, roof racks are often used because they are difficult to fit inside the car. Cross country skis are also bulky to carry when using public transportation.

There is a multitude of disclosures for sectioned and/or foldable skis. However, to our knowledge no such product has yet been successfully introduced on the market. This is a pity since a sectioned ski could be very useful. One reason for the lack of sectioned skis on the market is that previous designs have been unstable and unable to cope with the stress and bending that a ski undergoes as the skier skis in the terrain. Earlier designs has provided sectioned skis that can possible be used for emergency situations or for skiing short distances, but not for carrying out prolonged exercise or race training.

Also, most previous disclosures relate to old wooden skis or modern downhill skis, both which have a rather flat cross-section (they are much wider than they are high), see for example DE 298 12 765 U 1 and WO8501883. An example of a cross section of such skis are shown in Fig 16b. In contrast, modern high performance cross-country skis (for racing) have a midsection that is comparatively high compared to their width, at least compared to downhill skis. A cross section of a modern cross country ski for racing is designated by 24 in Fig 15 and Fig 16a.

Certain prior art relate to sectioned skis with complicated mechanisms, for example US20120025508. Such a mechanism will be prone to failure and may also to stop working when snow and or ice gets stuck in it. They are also expensive to manufacture. US4358130 provides a sectioned ski with two separate locking mechanism, one on each side of the ski, adapted to a ski with a flat cross section (Fig 16b).

US patent 4,600,211 discloses a sectioned ski where a wedge shaped tongue can be inserted into a hole.

It would be useful if a pre-manufactured ski could be modified into a sectioned ski. This could make the manufacturing of sectioned skis more cost-efficient. It would also be useful if a sectioned ski could have a more stable connection and if the assembled ski would be sufficiently stiff for not compromising the function of the camber of the ski.

Thus there is a need for a stiff, simple and cost efficient sectioned cross country ski, which is also easy to operate.

SUMMARY OF INVENTION

These problems and others are solved by the inventive device.

It is provided, in a first aspect of the invention, a device for producing a sectioned ski, comprising a recess part comprising a recess, a tongue part comprising a wedge-shaped tongue, said device having a fastening mechanism for pulling tongue into the recess and reversibly attaching the tongue to the recess part, where each of said recess part and said tongue part are arranged to be permanently installed in a ski. The recess part is intended be installed in one sub part of the ski and the tongue part is intended to be installed in the other sub part of the ski.

The tongue may be engaged by the recess in a wedging fit and the wedging fit may be achieved by the tongue being tapered in the longitudinal direction of the ski and where both the width and the height of the tongue is tapered.

The fastening mechanism can be a toggle latch located in the recess part. The fastening mechanism can be located in a well in the recess part which is accessible by the user from the top surface of the ski. The fastening mechanism can be located or contained in the well such that there are no protruding parts on the top surface of the ski or on the side surface of the ski. During operation of the fastening mechanism the user uses manual power to close the fastening mechanism. Some prior art solutions uses power transfer systems to transfer the power from a lever or such outside the ski (for example from the top surface) to inside the of the ski. Placing the fastening mechanism in a well removes the need for an axis that transfers the power of the user from outside the ski to a fastening mechanism inside the ski.

In one embodiment, at least one part of the device is designed to be a sacrificial part, such that the sacrificial part will break before the rest of the device or the ski when the ski is assembled and subjected to bending forces, said sacrificial part being reversibly fastened to the rest of the device. The sacrificial part can be a part of the toggle latch 6 or the hook 8 to which the bracket of the toggle latch attaches.

The device is intended to become an integrated part of the ski so that ski can easily be disassembled into two sub parts.

In one embodiment the two parts of device is installed in each of the two sub parts which are created when a ski has been split along a plane which is perpendicular to the longitudinal direction of the ski. Each subpart of the device is installed in holes that are arranged to run in said longitudinal direction from an opening in a cross-section of a the ski, so that the ski can be assembled by fastening together said recess part and said tongue part.

Preferably the tongue part has a projecting fixing member, arranged to be inserted into, and permanently anchor the tongue part in a sub part of the ski. The recess part can also have a projecting fixing member, arranged to be inserted into, and permanently anchor the recess part in a sub part of the ski. The recess part and the tongue part are each permanently fixed in a sub part of the ski with an adhesive. The fixing members, or the recess part can be equipped with at least one gluing structure.

In order to provide a connection that is stiff and rigid the two subparts of the device may have shoulders which have roughly the same profile as the cross section of the midsection of a cross country ski. The shoulders rest against each other when the device is in the closed state, thereby providing stiffness. The relationship between the height of the shoulders and the width of the bottom part of the shoulders is from 1:1.5 to 1:2.0, the width being measured along a line that is parallel to the width of the ski.

The relationship between the width w and the height h of the tongue can be from 1.5 to 2.2, more preferably from 1.5 to 2.0.

In a second aspect of the invention it is provided a ski with a device according to the invention. Preferably the ski is a cross country ski.

In a third aspect of the invention it is provided a method for manufacturing a sectioned cross country ski comprising the steps of a) dividing the ski along a straight line which runs perpendicular to the longitudinal direction of the ski, said straight line being located in the midsection of the ski, to create two sub parts, b) making holes in each of the sub parts of the ski, said holes being made at least in the two areas that forms the cross section of the ski, each of said holes being adapted to receive a part of the device according to the invention, c) installing the device mentioned in b) in each of the sub parts of the ski, and d) fixing the device mentioned in b) with an adhesive.

The device provides a simple and cost efficient way to produce a sectioned ski, in particular a sectioned cross country ski.

Skis are usually produced in a molding process. The design and production of new molds for this purpose is expensive. With the use of the inventive device, sectioned skis can be produced without the need for separate molds. Instead, regular skis made in the molds for regular skis can be used for producing a sectioned ski. Regular skis from a regular mold can be divided and turned into a sectioned ski with the aid of the device.

The device results in a sectioned ski which is easy to assemble and a ski with improved stability.

BRIEF DESCRIPTION OF DRAWINGS

Fig. 1 is a view of a cross country ski seen from the side.

Fig. 2 shows the device installed in a cross country ski

Fig. 3-5 shows the device seen from an oblique angle.

Fig. 6 is a side view of the device.

Fig. 7 shows the device seem from the top.

Fig. 8-9 shows the tongue part of the device seen from the short ends.

Fig. 9-10 shows the recess part of the device seen from the short ends.

Fig. 12-13 shows the device with a toggle latch as the fastening mechanism.

Fig. 14 shows the device where a screw is the fastening mechanism.

Fig. 15 shows the cross section of a part of the midsection of a cross country ski.

Fig. 16a shows a cross sections of a modern racing cross country ski.

Fig. 16b shows a cross section of an old style cross country ski or a downhill ski.

DETAILDED DESCRIPTION

Fig. 1 shows a ski 10 consisting of rear part 11 and front part 12 and device 13 installed in the ski 10. The midsection of the ski is relatively thick as can be seen in Fig. 15 and Fig. 16a. This part of the ski is stiff, whereas the front end and the back end are thinner and more flexible. The space between the snow and the midsection of the ski, the so called camber of the ski, IS shown somewhat exaggerated and marked with c in Fig. 1. The camber is essential for classical style cross country skiing. When the skier rests his full weight on one ski the camber of the ski is depressed, putting the bottom surface of that ski in contact with the snow to create traction. The midsection is located at a distance of 40 % to 60% from the tip, the percentage being of the total length of the ski.

The device 13 has two man parts, a recess part 1 with a recess 2 and a tongue part 3 with a tongue 4, each part to be installed in one sub part 11, 12 of the ski 10 as can be seen in Fig 2.

With the device 13, a sectioned cross country ski can be produced by taking a regular cross country ski, dividing it in two pieces, for example by sawing, and mounting the device in holes in the cross sections. The holes can be made, for example by milling holes into which the fixation members 14a, 14b of the device fits. The hole in the ski 10 made by milling is preferably slightly larger than the fixation members 14a, 14b so that there is room for an adhesive. Fixation members 14a, 14b are then fixed with adhesive, for example a strong composite glue, such as for example epoxy resin. Other types of filler or adhesives that result in a strong bond between device parts 1, 3 and ski 10 may be used. A hole for well 9 is also made in the top surface 19 of the ski.

Alternatively, the device 13 is installed already during the production of the ski. Modern skis are produced in a process where a synthetic foam is injected into a mold and allowed to harden. Sometimes a core of a stiff material is also used. Thus device 13 can be molded in place during the molding of the ski. The adhesive can thus be a hardeable synthetic foam of the kind normally used in the fabrication of cores of modern cross country skis.

Thus “adhesive” refers to all types of suitable adhesives such as for example, synthetic foam that can harden, or two-component adhesives.

Installation of device 13 in ski 10 is preferably made about midsection of the ski 10 so that two sub parts 11, 12 with approximately the same length is obtained as can be seen in Fig 1. Installation is preferably made just in front of the ski boot binding as not to interfere with the binding.

The recess part 1 of device 13 is preferably installed in the front part 12 of the ski 10 and the tongue part 3 is preferably installed in the rear part 11 of the ski 10. This ensures that the fastening mechanism 5, and the well 9, when present, does not interfere with the ski boot binding which is also located on the top of the midsection of the ski.

Alternatively, installation can be done behind the ski boot binding. This has the advantage that the device can be installed in the thickest part of the ski, which provides for a more rigid installation. Here the well 9 makes it possible to install the device 13 below the location of the ski boot. The recess part is in that case preferably installed in the rear part 11 of the ski, so that the well 9 is not in the way of the ski boot binding.

The two main parts 1,3 of device 13 is preferably manufactured in a durable yet lightweight material such as plastic or a light metal, such as for example, aluminum, titanium, glass fiber, plastic, carbon fiber or Kevlar, so that a tough and stiff, yet lightweight device is obtained. Aluminum is preferred as has low cost and maintains its strength at low temperatures. Plastic may become brittle at low temperatures.

Figs. 3 and 4 shows the device in its open and closed state, respectively.

Fig 5 shows the device in more detail. The tongue 4 is made to closely fit in the recess 2. Preferably the tongue 4 is wedge-shaped so that a wedging fit is achieved when tongue 4 is pulled forward into recess 2 by fasting mechanism 5. The wedge shape is most clearly seen

in Figs. 6-7, and comprises a tapered shape which narrows towards the free end of tongue 4 and towards the the interior of recess 2. The wedging fit of the tongue 4 with the recess 2 contributes to the stiffness of the assembled ski. The forward pull of fastening mechanism 5 provides friction in the wedging fit.

The wedging fit is achieved by the tongue 4 being tapered in the longitudinal direction of the ski. Preferably both the width (w) and the height (h) of the tongue is tapered as seen in Figs 6, 7 and 9 and 11. The degree of tapering is indicated by the angles α in Fig 6 (height) and β (width) in Fig 7. Suitable values of both α and β may be from 2° to 8°.

The cross section of tongue 4 can have a roughly square (as seen in Fig. 9) or oval profile in order to resist turning of the tongue 4 in recess 2.

The length of the tongue 4 is preferably from 25 to 60 mm. The width (w) of the tongue is preferably from 20 to 35 mm at the widest point. The height (h) of the tongue can be from 10 mm to 20 mm at the widest point. The relationship between the width w and the height h of the tongue 4 can suitably be from 1.5 to 2.2, more preferably from 1.5 to 2.0. An example of a profile of the tongue 4 is shown in Fig. 9. These dimensions of the tongue result in a device that fits well within the cross section of a modern cross country ski while providing maximum rigidity and stiffness.

The wedging fit should be directed in the longitudinal direction of the ski. This provides for increased stiffness of the ski, when assembled. The recess 2 should be tapered to the same extent as the tongue 4.

The interior of recess 2 which has a close fit with tongue 4 suitably has the same relative dimensions as the tongue 4.

The fastening mechanism 5 can be a toggle latch 6 as shown in Figs 12-13. The bracket 7 of the toggle latch 6 can be arranged to be slung over a hook 8 on the tongue 4, thereby pulling

the tongue 4 forward into recess 2 and locking the two parts 11, 12 of the ski 10 together when the toggle latch 6 is closed. The toggle latch 6 provides a simple and sturdy fastening mechanism at a low cost, by which the user can assemble and disassemble the ski 10. The toggle latch 6 can be adjustable in order to provide different pull forces. The toggle latch may be a toggle latch that is operated by the user by flipping or turning a handle.

Preferably there is one tongue 4 that fits into one recess 2 and the tongue is fastened and pulled into the recess by one single fastening mechanism 5.

Preferably the tongue 4, the recess 2 and the fastening mechanism 5 are located in the middle of the lateral axis (between the left side of the ski and the right side of the ski) of the ski when device 13 is installed in the ski 10.

The use of a single fastening mechanism that is located middle of the lateral axis makes the device 13 particularly well suited to be installed in a modern ski witch which are narrow compared to the old type of ski (Fig 16a and 16b).

The fastening mechanism 5, for example a toggle latch, or a part thereof, can preferably be located in a well 9 situated so that it is in communication with the recess 2 as seen in Fig. 13. Preferably the well 9 is in communication with the end of the recess 2 such that the fastening mechanism 5 can attach to the end of the tongue 4 and pull tongue 4 into the recess 2. The well 9 makes it possible for the user to access the fastening mechanism 5 from the top surface 19 of the ski 10. Thereby the fastening mechanism 5 and the tongue 3 and the recess 2 are somewhat recessed in relation to the top surface 19 of the ski as can be seen in Fig 2. Preferably the tongue and the recess are located close to or in the center 26, of the cross-section 24 of the ski indicated in 16a. “Close” shall mean within a distance of 10% of the width and the height from the center 26. This enables the pull force of the fastening mechanism 5 to be located in the middle of the section of the ski rather than on the top or on the side. The vector of the fastening mechanism 5 is preferably parallel to the longitudinal direction of the ski, as shown in Fig 12.

The fastening mechanism 5 can also be a screw 22 (or several screws) that is screwed from the top of the ski 10 into a thread 23 in the tongue 4 at an oblique downward/backward angle to pull the tongue 4 forward into recess 2 when screw 22 is tightened as seen in Fig. 14. With the aid of screw 22 the user can conveniently assemble and dissemble the ski 10.

The well 9 may be closed by a lid 25 seen detached from well 9 in Fig. 6. The lid 25 blocks snow and water from entering the well. Preferably the top of the well 9 is arranged so that it can be installed flush with the top surface 19 of the ski 10 as seen in Fig 2 and 10. When the lid 25 is closed, an almost smooth top surface 19 of ski 10 is obtained. This has the advantage that there are no protruding parts on the top of the ski.

Preferably, at least one part of the device 13 is designed with decreased strength, so that it will break before the ski 10 or any other part of the device 13 when the ski is subjected to a strong bending force. This so called sacrificial part is preferably arranged to be removable, such as by removing a fastening screw, and therefore easy to replace when broken. This has the advantage that in the case of severe stress (such as in the case of a hard fall during skiing), this sacrificial part breaks before any other part of the ski 10 or the device 13 and can be replaced at a low cost without having to discard the whole ski. For example, the hook 8 or bracket of 7 of toggle latch 6 can be the sacrificial part. The hook 8 and toggle latch 6 can, for example, be attached to the tongue part 3 and recess part 1, respectively, with screws 18. The screws 18 enables replacement of toggle latch 6 and/or hook 8. When the fastening mechanism is a screw such as screw 22, the screw 22 itself can be the sacrificial part. The breaking can be achieved by the sacrificial part being weaker than other parts of the device 13 and ski 10, for example by the sacrificial part being made in a weak material or being made thinner than other parts of the device 13 and the ski 10.

At least the tongue part 3 of the device 13 can be equipped with at least one fixing member 14a for permanently fixing the tongue part 3 into a cross section 24 of a part of a ski 10. Preferably both the tongue part 3 and recess part 1 has fixing members. The fixing members 14a, 14b should have dimensions so that the assembled ski does not break when the ski is subjected to bending forces during skiing. The fixing member 14a of tongue part 3 may be

approximately 25 mm to 70 mm, preferably 40-50 mm, long and 5 to 10 mm, preferably 6-8 mm thick and 20-35 mm, preferably 25-30 mm, wide. These dimensions will provide an installation that is sufficiently strong while still fitting inside the ski, and leaving room for screwing on the ski boot binding, etc.

The recess part 1 may also have a fixing member 14b which aids the permanent fixation of the recess part in the ski 10. However, since the recess part 1 is itself installed in the ski, the fixing member 14b may be shorter than fixing member 14a. A suitable length is 5-15 mm.

The fixing members 14a and 14b and the recess part 1 which are glued or molded into the ski may be equipped with gluing structures 15 such as orifices, holes, ridges or dimples where the adhesive used in installation can enter. When the adhesive hardens in the gluing structures 15 a particular strong installation is achieved.

At least one of the main parts 1, 3, preferably both of the main parts 1, 3 has shoulders 16, 17 which are pressed against each other when fastening mechanism 5 is tightened as seen in Figs. 4 and 13-14. This contributes to the rigidity of the connection and the stiffness of the assembled ski 10. The profile of the shoulders 16, 17 preferably has the same peripheral shape as, but preferably slightly smaller or retracted in relation to, the cross section 24 of the midsection of the ski as seen in Fig. 15 and 16a so that each of the shoulders 16, 17 covers a cross section 24 of the ski. Thus the shoulders preferably have a larger cross section than the tongue and the recess, and substantially the same or slightly smaller cross-section as compared to the skis themselves at the point along the skis at which the device 13 is installed. To fit most modern cross country skis the shoulders should have shape that is roughly trapezoid as seen in Figs. 8-11, with the dimensions 40-45 mm, preferably about 43 mm, (bottom width), 38-43 mm, preferably 41 mm, (top width) and 20-24 mm, preferably 22 mm, (height), and where the top width is narrower than the bottom width. The relationship between the bottom width and the height of the cross country ski at the site of insertion of device 13 is preferably from 1:1.5 to 1:2.0, and the profile of the device should match this. The width and the height of the shoulders 16, 17, which match the profile of the cross section of the ski, is shown in Fig. 11.

The undersides 21a and 21b of the shoulders 16, 17 may effectively be forming a part of the kick zone of the bottom of the ski. Ski wax is normally applied in this area. The underside 21a and 21b of shoulders 16, 17 may therefore have a layer of the same type of plastic as is used for the bottom of the ski, in order to facilitate waxing of the ski by the user.

CLAIMS

1. Device 13 for producing a sectioned ski 10, comprising a recess part 1 comprising a recess 2, a tongue part 3 comprising a wedge-shaped tongue 4, said device 13 having a fastening mechanism 5 for pulling tongue 4 into the recess 2 and reversibly attaching the tongue 4 to the recess part 1, where each of said recess part 1 and said tongue part 3 are arranged to be permanently installed in a ski 10.

2. Device according to claim 1 wherein the fastening mechanism 5 is located in a well 9 which is accessible by the user from the top surface 19 of the ski 10.

3. Device according to claim 1 or 2 wherein there is one single fastening mechanism 5.

4. Device according to any one of claims 1 to 3 wherein the fastening mechanism 5 is a toggle latch 6.

5. Device according to any one of claims 1 to 4 wherein the tongue is engaged by the recess in a wedging fit and the wedging fit is achieved by the tongue being tapered in the longitudinal direction of the ski and where both the width and the height of the tongue is tapered.

6. Device according to any one of claims 1 to 5 where the relationship between the width w and the height h of the tongue 4 is from 1.5 to 2.2, more preferably from 1.5 to 2.0.

7. Device according to any one of claims 1 to 6 where each of the sub parts 1, 2 of the device 13 has shoulders 16, 17 adapted to rest against each other when the device is in the closed state, said shoulders having the same profile as the cross section 24 of the midsection of a cross country ski 10.

8. Device according to claim 7 where the relationship between the height of the shoulders and the width of the bottom part of the shoulders is from 1:1.5 to 1:2.0, the width being measured along a line that is parallel to the width of the ski.

9. Device according to any one of claims 1 to 8 where the tongue part 1 has a projecting fixing member 14a, arranged to be inserted into, and permanently anchor the tongue part 3 in one of sub parts 11, 12 of the ski 10.

10. Device according to any one of claims 1 to 9 where the recess part 1 has a projecting fixing member 14b, arranged to be inserted into, and permanently anchor the recess part 1 in one of sub parts 11, 12 of the ski 10.

11. Device according to any one of claims 1 to 10 where at least one fixing member 14a, 14b or the recess part 1 is equipped with at least one gluing structure 15.

12. Device according to any one of claims 1 to 11 where at least one part of the device 13 is a sacrificial part, such that the sacrificial part will break before the rest of the device 13 or the ski 10 when the ski 10 is assembled and subjected to bending forces, said sacrificial part being reversibly fastened to the rest of the device 13.

13. Device according to 12 where the sacrificial part is a part of the toggle latch 6 or the hook 8 to which the bracket 7 of the toggle latch 6 attaches.

14. A cross-country ski comprising a device according to any one of claims 1 to 13.

15. A method of manufacturing a sectioned cross country ski comprising the steps of:

a) dividing the ski 10 along a plane which is perpendicular to the longitudinal direction of the ski, said straight line being located in the midsection of the ski, to create two sub parts 11, 12,

b) making holes in each of the sub parts 11, 12 of the ski, said holes being made at least in the two areas that forms the cross section 24 of the ski, said hole being adapted to receive a device 13 according to any one of claims 1 to 10.

c) installing the device mentioned in b) in each of the sub parts 10, 11 of the ski,

d) fixing the device mentioned in b) with an adhesive.

FIG 1

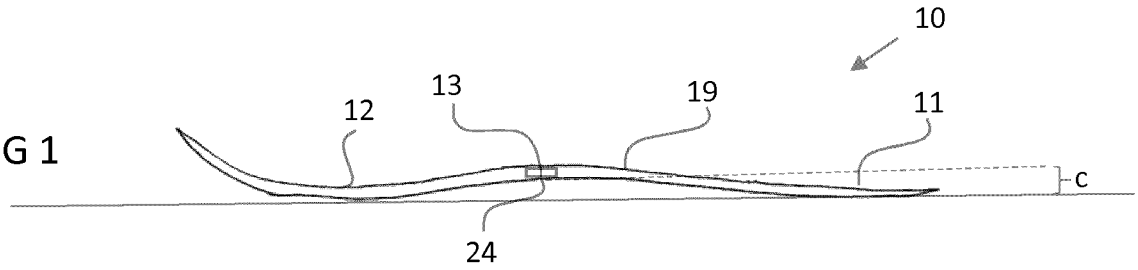


FIG 2

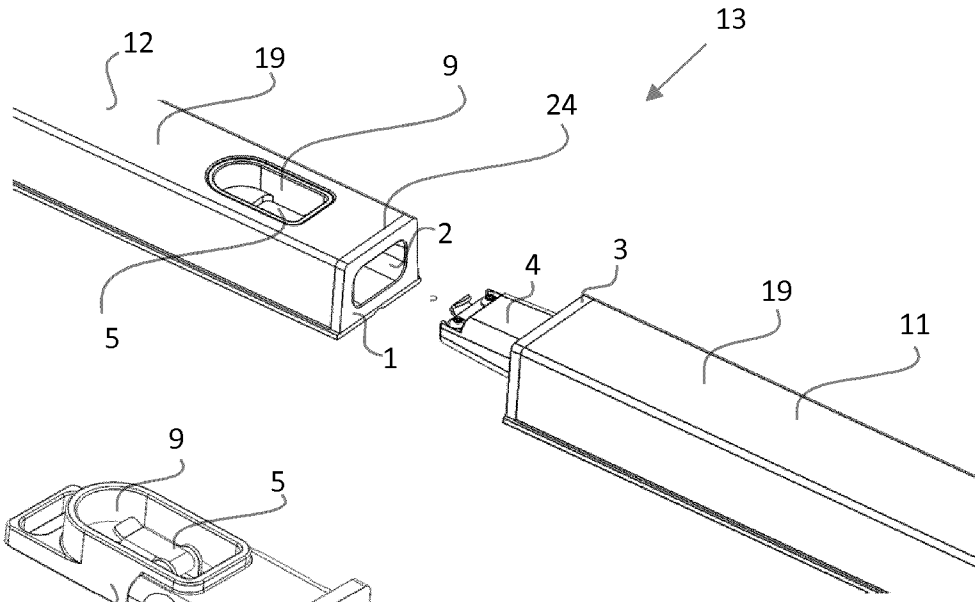


FIG 3

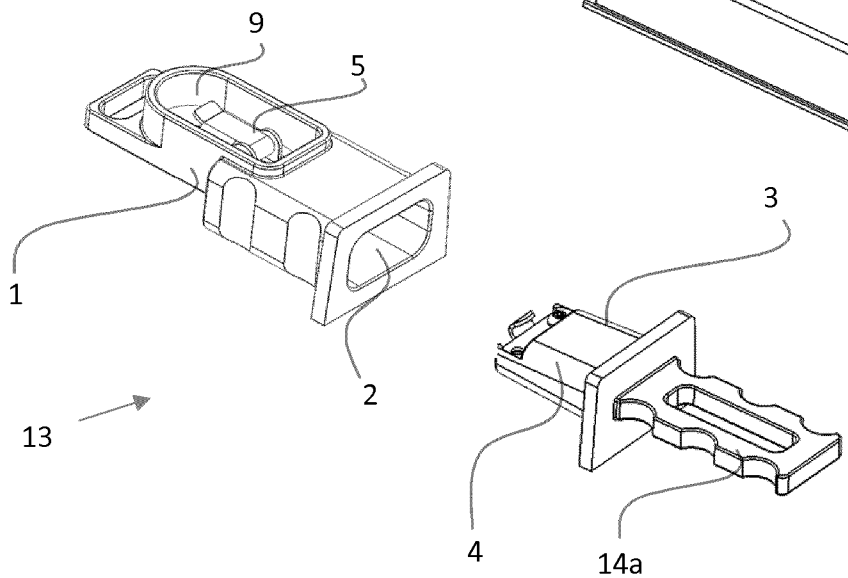
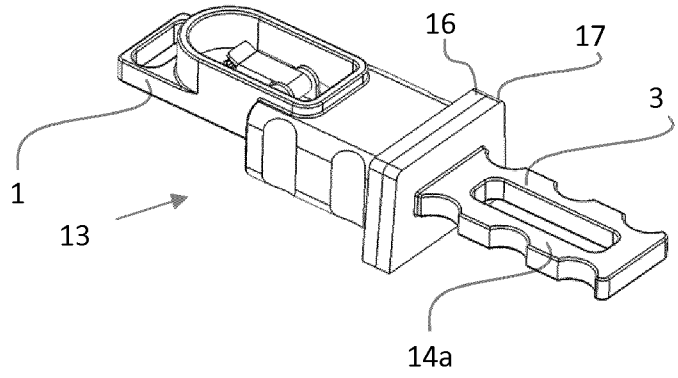


FIG 4



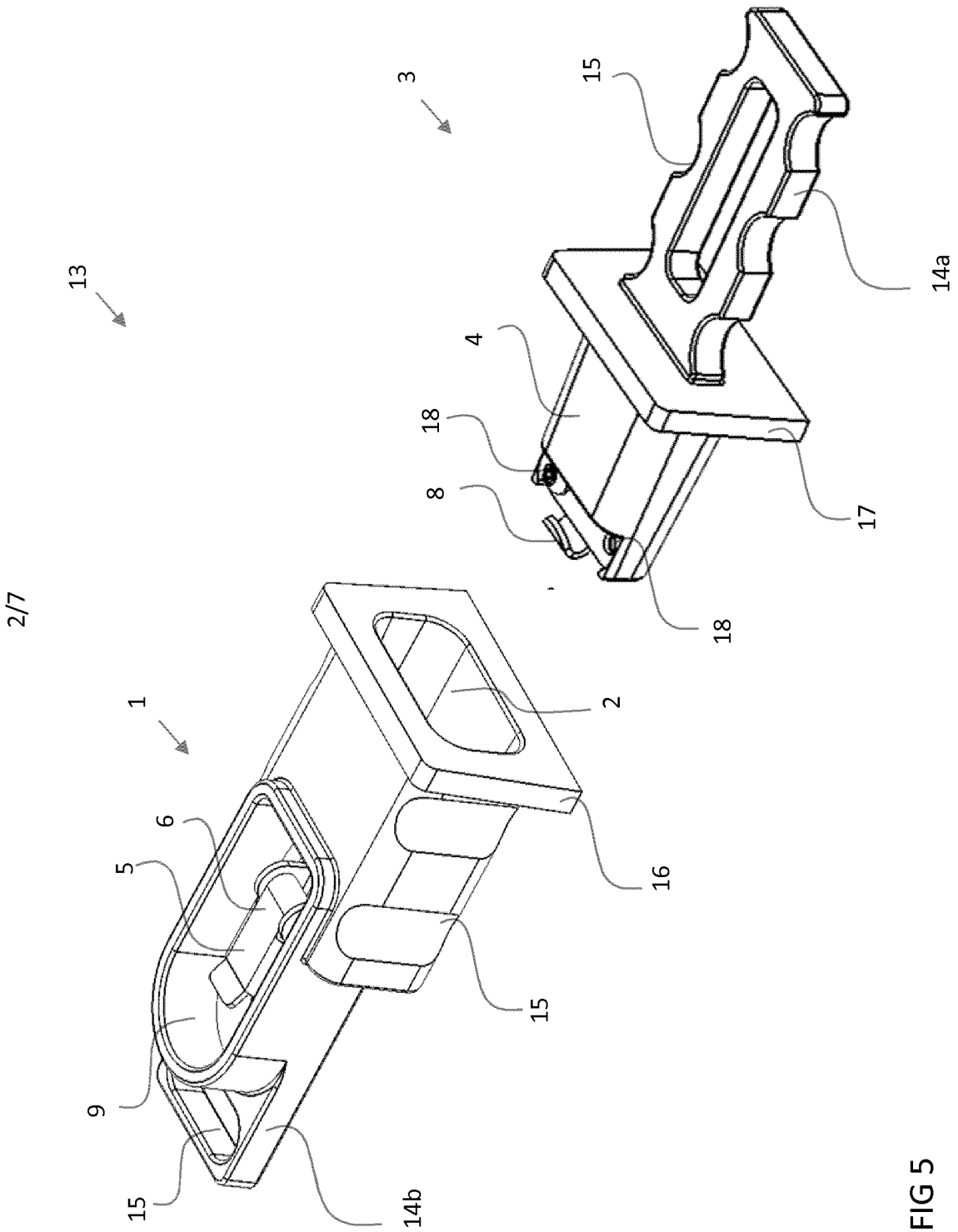


FIG 5

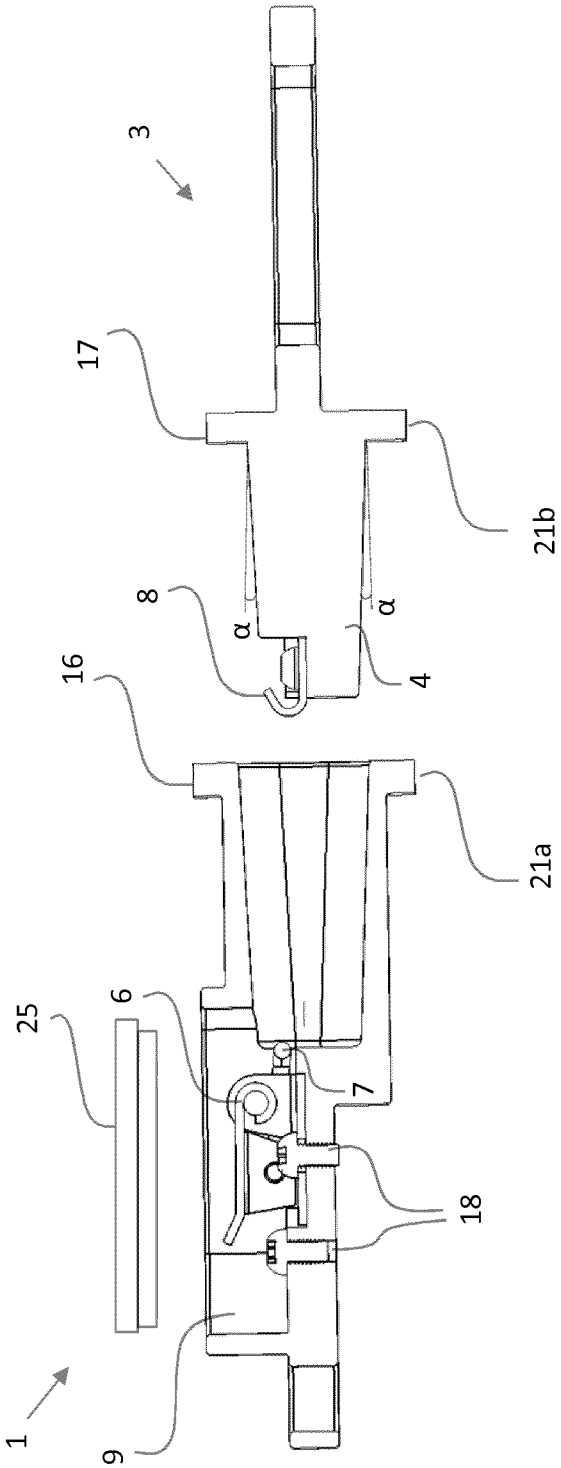


FIG 6

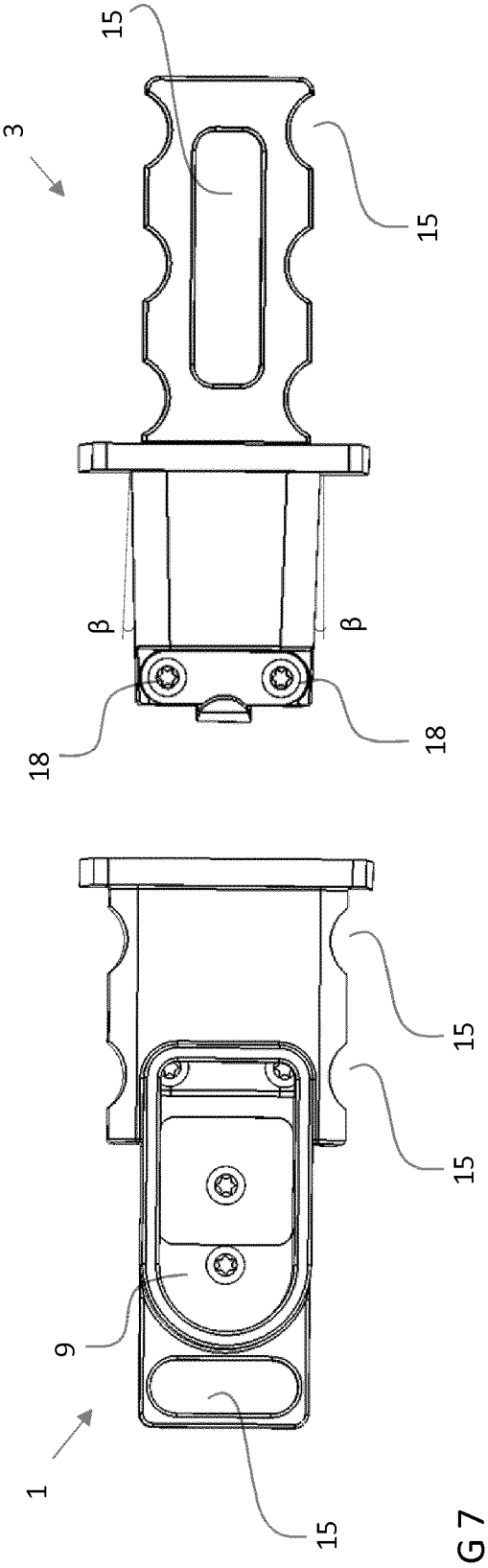


FIG 7

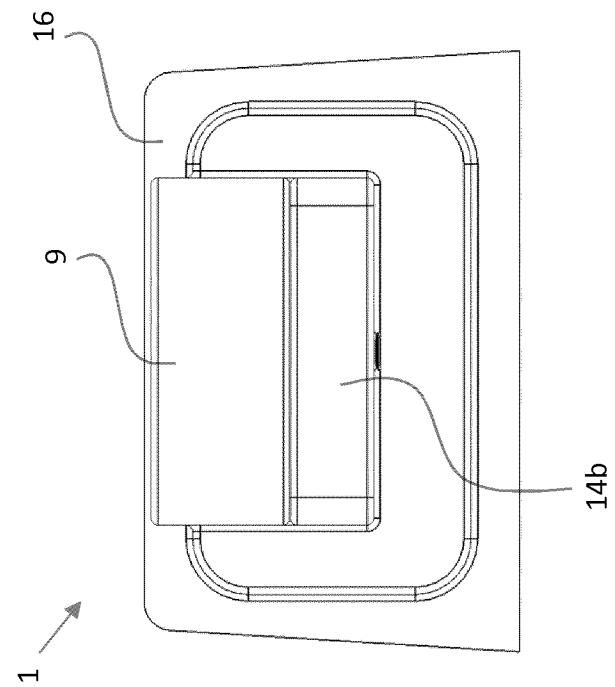


FIG 10

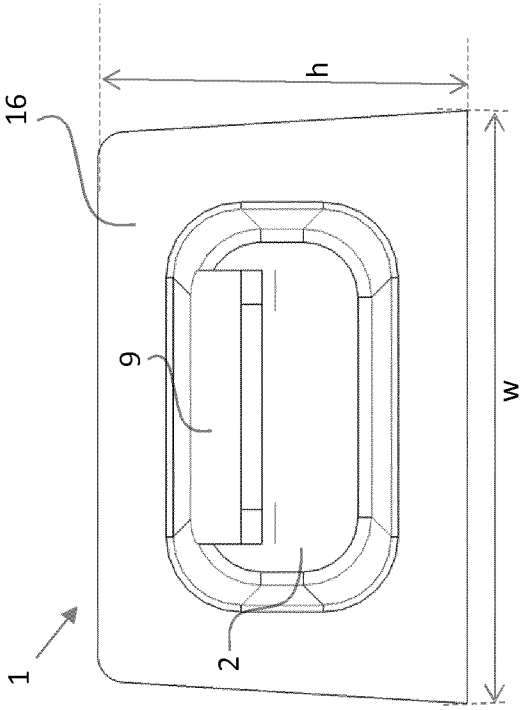


FIG 11

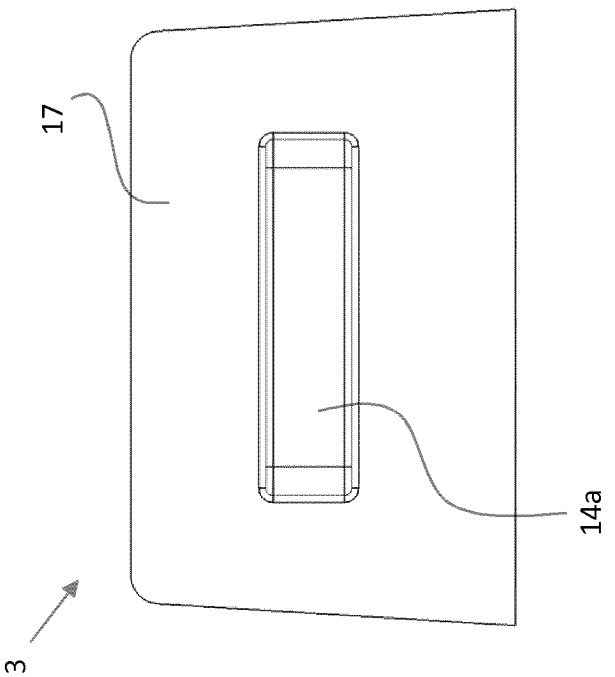


FIG 8

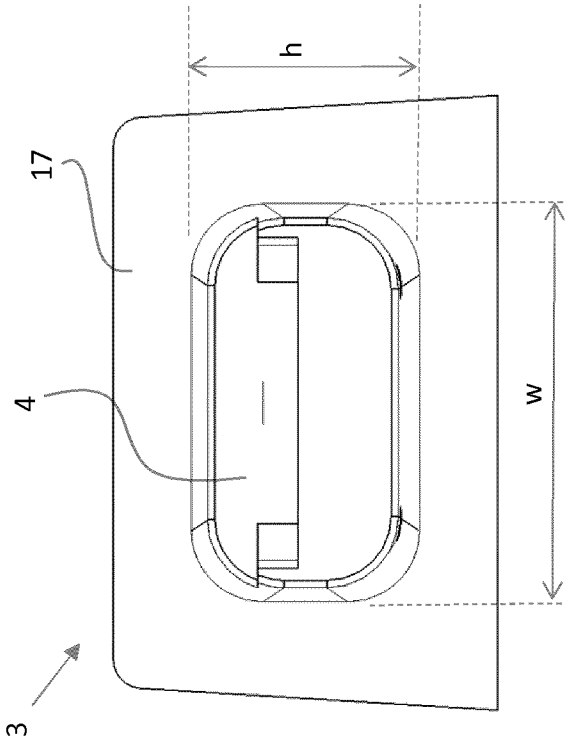


FIG 9

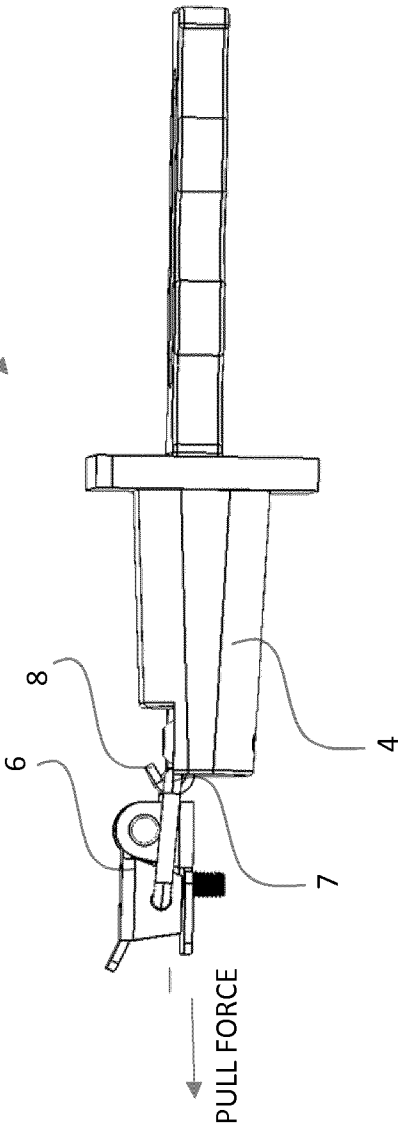


FIG 12

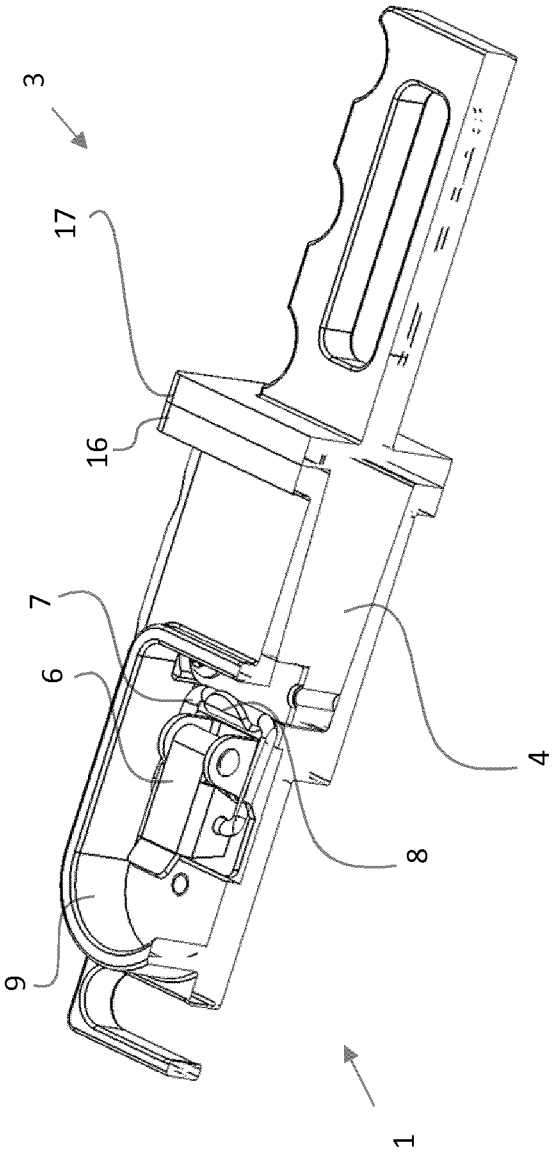


FIG 13

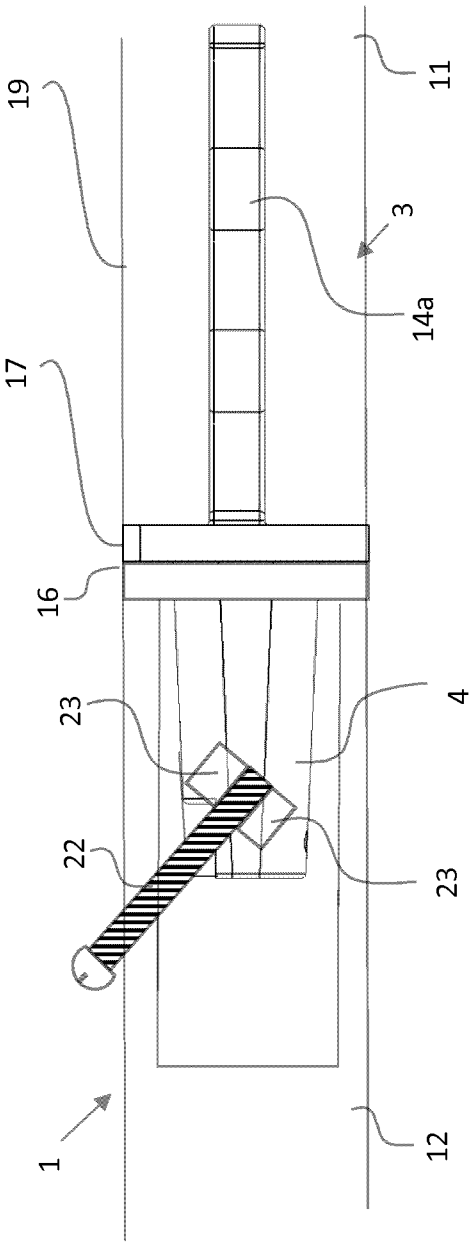


FIG 14

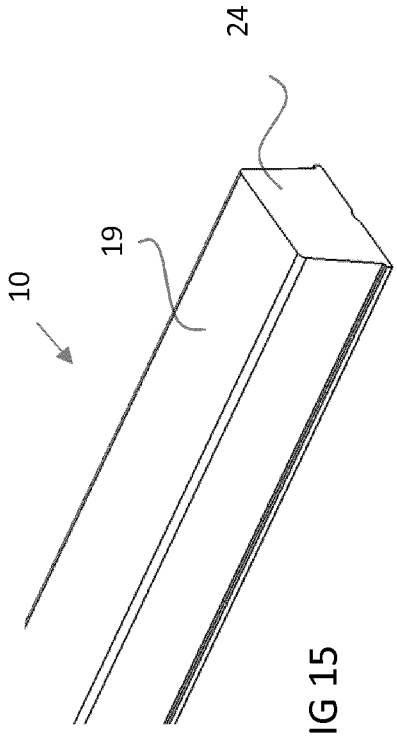


FIG 15

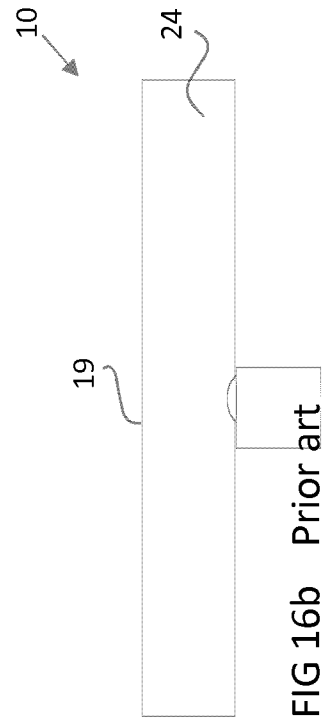


FIG 16b Prior art

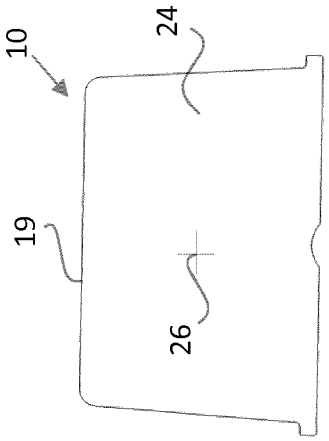


FIG 16a

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2015/052143

A. CLASSIFICATION OF SUBJECT MATTER
INV. A63C5/02
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)
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)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y A	US 3 104 888 A (W.B. DAY) 24 September 1963 (1963-09-24) column 2 - column 3; figures 1-6	1-5,7,9, 10,14 11,15 12,13
X	US 4 723 789 A (SCHMIDT GLENN H [US]) 9 February 1988 (1988-02-09) column 2, line 47 - column 3, line 38; figures 1-6	1-3,5-8, 14
X	DE 19 13 606 A1 (MIRION KINSEN TOROKUKI KABUSHI) 2 July 1970 (1970-07-02) page 6 - page 10; figures 1a-2	1,3,4,14
Y	US 3 797 838 A (SHURGOT J ET AL) 19 March 1974 (1974-03-19) column 4, line 49 - column 5, line 36; figures 6-10	11,15

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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
29 April 2015	11/05/2015

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Brunie, Franck

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Form PCT/ISA/210 (second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2015/052143

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	KR 2009 0038097 A (YANG BYEONG IL [KR]) 20 April 2009 (2009-04-20) figures 1-3 -----	1

1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2015/052143

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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US 3797838 A	19-03-1974	NONE	
KR 20090038097 A	20-04-2009	NONE	