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(71) Applicant: **Belfrond, Matteo**  
**11010 Pré-Saint-Didier (AO) (IT)**

(72) Inventor: **Belfrond, Matteo**  
**11010 Pré-Saint-Didier (AO) (IT)**

(74) Representative: **La Ciura, Salvatore**  
**Via Francesco Sforza 3**  
**20122 Milano (IT)**

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(54) **Support plate for ski bindings allowing flexion of ski**

(57) A support for attaching ski bindings, characterised in that it comprises two blocks (2) attached to the ski (1), between which said blocks is inserted a plate (3) with the ski bindings, length "l" of said plate (3) being shorter than distance "d" between said blocks (2), thus allowing the blocks to move closer together when the ski bends, connecting means (4, 5, 6, 7) between said plate and said blocks being fitted to allow said plate and said blocks limited reciprocal slide in the longitudinal direction

and limited reciprocal rotation.

In this way the ski can bend, taking on an arched configuration, which produces greater stability during turns.

A vertical pin fixed to the ski slides in a hole in the plate on which the boot rests, to lock said plate longitudinally while allowing it to perform limited movements in a vertical direction so that the plate can move away from the ski when the ski bends.

Fig. 3

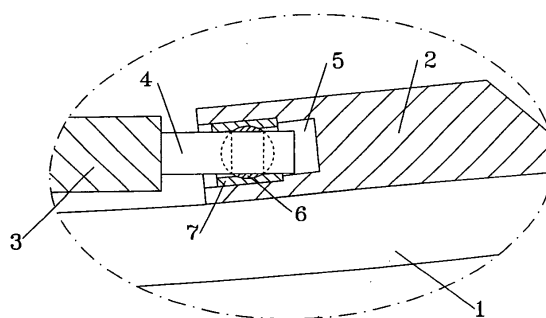
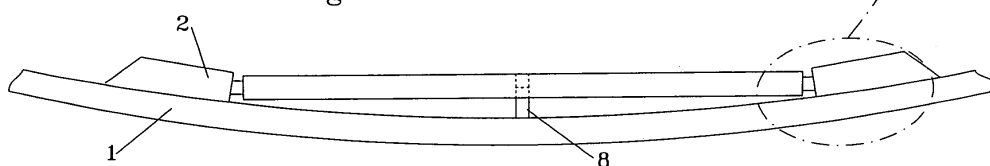


Fig. 2



## Description

[0001] This invention relates to a support for attaching ski bindings which comprises two blocks fixed to the ski, between which is inserted a plate on which the boot rests, said plate being shorter than the distance between said blocks to allow them to move closer together when the ski bends, means for connection of said plate and said blocks being fitted to allow said plate and said blocks limited reciprocal slide in a longitudinal direction, as well as limited rotation.

[0002] In this way the ski can bend, taking on an arched configuration, which produces greater stability during turns.

[0003] A vertical pin fixed to the ski slides in a hole in the plate on which the boot rests, to lock said plate longitudinally while allowing it to perform limited movements in a vertical direction so that the plate can move away from the ski when the ski bends.

[0004] Developments in ski manufacturing technology in recent years have led to numerous modifications, which have considerably improved the performance of these bindings.

[0005] In addition to the use of new materials, which are stronger and more flexible, the shape of skis has been modified in recent years with the introduction of a "parabolic" shape, which is narrower at the centre and wider towards the tip and tail, and provides better directional accuracy in turns than straight skis.

[0006] The flexibility of the materials used nowadays allows a certain flexibility of the ski which, during turns, tends to bend and take on an arc shape, a characteristic that produces excellent stability in turns.

[0007] For this reason it is important not only for the ski to offer good flexibility but also for the bending line to be as continuous and uniform as possible, in order to enhance these characteristics.

[0008] The problem presented by the skis currently known is that they cannot guarantee continuous bending along the whole length of the ski.

[0009] The reason is that the rigid plates to which the bindings are attached are fitted in the central part of the ski, and these plates, by locally increasing the rigidity of the ski, prevent it from bending uniformly.

[0010] Plates and supports which at least partly eliminate said problem have been studied and manufactured recently.

[0011] Said supports, for example, can comprise two separate half-plates, namely a front and a rear plate. The overall rigidity of such a support is less than that of a support with a single plate.

[0012] The problem with these devices is that they only guarantee good flexibility of the ski when it is uncoupled from the ski boot.

[0013] As the sole of the ski boot is practically unbending, once coupled to the binding it makes the entire central part of the ski highly rigid, preventing it from having the continuous, uniform bending line needed to maintain

good stability during turns.

[0014] The need is therefore felt, especially in the field of racing skis, for means which allow optimum bending of the ski while guaranteeing the necessary robustness and safety of the bindings.

[0015] The present invention, which falls into this sector, offers a support for attaching ski bindings that allows complete bending of the ski, which can thus take on a shape close to an arc shape, with all the ensuing advantages in terms of stability and grip. In particular, in the ski according to the invention, the bindings are mounted on a plate which is not attached to the ski but mounted on a pair of blocks, namely one front and one rear block, which are attached to the ski via systems that allow limited rotation and limited reciprocal sliding.

[0016] In this way the ski can bend, moving slightly away from the plate to which the ski bindings are fitted, with the result that the boot does not hinder free bending of the ski.

[0017] This invention will now be described in detail, by way of example but not of limitation, by reference to the annexed figures wherein:

- figure 1 is a partial perspective view of a ski with the binding support according to the invention;
- figure 2 is schematic side view of the support applied to the ski;
- figure 3 shows a detail of the binding support illustrated in the previous figures, in cross-section;
- figures 4 and 5 show a perspective view of two different forms of embodiment of the connection systems between plate and blocks;
- figure 6 is a perspective view of the binding support according to a further preferred embodiment;
- figures 7 and 9 are perspective views of different forms of embodiment of the connection systems between plate and blocks;
- figure 8 is a schematic side view of the binding support according to the configuration shown in figure 7.
- Figures 10a and 10b are a side view and a perspective view of another embodiment of the support according to the invention, respectively;
- Figures 11 to 16 are views of further preferred embodiments of the support according to the invention.

[0018] In figure 1, no. 1 indicates the central section of the ski, to which a pair of blocks 2 is attached, a plate 3 to which the ski bindings are attached being inserted between them.

[0019] Length "l" of plate 3 is slightly shorter than distance "d" between the blocks, to allow these last to move towards and away from the plate as the ski bends.

[0020] Plate 3 is not constrained to the body of the ski, but mounted on blocks 2 via one or more pins 4 (in the case illustrated, two pins per block), which are inserted in the corresponding holes 5 in blocks 2. The dimensions of holes 5 are larger than those of pins 4, and each pin is mounted slidingly on a bearing 6 which in turn can

rotate in a support cylinder 7, which is inserted and locked in holes 5.

**[0021]** In this way slight reciprocal rotations between plate 3 and blocks 2 are possible, as well as limited slide in a longitudinal direction (in the description and the claims, "longitudinal direction" refers to the direction along the axis of the ski).

**[0022]** A substantially vertical pin 8 is attached to the ski in a substantially central position and inserted into a hole in plate 3. Said plate is thus guided by said pin which prevents its slide in a longitudinal direction but allows movements in a vertical direction, so that it can move away from the body of the ski.

**[0023]** During the descent, the thrust that the skier's weight applies to the body of the ski causes it to bend, and acquire the shape illustrated in figure 2. This bending causes blocks 2 to move slightly towards one another, this movement being permitted by the slide of pins 4 in the corresponding bearings 6 and the simultaneous rotation of the bearings in the corresponding cylinders 7.

**[0024]** Rigid plate 3 becomes slightly detached from the ski, sliding along pin 8, which prevents movements in a longitudinal direction but allows the ski to bend and thus acquire the configuration best suited to the turn being performed.

**[0025]** The connection system between blocks 2 and plate 3 can also acquire different configurations, illustrated in figures 4 to 9.

**[0026]** In figure 4 a connecting element 10 is hinged to block 2, which said element presents a T-shaped shank 11 that slides in a corresponding seating 12 in plate 3.

**[0027]** In the version shown in figure 5, a connecting element 13 similar to the preceding one is also fitted with a pin 14 which is inserted in a corresponding hole 15 in plate 3.

**[0028]** In the version shown in figure 6, pins 4 can slide in corresponding holes in plate 3 and are hinged externally to blocks 2, in relation to which they can therefore perform limited rotations.

**[0029]** The version shown in figure 7 is similar to the one shown in figure 6, with the difference that pins 4 are positioned more externally.

**[0030]** The embodiment of fig. 8 is similar to the one shown in figure 6, with the difference that pins 4 are hinged to the plate and can slide in a corresponding seating in the blocks.

**[0031]** In the version shown in figure 9, a connecting element 15 between blocks 2 and plate 3 has a polygonal shape, such as a T-shape, and can slide in a corresponding seating 16 in blocks 2, being hinged to plate 3 on the opposite side.

**[0032]** One skilled in the art could devise different forms of embodiment in the ambit of the same solution idea, in particular as regards the devices that connect plate 3 to blocks 2, provided that they allow limited slide and limited reciprocal rotation between the blocks and the plate, so that the distance between the blocks can

reduce and the plate can move slightly away from the ski to allow the ski to take on the required curved configuration.

**[0033]** For example, the connecting pins between plate and blocks could be integral with the blocks and slide in seatings formed in the plate.

**[0034]** Other embodiments could also be devised, shown in figures 10 to 16.

**[0035]** As shown in figures 10a and 10b, the support for attaching ski bindings, shown as 20, consists of a pair of facing half-plates 21, 21' and a plate 22, mounted on the two preceding half-plates, so that it can slide in relation to them via means which will be described below.

**[0036]** Each half-plate 21, 21' is hinged at one end to a corresponding block 2 which in turn is rigidly connected to ski 1 with screws.

**[0037]** On the two facing surfaces of each half-plate there are two holes, each designed to receive a rod 23 inserted partly into each of said two half-plates so that it can slide inside holes.

**[0038]** Two semicircular channels 24 are also formed in correspondence with the facing surfaces of the half-plates, which said channels form a circular housing when the two plates move closer together until they touch.

**[0039]** Plate 22 is mounted on top of the two half-plates 21, 21' and presents two rectangular channels 25 designed to receive two roller carriages 26, which are rigidly constrained to the half-plates with screws, but can slide with respect to plate 22.

**[0040]** Said carriages 26 have the function of guiding plate 22, to keep it aligned with the two half-plates 21 and 21' and the longitudinal axis of the ski when half-plates move towards and away from each other.

**[0041]** Plate 22 also contains a through hole which houses a pin 27, attached to the ski with screws or the like and which has a head having a slightly larger diameter, so that plate 22 can only traverse vertically in relation to the ski, and the extent of said traverse is limited by the head of pin 27.

**[0042]** Two rectangular cavities are also formed in plate 22, inside which are hinged two cylindrical rollers 28 via which plate 22 slides on the two half-plates, preventing them from rubbing against one another during their travel.

**[0043]** Due to the bending of the ski, blocks 2 to which half-plates 21 and 21' are hinged, tend to move closer together; the half-plates consequently traverse towards one another, remaining aligned and coplanar thanks to rods 23, which act as guides.

**[0044]** Plate 22, being constrained via pin 27, traverses vertically away from the base of the ski, whereas the two half-plates slide under it due to rollers 28, which prevent the different parts from rubbing together.

**[0045]** The embodiment shown in figure 11, comprises two opposite half-plates 30 shaped as a T-section, with the wings 38 inserted into a channel 50 in the upper plate 22 and which slide inside it. Plate 22 contains a hole that houses pin 27, fixed to the ski, which constrains the plate

in longitudinal traverse.

[0046] As shown in figure 12, the invention presents two facing half-plates 31 with sliding rods 32. Said half-plates present two pairs of T-sections 33 which slide in two grooves 34 formed in upper plate 22.

[0047] As shown in figure 13, the invention comprises a pair of facing plates 35 with edges which present a groove 36.

[0048] Plate 22 presents a C-shaped section, with folded edges 37 which are inserted slidingly into channels 36, to guide the two half-plates which can slide in relation to plate 22.

[0049] Further preferred versions of the support according to the invention are illustrated in figures 14 to 16.

[0050] The upper plate is not shown in said figures, because these versions relate to various forms of embodiment of the half-plates, whereas the upper plate can be any of the plates illustrated above.

[0051] The embodiment shown in figure 14 presents two facing half-plates 39 and 39'. Two arched brackets 40 are hinged at one end of half-plate 39', with the opposite end hinged to the ski. The opposite end of half-plate 39 is shaped with a curved contour 41 identical to that of brackets 40, so that when the half-plates approach one another as the ski bends, said brackets rotate and keep the two half-plates aligned when they rise in the central area.

[0052] The embodiment shown in figure 15 comprises two facing half-plates 42 which present, at the free ends, two bevels with slanted walls 43 facing towards the ski. A triangular wedge 44, fixed to the ski, is inserted between the two half-plates.

[0053] When the two half-plates approach one another, their slanted surfaces slide above the wedge, keeping the half-plates aligned.

[0054] The embodiment shown in figure 16 presents two half-plates 45, at the ends of which are hinged two pairs of arched, facing brackets 46, in which slots 47 are formed. Two pins 48 are housed in said slots.

[0055] When the two half-plates move towards one another, due to the presence of the pin the two pairs of brackets rotate, causing the free end to rest on the ski.

[0056] The two half-plates consequently remain aligned.

## Claims

1. Support for attaching ski bindings, **characterised in that** it comprises two blocks (2) attached to the ski (1), between which said blocks is inserted a plate (3) with the ski bindings, length "l" of said plate (3) being shorter than distance "d" between said blocks (2), thus allowing the blocks to move closer together when the ski bends, connecting means (4, 5, 6, 7) between said plate and said blocks being fitted to allow said plate and said blocks limited reciprocal slide in the longitudinal direction and limited reciprocal

cal rotation.

2. Support for ski bindings as claimed in claim 1, **characterised in that** said connecting means between said plate (3) and said blocks (2) are hinged to said plate and can slide inside said blocks, said connecting means allowing limited rotations between plate and blocks.
3. Support for ski bindings as claimed in claim 1, **characterised in that** said connecting means between said plate (3) and said blocks (2) are hinged to said blocks and slide inside the plate, said connecting means allowing limited rotations between plate and blocks.
4. Support for ski bindings as claimed in claim 1, **characterised in that** said plate (3) is fitted, at the ends, with pins (4) which slide in supports (6) mounted in such a way as to allow limited rotations on said blocks.
5. Support for ski bindings as claimed in claim 4, **characterised in that** said pins (4) are mounted slidingly on bearings (6) which in turn are mounted in such a way as to allow rotation in cylinders (7) inserted into seatings (5) formed in said blocks (2).
6. Support for ski bindings as claimed in any of the preceding claims, **characterised in that** it includes means (8) designed to prevent longitudinal slide of the plate but to allow movements towards and away from the body of the ski.
7. Support as claimed in claim 6, **characterised in that** said means consist of a pin (8) fixed to the body of the ski which slides in a corresponding seating in said plate (3).
8. Support as claimed in claim 1, **characterised in that** said connecting pins (4, 11, 14) between the plate and the blocks slide in corresponding seatings (5, 12, 15) formed in the plate, and are hinged, on the opposite side, to the blocks.
9. Support as claimed in claim 1, **characterised in that** said connecting pins (4, 11, 14) between the plate and the blocks slide in corresponding seatings formed in the blocks, and are hinged, on the opposite side, to one end of the plate.
10. Support for attaching ski bindings, **characterised in that** it includes:
  - a pair of aligned half-plates (21, 21'), with the facing ends free and the other ends hinged to the ski, so that said facing ends move closer to one another when the ski bends;

- a plate (22) with ski bindings, fitted on said half-plates in such a way that it can only slide, in relation to them, in the axial direction of the ski;
- said support being fitted with means designed to keep said half-plates aligned.

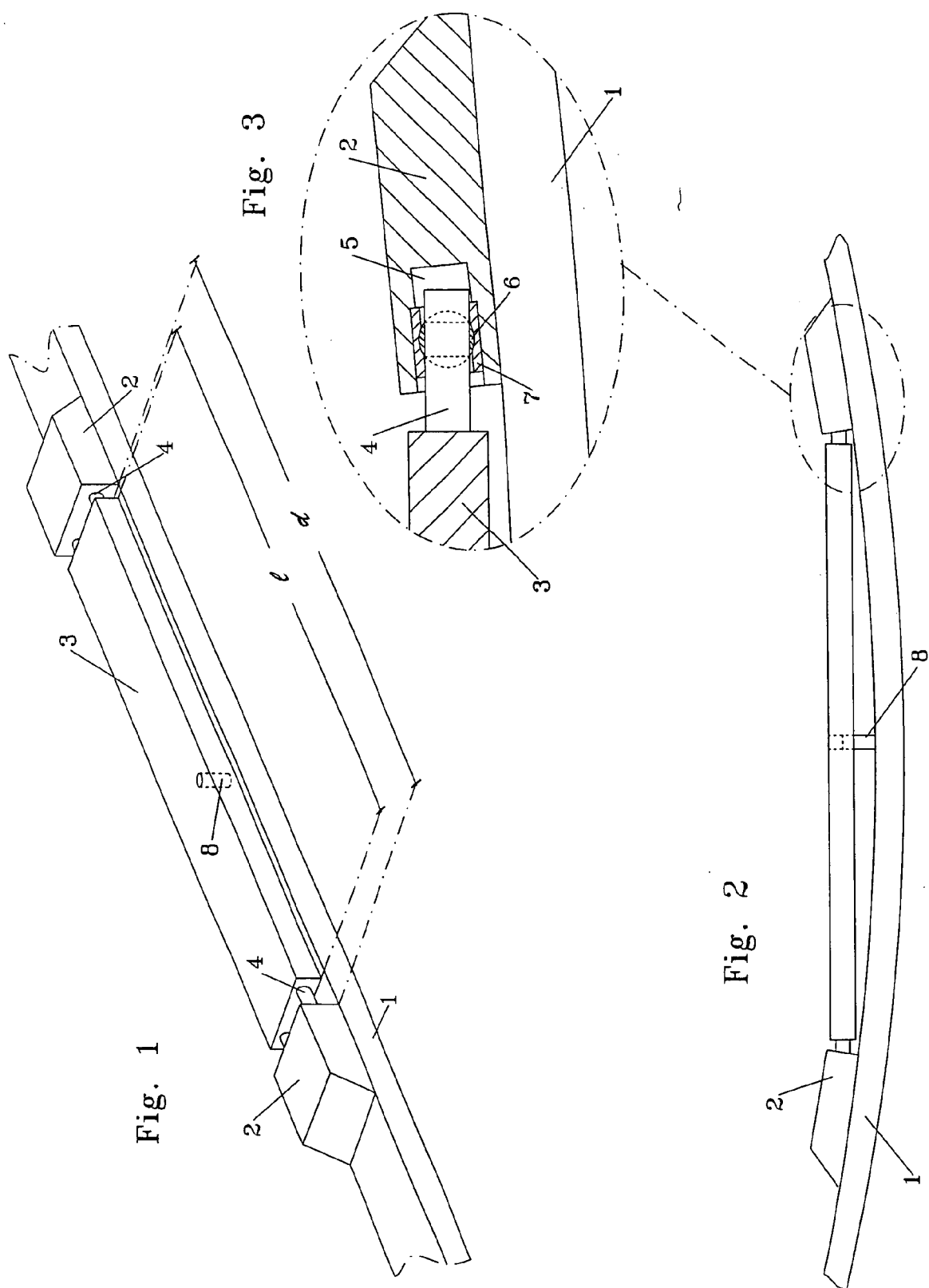
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11. Support for attaching ski bindings as claimed in claim 10, wherein said means designed to keep said half-plates aligned consist of one or more rods (23) inserted in holes made in the facing ends of said half-plates (21, 21'). 10
12. Support as claimed in claim 10, **characterised in that** said plate (22) mounted on said half-plates contains a hole in which a pin (27) fixed to the ski slides, which said pin presents an enlarged part designed to limit the movements of said plate as it moves away from the ski. 15
13. Support as claimed in claim 10, **characterised in that** it includes a pair of rollers (28), mounted on said plate (22), which slide on said half-plates. 20
14. Support as claimed in claim 10, **characterised in that** said half-plates and said plate, respectively present channels (50, 34, 36) and ribs (38, 33, 37), which slidingly engage said channels, said half-plates being kept aligned by the engagement between said channels and said ribs. 25  
30
15. Support as claimed in claim 10, **characterised in that** it includes two half-plates which present, at the free ends, two bevels (43) with the slanted walls facing towards the ski, a wedge-shaped support (44) being inserted between said half-plates which is attached to the ski in such a way that when the ski bends, the engagement between the slanted surfaces of said half-plates and said wedge-shaped support causes the free ends of the plates to lift, thus keeping the plates aligned. 35  
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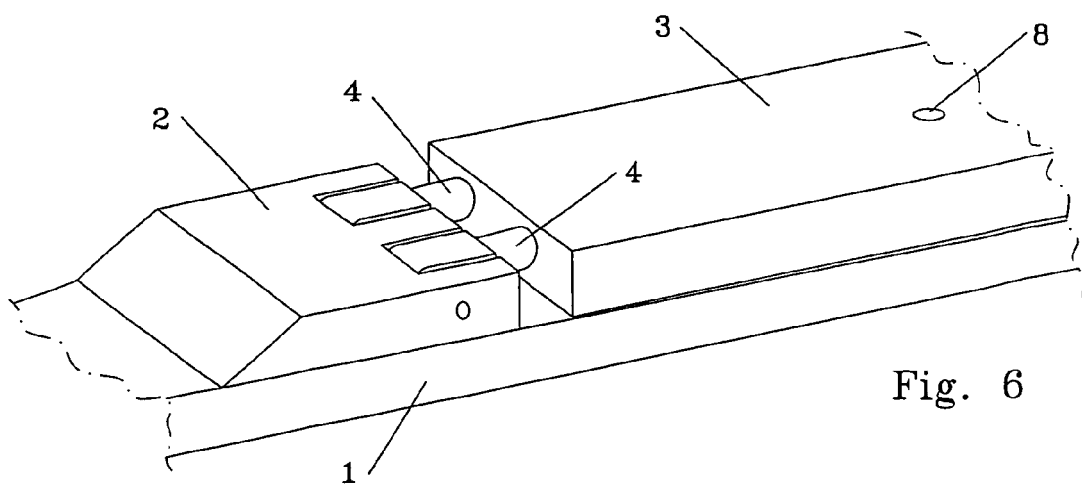
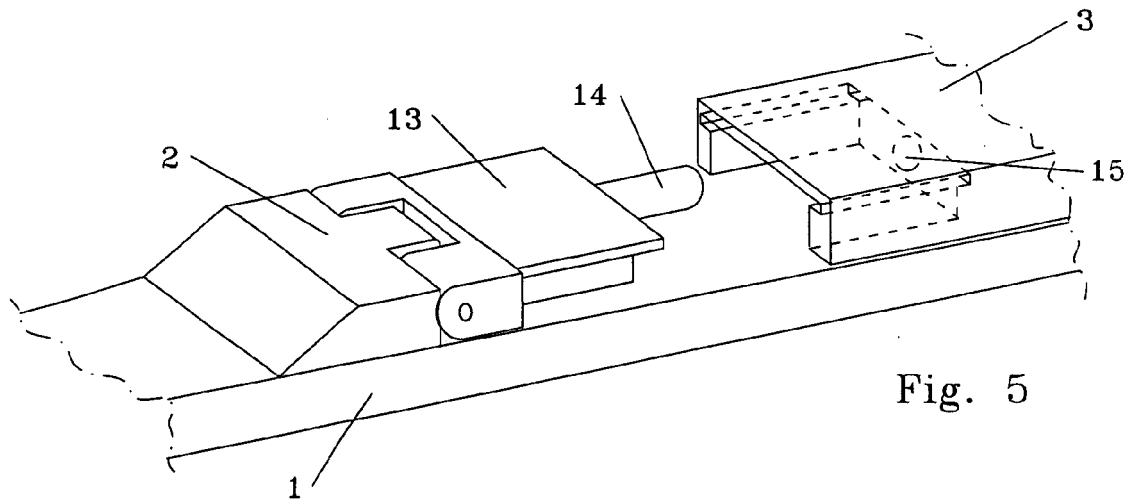
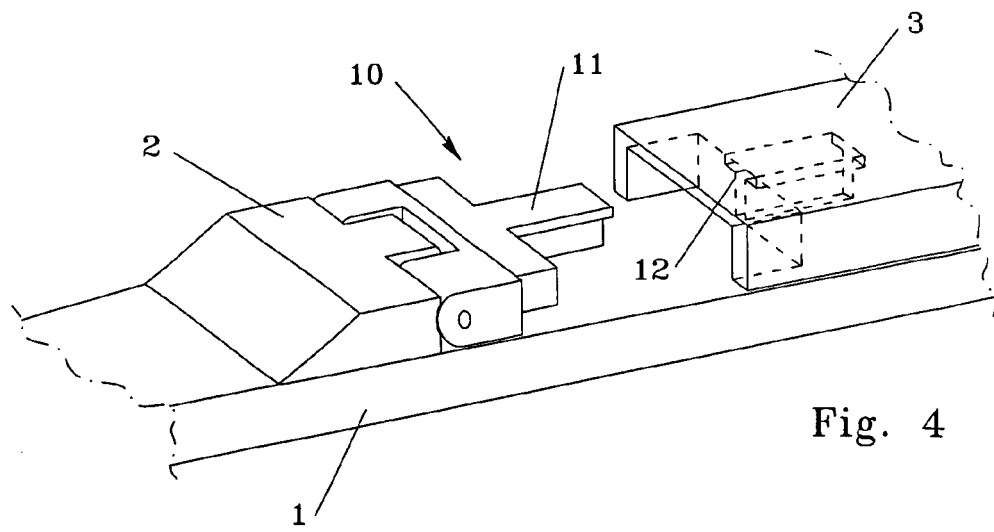


Fig. 7

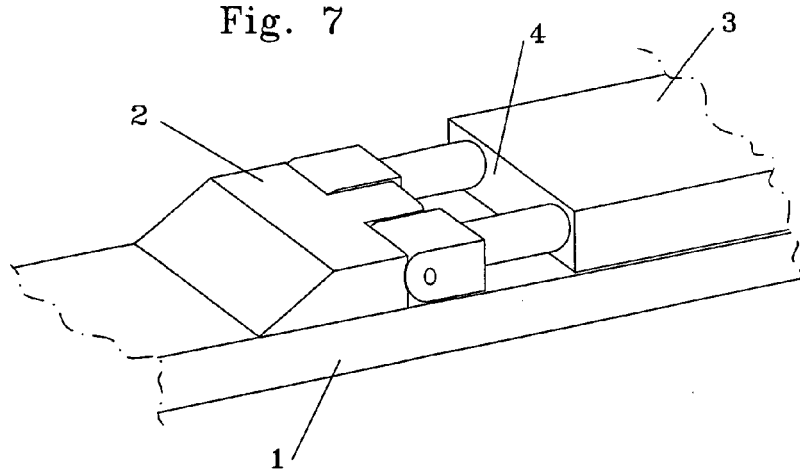


Fig. 8

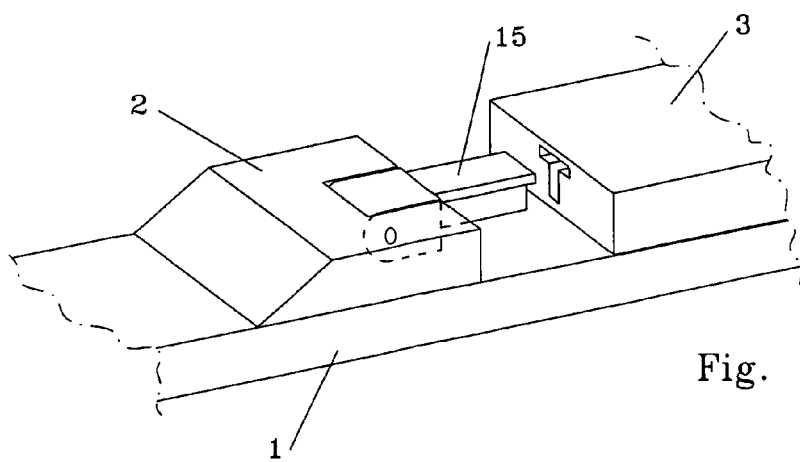
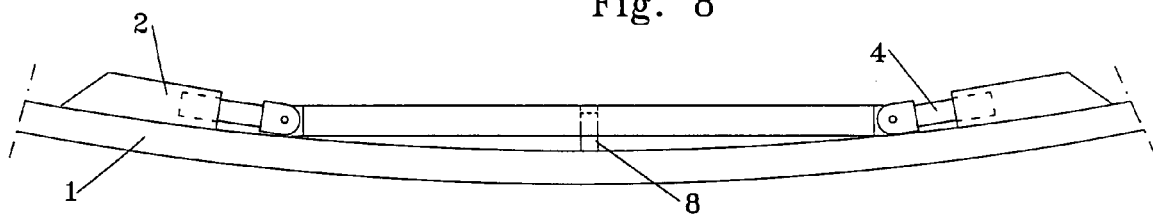


Fig. 9



Fig. 10a

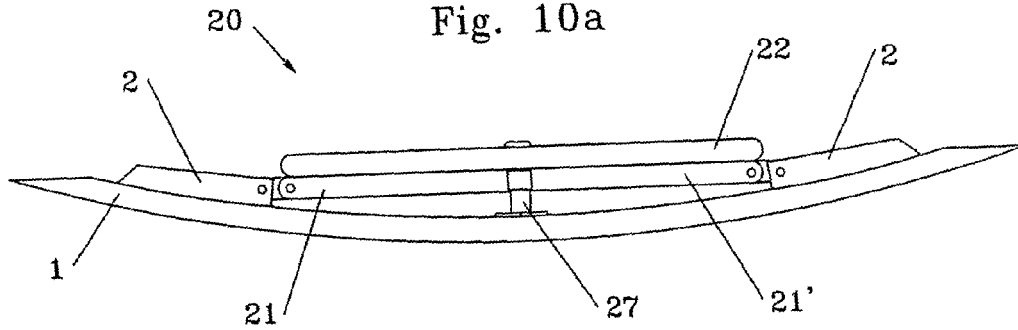


Fig. 10b

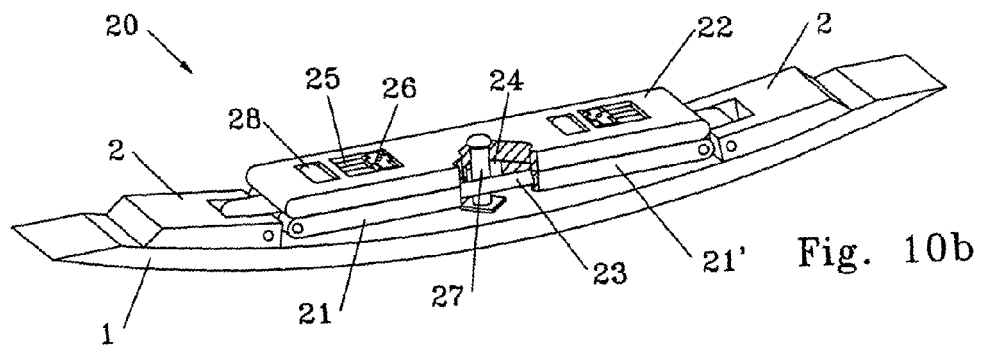


Fig. 11

