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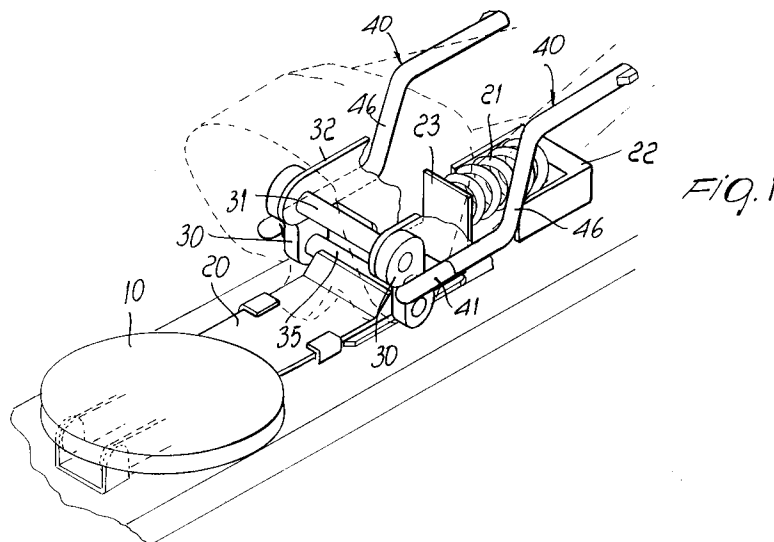
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16.06.93 Bulletin 93/24**Via C. Rizzarda, 15****I-32032 Feltre (Belluno)(IT)**(84) Designated Contracting States:
AT CH DE FR IT LI(74) Representative: **Modiano, Guido et al**(71) Applicant: **NORDICA S.p.A**
Via Piave, 33
I-31044 Montebelluna (Treviso)(IT)**MODIANO, JOSIF, PISANTY & STAUB, Via****Meravigli 16****I-20123 Milan (IT)**(54) **Ski brake.**

(57) A ski brake, with articulation about two distinct axes, includes an actuation member (10) arranged on a ski in the region affected by the sole of a ski boot. The actuation member is connected to a slider (20) on which a spring (21) acts. The spring is contrasted by the presence of the ski boot on the ski. The supports (30) of the brake arms (40) engage the slider (20) so as to generate, upon the translatable motion of the slider, a rotation of the arms about a first axis (31) which is substantially horizontal and perpendicular to the longitudinal extension of

the ski. Each of the arms has a terminal portion which can rotate, in contrast with and by virtue of the action of a torsion spring, about a second axis (41) which is substantially perpendicular to the first axis. A curved linking portion (46) is provided in the terminal portion of the brake arms and is adapted to interact with a part which is rigidly associated with the ski to rotate the terminal portion about the second axis in a preset portion of the rotation of the arm about the first axis.

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The present invention relates to a ski brake.

As known, braking devices are often applied to skis and are in practice constituted by two arms which protrude laterally with respect to the ski and move to a level below the lower face of the ski, so as to provide an element for friction against the snow which prevents the ski from sliding freely when released from the ski boot.

A first type of brake has a so-called pedal arranged below the sole of the ski boot, generally in the heel region, and keeps the brake in retracted position, i.e. raised and generally to the side of the binding, so long as the skier's weight bears on it, and it is automatically extracted when the boot is separated from the ski.

When in retracted position, the brake has to be arranged within the sides of the ski, and for this reason the brake arms oscillate about axes which are inclined with respect to the longitudinal extension, so as to obtain a lateral movement of the brake arms, as well as an oscillation or translatable motion which moves them below the lower face of the ski.

These brakes are generally rather bulky and difficult to arrange on the ski, and their effectiveness is furthermore conditioned by the efficiency of the elastic means which perform extraction; the elastic means must necessarily have a rather small size.

Other types of brake are integrated directly in the heel unit of the binding, i.e. the extraction and lowering of the brake arms is actuated directly by the heel unit. In these solutions, direct contact between the brake element and the jaw of the heel unit "rigidly" links the brake to the heel unit, with the risk of causing breakages of the brake arm as a consequence of shocks or when the ski boot is inserted.

Other solutions, such as for example the one described in the French patent application No. 2,593,403, do not have a rigid coupling between the brake and the heel element, but require, for the actuation of the brake, a translatable motion of the heel unit which triggers a series of ratchet systems which actuate the extraction of the brakes.

Although this solution is valid from a functional point of view, it is structurally very complicated and can be used only in combination with a heel unit manufactured specifically for this purpose.

The aim of the invention is to eliminate the problems described above by providing a ski brake which allows to combine the compactness, typical of brakes connected to jaws, with the simplicity and elasticity of connection obtained by using a pedal connection.

Within the scope of the above aim, a particular object of the invention is to provide a brake which may be integrated in the heel unit without however

being functionally associated therewith. The brake according to the invention can furthermore be connected to the heel unit, but in the sense that it is the braking device which performs possible actuations of the heel unit, not the heel unit which extracts the brake, as instead occurs in the solutions of the known art.

Another object of the present invention is to provide a brake which by virtue of its peculiar constructive characteristics is capable of giving the greatest assurances of reliability and safety in use.

This aim, these objects and others which will become apparent hereinafter are achieved by a ski brake, characterized in that it comprises an actuation means arranged on a ski in the region affected by the sole of a ski boot, said actuation means being connected to a slider, an elastic thrust means acting on said slider, said elastic thrust means being contrasted by the presence of the ski boot on the ski, said brake comprising arms and supports for said arms, said supports of the brake arms engaging said slider so as to generate, upon the translatable motion of said slider, a rotation of said arms about a first axis which is substantially horizontal and perpendicular to the longitudinal extension of the ski, each of said arms having a terminal portion which can rotate, in contrast with and by virtue of the action of a rotational elastic means, about a second axis which is substantially perpendicular to said first axis, an engagement means being furthermore provided on said terminal portion, said engagement means being suitable for interacting with a part which is rigidly associated with said ski for the rotation of said terminal portion about said second axis in a preset portion of the rotation of said arm about said first axis.

Further characteristics and advantages will become apparent from the description of a preferred but not exclusive embodiment of a ski brake with articulation about two distinct axes, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

figure 1 is a schematic perspective view of the ski brake according to the invention;

figure 2 is a side view of the brake when the ski boot is applied to the ski;

figure 3 is a side view of the brake in an intermediate position, when the boot separates from the binding;

figure 4 is a side view of the brake in extracted position after the boot has separated from the binding;

figure 5 is a schematic top plan view of the brake;

figure 6 is a partially sectional view of the detail of the connection between the slider and the supports of the brake arm;

figure 7 is a partially sectional view of a brake arm;

figures 8 and 9 are sectional views, taken along the plane VIII-VIII of figure 7, of the brake arms in two different operation positions, illustrating the interaction between the engagement means and a part which is rigidly associated with the ski.

With reference to the above figures, the ski brake according to the invention, comprises actuation means arranged on the ski and comprising a pedal 10 which is articulated at an end of a lever 11. At its other end, lever 11 is articulated to a base 12 which can be fixed to the ski 13. The end of a second lever 15 is articulated to the pedal 10, possibly in the same articulation position as the first lever 11 or in a point which is spaced therefrom. The second lever is pivoted, at its other end, to a slider 20 which is slidingly guided on the base 12. An elastic thrust means acts on the slider 20 and is constituted by a thrust spring 21 which acts between a first abutment 22 which is rigidly associated with the base 12 and a second abutment 23, which is arranged at the end of the slider 20.

The brake also comprises brake arm supports, designated by 30, which are articulated to a transverse shaft 31. Shaft 31 is supported by side walls 32 which are rigidly associated with the base 12 or may be part of the heel unit.

A transverse actuation pivot 35 is connected to the supports 30 and is inserted in a recess 36 defined on the slider 20, so that the supports 30, one of which is arranged at each side, rotate about the transverse shaft 31 when the slider moves.

The brake arms, generally designated by the reference numeral 40, extend from the supports 30 and are constituted by a coupling portion 41 which rigidly protrudes from the support 30 and extends substantially perpendicular to the direction of the transverse shaft 31 which constitutes the first articulation axis.

A terminal portion, indicated by 45, is connected to the coupling portion 41 and has a curved linking portion 46 provided with an insertion pin 47 which can be rotatably accommodated in a seat 48 defined on the coupling portion. A rotational elastic means acts between the coupling portion and the curved linking portion and is constituted by a torsion spring 50 which is fixed at its ends to the coupling portion 41 and to the curved linking portion 46 respectively.

The curved linking portion 46 is connected, at its other end, to a straight portion 51 which ends with a protrusion 52.

An engagement means is provided at the curved linking portion 46, preferably proximate to the region of rotary articulation to the coupling portion 41 by means of the first pin 47 which

defines a second rotation axis which is substantially perpendicular to said first axis. In a preferred embodiment, the engagement means is constituted by an eccentric protrusion 55 which is suitable for interacting with a part which is rigidly associated with the ski 13. In a preferred but non-limitative embodiment, the eccentric protrusion 55 is suitable for engaging a lateral curling 60 by contact. Lateral curling 60 is rigidly associated with the base 12, so that when the brake arms rotate about the first axis and move toward the extracted position, the engagement between the eccentric protrusions 55 and the lateral curls 60 causes a rotation of substantially 90° about the second axis which in practice extracts the brake arms laterally.

In practical operation, when the weight of the ski boot 70 bears on the pedal 10, the pedal is in its lowered position and the slider is in its rearward position, maximally compressing the thrust spring 21.

In this position, due to the rearward movement of the slider, the support is rotated so that the brake arms are in raised position and the terminal portion, pushed by the torsion springs 50, is furthermore rotated within the ski.

When the ski boot separates from the ski due to release from the binding, the pedal 10 (figure 3) starts to raise, pushed by the translatory motion of the slider 20 caused by the action of the spring 21.

A first portion of rotation of the support 30 about the first axis 31 begins during this initial step, and the eccentric protrusion 55, by engaging the curlings 60, produces an outward rotation of the terminal portions, loading the torsion springs 50.

The subsequent raise of the pedal, produced by the further translatory motion of the slider 20, continues the rotation of the brake arms, which are at this point extracted laterally, so as to move them below the lower face.

The terminal portions, in extracted position, remain rotated outward by virtue of the continuing engagement of the eccentric protrusion 55 with the curling 60.

When a ski boot is reinserted, the pressing action exerted on the pedal causes the backward movement of the slider 20, with the consequent repetition of the movements of the brake arms in the opposite direction.

It should be noted that in these conditions the brake arms are connected elastically with respect to the slider, so that when a thrust action on the ski, typical of the boot insertion step, is exerted, stresses which might cause breakages do not occur.

To the above it should be added that the brake is structured to be easily coupled to a heel unit without being functionally connected thereto, or it is also possible, as illustrated in a copending applica-

tion in the name of the same Applicant, to provide a functional connection between the brake and the heel unit in which however it is the brake pedal which actuates functions of the heel element, such as for example automatic reset.

By means of the above described solution, it is thus possible to obtain the advantages typical of so-called pedal brakes, together with the bulk reductions and compactness of brakes which are directly integrated in the heel unit and are actuated by said heel unit movements; however, it is once more stressed that in the present case it is the brake which performs possible actuations on the heel unit, not the reverse.

The ski brake thus conceived is susceptible to numerous modifications and variations, all of which are within the scope of the inventive concept.

All the details may furthermore be replaced with other technically equivalent elements.

In practice, the materials employed, as well as the contingent shapes and dimensions, may be any according to the requirements.

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 scope of each element identified by way of example by such reference signs.

Claims

1. Ski brake, characterized in that it comprises an actuation means (10) arranged on a ski (13) in the region affected by the sole of a ski boot (70), said actuation means being connected to a slider (20), an elastic thrust means (21) acting on said slider, said elastic thrust means being contrasted by the presence of the ski boot on the ski, said brake comprising arms (40) and supports (30) for said arms, said supports of the brake arms engaging said slider so as to generate, upon the translatory motion of said slider, a rotation of said arms about a first axis (31) which is substantially horizontal and perpendicular to the longitudinal extension of the ski, each of said arms having a terminal portion (45) which can rotate, in contrast with and by virtue of the action of a rotational elastic means (50), about a second axis (41) which is substantially perpendicular to said first axis, an engagement means (55) being furthermore provided on said terminal portion, said engagement means being suitable for interacting with a part (60) which is rigidly associated with said ski for the rotation of said terminal portion about said second axis in a

preset portion of the rotation of said arm about said first axis.

2. Brake according to claim 1, characterized in that said actuation means comprises a pedal (10) which is articulated at one end of a first lever (11) which is articulated to the ski (13) about a substantially horizontal axis which is perpendicular to the longitudinal arrangement of the ski, said pedal being articulated to the end of a second lever (15) which is pivoted to said slider at its other end.
3. Brake according to the preceding claims, characterized in that said elastic thrust means is constituted by a thrust spring (21) which acts between a first abutment (22) which is rigidly associated with the ski (13) and a second abutment (23) which is arranged at the end of said slider.
4. Brake according to one or more of the preceding claims, characterized in that said brake arm supports (30) are articulated to a transverse shaft (31) which is supported by side walls (32) which are rigidly associated with the base (12) for connection to the ski or are part of the heel unit.
5. Brake according to one or more of the preceding claims, characterized in that it comprises a transverse actuation pivot (35) arranged in a recess (36) formed by said slider (20) in order to rotate said brake supports when said slider moves.
6. Brake according to one or more of the preceding claims, characterized in that each brake arm (40) comprises a coupling portion (41) which rigidly protrudes from said support (30) and extends substantially perpendicular to the direction of a transverse shaft (31), a terminal portion (45) being rotatably connected to said coupling portion and having a curved linking portion (46), a straight portion (51) being connected to the other end of said curved linking portion and ending with a protrusion (52).
7. Brake according to one or more of the preceding claims, characterized in that said rotational elastic means (50) is interposed between said coupling portion and said curved linking portion.
8. Brake according to one or more of the preceding claims, characterized in that said rotational elastic means is constituted by a torsion spring (50) having axial ends respectively rigidly in-

serted in said coupling portion and in said curved linking portion.

9. Brake according to one or more of the preceding claims, characterized in that said curved linking portion has an insertion pin (47) which is rotatably arranged in a seat (48) defined on said coupling portion. 5
10. Brake according to one or more of the preceding claims, characterized in that said curved linking portion (55) is provided with said engagement means proximate to the region of articulation to said coupling portion. 10
11. Brake according to one or more of the preceding claims, characterized in that said engagement means comprise an eccentric protrusion (55) of said curved linking portion which is suitable for interacting with a part which is rigidly associated with the ski and is constituted by a lateral curling (60) of the base for connection to the ski. 15 20
12. Brake according to one or more of the preceding claims, characterized in that it is arranged at the heel unit of a ski binding. 25

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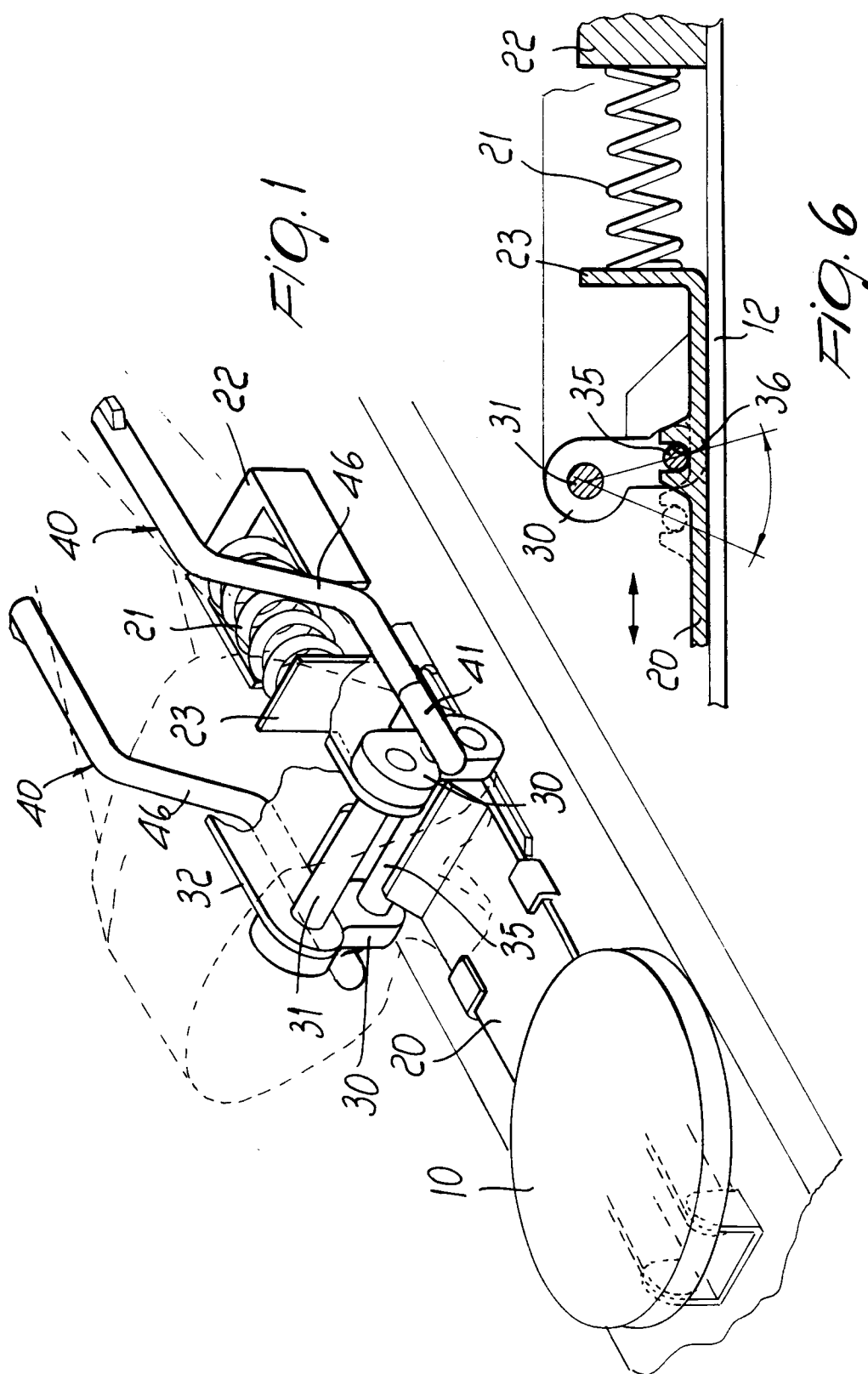
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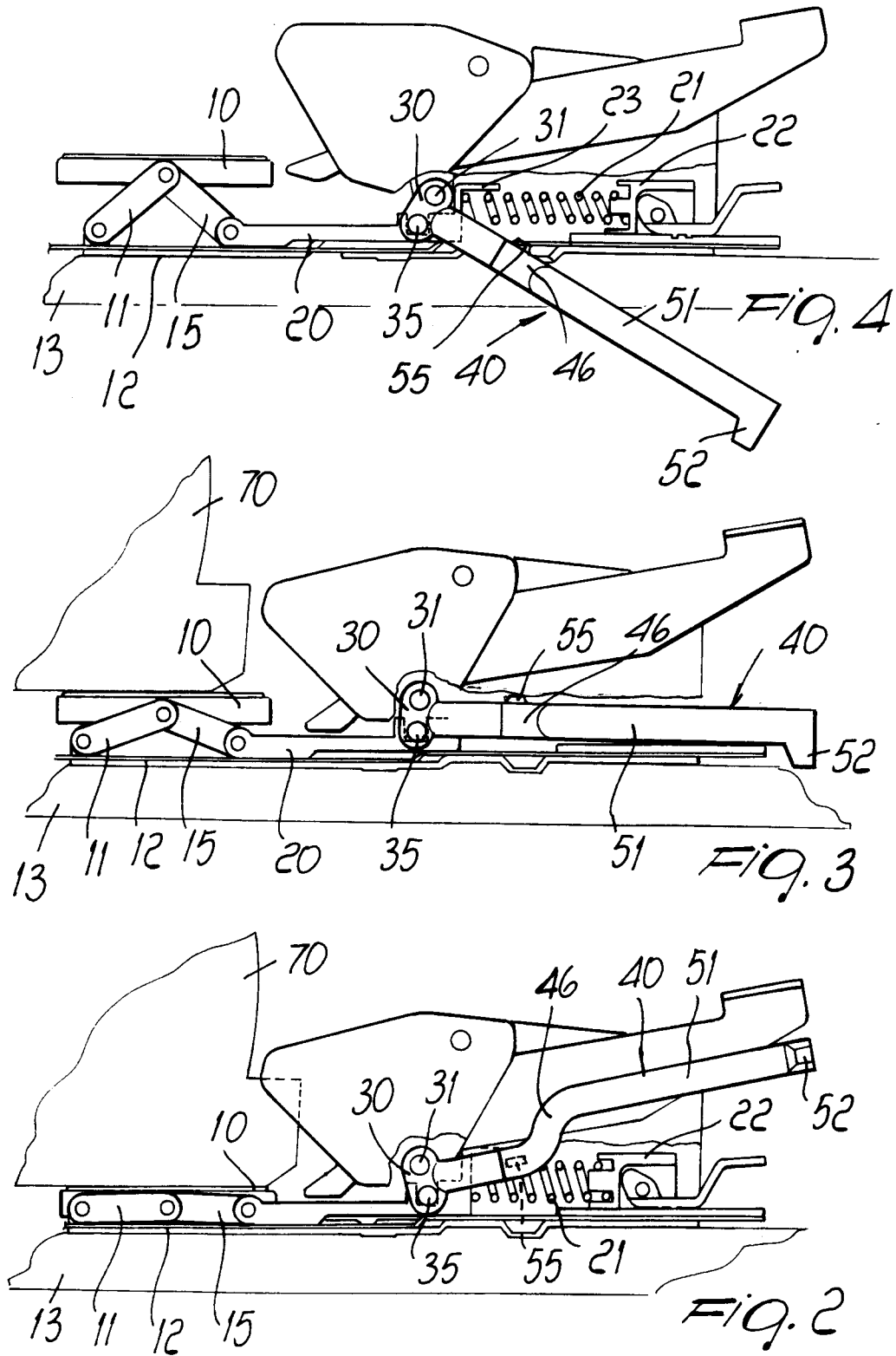
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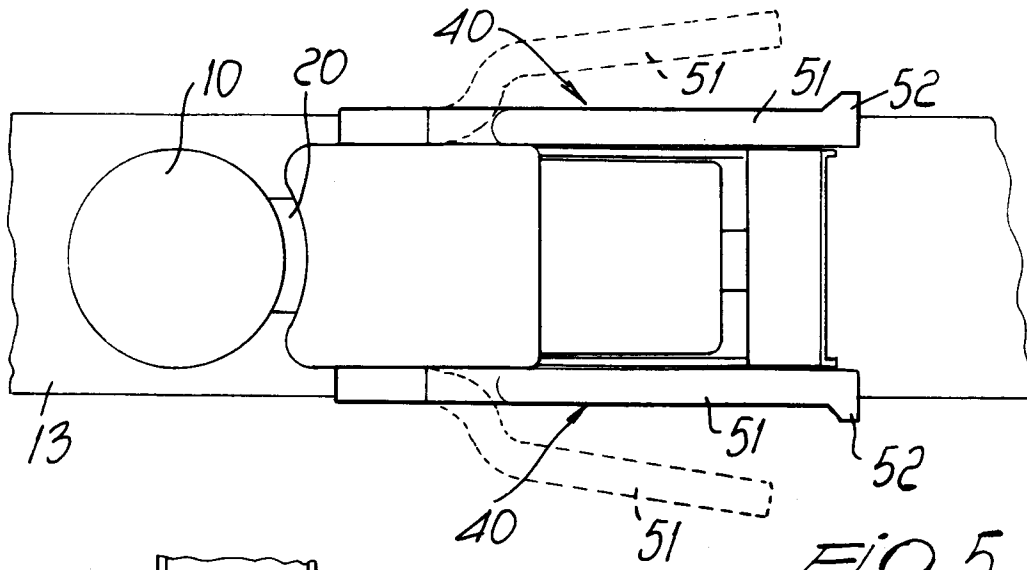


Fig. 5

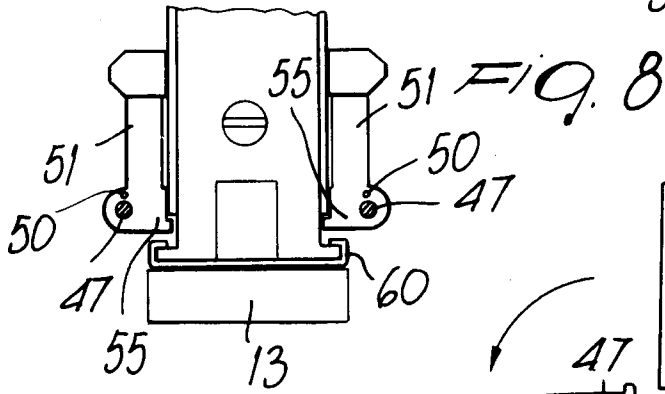


Fig. 8

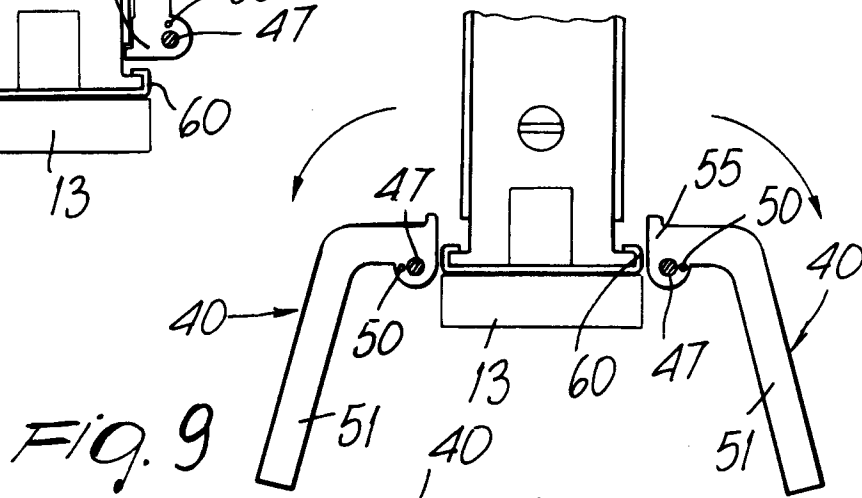


Fig. 9

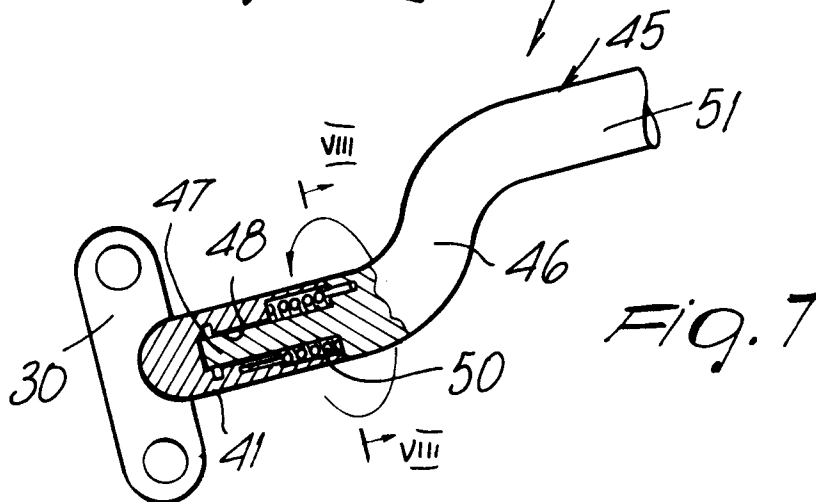


Fig. 7