



(11) **EP 2 418 006 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**15.02.2012 Bulletin 2012/07**

(51) Int Cl.:  
**A63C 5/035<sup>(2006.01)</sup>**

(21) Application number: **10171857.5**

(22) Date of filing: **04.08.2010**

(84) Designated Contracting States:  
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK SM TR**  
Designated Extension States:  
**BA ME RS**

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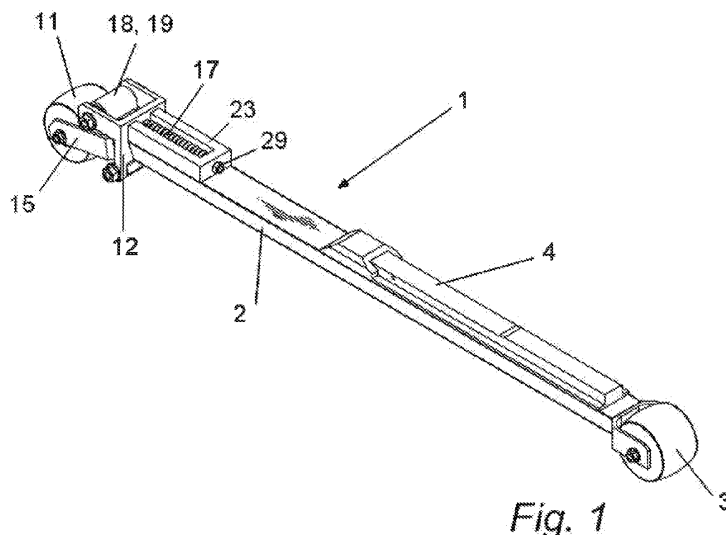
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(54) **Arrangement for a roller ski and a roller ski**

(57) Arrangement for a roller ski comprising a first roller wheel (11) and a fixing element (12) for attaching the arrangement to an elongated body of a roller ski. The fixing element (12) has an upper side (13) and a lower side (14). A pivoting element (15) is connected to the fixing element (12) by means of a pivotal connection (16). The arrangement further comprises a resilient element (17) coupled to the fixing element (12) and the pivoting element (15), wherein the resilient element (17) biases

the pivoting element (15) in a first direction, and wherein the pivoting element (15) is arranged to move in a second direction, opposite to said first direction, when a force is applied to the fixing element, said force being directed from the upper side (13) towards the lower side (14) of the fixing element. The arrangement further comprises brake means (18) approaching a non-active position as the pivoting element (15) moves in said first direction and said brake means (18) approaching an active position as the pivoting element (15) moves in said second direction.



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## Description

### FIELD OF THE INVENTION

**[0001]** The present invention relates to roller skis suitable for skiing in the classic style, i.e. where a diagonal stride is used.

### BACKGROUND OF THE INVENTION

**[0002]** Roller skis are most commonly used as an efficient training method for cross-country skiers who do not have the possibility to always train on snow, for example during summer. Commonly, roller skis are provided with front and rear wheels where either wheel is provided with a ratchet mechanism such that a user will have sufficient grip during the kick-phase of a diagonal stride. A problem with that type of ratchet mechanisms is that they provide full grip even if a skier does not perform a faultless stride. This form a contrast to cross-country skiing on snow where a correctly performed diagonal stride is essential to obtain sufficient grip and avoid that the ski slip backwards. Using roller skis of that type may therefore cause a skier to adapt an incorrect technique. US-2008/0030014 discloses a prior art roller ski which aims to overcome this problem. That prior art discloses several different approaches to solve the problem, among other a solution where a wheel mount is pivotally connected to the rest of the roller ski. The wheel mount is biased by a spring mounted within the roller ski. The manner in which the spring is mounted provides only limited possibilities to adjust the bias to match with different skiers having different techniques and physique.

### SUMMARY OF THE INVENTION

**[0003]** It is an object of the present invention to provide an arrangement for a roller ski that avoids the above-mentioned drawback. This object is achieved by an arrangement according to the present invention as defined in claim 1 of the appended claims. This object is also achieved by a roller ski comprising an arrangement according to any of claims 1 to 14 as defined in appended claim 15.

**[0004]** Thus, in accordance with the present invention there is provided an arrangement for a roller ski comprising a first roller wheel and a fixing element for attaching the arrangement to an elongated body of a roller ski. The fixing element has an upper side and a lower side. The arrangement further comprises a pivoting element connected to the fixing element by means of a pivotal connection, which pivotal connection has a rotational axis that is perpendicular to a longitudinal axis of the elongated body of the roller ski. The arrangement also comprises a resilient element coupled to the fixing element and the pivoting element. The resilient element has a longitudinal axis parallel to the longitudinal axis of the elongated body of the roller ski and biases the pivoting element in a first

direction. The pivoting element is arranged to move in a second direction, opposite to said first direction, when a force is applied to the fixing element. This force being directed from the upper side of the fixing element towards the lower side of the fixing element and substantially perpendicular to the rotational axis of the pivotal connection. The arrangement also comprises a brake means, which approaches a non-active position as the pivoting element moves in said first direction and approaches an active position as the pivoting element moves in said second direction. The brake means is in said non-active position when the force is below a predetermined threshold and said brake means reaches an active position when the force exceeds this predetermined threshold, wherein a braking effect increases with increasing force. By positioning the resilient element with its longitudinal axis parallel to the longitudinal axis of the elongated body of the roller ski it is possible to use resilient elements of greater dimensions. In comparison to smaller resilient elements, it is easier to provide resilient elements of greater dimensions with desirable properties.

**[0005]** In accordance with a first aspect of the arrangement of the invention, the brake means abuts said first roller wheel when in said active position. This provides for a simple construction which gives a riding experience which is very similar to that of cross country skiing on snow.

**[0006]** In accordance with an embodiment of the first aspect of the arrangement of the invention, the brake means comprises a brake shoe. This provides for a very simple, yet effective construction of the brake means.

**[0007]** In accordance with an embodiment of the first aspect of the arrangement of the invention, the brake means comprises a unidirectional roller means. By using a unidirectional roller means it is achieved that a braking effect can only occur in one direction, preferably in a direction preventing the roller ski from rolling backwards. By urging the ski downwards with an adequate force, a skier can obtain the necessary grip against the ground during the kick-phase of a diagonal stride, in the same way as when exercising cross country skiing on snow. At the same time, the use of a unidirectional roller means prevents unwanted braking effect from occurring which could have the result that a skier would come to a fall. This could, for example, happen if a skier hits a sharp bump with the roller wheel thereby causing the brake means to abut the roller wheel.

**[0008]** In accordance with an embodiment of the first aspect of the arrangement of the invention, the first roller wheel is arranged at the pivoting element and the brake means is arranged at the fixing element. When the force exceeds the predetermined threshold the pivoting element will move in the second direction and cause the first roller wheel arranged at the pivoting element to abut the brake means.

**[0009]** In accordance with an embodiment of the first aspect of the arrangement of the invention, the brake means is arranged at the fixing element by means of a

threaded connection such that the position of the brake means can be adjusted. By providing an adjustable positioning of the brake means, the character of the roller ski can be adjusted to suit different skiers.

**[0010]** In accordance with a second aspect of the arrangement of the invention, the brake means, when in use, abuts the ground surface when in said active position.

**[0011]** In accordance with an embodiment of the second aspect of the arrangement of the invention, the brake means comprises a second roller wheel, said second roller wheel being unidirectional. A unidirectional roller wheel provides a brake effect only in the wanted direction, i.e. during the kick-phase of a diagonal stride.

**[0012]** In accordance with an embodiment of the second aspect of the arrangement of the invention, the pivotal connection coincide with a wheel centre of the second roller wheel. By combining the wheel centre of the second roller wheel and the pivotal connection, an uncomplicated and reliable construction of the arrangement can be achieved.

**[0013]** In accordance with an embodiment of the first or the second aspect of the arrangement of the invention, the resilient element are provided at the upper surface of the fixing element. By providing the resilient element at the upper surface of the fixing element, efforts necessary for maintenance and service are kept at a minimum.

**[0014]** In accordance with an embodiment of the first or the second aspect of the arrangement of the invention, the resilient element are provided inside the fixing element. By providing the resilient element inside the fixing element dirt, water and similar are kept away from the resilient element.

**[0015]** In accordance with an embodiment of the first or the second aspect of the arrangement of the invention, a pre-load of the resilient element is adjustable. An adjustable pre-load is convenient in order to be able to adapt the characteristics of the roller ski to different skiers.

**[0016]** In accordance with an embodiment of the first or the second aspect of the arrangement of the invention, the fixing element is arranged to be inserted into a recess of an elongated body of a roller ski. This provides a simple and reliable mounting of the arrangement to the elongated body of the roller ski which is often constituted by a hollow beam into which the arrangement can be inserted.

**[0017]** In accordance with an embodiment of the first or the second aspect of the arrangement of the invention, the fixing element is arranged to enclose an end of an elongated body of a roller ski. This solution can be used, for example, when the hollow recess in the elongated body of the roller ski is too narrow or when the elongated body is constituted by a massive beam.

**[0018]** In accordance with the present invention there is also provided a roller ski comprising at least one arrangement according to any of claims 1-14.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0019]** The invention will now be described in more detail and with reference to the appended drawings in which:

Fig.1 is a perspective view of a first embodiment of an arrangement for a roller ski of the first aspect of the invention.

Fig. 2a is a side view of a first embodiment of an arrangement for a roller ski of the first aspect of the invention with the brake means in a non-active position.

Fig. 2b is an enlarged side view of a detail of a first embodiment of an arrangement for a roller ski of the first aspect of the invention with the brake means in a non-active position.

Fig. 3 is a top view of a first embodiment of an arrangement for a roller ski of the first aspect of the invention.

Fig. 4 is a side view of a first embodiment of an arrangement for a roller ski of the first aspect of the invention with the brake means in an active position.

Fig. 5a is a side view of a second embodiment of an arrangement for a roller ski of the first aspect of the invention with the brake means in a non-active position.

Fig. 5b is an enlarged side view of a detail of a second embodiment of an arrangement for a roller ski of the first aspect of the invention with the brake means in a non-active position.

Fig. 6 is a top view of a second embodiment of an arrangement for a roller ski of the first aspect of the invention.

Fig. 7 is a side view of a second embodiment of an arrangement for a roller ski of the first aspect of the invention with the brake means in an active position.

Fig.8 is a perspective view of a first embodiment of an arrangement for a roller ski of the second aspect of the invention.

Fig. 9a is a side view of a first embodiment of an arrangement for a roller ski of the second aspect of the invention with the brake means in a non-active position.

Fig. 9b is an enlarged side view of a detail of a first embodiment of an arrangement for a roller ski of the second aspect of the invention with the brake means in a non-active position.

Fig. 10a is a side view of a second embodiment of an arrangement for a roller ski of the second aspect of the invention with the brake means in a non-active position.

Fig. 10b is an enlarged side view of a detail of a second embodiment of an arrangement for a roller ski of the second aspect of the invention with the brake means in a non-active position.

Fig. 11 is a side view of a second embodiment of an arrangement for a roller ski of the second aspect of

the invention with the brake means in an active position.

Fig. 12a is a side view of a third embodiment of an arrangement for a roller ski of the second aspect of the invention with the brake means in a non-active position.

Fig. 12b is an enlarged side view of a detail of a third embodiment of an arrangement for a roller ski of the second aspect of the invention with the brake means in a non-active position.

Fig. 13 is a top view of a third embodiment of an arrangement for a roller ski of the second aspect of the invention.

#### DESCRIPTION OF PREFERRED EMBODIMENTS

**[0020]** In a first embodiment of an arrangement of the first aspect of the invention, as shown in figures 1, 2a, 2b, 3 and 4 mounted to a roller ski 1 comprising an elongated body 2, a roller wheel 3 and a binding 4, an arrangement comprises a fixing element 12 for fixing the arrangement to the roller ski 1. The fixing element 12 is inserted into the hollow elongated body 2 of the roller ski 1. The fixing element 12 is clamped to the roller ski 1 by means of a bolt 12, as shown in figures 2 and 4. A pivoting element 15 is connected to the fixing element 12 through a pivotal connection 16 constituted of a through bolt with lateral nuts. Other solutions are possible as well, such as two separate bolts, one at each side, bushings or similar. A first roller wheel 11 is mounted to the pivoting element 15 by means of a wheel axle and two lateral nuts. The first roller wheel 11 is mounted in bearings, such as ball bearings or plain bearings depending on the intended use. The arrangement further comprises a brake means 18 comprising a unidirectional roller means 19. The unidirectional roller means is arranged within a U-shaped part of the fixing element 12 by means of a through bolt and lateral nuts. This provides for a reliable yet simple construction which is easy to access for inspection and maintenance. The unidirectional roller means 19 can be made from metal, plastics or rubber or any other material providing a required braking behaviour. A spring housing 23 is arranged at the fixing element 12. Within the spring housing 23 a resilient element 17, here in the form of a coil spring, is arranged with its longitudinal axis parallel to the longitudinal axis of the elongated body 2 of the roller ski 1. This construction brings about a number of advantages. It is possible to use resilient elements of almost any dimension, in contrast to the solution in the prior art where the length of the resilient element has to be adapted to the height of the interior of the roller ski. This allows for the use of reliable, easy to adjust resilient element. The resilient element 17 acts on the fixing element 12 via the spring housing 23 and on the pivoting element 15 via a bolt 21. Said bolt 21 passing through an opening in the fixing element 12 and the spring housing 23, as can be seen in figures 2 and 4. The bolt 21 acts on the coil spring through a threaded nut 22 which

also can be used to adjust a level of pre-load in the coil spring. It should be noted that the resilient element 17 can be constituted by other elements than a coil spring, for example an elastomeric block or similar. A bolt 51 passes through an opening in the pivoting element 15 and is threaded into the fixing element 12. Bolt 51 acts as an adjustable position limiter for the pivotal movement of the pivoting element 15. This is advantageous since it can be avoided that the pivoting element 15 pivots too far and comes in contact with the brake means 18, causing unnecessary wear of the brake means 18.

**[0021]** The functioning of an arrangement according to the first aspect of the invention will now be discussed. In figure 2a a roller ski 1 with an arrangement according to the invention is shown positioned on a ground surface S with the brake means 18 in a non-active position, i.e. the unidirectional roller means 19 is at a distance from the first roller wheel 11. When a downwardly directed force F (not shown in the figures), i.e. directed from an upper side 13 of the fixing element 12 towards a lower side 14, which is strong enough to overcome the force exerted by the resilient element 17, is applied to the fixing element 12, as for example done by a skier, not shown in the figures, during the kick phase of a diagonal stride, the pivoting element 15 will rotate around the rotational axis of pivotal connection 16 in a first direction, in this case clock-wise. The first roller wheel 11, arranged at the pivoting element 15, will thus travel substantially upwards. If the force F is strong enough, the first roller wheel 11 will come in contact with the brake means 18, shown in figure 4, which means that the brake means 18 reaches an active position and a brake effect will occur. The force required to overcome the resistance of the resilient element is also denoted threshold. This construction also provides for an increasing brake effect with increasing force. This means that if the force only just reaches the threshold, full brake effect will not be provided since the brake means 18 will barely touch the first roller wheel 11. With increasing force, the first roller wheel 11 will press harder against the brake means 18 and the brake effect will increase. The brake effect will depend upon the coefficient of friction between a brake surface of the brake means 18 and a tread of the first roller wheel 11. This effect is important since this is also the case when doing cross country skiing on snow. In this embodiment the brake means 18 comprises a unidirectional roller means 19 which means that it only will provide a brake effect in one direction and will allow the first roller wheel 11 to roll in the other direction. In order to provide skier with grip during a kick phase of a diagonal stride, the unidirectional roller means 19, when in an active position, will be arranged to restrain the first roller wheel 11 from rolling backwards and allow the first roller wheel 11 to continue rolling forwards. This also has the advantage that in a case where the brake means 18 unintentionally reaches an active position, for example if a skier rides over a sharp bump, the first roller wheel 11 will not suddenly brake, which could cause a skier to come to a fall.

**[0022]** In a second embodiment of an arrangement of the first aspect of the invention, as shown in figures 5a, 5b, 6 and 7 mounted to a roller ski 10 comprising an elongated body 2, a roller wheel 3 and a binding 4, an arrangement comprises a brake means 18 in the form of a brake shoe 29 made from for example metal or plastics providing a required braking behaviour. The use of a brake shoe 29 provides for a very simple and reliable construction. The brake shoe 29 is arranged at one end of a bolt 20 which is threaded into the fixing element 12 and which passes through an opening in the pivoting element 15. The threaded connection of bolt 20 allows for adjusting of the position of the brake shoe 29 which is advantageous in order to provide a roller ski 10 having the required characteristics. Other than the differences in the brake means 18 described above, the arrangement and the advantages thereof according to this second embodiment corresponds to previously described arrangement, referring to figures 1 to 4.

**[0023]** In a first embodiment of an arrangement of the second aspect of the invention, as shown in figures 8, 9a and 9b mounted to a roller ski 100 comprising an elongated body 2, a roller wheel 3 and a binding 4, an arrangement comprises a fixing element 12 for fixing the arrangement to the roller ski 100. The fixing element 12 is inserted into the hollow elongated body 2 of the roller ski, similar to the fixing elements of the first aspect of the invention even though not shown explicitly in figures 8, 9a or 9b. A pivoting element 15 is connected to the fixing element 12 through a pivotal connection 16. A first roller wheel 11 is mounted to the pivoting element 15 by means of a wheel axle and two lateral nuts. The roller wheel is mounted in bearings, such as ball bearings or plain bearings depending on the intended use. The arrangement further comprises a brake means 18 comprising a second roller wheel 39, said second roller wheel 39 being unidirectional. In this embodiment, the pivotal connection 16 is constituted by a wheel axle of the second roller wheel 39. The pivoting member 15 has two parallel side members each having a downwardly directed cut-out in which the wheel axle of the second roller wheel 39 is positioned, in that way providing the pivotal connection 16. The wheel axle is provided with threaded nuts outside of each side member. Other solutions are possible as well, such as providing the side members with holes instead of cut-outs. The wheel axle of the second roller wheel 39 may be fixed to the wheel or it can be a separate, loose axle. A resilient element 17, here in the form of a coil spring, is arranged between the fixed element 12 and the pivoting member 15. A bolt 31 passes through the fixing element 12, the pivoting member 15 and the resilient element 17 respectively to hold the resilient element in place. An inner threaded nut 32 together with washer is provided on the bolt 31 for adjusting a pre-load of the resilient element 17. An outer threaded nut 33 is provided at an end of the bolt 31 to keep the bolt 31 in place. As with the arrangement according to the first aspect of the invention, the resilient element 17 is positioned with its longitudinal axis

parallel to the longitudinal axis of the elongated body 2 of the roller ski 100. This construction brings about a number of advantages. It is possible to use resilient elements of almost any suitable dimension, in contrast to the solution in the prior art where the length of the resilient element has to be adapted to the height of the interior of the roller ski. This allows for the use of reliable and easy to adjust resilient element. It should be noted that the resilient element 17 can be constituted by other elements than a coil spring, for example an elastomeric block or similar.

**[0024]** The functioning of an arrangement according to the second aspect of the invention will now be discussed, referring to figures 9a and 9b. In these figures a roller ski 100 with an arrangement according to the second aspect of the invention is shown positioned on a ground surface with the brake means 18 in a non-active position, i.e. the unidirectional second roller wheel 39 is at a distance from the ground surface. When a downwardly directed force F (not shown in the figure), i.e. directed from an upper side 13 of the fixing element 12 towards a lower side 14, which is strong enough to overcome the force exerted by the resilient element 17, is applied to the fixing element 12, as for example done by a skier, not shown in the figures, during the kick phase of a diagonal stride, the pivoting element 15 will rotate around the rotational axis of pivotal connection 16 in a first direction, in this case counter clock-wise. The second roller wheel 39, arranged at the pivoting element 15, will thus travel substantially downwardly. If the force F is strong enough, i.e. exceeding the threshold, the second roller wheel 39 will come in contact with the ground surface, which means that the brake means 18 reaches an active position and a brake effect will occur due to the unidirectional functioning of the second roller wheel 39. Similar to the arrangements according to the first aspect of the invention, the brake effect will increase with increasing force. The brake effect will depend on the force with which the second roller wheel 39 is pushed against the ground surface and the coefficient of friction between these two. Due to the unidirectional functioning of the second roller wheel 39 it will only provide a brake effect in one direction and will roll freely in the other direction. In order to provide skier with grip during a kick phase of a diagonal stride, the second roller wheel 39, when in an active position, will be arranged to restrain the roller ski 100 from rolling backwards and allow the roller ski 100 to continue rolling forwards. This also has the advantage that in a case where the brake means 18 unintentionally reaches an active position, for example if a skier rides over a sharp bump, the roller ski 100 will not suddenly brake, which could cause a skier to come to a fall.

**[0025]** A second embodiment of an arrangement of the second aspect of the invention, is shown in figures 10a, 10b and 11. In this embodiment, the brake means 18, which comprises a second roller wheel of the unidirectional type, is mounted to the fixing element 12. A first roller wheel 11 is arranged at a pivoting element 15. The

separate construction details of this embodiment correspond to those already described above. The functioning of this second embodiment of an arrangement of the second aspect of the invention correspond to that of the embodiments previously described. Accordingly, if a downwardly directed force F, i.e. directed from an upper side 13 of the fixing element 12 towards a lower side 14, which is strong enough to overcome the force exerted by the resilient element 17, is applied to the fixing element 12, as for example done by a skier, not shown in the figures, during the kick phase of a diagonal stride, the pivoting element 15 will rotate around the rotational axis of pivotal connection 16 in a first direction, in this case clock-wise. The second roller wheel 49, arranged at the fixing element 15, will thus travel substantially downwardly. If the force F is strong enough, i.e. exceeding the threshold, the second roller wheel 49 will come in contact with the ground surface, which means that the brake means 18 reaches an active position and a brake effect will occur due to the unidirectional functioning of the second roller wheel 49. Again, the brake effect will increase with increasing force. The brake effect will depend on the force with which the second roller wheel 49 is pushed against the ground surface and the coefficient of friction between these two. Due to the unidirectional functioning of the second roller wheel 49 it will only provide a brake effect in one direction and will roll freely in the other direction. In order to provide skier with grip during a kick phase of a diagonal stride, the second roller wheel 49, when in an active position, will be arranged to restrain the roller ski 100 from rolling backwards and allow the roller ski 100 to continue rolling forwards.

**[0026]** A third embodiment of an arrangement of the second aspect of the invention, is shown in figures 12a, 12b and 13. The arrangement according to this embodiment differs from those previously described primarily in two matters. Firstly, in order to provide a roller ski 300 which is easy to use also to people who are not used to roller skiing, the arrangement comprises two separate coaxial second roller wheels of the unidirectional type and two separate coaxial first roller wheels 11 are mounted to the pivoting element 15. The use of separate coaxial roller wheels requires less balance skills from a skier. Secondly, the resilient element 17 has been mounted inside the fixing element 12. The fixing element 12 in turn is mounted within the recess of the elongated body 2 of the roller ski 300. This provides for excellent protection of the resilient element 17 from dirt, water and similar. A pre-load of the resilient element can still be adjusted by means of bolt-head 36 of bolt 31. Bolt 31 is threaded and passes through the resilient element 17 and into block 35 having an internal thread corresponding to that of bolt 31. By turning bolt 31 the longitudinal position of block 35 can be adjusted and thereby the pre-load of resilient element 17. Apart from these differences, the arrangement according to this third embodiment corresponds to those previously described.

**[0027]** The tyre tread of the roller wheels described

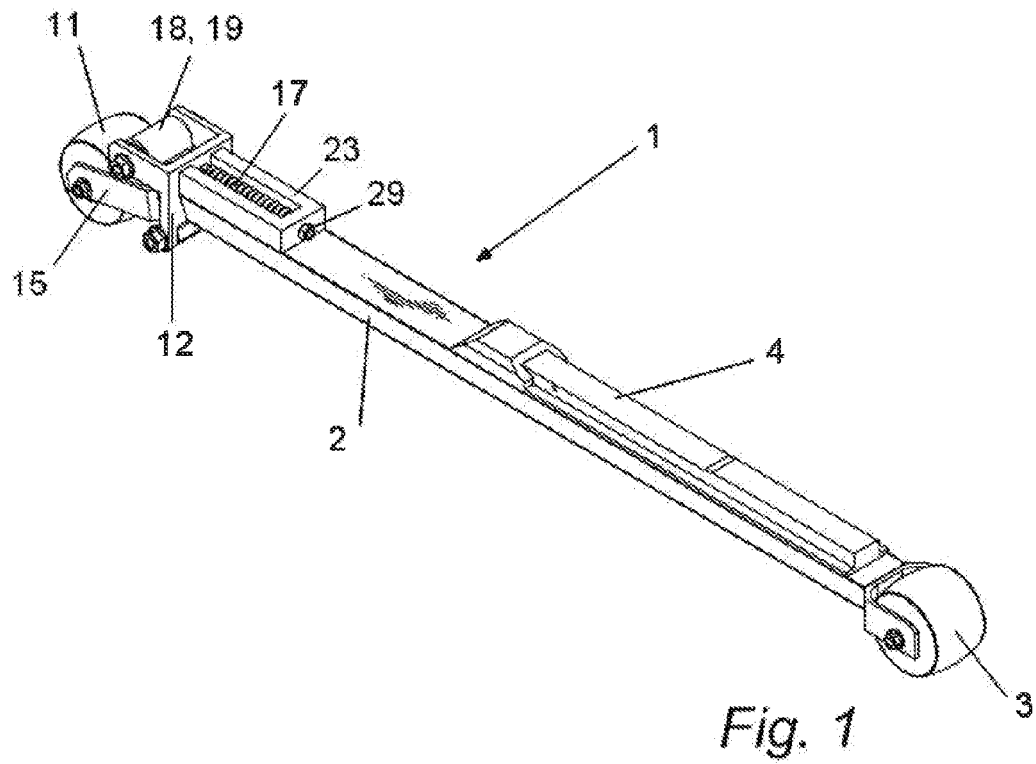
herein is preferably made from rubber or materials having similar properties whereas wheel axles, bolts and nuts preferably are made from metal, such as steel alloys. The elongated body of the roller ski, the fixing elements and the pivoting elements are preferably made from suitable metal, such as steel or aluminium and alloys thereof but composite materials are also possible to use in this respect. The resilient elements can be made from metal coil springs or elastomeric blocks. Instead of mounting the fixing element within a recess in the elongated body of the roller ski, it is also possible to fit the end of an elongated body of the roller ski within a recess provided in the fixing element.

## Claims

1. An arrangement for a roller ski, said arrangement comprising a first roller wheel, a fixing element for attaching the arrangement to an elongated body of a roller ski, said fixing element having an upper side and a lower side, a pivoting element connected to the fixing element by means of a pivotal connection, said pivotal connection having a rotational axis perpendicular to a longitudinal axis of the elongated body of the roller ski, the arrangement further comprising a resilient element coupled to the fixing element and the pivoting element, said resilient element having a longitudinal axis parallel to the longitudinal axis of the elongated body of the roller ski, wherein the resilient element biases the pivoting element in a first direction, and wherein the pivoting element is arranged to move in a second direction, opposite to said first direction, when a force is applied to the fixing element, said force being directed from the upper side of the fixing element towards the lower side of the fixing element and substantially perpendicular to the rotational axis of the pivotal connection, wherein the arrangement further comprises a brake means, said brake means approaching a non-active position as the pivoting element moves in said first direction and said brake means approaching an active position as the pivoting element moves in said second direction and wherein said brake means is in said non-active position when the force is below a predetermined threshold and said brake means reaches an active position when the force exceeds the predetermined threshold, wherein a braking effect increases with increasing force.
2. Arrangement for a roller ski according to claim 1, wherein the brake means abuts said first roller wheel when in said active position.
3. Arrangement for a roller ski according to claim 2, wherein the brake means comprises a unidirectional roller means.

4. Arrangement for a roller ski according to claim 2, wherein the brake means comprises a brake shoe.
5. Arrangement for a roller ski according to any of claims 2 to 4, wherein the first roller wheel is arranged at the pivoting element and the brake means is arranged at the fixing element and wherein the pivoting element will move in said second direction when the force exceeds the predetermined threshold causing the first roller wheel arranged at the pivoting element to abut the brake means.
6. Arrangement for a roller ski according to any of claims 2 to 5, wherein the brake means is arranged at the fixing element by means of a threaded connection such that the position of the brake means can be adjusted.
7. Arrangement for a roller ski according to claim 1, wherein the brake means, when in use, abuts the ground surface when in said active position.
8. Arrangement for a roller ski according to claim 7, wherein the brake means comprises a second roller wheel, said second roller wheel being unidirectional.
9. Arrangement for a roller ski according to claim 8, wherein the pivotal connection coincide with a wheel centre of the second roller wheel.
10. Arrangement for a roller ski according to any of the preceding claims, wherein the resilient element are provided at the upper surface of the fixing element.
11. Arrangement for a roller ski according to any of claims 1 to 9, wherein the resilient element are provided inside the fixing element.
12. Arrangement for a roller ski according to any of the preceding claims, wherein a pre-load of the resilient element is adjustable.
13. Arrangement for a roller ski according to claim any of the preceding claims, wherein the fixing element is arranged to be inserted into a recess of an elongated body of a roller ski.
14. Arrangement for a roller ski according to any of claims 1 to 12, wherein the fixing element is arranged to enclose an end of an elongated body of a roller ski.
15. Roller ski comprising at least one arrangement according to any of claims 1-14.

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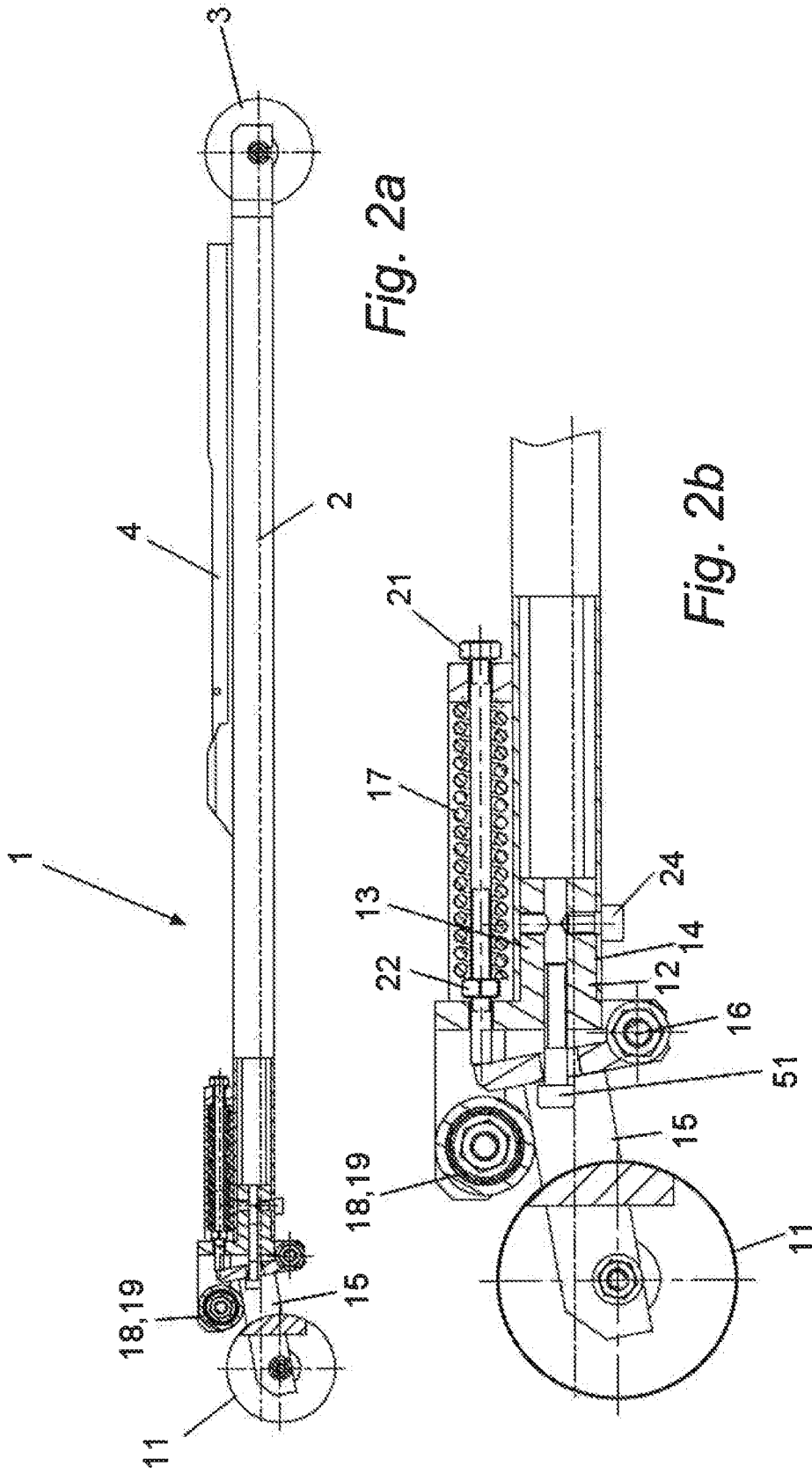


Fig. 2a

Fig. 2b

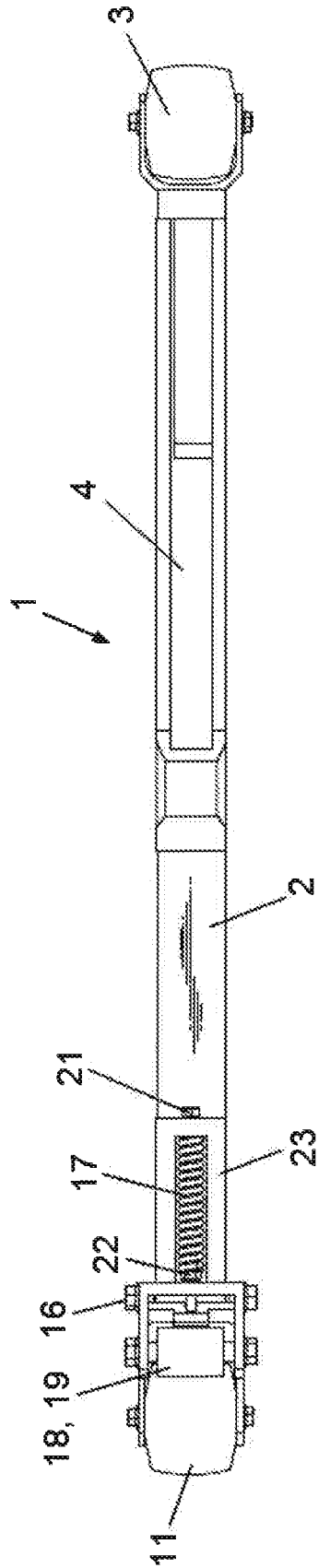


Fig. 3

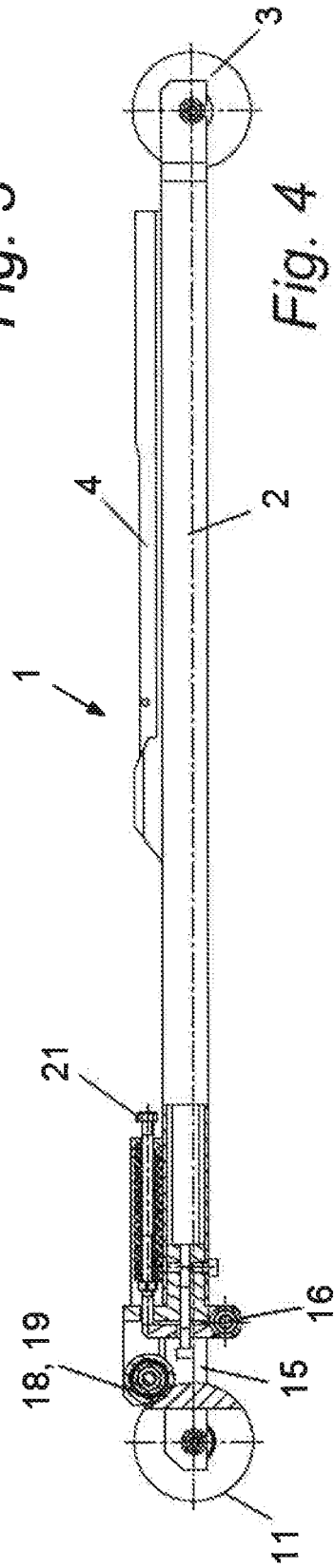
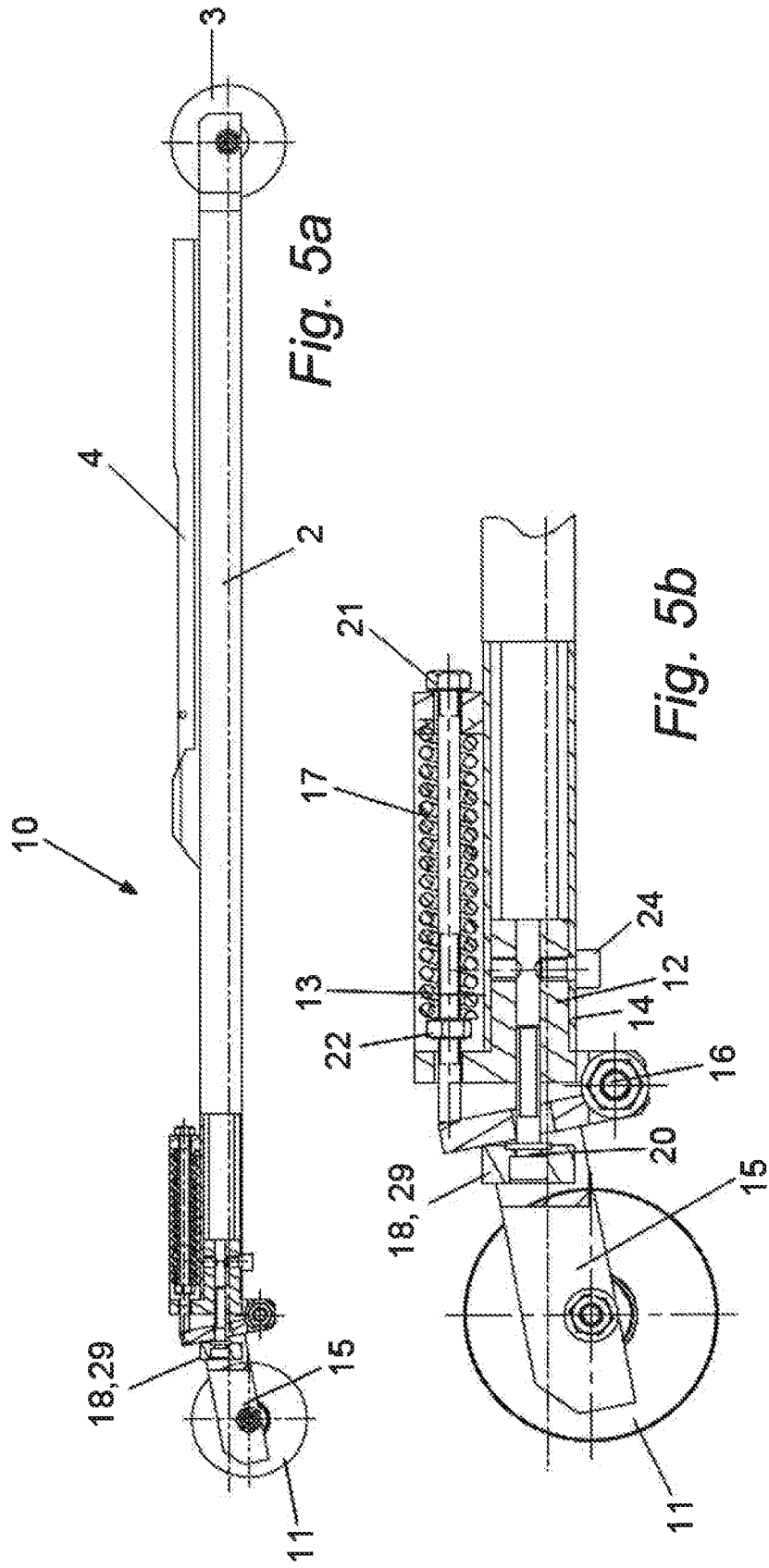
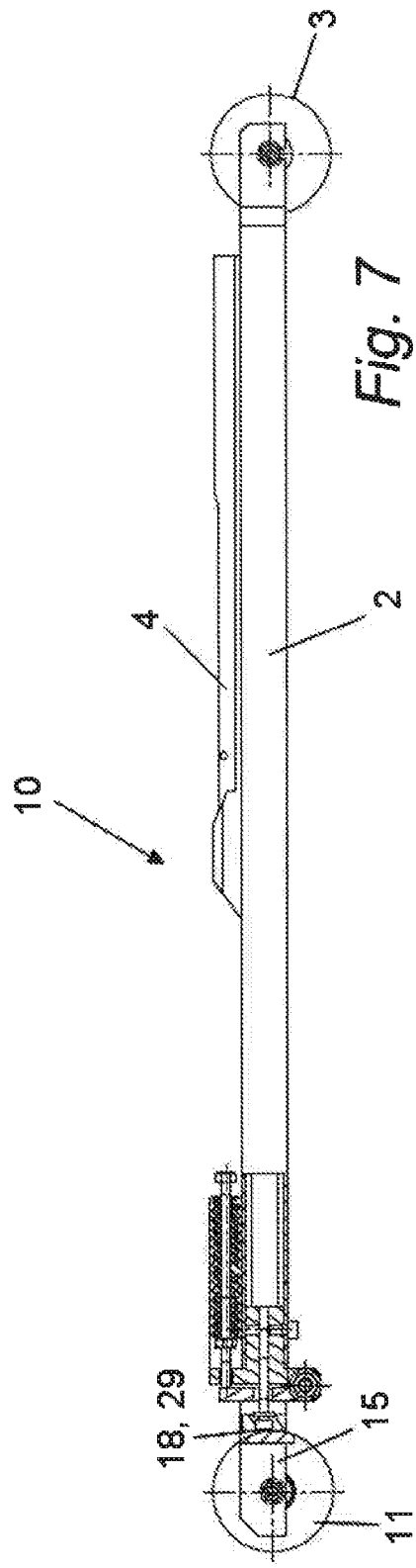
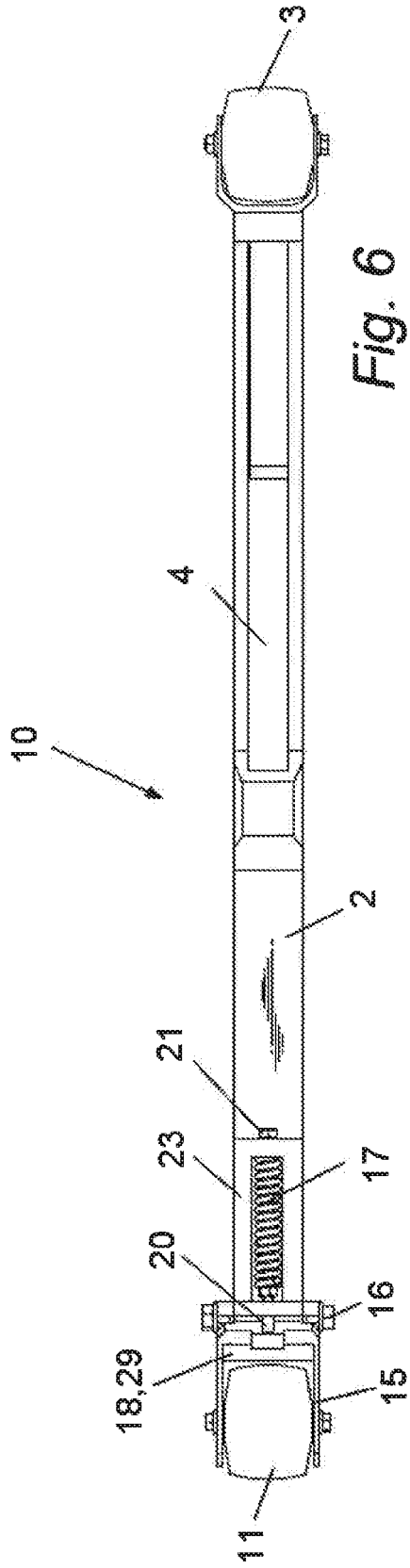
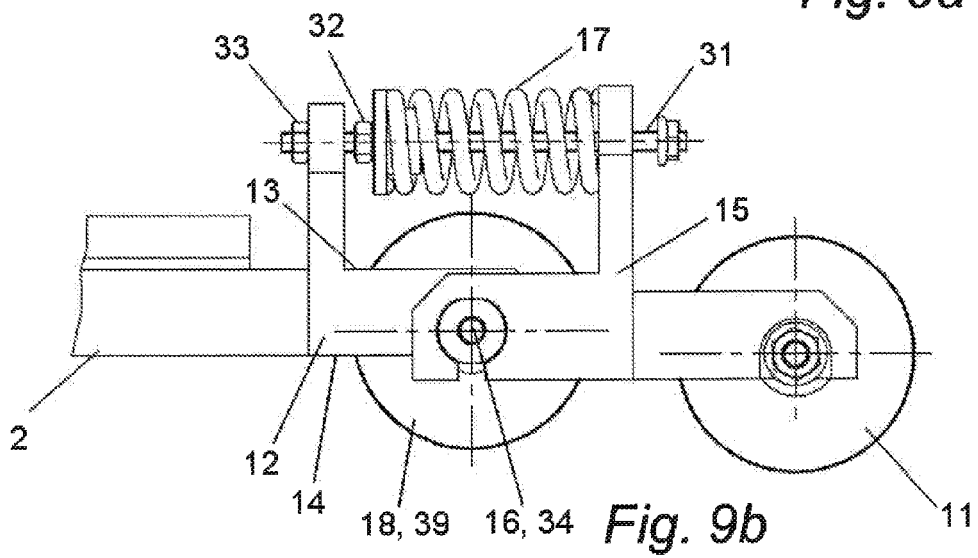
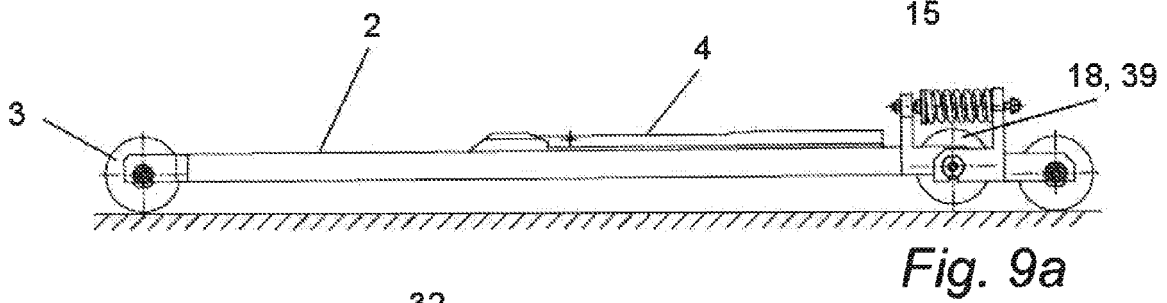
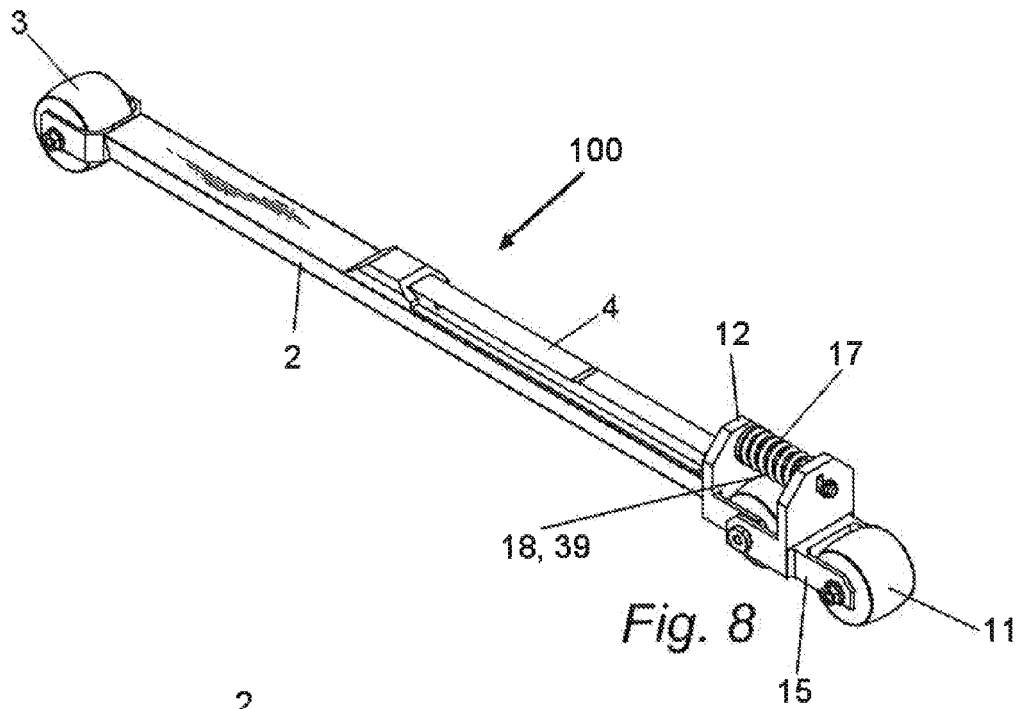


Fig. 4







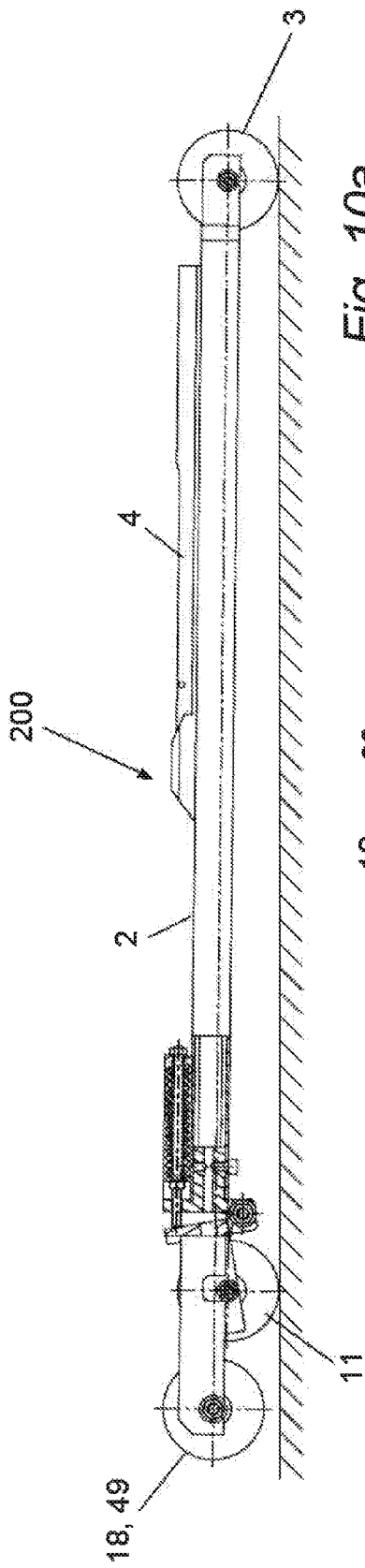


Fig. 10a

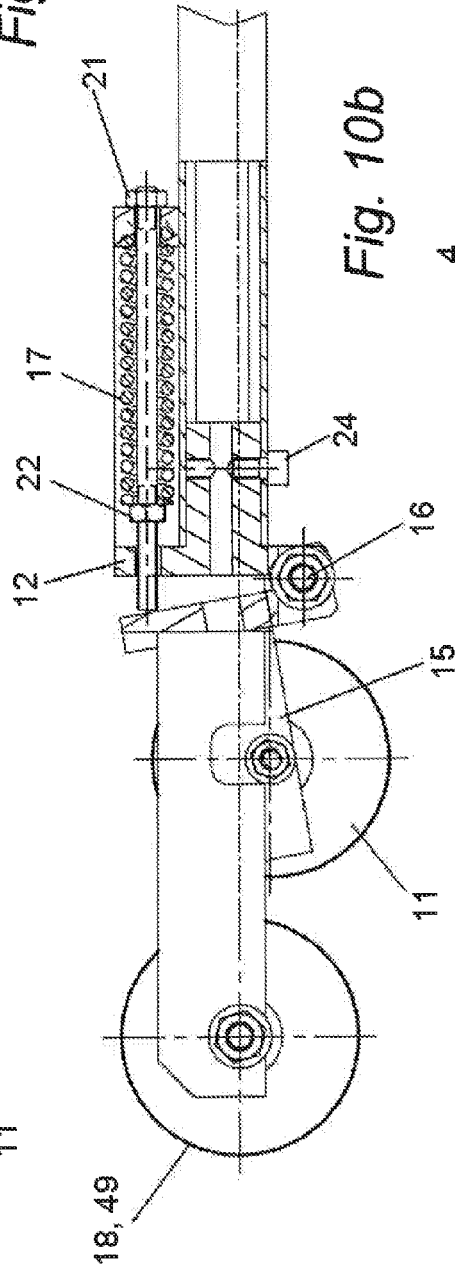


Fig. 10b

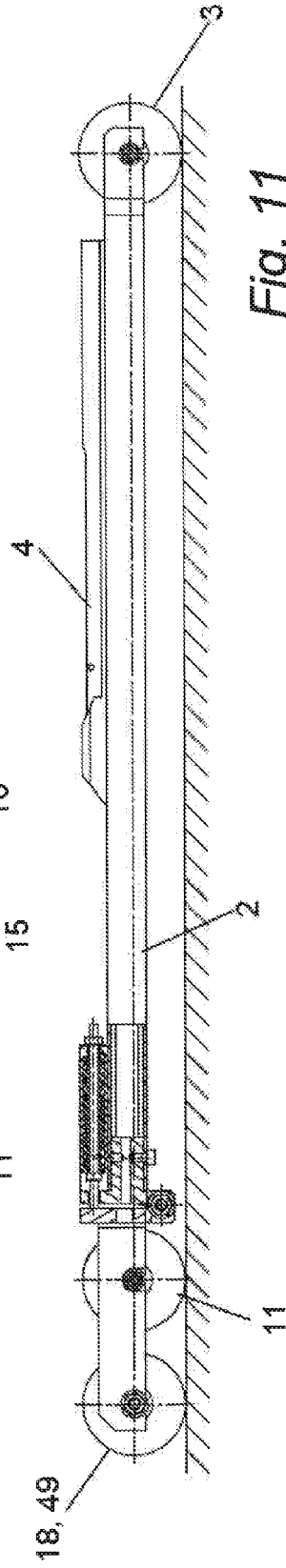


Fig. 11

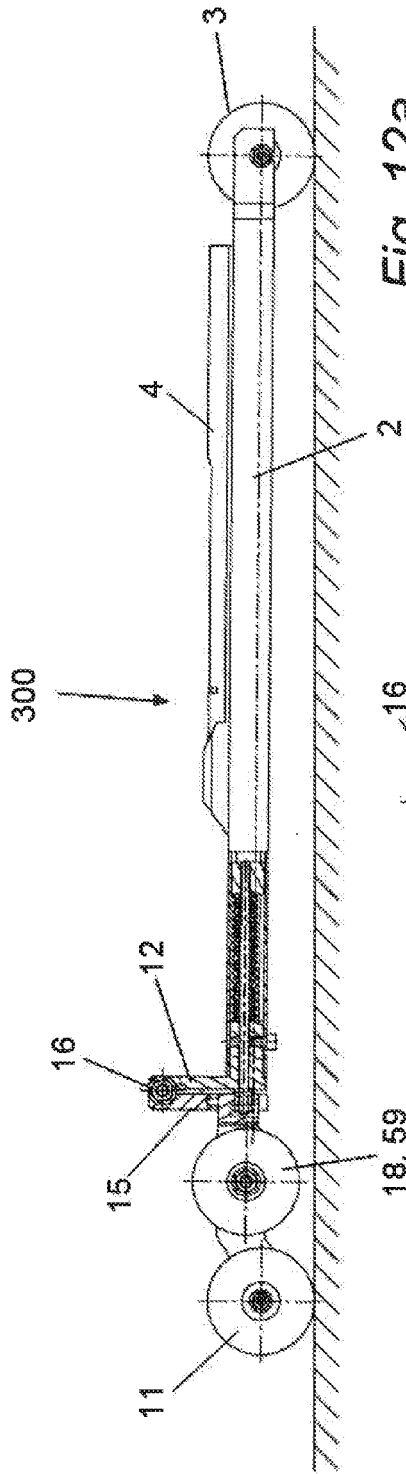


Fig. 12a

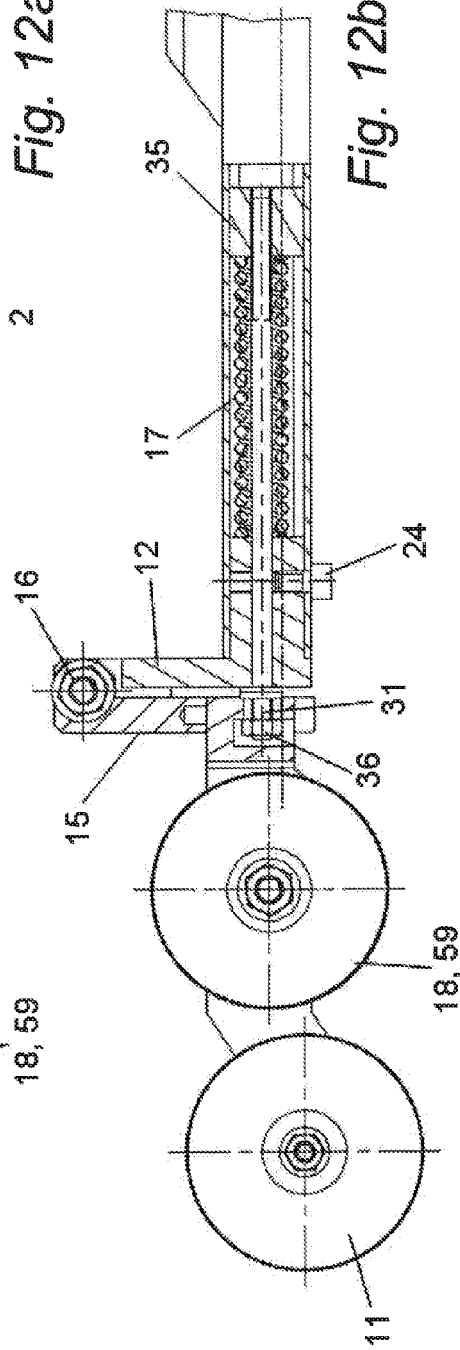


Fig. 12b

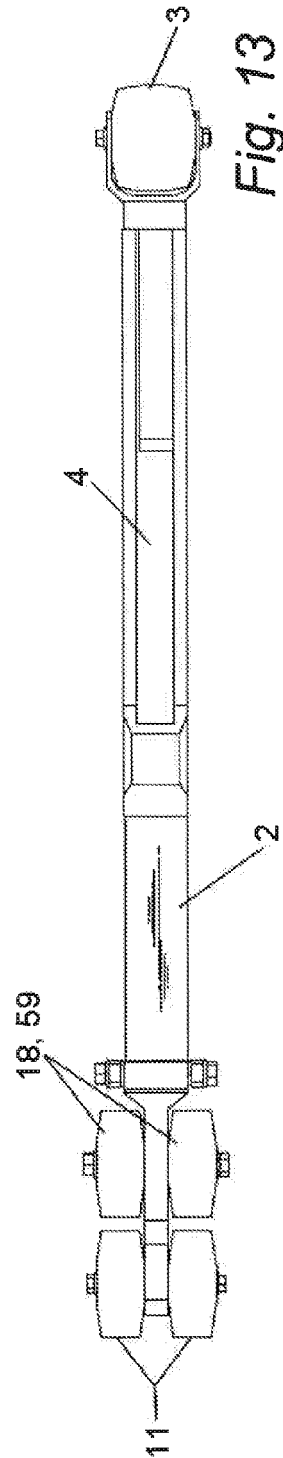


Fig. 13



EUROPEAN SEARCH REPORT

Application Number  
EP 10 17 1857

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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			TECHNICAL FIELDS SEARCHED (IPC)
			A63C
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 13 January 2011	Examiner Haller, E
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13-01-2011

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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