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(54) **Skate with adjustable shoe**

(57) The present invention relates to a skate, comprising a frame, a shoe attached to the frame, which shoe is constructed from a heel part and a toe part, wherein the toe part and the heel part are slidable relative to each other in order to adjust the size of the shoe, and an operating unit for operating the shoe size adjustment, the operating unit comprising:
- a support element to which the heel part and the toe part are fixed;
- spring means for holding the heel part under spring tension relative to the toe part;
- a locking member to be displaced selectively by a user between a first and second position and co-acting with the support element, which member locks the heel part and the toe part relative to each other in the first position and releases the heel part relative to the toe part in the second position in order to allow sliding of the heel part and the toe part relative to each other under spring tension.

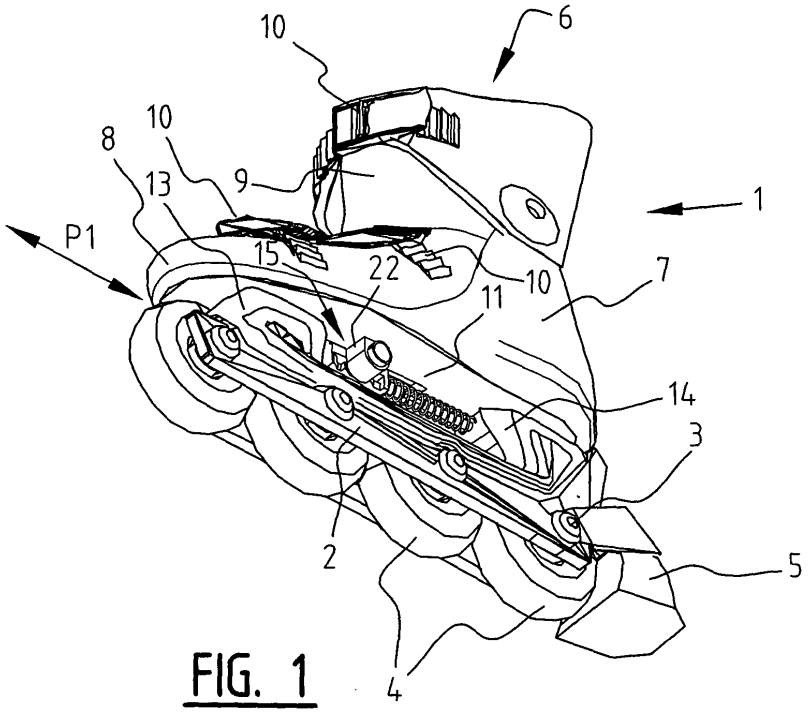


FIG. 1

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Description

[0001] The present invention relates to a skate. The invention relates more particularly to a skate provided with a runner for transport over ice or provided with a number of wheels (with successively placed wheels in an in-line skate or with wheels placed at offset positions in a roller skate) for land transport.

[0002] There is a need for skates with a shoe which can be adjusted such that the shoe size can be modified. In the case of young children an adjustment of the shoe size is important because of the rapid growth of the feet of these children. Skates with an adjustable shoe size can then be used for a longer period of time. Shoe size adjustment of the skate can also be important for adults. Shoe size adjustment of a pair of skates makes it possible for the same pair to be used by different people with differing shoe size. Such people can therefore suffice with the purchase of a single pair of skates. It is also sometimes useful to adjust the shoe size of a skate in changing weather conditions. When the skates are used in cold conditions, the user wears thick socks which in some cases requires a larger shoe size land when the user uses the skate with thin socks, for instance in mild conditions.

[0003] Many types of skate are already known in which the shoe size can be adjusted in more or less successful manner. Known for instance from the international patent application WO 96-40.391 is an in-line skate wherein the heel portion of the shoe is fixed to a frame provided with wheels, while the toe portion of the shoe is fastened to the heel. The toe portion is adjustable in longitudinal direction and thereby provides the option of varying the shoe size of the skate shoe. The adjustment of the shoe size is however rather laborious in the known skate. A bolt must be loosened, the toe portion must be displaced manually and, once the correct shoe size has been set, the bolt must be re-tightened.

[0004] Likewise known from the American document US 5,794,362 is a skate or roller skate with a shoe size which can be adjusted. The shoe size can be adjusted by rotating a rod provided with screw thread. The shown construction ensures that the length of the shoe, i.e. the shoe size provided by the shoe, is continuously adjustable. The drawback of this known skate is that a user must determine by trial and error whether the length of the shoe is set correctly for him/her. Furthermore, adjustment of the length of the shoe requires rotation of the rod, which can create difficulties for the user, for instance in low-temperature conditions.

[0005] The American patent US 2003-0,111,808 describes a skate provided with a heel part and a toe part, wherein the toe part can be fixed at a number of positions along the longitudinal axis of the skate so that the shoe size of the skate can be adjusted in a number of fixed steps. However, fastening of the toe part takes place with a buckle, which does not enhance convenience of use.

[0006] Known from the European patent application EP 1,112,698 A2 is an in-line roller skate in which the toe unit of the shoe can be displaced in stepped manner in longitudinal direction after pressing a button. In a first position of the shoe the shoe of the skate is locked, while in a second position the shoe can be freely adjusted by the user. The user adjusts the shoe size of the skate by displacing the toe unit of the shoe. Displacing of the toe unit takes place by exerting a manual force on the toe unit. The toe unit is fixed at a desired position by releasing the button. A drawback of the known skate is however that the user must still displace the toe unit of the shoe by hand in order to obtain the desired shoe size. The button must moreover remain pressed-in during this displacement. This limits the convenience of use of the known skate.

[0007] Similar drawbacks are associated with the in-line skate known from the document EP 1,258,268 whereby a part of the shoe can be engaged by operating an operating unit or actuator that is under bias so that the relevant shoe part can be displaced forward or backward in order to adjust the shoe size. In this known skate the user must also displace by hand the relevant shoe part of the skate in order to obtain the desired shoe size. The operating unit must moreover remain pressed-in during the displacement.

[0008] It is an object of the invention to provide an improved adjustable skate in which at least one of the above stated drawbacks of the prior art skates is obviated.

[0009] It is a further object of the invention to provide a skate in which adjustment of the shoe size is possible without separate components or tools.

[0010] Provided for this purpose according to the invention is a skate, comprising:

- a frame provided with fixing means for fixing a runner or a number of wheels placed mutually in line;
- a shoe attached to the frame, which shoe is constructed from a heel part and a toe part, wherein the toe part and the heel part are slidable relative to each other in order to adjust the size of the shoe;
- an operating unit for operating the shoe size adjustment, the operating unit comprising:
    - a support element to which the heel part and the toe part are fixed;
    - spring means for holding the heel part under spring tension relative to the toe part;
    - a locking member to be displaced selectively by a user between a first and second position and co-acting with the support element, which member locks the heel part and the toe part relative to each other in the first position and releases the heel part relative to the toe part in the second position in order to allow sliding of the heel part and the toe part relative to each other under spring tension.

[0011] Under the influence of the spring means the toe

part and the heel part are displaced automatically relative to each other, i.e. without intervention by the user, by placing the locking member in the second position. After the locking member has been displaced to the starting position, for instance by releasing thereof, locking of the shoe takes place automatically.

[0012] An advantage of this skate is that no external, possibly separate assist means such as screwdrivers and the like are required to enable adjustment of the skate. The construction is moreover extremely simple and can be understood by anyone (practically) without instruction. A further advantage is that the skate can be adjusted easily during use. If for instance the feet of the user swell during skating, it can be agreeable to temporarily increase the shoe size of the skate. This increase in the shoe size can be brought about simply by operating the locking member, without the user here having to take off the shoe.

[0013] According to a preferred embodiment, the operating component comprises arresting means for arresting the sliding movement of the heel part and/or the toe part after sliding over a set sliding distance. When the locking member is therefore moved from the first position to the second position, the spring means ensure that the length of the shoe is increased or decreased automatically over the preset distance. The shoe also remains locked in the adjusted position after the locking member has been returned from its second position to its first position. The process of pressing in and releasing the locking member can be repeated, wherein the shoe is displaced a preset distance at a time. In the particularly advantageous embodiment the above stated set distance substantially corresponds with a single shoe size unit. The user who is accustomed to thinking in terms of shoe size, for instance shoe size 42 according to the European system or shoe size 8 according to the British system, can now, simply by operating the operating member a sufficient number of times, set the shoe size to the value suitable for him/her without further operations here being necessary.

[0014] In a particular preferred embodiment of the invention the spring means are adapted to push the toe part and the heel part away from each other in order to increase the shoe size automatically, i.e. without further intervention by the user.

[0015] In a further preferred embodiment of the invention the arresting means and the locking member are integrated with each other so that a compact operating unit is obtained.

[0016] According to a further preferred embodiment, the support element comprises at least two telescopic support element parts. One of the support element parts is herein mounted on the heel part of the shoe, while another support element part is mounted on the toe part of the shoe. A decrease and increase in the shoe size can be realized by respectively sliding the support element parts in and out in longitudinal direction relative to each other.

[0017] In a further preferred embodiment there is arranged around a least a part of the support element a helical spring which provides the necessary tension between the heel part and the toe part of the shoe.

[0018] According to a further preferred embodiment, the locking member is provided with spring means for urging the locking member into the first position. This means that, except when it is being operated by the user, the locking member is practically always located in the first position, in which position the shoe is locked. The chance of release during use of the skate is hereby extremely small.

[0019] In a preferred embodiment of the invention the locking member comprises a first stop element which can co-act with protrusions provided on the support element for the purpose of locking the support element when the locking member is located in said first position. In the first position the stop element remains hooked behind the protrusions so that the support element, and thereby the shoe parts, remain locked relative to each other. When the locking member is situated in the second position, the stop element is displaced such that it no longer remains enclosed between the protrusions, whereby a displacement of the support element parts, and thereby of the shoe parts, relative to each other becomes possible.

[0020] According to a further preferred embodiment, the locking member comprises a second stop element which can co-act with one or more teeth provided on the support element for arresting the support element when the locking member is situated in the second position. When the locking member is situated in the second position and, as stated above, the stop element is no longer enclosed between the protrusions and the support element parts can therefore be displaced relative to each other, the second stop element in co-action with said teeth on the support element ensures that the displacement of the support element parts relative to each other can take place through only a limited distance determined mainly by the mutual distance between the teeth. This means that when the locking member is operated the shoe parts are automatically displaced through a predetermined distance relative to each other under the influence of the spring tension. A simple and operationally reliable construction is hereby provided with which the length of the shoe can be adjusted in stepped manner without further intervention by the user.

[0021] The second stop element is preferably arranged in spring-mounted manner, and said teeth are chamfered in each case on one side while a stop surface is formed on the opposite side. This surface is preferably straight. Owing to this "ratchet" construction the arresting means ensure that, while the support element parts are arrested during displacement in a first direction, the support element parts are not arrested during displacement in another opposite direction.

[0022] According to a further preferred embodiment, markings representing shoe size are arranged on the one hand on the frame and on the other on the part of the

shoe displaceable relative to the frame, for instance in the form of a series of shoe size designations. The user can hereby quickly determine visually the shoe size of the shoe that has been set or is to be set.

[0023] Further advantages, features and details of the present invention will be elucidated on the basis of the following description of a preferred embodiment thereof. Reference is made in the description to the accompanying figures, in which:

Figure 1 shows a view in perspective of an in-line skate provided with a preferred embodiment of an operating unit according to the invention;
Figure 2 is a view in perspective of the in-line skate of figure 1 in a position with an increased shoe size compared to the position shown in figure 1;
Figure 3A is a partially cut-away top view in perspective of the skate of figure 1;
Figure 3B shows a partially cut-away bottom view of the skate of figure 1; and
Figures 4A-4D are schematic views of the skate at different stages of the adjustment process.

[0024] Figure 1 shows an in-line skate 1 constructed from a plastic frame 2 on which are arranged a number of wheels 4. Wheels 4 are mounted in known manner on frame 2 using wheel axles 3. A different number of wheels can also be applied instead of four. In another embodiment of the invention (not shown) a runner is arranged on frame 2 so that the skate can be used for skating on ice.

[0025] A braking mechanism 5 is also arranged in known manner on frame 2. Frame 2 comprises a front support leg 13 and a rear support leg 14 on which a plastic shoe sole is arranged in known manner, for instance via pop rivets or a screw connection. Fixed to sole 11 is a shoe 6 which consists of a rear shoe part or heel part 7, which is fixedly attached to sole 11, and a front shoe part or toe part 8 which is displaceable in longitudinal direction of the skate (P_1) relative to sole 11. Figure 2 shows a position of the shoe in which the toe of the shoe is displaced forward, and an increased shoe size is therefore realized.

[0026] An inner shoe 9 is provided which can be arranged in heel part 7 and toe part 8. The shoe can be secured using buckles 10.

[0027] The front part 8 is slidable relative to the rear part 7 by operating an operating unit 15 shown in more detail in figures 3A and 3B. Figures 3A and 3B show operating mechanism 15 in relation to shoe sole 11 and a displaceable shoe sole part 16 of toe part 8 of the shoe. In figure 3A the slidable shoe part 16 is shown cut-away to some extent so that the operating unit 15 lying thereunder can be seen. In practice however, the slidable sole part 16 is attached to the support element 17 shown in the figure. Support element 17 can be displaced in an elongate slot 18 provided in sole 11. Displacement of support element 17 in the slot therefore provides for a corresponding displacement of toe part 18 relative to heel part 7 of the shoe.

[0028] Support element 17 comprises a guide element 19 for guiding the displacement thereof. Guide element 19 is constructed from two telescopic parts and is fixed on one side to support element 17 and on the other side to a support block 21 connected fixedly to sole 11 or formed integrally therewith.

[0029] It can further be seen in figure 3B that there is provided around guide element 19 a helical spring 21 which rests on one side against support block 21 and rests on the other side against support element 17. The helical spring ensures that support element 17 is subjected to a forward force (direction P_2). This force ensures that toe part 8 always tends to be displaced forward.

[0030] A locking mechanism is provided in order to prevent toe part 8 of the shoe always coming to lie in its extreme position with a maximum shoe size as a result of the spring tension of spring 20. As shown in more detail in figures 4A-4D, the locking mechanism comprises a housing 22 fixed to sole 11. A cylindrical pushbutton 23 is arranged in housing 22. Fixedly connected to this pushbutton 23 is a first stop element 25 which is connected to pushbutton 23 via a connecting piece 26 extending through an opening 27 in support element 17. A displacement of pushbutton 23 therefore also produces a displacement of the first stop element 25. Stop element 25 is held in position by a helical spring 28 provided in housing 22. A second stop element 35 is also provided in spring-mounted manner on pushbutton 23 (using a compression spring 29).

[0031] Protrusions 30 are provided on support element 17. Protrusions 30 are embodied to accommodate therebetween the protruding part 32 of stop element 25 so that support element 17 can be locked by stop element 25. This situation is shown in figure 4A. Also provided on support element 17 are teeth 36 which can co-act in the manner described below with the second stop element 25.

[0032] Figure 4B shows the situation in which pushbutton 23 is pressed in by the user (direction P_3). By pressing in pushbutton 23 counter to the spring action of spring 28 the protruding part 32 of the first stop element 25 moves clear of the protrusions so that support element 17 is no longer arrested by stop element 25. A displacement in longitudinal direction (P_2) therefore occurs under the influence of spring 20. An increase in the shoe size of shoe 6 takes place due to the displacement in longitudinal direction of support element 17 and the toe part 8 of the shoe fixed thereto.

[0033] Figure 4B further shows that as a result of the displacement the outer end of the spring-mounted second stop element 35 has come to lie at the outer end 40 of a tooth 36 and is therefore pressed in counter to the spring pressure of spring 29. With further displacement of support element 17 in the direction P_2 the second stop element 35 is pressed against the surface of tooth 36 under the influence of compression spring 29, this such that the chamfered outer end of the second stop element

35 continues to follow the inclining surface 37 of tooth 36. When however support element 17 is displaced still further, stop surface 43 of the second stop element 35 comes into contact with the straight part 38 of tooth 36, as a result of which support element 17 is arrested by the second stop element 35. It is noted that in this situation the first stop element 25 still does not have a locking function.

[0034] Because the second stop element 35 arrests the displacement of support element 17 when pushbutton 23 is pressed in, a displacement of the support element has taken place which as a result of the shown construction roughly corresponds to the mutual distance (a) of teeth 36. When pushbutton 23 is released by the user, it springs back again into its starting position under the influence of spring 28, as shown in figure 4D. In the starting position the stop surface 43 of the second stop element 35 is again clear of tooth 36 of support element 17, so that stop element 35 no longer arrests the displacement of support element 17. The first stop element 25 has however returned to its original position again as a result of the button 29 springing back, wherein the protruding part 32 of the first stop element 25 is once again enclosed between two protrusions 30. Pushbutton 29 remains in its starting position under the influence of the spring pressure, thus producing a stable blocking of the locking mechanism.

[0035] In the above described manner the toe part 8 of the shoe can be displaced a predetermined distance (a) by pressing in pushbutton 23 and allowing pushbutton 23 to spring back again until the correct length of the shoe is obtained. When for instance someone with size 42 acquires the skate, and this is set to a shoe size of 40, the user need only press pushbutton 29 twice in order to adjust the skate to the desired shoe size.

[0036] Conversely, when the starting size is greater than the desired size, toe part 8 of the shoe has to be pushed in opposite direction, i.e. in the direction of heel part 7. This can be done manually by pushing the front toe part 8 of the shoe counter to the spring pressure of spring 20 in the direction of heel part 7. As a result of the spring-mounting of the second stop element 35 and the inclining side 37 of teeth 36, this pressing-in movement is possible without the stop element 35 blocking support element 17 in any way. When the shoe is pressed in, the second stop element 35 moreover follows the surface of teeth 36 under the spring tension of spring 29, which results in an up and downward displacement of the second stop element 35. As a result of this displacement 35 there occurs a corresponding displacement of the first stop element 25 so that this latter releases locking element 17.

[0037] It will be apparent that instead of a spring 20 urging the support element 17 forward in order to enable an automatic increase in the shoe size, it is also possible to exert a pulling force on support element 17 instead of a pushing force, so that when release takes place the shoe size is decreased instead of being increased.

[0038] The figures show that markings are arranged on the outside of the skate with which the user can visually inspect the current shoe size of the skate. Figure 3A for instance shows that a first arrow-shaped marking element 50 is provided on the movable part, i.e. toe part 8 of the shoe, while a number of projections 51 are provided on the stationary part, i.e. on sole 11. Each of the projections corresponds to a specific size of the internal space provided by the shoe. Numerical indications can also be provided instead of or in addition to projections 51 so that the user can determine at a glance the current size of the shoe.

[0039] The present invention is not limited to the preferred embodiments thereof described herein. The rights sought are rather determined by the following claims, within the scope of which many modifications can be envisaged.

Claims

1. Skate, comprising:

- a frame provided with fixing means for fixing a runner or a number of wheels placed mutually in line;
- a shoe attached to the frame, which shoe is constructed from a heel part and a toe part, wherein the toe part and the heel part are slidable relative to each other in order to adjust the size of the shoe;
- an operating unit for operating the shoe size adjustment, the operating unit comprising:
  - a support element to which the heel part and the toe part are fixed;
  - spring means for holding the heel part under spring tension relative to the toe part;
  - a locking member to be displaced selectively by a user between a first and second position and co-acting with the support element, which member locks the heel part and the toe part relative to each other in the first position and releases the heel part relative to the toe part in the second position in order to allow sliding of the heel part and the toe part relative to each other under spring tension.

2. Skate as claimed in claim 1, wherein the operating unit comprises arresting means for arresting the sliding movement after sliding over a set sliding distance.

3. Skate as claimed in claim 1 or 2, wherein the operating unit is adapted to displace the toe part relative to the heel part a fixed predetermined distance at a time when operated.

4. Skate as claimed in any of the foregoing claims, wherein the spring means are adapted to push the toe part and the heel part away from each other.

5. Skate as claimed in claim 2 or 3, wherein the set distance substantially corresponds with a single shoe size unit.

6. Skate as claimed in any of the foregoing claims, wherein the arresting means and locking unit are integrated with each other.

7. Skate as claimed in any of the foregoing claims, wherein the support element comprises at least two telescopic support element parts.

8. Skate as claimed in any of the foregoing claims, comprising a helical spring arranged around a least a part of the support element.

9. Skate as claimed in any of the foregoing claims, wherein the locking member is provided with spring means for urging the locking member into the first position.

10. Skate as claimed in any of the foregoing claims, wherein the locking member comprises a first stop element which can co-act with protrusions provided on the support element for the purpose of locking the support element when the locking member is located in the first position.

11. Skate as claimed in any of the foregoing claims, wherein the locking member comprises a second stop element which can co-act with one or more teeth provided on the support element for arresting the support element when the locking member is situated in the second position.

12. Skate as claimed in claim 11, wherein the teeth are chamfered in each case on one side and form a stop surface for the second stop element on the opposite side, and wherein the second stop element is arranged in spring-mounted manner.

13. Skate as claimed in any of the foregoing claims, wherein markings representing shoe size are arranged on the one hand on the frame and on the other on the part of the shoe displaceable relative to the frame.

14. Skate as claimed in claim 13, wherein the markings comprise a series of shoe size designations.

15. Operating unit for a skate as claimed in any of the foregoing claims.

16. Use of a skate as claimed in any of the foregoing claims.

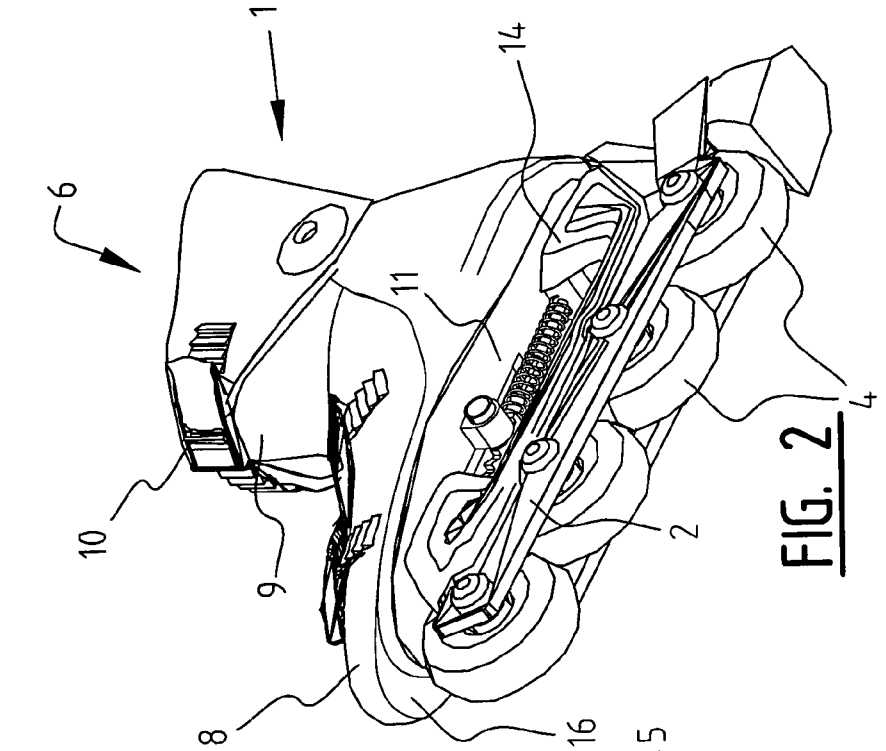


FIG. 2

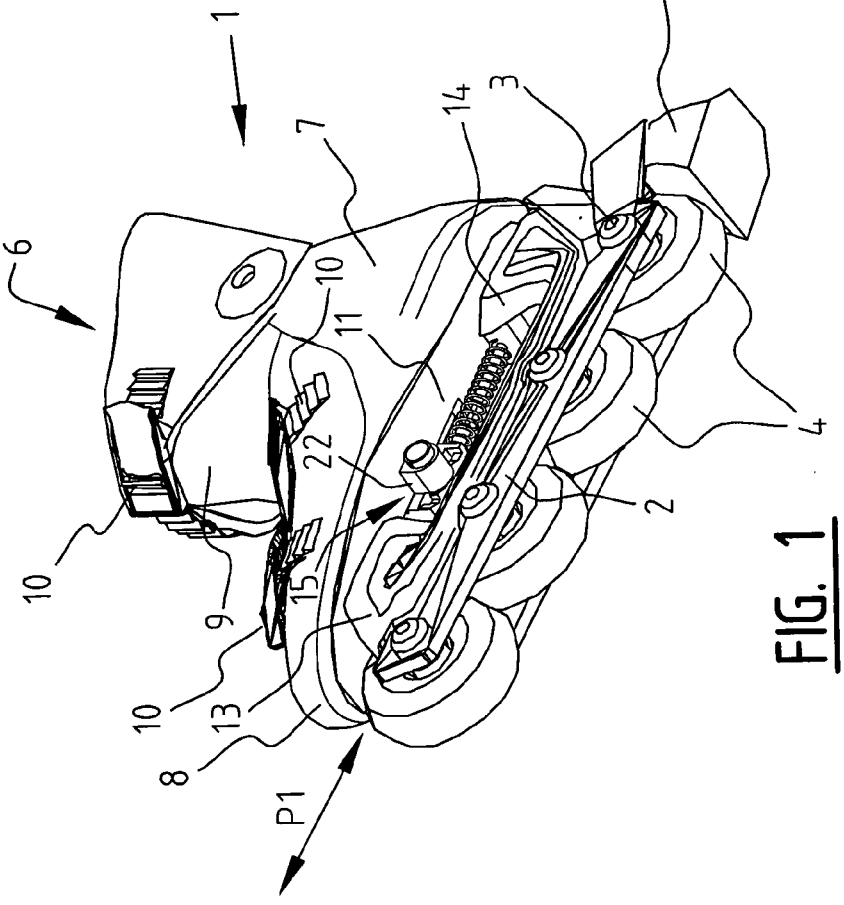


FIG. 1

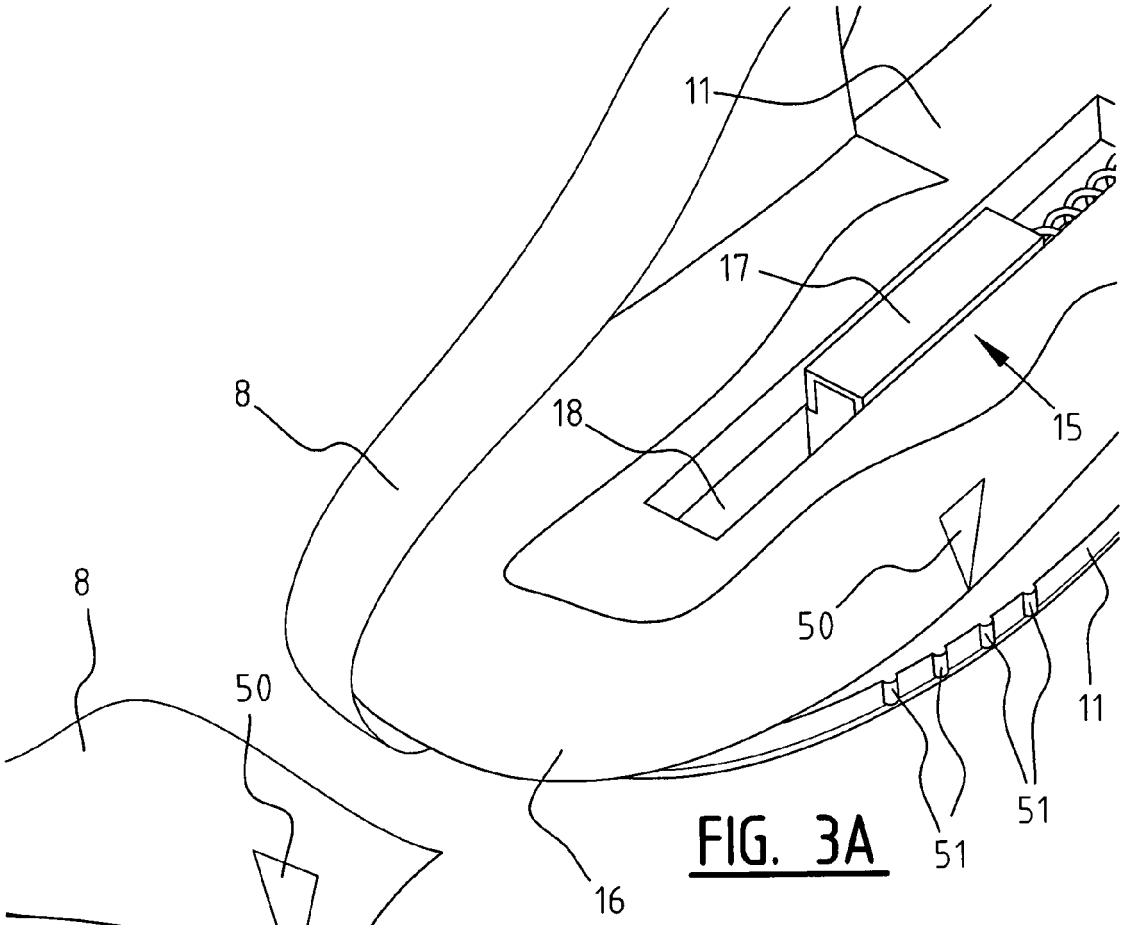


FIG. 3A

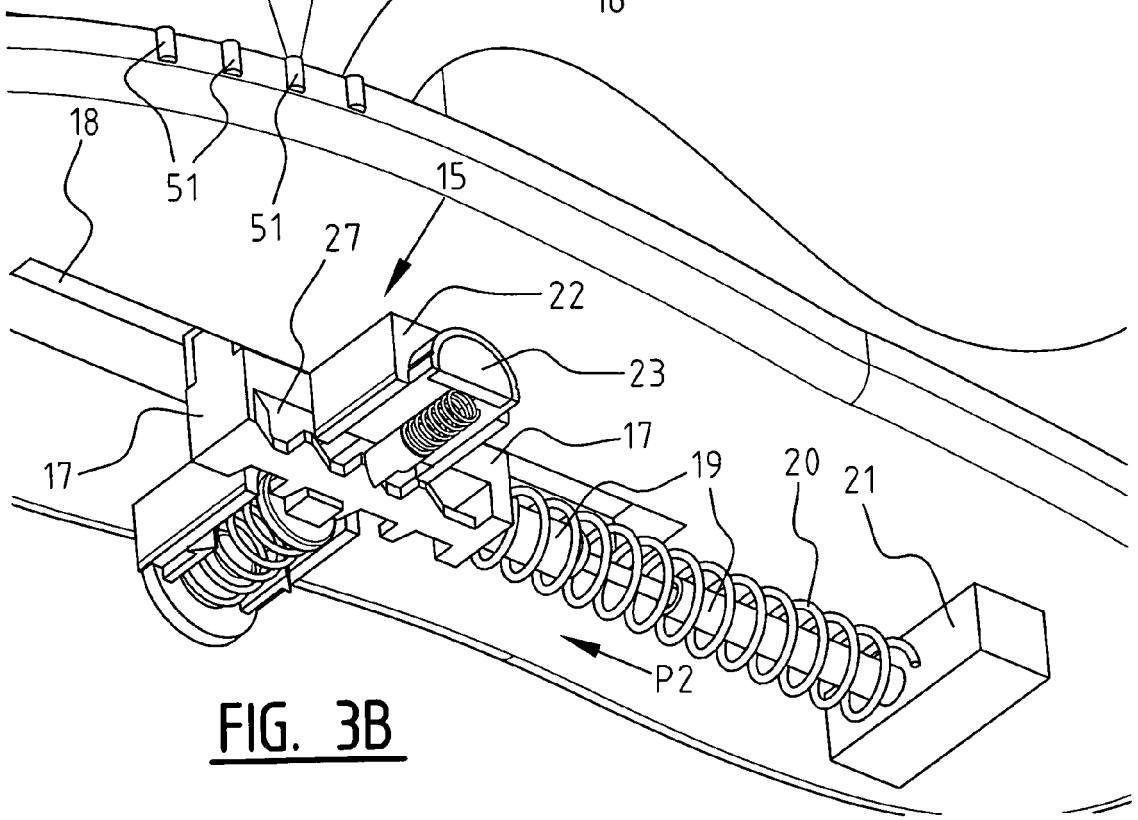


FIG. 3B

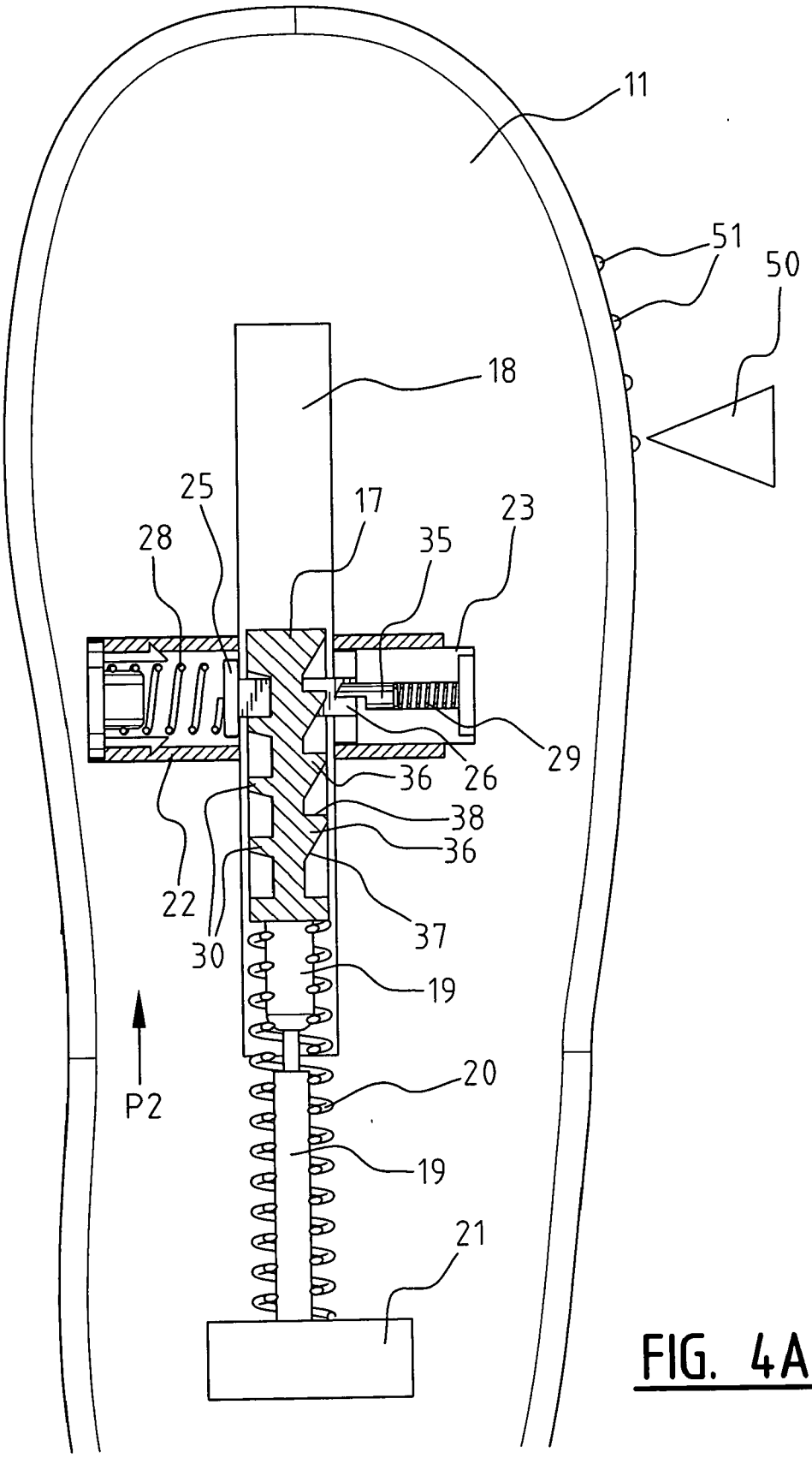


FIG. 4A

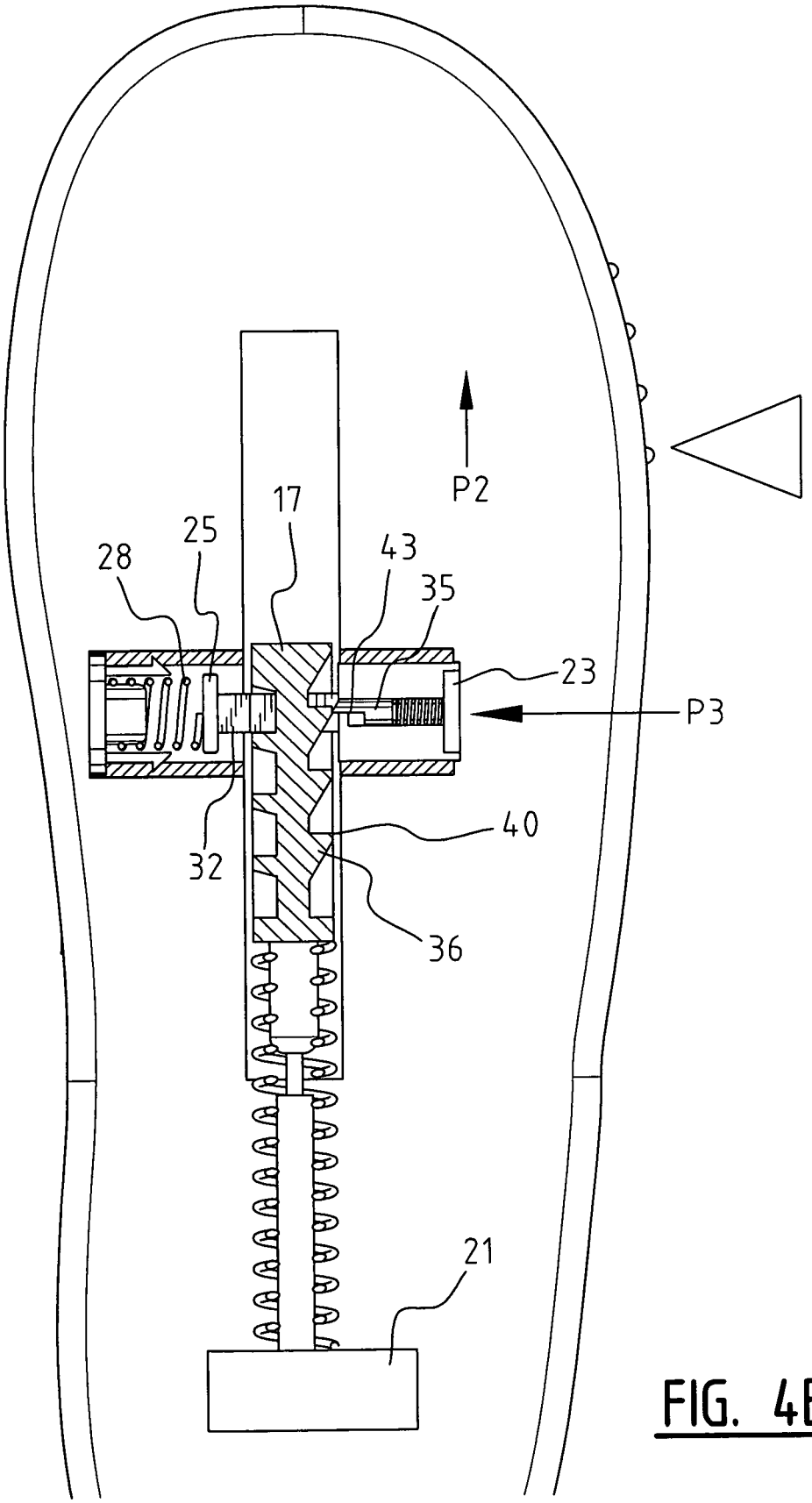


FIG. 4B

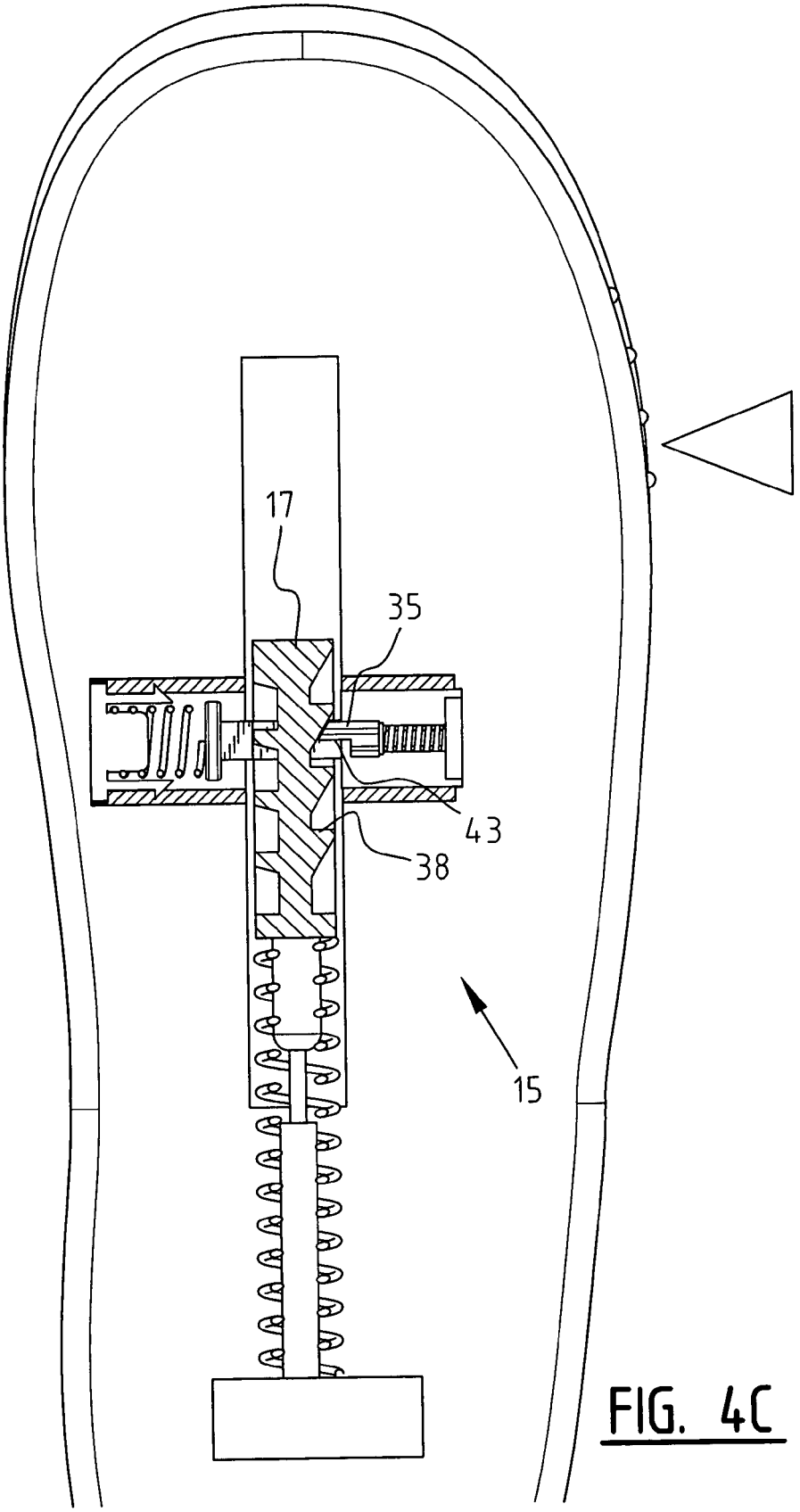


FIG. 4C

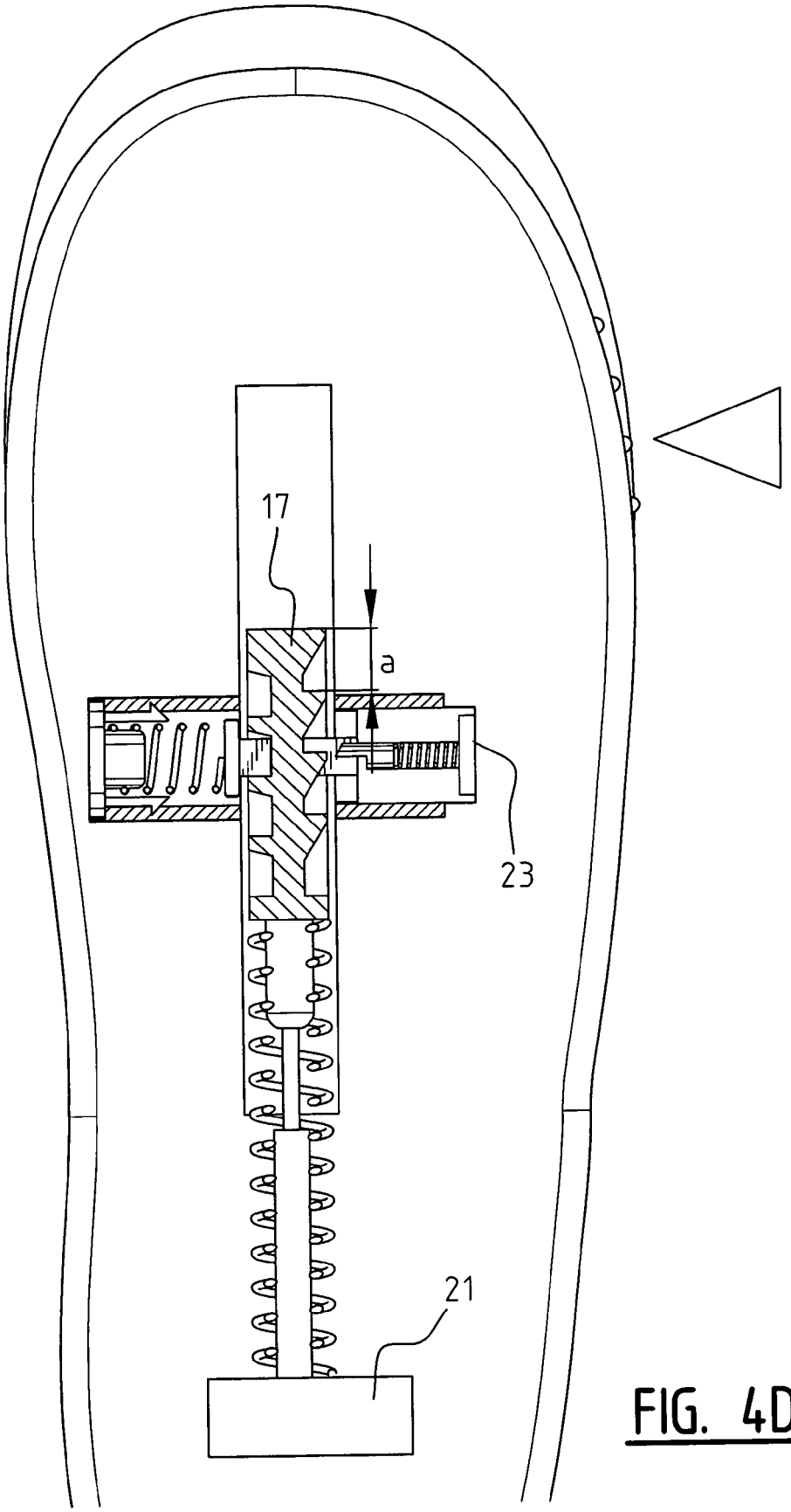


FIG. 4D

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 06 07 6413

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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A	US 2004/211090 A1 (MILLER HARRY ET AL) 28 October 2004 (2004-10-28) * paragraph [0051] *	1-3,15, 16	
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TECHNICAL FIELDS SEARCHED (IPC)

A43B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	21 September 2006	Claudel, Benoît

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 06 07 6413

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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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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