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(11)

EP 1 433 505 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
30.06.2004 Bulletin 2004/27

(51) Int Cl.7: **A63C 17/06, A43B 5/16**

(21) Application number: **03028464.0**

(22) Date of filing: **12.12.2003**

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IT LI LU MC NL PT RO SE SI SK TR**
Designated Extension States:
AL LT LV MK

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(30) Priority: **23.12.2002 IT BG20020046**

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(54) Improved skate structure with one-piece frame

(57) A skate structure, particularly a roller skate with in-line wheels, comprising a frame (10) for supporting the wheels (14), a rigid sole (16) for supporting a first shoe body (30), a rigid cradle (34) for lateral and rear support of said first shoe body (30), an oscillating collar (40) for supporting the user's leg, and a removable, soft second shoe body (50) inserted into the said first shoe

body (30) and designed to hold the user's foot. The frame (10), the rigid sole (16) and the rigid support structure (34) constitute an integral structure made in a single piece. A rigid toe-piece (18) may also be part of the one-piece structure, or, alternatively, may be produced as a separate component to be attached to the first shoe body (30') or to the one-piece structure before final assembly of the skate (Figure 1).

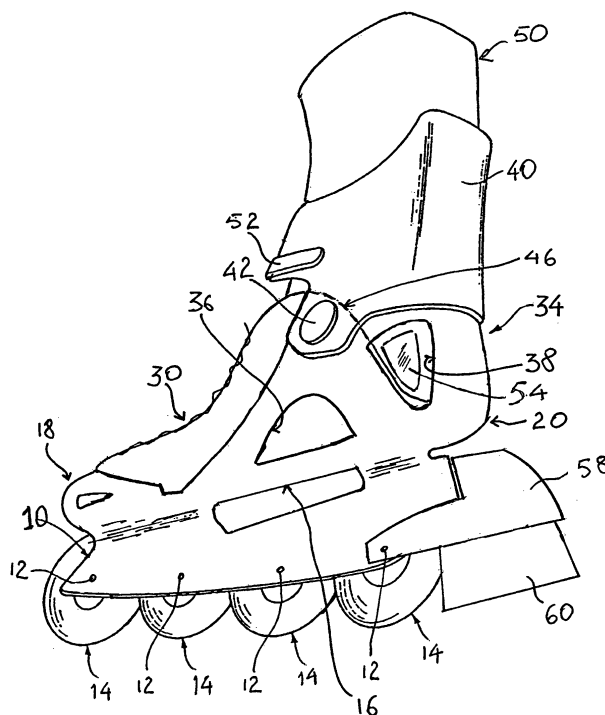


FIG. 1

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Description

[0001] This invention relates to an improved skate structure, particularly a roller-skate structure with a plurality of in-line wheels.

[0002] There are several types of roller skates with in-line wheels. These are typically comprised of a plurality of components, substantially centred on a rigid frame onto which the wheels are mounted, and on which in turn a shoe body is mounted to hold the user's foot. The structure must meet strict functional and safety requirements, and its components must be of easy construction and assembly. To meet these requirements, many different roller-skate structures have been developed, some of which are made up of a relatively high number of components, and are therefore very complex. For example, it is clear that the shoe body must have a certain degree of intrinsic stiffness and must be firmly attached to the frame to be able to transmit to it, and to the wheels, the thrust imparted by the user, and also be able to withstand external stresses. This determines the need to have rigid parts such as: a) a sole for the shoe body, as part of the shoe body itself or as part of the frame or produced as a separate component to be fixed to the sole and/or frame; b) a cradle at least at the rear of the structure to assist the shoe body in withstanding lateral forces and twisting forces that the user's foot is subject to, and which can also be attached to the frame and/or sole; c) a toe-piece to reinforce the front part of the shoe body and withstand frontal stresses, also produced separately or as a single-piece with one of the above-mentioned parts. Whatever the structure, it is clear that a large number of detachable or fixed fastening means are required to assemble the various components, including holes, slots or other coupling means. The stiffness of the shoe body deriving from such a structure often compromises its comfort, and for this reason there is usually a second inner shoe body, in soft material, which is inserted inside the first shoe body, and this second shoe body holds the user's foot. Lastly, there is also usually an oscillating leg section or collar fixed to the rigid skate structure, giving improved support for the user's leg around the calf.

[0003] It is clear that a roller-skate structure comprising all of the above components is quite complex, and that the manufacture or at least assembly of such a skate is also complex, and that as a result the end cost of the product may be quite high. End product lightness, which would be very desirable, may also be compromised by the large number of components and their relative fastening means. In addition, the large number of attachments needed means that particular attention must be paid to ensure that safety is not compromised.

[0004] EP 551 704 A2 discloses a roller skate for use with a detachable shoe. This kind of skate is designed for students that commute to schools, and obviates the need for the skater to carry additional shoes for off-skate wear. However, shoes that can be detached by the skat-

er to be used as normal shoes for walking can hardly be fastened strongly enough to the skate structure. Moreover, such shoes are enough flexible to provide a good degree of comfort when used to walk, but for this reason do not ensure enough rigidity as it would be desirable when used as a skate shoe.

[0005] EP 1 258 268 A2 discloses a roller skate with a base on which a non-rigid upper is mounted, to receive and surround a skater's foot and ankle. This upper includes a toe end separate from the rest of the upper and fastened to a toe cup slideably coupled to the base of the roller skate. Such structure permits to adjust the size of the skate to the foot size expansion of a child. However, a risk of accidental actuation of the adjustment mechanism exists, and the overall structure of the skate is rather complex, as said above.

[0006] From the above description, it is obvious that there exists the need for a skate structure, and particularly a roller-skate structure, that eliminates or reduces the disadvantages of the known structures.

[0007] The aim of this invention is to provide an improved skate structure, particularly for a roller-skate with in-line wheels, comprising a smaller number of components and therefore, given the same construction materials, being lighter, nimbler, safer and easier to manufacture.

[0008] This aim is achieved with a skate structure, particularly a roller-skate with in-line wheels, comprising a frame for supporting the wheels, a rigid sole for supporting a first shoe body, a rigid cradle for lateral and rear support of said first shoe body, a collar for supporting the user's leg, and a removable, soft second shoe body inserted into the said first shoe body and designed to hold the user's foot, characterised in that said frame, said rigid sole and said rigid cradle are an integrally formed structure made in one piece, and said first shoe body is permanently fastened to said rigid sole.

[0009] The invention will now be described with reference to the enclosed drawings, which are given purely for the purpose of example and are not limiting, where:

- figure 1 is a perspective view of a skate structure according to a first embodiment of the invention;
- figure 2 is a schematic, partial side view of the skate structure of fig. 1;
- figure 3 is a schematic, partial side view of a skate structure according to a second embodiment of the invention;
- figure 4 is an exploded, schematic view of part of a skate structure according to a third embodiment of the invention.

[0010] With reference to figures 1 and 2, the skate structure according to the first embodiment of the invention includes a frame 10 with parallel sides, to which a series of in-line wheels 14 is mounted using pins 12. The frame 10 extends upwards to form a sole 16 that is almost horizontal or slightly inclined towards the front of

the structure, namely the part corresponding to the tip of the user's foot. The top, front part of the frame 10 is shaped to form a toe-piece 18, while the top, rear part is shaped to form a heel 20, the whole being designed to hold a first shoe body 30, produced as a separate component from the skate, while parts 16, 18 and 20 described above constitute a structure integrally formed with the frame 10, i.e. they are produced in a single piece with the frame.

[0011] In addition, extending above and to the rear of the middle portion of sole 16 there is a cradle 34, preferably with openings 36 and 38 on both sides, openings 38 being made approximately corresponding to the position of the user's ankles. Cradle 34 is also produced as part of a single piece together with the sole 16, toe-piece 18 and heel 20 of the frame 10, and is designed to provide a rigid support for the sides and the rear of the first shoe body 30. An oscillating collar 40 is fixed by means of a pin 42 on the upper part of each side of cradle 34.

[0012] The first shoe body 30 is fixed to frame 10 in one or more points or areas during the manufacturing process by adhesive means, rivets, screws or the like, not illustrated. Such fixing is permanent, where "permanent" in the present description means that it is done at the time of manufacturing the skate and it is not intended that a skater detaches the first shoe body 30 from the skate structure.

[0013] A first compulsory area for fixing the shoe body is at the front bottom and side, corresponding to toe-piece 18. Other optional points or areas for attachment of the first shoe body 30 are the areas corresponding to the middle portion of the sole 16 or the rear portion corresponding to the heel 20. The choice of whether or not to make these further attachments to the first shoe body depends on the degree of freedom of movement wanted for the first shoe body inside the rigid frame structure. An attachment made only at the point corresponding to the toe-piece 18 enables the user to raise the rear portion of the shoe body, which may be desirable when inserting the foot. Otherwise the shoe body is completely fixed to the frame along its entire length.

[0014] The top rear edge 46 of the first shoe body 30 may be cut obliquely towards the heel, so as to leave the openings 38 uncovered, as illustrated in figures 1 and 2.

[0015] A second shoe body 50, illustrated in figure 1 but not in figure 2, is inserted inside the first shoe body 30. The second shoe body 50 is soft, to hold the user's foot comfortably and to absorb at least in part the mechanical stresses exerted by the rigid parts of the structure against the user's foot and lower leg. For this reason, the second shoe body is typically higher than the first shoe body, from the top of which it projects to above the height of the collar 40, so that it can also absorb the grip exerted by the fastener 52 on the collar around the user's calf. In a preferred embodiment, the second shoe body 50 is fitted with semi-rigid cushioning pads 54

placed in the area corresponding to the openings 38 on the cradle 34. Thanks to the edge 46 being cut obliquely towards the bottom of the first shoe body 30, the semi-rigid cushioning pads 54 on the second shoe body 50 are not contained inside the first shoe body 30 and can therefore engage the openings 38 on the cradle, creating a detachable fastening directly between the second shoe body and the cradle 34 and thus with the skate's rigid structure. In another embodiment, not illustrated, the first shoe body 30 is produced with its rear upper edge cut, not obliquely towards the heel, but rather substantially parallel to the sole 16 or to the ground. In this case, similar semi-rigid cushioning pads are created as part of the first shoe body in the area corresponding to the openings 38 on the cradle, and the fastening is between the cradle and the first shoe body.

[0016] Rigidly fixed to the rear of the frame 10 there is a support 58 for a downward-pointing friction element 60 acting as a brake, placed behind the last of the inline wheels 14. The support 58 is rigidly fixed to the pin 12 of the last wheel 14, but in a different version, which is not illustrated, it is produced in a single piece with the frame 10.

[0017] Figure 3 illustrates a second embodiment of the skate structure according to the invention, without showing the second shoe body to be inserted into the first. This second embodiment of the invention differs from the first in that the toe-piece 18' is not part of the integrally formed structure constituted by the frame 10, sole 16 with heel 20 and cradle 34, but rather it is part of the first shoe body 30'. The unit comprising the first shoe body 30' and the toe-piece 18', to which it is permanently fixed, must be in turn fixed to the top part of the frame 10 by means of, for example, rivets 64, or by other permanent or detachable fastening means. As described in relation to the first embodiment of the invention, other points or areas where the first shoe body is fixed to the frame are in the middle portion of the sole 16 or at the rear of the heel 20, if so desired. A feature of the skate structure illustrated in figure 3 is that it is able to accommodate shoe bodies of slightly different sizes than when the toe piece is formed integrally with the frame of the skate, since there no longer exists the constraint of having to join the front part of the shoe body to a point whose position on the one-piece frame structure is permanently predetermined by the fact that it constitutes an integral part of that structure. In the skate structure illustrated in figure 3, the unit comprising the first shoe body 30' and the toe-piece 18' can be fixed with a margin of tolerance either behind or beyond the tip of the one-piece frame structure, while in a version in which the toe-piece is an integral part of the one-piece frame structure, the front of the shoe body must necessarily abut the toe-piece 18 on the frame. The fastening means used to attach the unit comprising the first shoe body 30' and the toe-piece 18' can be adjustable, such as, for example, the use of slots in the rigid sole 16 and holes in the sole of the shoe body suitable to engage

screws and similar components. This structure permits to use frames of just one size to produce several skates by combining such frame with several shoe bodies of different size.

[0018] Figure 4 illustrates a third embodiment of the invention, in which the toe-piece 18" is produced as a component separate from both the frame 10 and the first shoe body 30". According to this embodiment, the toe-piece can be attached permanently to either the frame 10 or the first shoe body 30". In the first case, the first shoe body 30" is then fixed permanently to the unit comprising the toe-piece 18" and the frame 10. In the second case, the unit comprising the toe-piece 18" and the first shoe body 30" is fixed permanently to the frame 10. The relative fastening means are those already known to the person skilled in the art and described above. Similarly, the points or areas where the shoe body should be attached to the frame are those mentioned above.

[0019] The integral structure comprising the frame 10 with sole 16, heel 20, and cradle 34, with or without toe-piece 18, is made from a suitable material providing the required rigidity and lightness. A preferred material is a synthetic resin with suitable mechanical properties, which would enable the one-piece structure to be produced by moulding; but it is also possible to produce the structure in metal or a metal alloy or other similar materials.

[0020] Several preferred embodiments of the invention have been described here, but it is obvious that these may be subject to numerous changes and variants of the same inventive idea, as described in the enclosed claims.

Claims

1. Skate structure, particularly a roller-skate with in-line wheels, comprising a frame (10) for supporting the wheels (14), a rigid sole (16) for supporting a first shoe body (30, 30', 30"), a rigid cradle (34) for lateral and rear support of said first shoe body, a collar (40) for supporting the user's leg, and a removable, soft second shoe body (50) inserted into the said first shoe body (30, 30', 30") and designed to hold the user's foot, **characterised in that** said frame (10), said rigid sole (16) and said rigid cradle (34) are an integrally formed structure made in one piece, and said first shoe body (30, 30', 30") is permanently fastened to said rigid sole (16).
2. Skate structure according to claim 1, comprising a rigid toe-piece (18) integral with said rigid sole (16) and placed at the front of said structure, designed to be functionally coupled to the front portion of said first shoe body (30), **characterised in that** also said toe-piece (18) is integrally formed with said sole (16), said frame (10) and said cradle (34), thereby forming a single piece.

3. Skate structure according to claim 1, **characterised in that** said first shoe body (30') includes a rigid toe-piece (18') and the unit formed by said first shoe body (30') and said rigid toe-piece (18') is fixed to said one-piece structure comprising said frame (10), said rigid sole (16) and said support structure (34).
4. Skate structure according to claim 3, **characterised in that** said unit comprising said first shoe body (30') and said rigid toe-piece (18') is fixed to said one-piece structure by adjustable fastening means.
5. Skate structure according to claim 1, **characterised in that** it also comprises a rigid toe-piece (18") made as a separate component, designed to be functionally coupled to said one-piece structure or to said first shoe body (30") before final assembly of the skate structure.
6. Skate structure according to claim 1, **characterised in that** said first shoe body (30, 30', 30") is formed with an upper edge (46) cut at the rear towards the bottom, said rigid cradle (34) has side openings (38) in a position corresponding essentially to the user's ankles, and said second shoe body (50) has semi-rigid cushioning pads (54) in a position corresponding to said openings (38) on said rigid cradle (34), said semi-rigid cushioning pads (54) being engaged in said openings (38) as a means of fixing said second shoe body (50) to said rigid cradle (34) and thus to said one-piece structure.
7. Skate structure according to claim 1, **characterised in that** said collar (40) is pivotally fixed to said rigid cradle (34) by means of pins (42) on the upper part of each side of said cradle.

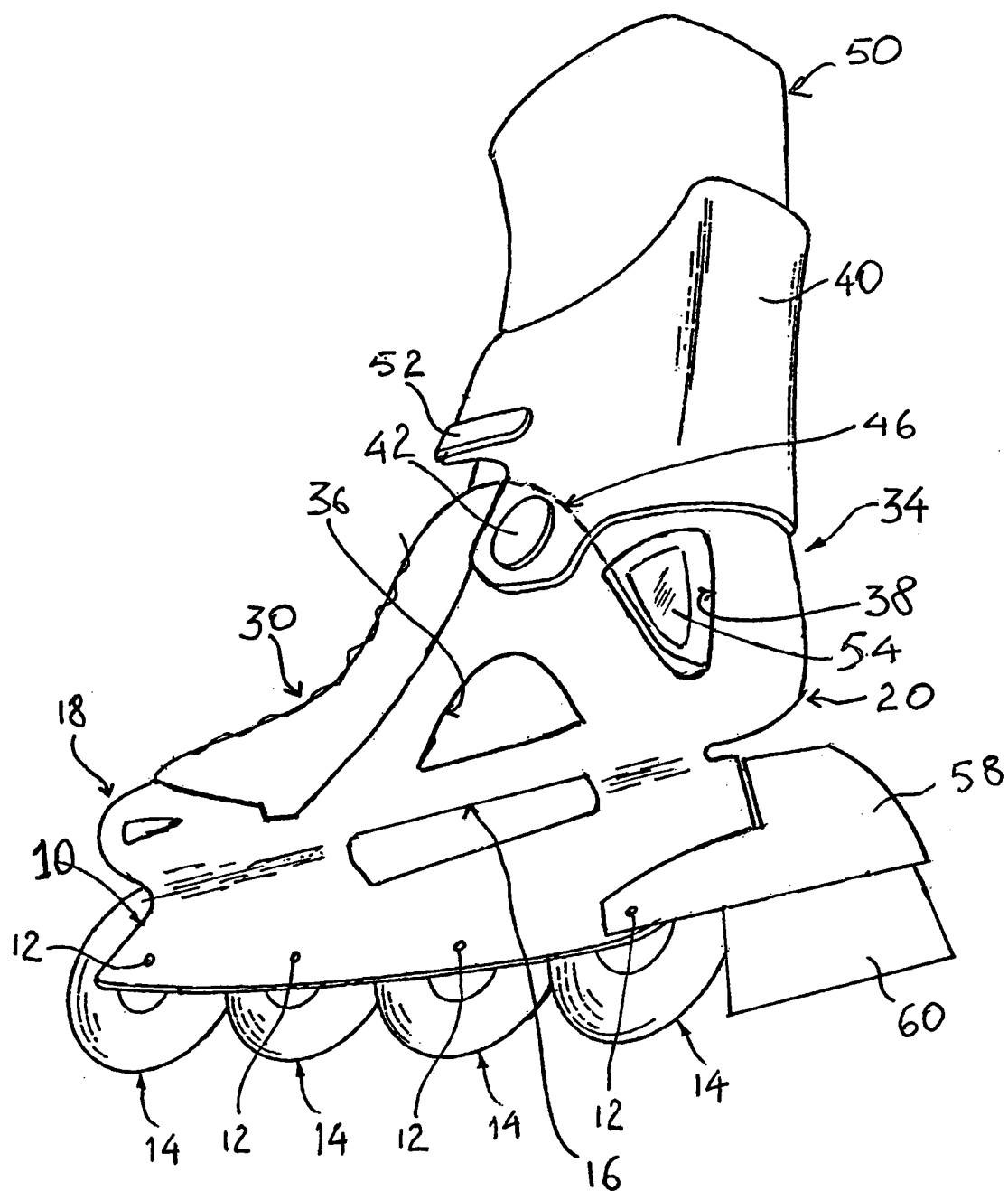


FIG. 1

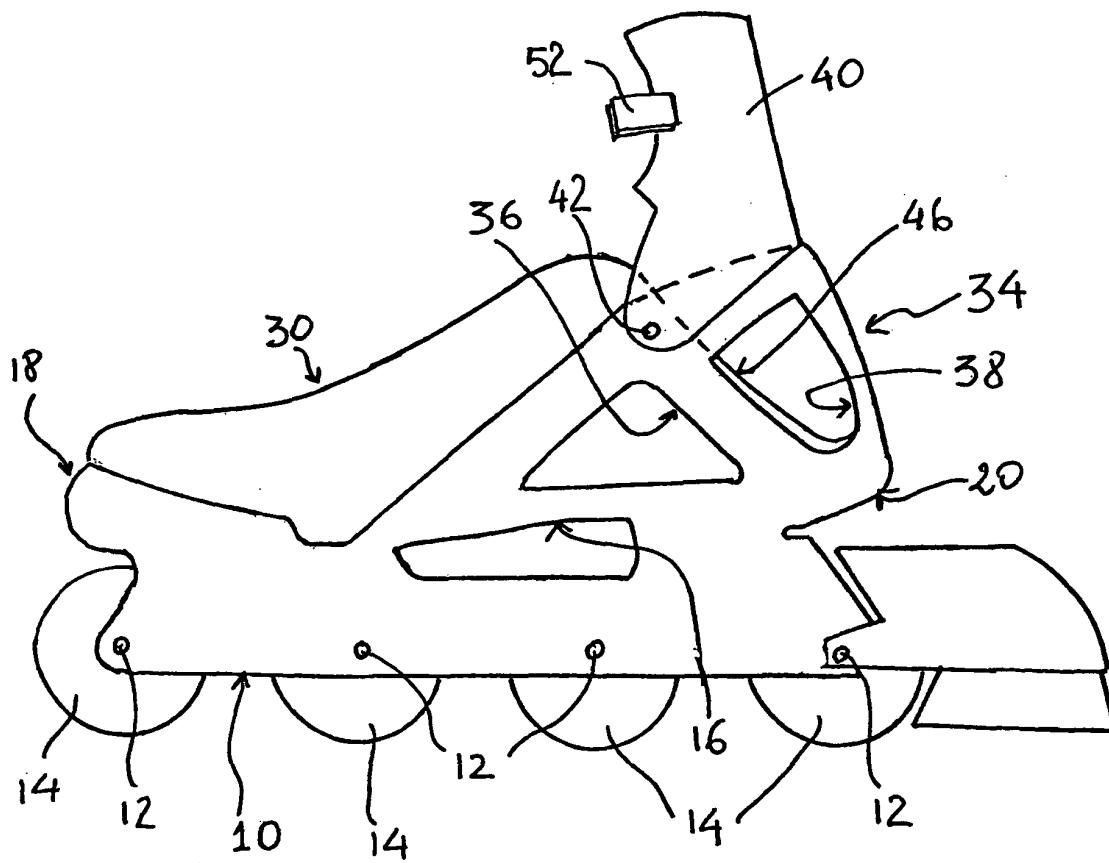


FIG. 2

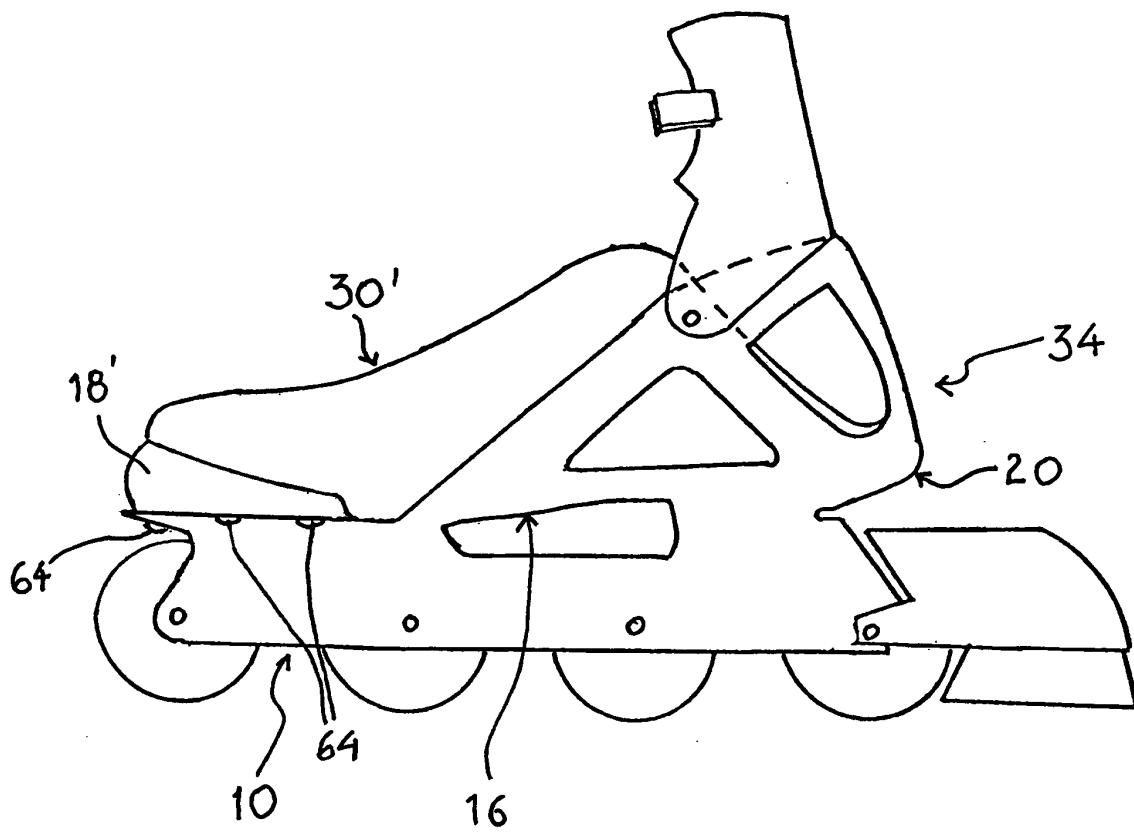


FIG. 3

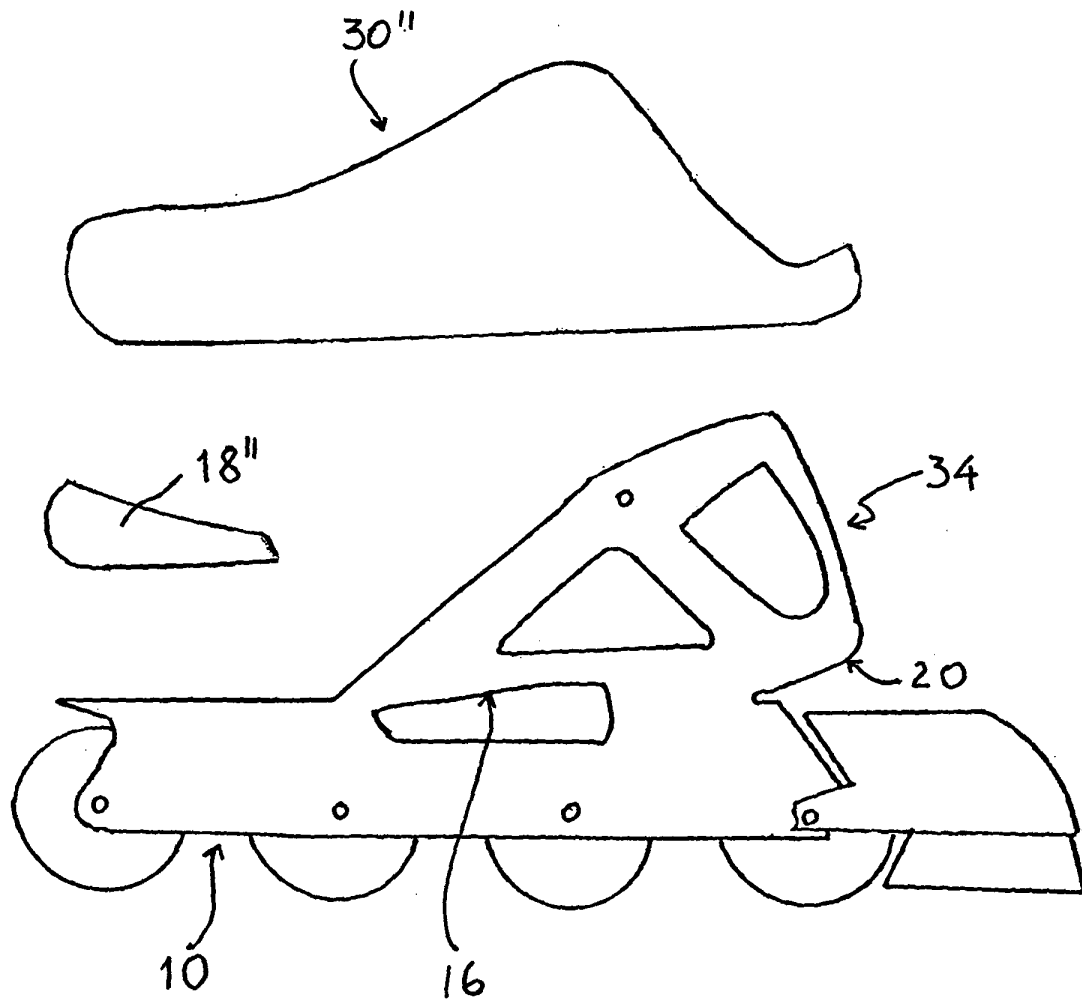


FIG. 4



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Application Number
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Place of search Munich		Date of completion of the search 12 March 2004	Examiner Brunie, F
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