(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 684 055 A1**

(12) # EUROPEAN PATENT APPLICATION

(21) Application number: **95107804.7**

(51) Int. Cl.[6]: **A63C 17/06**

(22) Date of filing: **22.05.95**

(30) Priority: **26.05.94 IT VR940049**
15.07.94 IT VR940064

(43) Date of publication of application:
29.11.95 Bulletin 95/48

(84) Designated Contracting States:
AT CH DE ES FR IT LI

(71) Applicant: **NORDICA S.p.A.**
Via Montebelluna 5/7
I-31040 Trevignano (Treviso) (IT)

(72) Inventor: **Caregnato, Paolo**
Via Venturelli 2
I-37128 Verona (IT)

(74) Representative: **Modiano, Guido, Dr.-Ing. et al**
Modiano & Associati S.r.l.
Via Meravigli, 16
I-20123 Milano (IT)

(54) **In-line roller skate with axles that can be positioned at two different levels.**

(57) An in-line roller skate including a supporting frame (1) that has two spaced side walls (2,3) and in-line wheels (4) arranged therebetween by means of pivots (5). The side walls have a plurality of pairs of oppositely arranged seats (8) for detachably accommodating a respective pivot. There are two supporting end elements (9) for each pivot, which are axially offset with respect to the pivot and can be slidingly inserted, both in an upright position and in an inverted position, starting from the lower edge of the side walls, in a respective pair of seats, so as to allow to place the respective pivot in two positions at different levels.

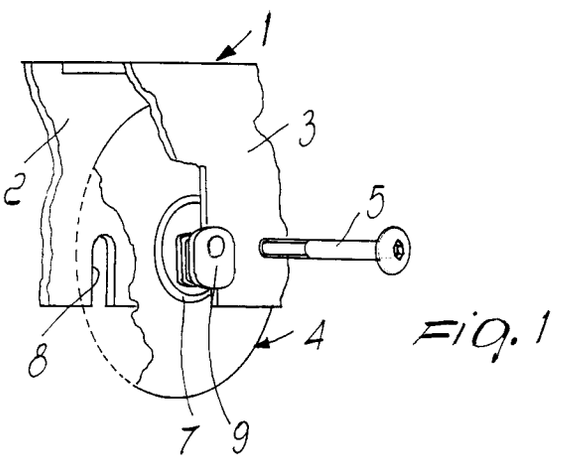


Fig. 1

EP 0 684 055 A1

The present invention relates to an in-line roller skate with axles that can be positioned at two different levels.

It is known that to allow easier maneuverability of an in-line roller skate it is possible to arrange the axle or pivot of the intermediate wheel or wheels at a lower level than the end wheels. The same can be done to extend the useful life of the skate wheel tread to a certain point.

It has already been suggested, for this purpose, in U.S. patent No. 5,048,848, to use special supporting bushes for the hubs of the wheel pivots. These bushes have an external contour that is identical to the contour of the respective seat or accommodation opening provided in one of the sides of the supporting frame or chassis of the skate, so that they can be mounted both in "upright" position and in "upside down" position by directly inserting them frontally. Each bush is internally provided with an accommodation hole for a hub, which is offset with respect to the horizontal centerline of said hub. Accordingly, when a bush thus configured is inserted in the "upright" position in a seat, its hub, and therefore the wheel that is mounted thereon, are kept in a raised position, that is to say, further away from the lower edge of the chassis, whereas when the bush is inserted "upside down", the hub, and therefore the wheel, are lowered, and this means that the respective wheel protrudes further downward from the free edge of the chassis, for example to compensate for any wear of the tread of the wheel.

Another solution to the same problem has been proposed in European Patent Application No. 94116551.6 filed on October 20, 1994, which discloses seats with two lobes on the sides of the chassis for each hub and an insert for each seat that is configured so that it closes one of the lobes while the other lobe is occupied by the hub.

However, although the solutions proposed so far are satisfactory from many points of view, they entail the intervention of the operator with adapted tools to remove a nut at the tip of each hub, extract the pivot from the bush or from the chassis, remove the bush from its seat and then invert it and reinstall it, finally tightening the nut on each pivot. The entire operation, in addition to requiring considerable time, also entails a certain skill and technical preparation of the operator, who must also pay great attention in reassembling the various components in the right order.

The aim of the present invention is to provide an in-line roller skate that allows a substantial simplification of the operations required to "lower" the wheels of the skate, which can be performed quickly even without using tools.

An object of the present invention is to provide a roller skate having a system for applying the wheels to the frame ensuring high precision and stability in assembly, and higher performance of the skate.

Another object of the present invention is to provide a skate that is extremely simple to manufacture and to assemble and use and can be manufactured at competitive costs.

This aim, these objects, and others which will become apparent hereinafter are achieved by an in-line roller skate comprising a supporting frame having two side walls and a plurality of wheels arranged therebetween, characterized in that it comprises a plurality of pairs of oppositely arranged seats, pivots adapted to engage said seats for supporting said wheels, supporting elements for said pivots and adapted to engage respective said seats in order to place each pivot at a different height in said frame.

Further aspects and advantages of the present invention will become apparent from the following detailed description of some currently preferred embodiments thereof, illustrated only by way of non-limitative example with reference to the accompanying drawings, wherein:

figure 1 is a schematic perspective view, partially sectioned, of a portion of a frame for an in-line roller skate, according to the invention;

figure 2 is a perspective view of an eccentric slider supporting element of the frame of figure 1;

figure 3 is a partial enlarged-scale view of the insertion seat, according to a further aspect of the invention;

figure 4 is a perspective view, in enlarged scale with respect to figure 1, of a supporting element that can be accommodated in a seat of figure 1;

figure 5 is a reduced-scale side view of the supporting element of figure 4, mounted on a skate wheel pivot;

figure 6 is a perspective view of another embodiment of an insertion seat in a side wall of a roller skate frame;

figure 7 is a perspective view of a supporting element for sliding insertion in a seat of figure 6;

figure 8 is a side view of the supporting element of figure 7, inserted on one end of a pivot of a skate wheel;

figure 9 is a schematic perspective view of an insertion seat according to a further aspect of the invention;

figure 10 is a perspective view of a supporting element that can be accommodated in a seat according to figure 9;

figure 11 is a perspective view similar to figure 1, illustrating another embodiment of the insertion seat for supporting elements;

figures 12 and 13 are respectively a front view and a perspective view, in enlarged scale, of the

insertion seat of figure 11;
figures 14, 15, 16, and 17 are respectively an elevation view, a left side view, a right side view, and a perspective view with some parts shown in cross-section, of half of a pivot or half-axle that can be used with the insertion seats of figures 11 to 13;
figure 18 is a partial perspective view of two half-axles of figures 14 to 17, coupled frontally to each other;
figures 19 and 20 are respectively a front view and a perspective view of another embodiment of an insertion seat;
figures 21 to 23 are respectively an elevation view, a left side view, and a right side view of a half-axle that can be used with insertion seats according to figures 19 and 20;
figure 24 is a schematic perspective view, with some parts shown in cross-section, of a portion of a frame for an in-line roller skate with side walls provided with pairs of oppositely arranged seats for a respective pivot;
figure 25 is a sectional view of a new wheel for in-line roller skates;
figure 26 is a side view, with a portion shown in cross-section, of a flanged bush to be interposed between the bearing and the rotation pivot of the wheel of figure 25;
figures 27 and 28 are respectively a right-side and a left-side lateral view of the bush of figure 26;
figure 29 is a side view of a flanged half-pivot element that can be used in replacement of the bush of figures 26 to 28;
figure 30 is a perspective view of the outer face of a side wall provided with a seat according to another embodiment;
figure 31 is a front view of a seating support selector element rotatable in the seat of figure 30;
figure 32 is a perspective view of a portion of the outer face of a side wall provided with a seat according to another embodiment;
figure 33 is a front view of a seating support selector element rotatable in the seat of figure 32;
figure 34 is a perspective view of a portion of the inner face of a side wall provided with a seat according to another embodiment;
figure 35 is a front view of a support selector element that can be rotatably accommodated in the seat of figure 34;
figure 36 is a perspective view of a portion of the outer face of a side wall provided with a seat according to another embodiment; and
figure 37 is a front view of a support selector element that can be rotatably accommodated in the seat shown in figure 36.

In the accompanying drawings, identical or similar elements have been designated by the same reference numerals.

With reference to figures 1 and 2, an in-line roller skate has a supporting frame 1, for example a profiled element shaped like an inverted U, that has two side walls 2 and 3 that are for example parallel to each other. Said side walls delimit an internal gap or space for mounting a plurality of in-line wheels 4, all having the same diameter. Each wheel 4 is mounted so that it can rotate about a respective pivot or axle 5, and is provided with a tread 6 made of rubber or other adapted material and with one or two rolling bearings 7 between the tread and the pivot.

Pairs of oppositely arranged seats 8 are formed in the side walls 2 and 3; the number of said pairs is equal to the number of the wheels, and said seats are meant to accommodate a respective supporting element 9 for supporting one end of a pivot 5. The seats 8 are constituted by vertical slots that are open downward; that is to say, they run with parallel sides for a certain extent starting from the lower edge of the respective side wall 2 or 3.

Each supporting element 9 is constituted by a slider with rounded opposite ends that has two oppositely arranged sides that are milled so as to form two sliding guides 10 that can be slidingly inserted from below along the parallel edges of a seat 8. Each supporting element 9 also has a through hole 12 whose axis is perpendicular to the direction of the guides 10 and is shifted away from the centerline towards the guides 10, so that if a supporting element 9 is inserted fully in the upright position, as in figure 2, in a seat 8, the hole 12 is at a higher level, whereas if it is inserted upside down said hole is at a lower level.

Two supporting elements 9 are arranged at the ends of each pivot 5 (outside the supporting bearings) and are inserted and mounted in position thereon so that they are both upright or both upside down. To prevent the pivot 5 and its supporting elements 9 from falling out of the side walls 2 and 3, a lock nut (not shown in the drawings) is tightened against one of the supporting elements or against one of said side walls.

If one wishes to disassemble a pivot from the frame 1, for example to lower its level in order to compensate for wear of the tread 6 of the respective wheel, it is sufficient to loosen the pivot locking nut, slide the supporting elements or sliders 9 so as to extract them from the seats 8, invert them, reinstall them by sliding them from the lower edge of the side walls 2 and 3 along the sides of the seats, and fix the locking nut.

In the embodiment of figures 3 to 5 there are seats 13 that extend upward starting from the lower

edge of the inner face of the respective side wall 2 or 3. Each seat 13 is blind at its lower portion 14 and has a vertical through slot 15 at its upper portion.

The supporting element 16 is constituted by a sleeve that has a flanged end 17; the other end is cut at 18 with a given angle, for example at 45° with respect to the longitudinal axis of the sleeve. The flange 16, on the side directed towards the sleeve, has a collar 19 that acts as spacer between the bearing 7 and the side wall of the frame 1, and is rigidly coupled, on the other side, to a radial sector 20 that can be slidingly inserted in a seat 13. Said sector is peripherally flush with the edge of the flange and has the same radius of curvature as the inner end or vault 13a of the seat 13; on its inner side, it is curved and follows the curvature of the internal space of the sleeve.

In this embodiment, two lateral, or end, supporting elements 16 and an intermediate sleeve 21 are inserted on each pivot 5. The sleeve 21 has two outside diameters, a smaller one in its end portions 22 and a larger one in its intermediate portion 23, and acts as spacer between the two bearings 7 that are normally provided in a skate wheel 4 (figure 5). The end portions 22 end with a cut that is complementary to the cut 18 in the corresponding supporting element 16, and therefore, during the tightening of the locking nut of the pivot 5 there is an element for checking whether the sectors 20 of each sleeve 16 are directed in the same direction, that is to say, are both directed towards the vault 13a of the respective seats 13 or in the opposite direction, otherwise the locking nut cannot screw on fully.

Figures 6 to 8 show an embodiment in which each seat 25 is constituted by a recess that is directed towards the inner face of the respective side wall 2 or 3 of the frame and is shallower than the thickness of said side wall. Each recess 25, starting from the lower free edge of the respective side wall, extends upward to a certain extent and has two straight and parallel lateral shoulders 26 and a top shoulder 27 that can be either straight or curved. The lateral shoulders 26, and optionally the top shoulder 27, are affected by a female coupling portion 28.

A through slot 29 is formed at the centerline of each seat 25, proximate to the shoulder 27, and its longitudinal axis is parallel to the lateral shoulders 26.

The supporting element is constituted by a quadrangular slider 30 that is provided, on at least two opposite and parallel sides 31, with a male coupling element 32 that can be slidingly inserted in the female coupling element 28 of the seat 25. A through hole 33 is provided along the vertical centerline of the slider 30 but away from its vertical centerline and continues, at one of its faces (the one meant to be directed towards the internal space of the frame 1), with a sleeve 34 that has two outside diameters and ends with a truncated portion 35 that is inclined at a preset angle.

The mounting of a pivot 5 with respective supporting end elements that can be inserted from below into seats 25 is shown in figure 8, and is evident if one considers the description given regarding figure 5.

A further embodiment of the above-described example is shown in figures 9 and 10, where there are seats 36 that are open downward, are recessed in the thickness of the side walls 2 or 3, and have a through slot 29 on the outside of the side wall and a recess 37 that is open downward like the seat 8 of figure 1 and is directed towards the inner face of said side wall.

The supporting element is a slider 38 that is fully similar to the slider 30 but has no snap-together coupling elements on the sides and can be inserted in a seat 36.

Figures 11 to 18 show an embodiment in which the seats are constituted by recesses 40 that are open downward, are formed on the inner face of the respective side wall 2 or 3, and affect only part of its thickness. The contour of the recesses 40 is undercut, as shown by 41, and the inner part of the recess is formed by a lower portion, with undercut peripheral sides that are flared downward so as to form a guide for easier insertion of a supporting element, and by an upper portion that is more deeply recessed than the lower portion, with which it delimits a demarcation step 42.

In this embodiment, the axle 5 for each wheel 4 is constituted by two identical half-axles 44 that can be coupled frontally, for example by providing two diametrically opposite and identical longitudinal sectors 45 that delimit, between them, two slots 46 that allow to frontally couple two half-axles 44 by simply arranging them axially mutually adjacent (figure 18) when the sectors 45 of one are inserted in corresponding slots of the other.

The supporting element for each half-axle 44 is constituted by a slider 47 that can be inserted in a seat 40 and has a lateral edge 48 that is chamfered or frustum-shaped so as to slidingly engage the undercut perimeter 41 of said seat. The slider 47 is symmetrical with respect to the horizontal centerline and is rigidly coupled to the tip of a respective half-axle 44 (preferably with the interposition of a respective spacer 49, which for example has a frustum-like contour), which is furthermore offset with respect to the longitudinal axis of its own half-axle (figure 14).

Once two half-axles 44 have been mutually assembled inside a wheel 4, so that the respective supporting elements 47 are axially offset on the

same side, said elements can be inserted from below into a pair of opposite seats 40, where they are slightly forced to slide along the lower portion of said seats and so that they snap into abutment beyond the step 42 at the upper portion.

If one wishes to "lower" the wheel 4, it is sufficient to remove it from the seats 40, invert the entire axle constituted by the two engaged half-axles 44, so as to orientate the end supporting elements 47 in the opposite direction, and reinsert it in the seats 40 by making it slide upward.

Figures 19 to 23 are views of a variation of the last example described above, in which above each seat 40, on the inner face of the respective side wall 2 or 3, there is a shaped expansion 50 that delimits an undercut 51 that surrounds the upper part of the seat 40 and in which it is possible to detachably engage the upward-facing edge 52 of the spacer 49 to obtain a structure that is stronger and more stable with respect to stress.

With reference to figures 24 to 28, an in-line roller skate has a supporting frame or chassis 101 that is constituted for example by an extruded profiled element shaped like an inverted U, made of light alloy, and having two mutually parallel side walls 102 and 103 that delimit an internal cavity 104 for mounting a plurality of in-line wheels 105, all having the same diameter.

Each one of the wheels 105 is rotatably mounted about a respective pivot or axle 106, which can be monolithic and have threaded hubs or ends 107 for screwing a respective locking nut 108. Each wheel 105 comprises an annular tread 109, made of rubber or of another adapted material, that delimits an axial central hole 110, and one or two rolling bearings 111 accommodated coaxially with respect to the hole 110 in appropriately provided lateral seats 112 formed in the tread 109. A respective bush 113, provided with a flanged outer end 114, can be inserted into each bearing 111 and acts as a spacer between the bearing and the inner face of a respective side wall 102 or 103.

As shown in figure 24, the side walls 102 and 103 have a plurality of pairs of vertical seats or slots 115 at which, on the outer face of said side walls, there is a respective cylindrical seat 116, formed for example within an enlargement of the side wall or in any other convenient manner, and adapted to rotatably accommodate a respective cylindrical selector 117. Said cylindrical selector has an axial or eccentric hole 118 and one or two peripheral radial notches 119 and 120 having different depths and angularly offset.

A pivot 106 can be driven through the bushes 113 and the hole 110 of the tread and protrudes from both side walls 102 and 103 with a smooth portion 121 that remains within the respective seat 116 and has a length substantially equal to the thickness of a selector 117. The selector 117 is inserted on the two portions 121 on either side and then the entire assembly is locked either with two end nuts 108, if the pivot 106 has two threaded ends 107, or with a single nut, if the pivot 106 is bolt-shaped.

Depending on whether the pair of lateral selectors 117 engages the respective pivot 106 with its axial hole 118 or with one of the notches 119 and 120, the level of the pivot inside the side walls 102 and 103 can vary within the slots 115 from a maximum value (as shown in figure 24), if the axial hole 118 is engaged, to a minimum value, if the pivot is engaged by the deepest notch 120.

As shown in figure 24, each selector 117 is preferably rigidly coupled within its respective seat 116, for example by means of a male peripheral raised portion 122 adapted to engage, in a snap-together manner, a corresponding internal groove 123 provided in the seat 116. In this manner, the selector is prevented from falling out of its respective seat 116, and therefore in order to change the level of the respective pivot 106 it is sufficient to extract it, turn the selectors 117 into the desired angular position, for example by acting with one finger on a side wall of the deepest notch 119, reposition the pivot, and fix the assembly with the nut or nuts 108.

In the embodiment of figures 30 and 31, the seats 116 are formed on the outer face and within the thickness of the side walls 102 and 103, and their center is arranged along the axial vertical plane that is normal to the side wall 102 or 103 above a respective vertical slot 115. Each selector 124 has two radial notches: a deeper notch 119 and a shallower notch 120. An axial slot 125 is formed on the front face of each selector 124 to allow to turn said selector by using a coin or a screwdriver.

Figures 32 and 33 illustrate another embodiment, similar to the one of figures 30 and 31, but with selectors 126 having four peripheral radial notches that decrease in depth from 127 to 130 and therefore allow to arrange the rotation pivots of the wheels 105 at four different operating levels.

In the embodiment illustrated in figures 34 and 35, the seats 116 are formed within the side walls 102 and 103 as in the embodiments of figures 30 to 31, but on the inner face of said side walls, where the slots 115 are also blind. In this case, instead of the bushes 113 and of the pivots 106 it is possible to use, for each wheel, two oppositely arranged half-pivots 131 (figure 29) having an intermediate flange 132, which has the same purpose as the flange 114 of the bushes 113 and beyond which the half-pivot has an axial portion 133 for engaging one of the notches 134 to 136 of a respective selector 137. The selectors 137, in this

embodiment, do not require means for coupling and retaining them to their seat 116, since said seat, being internal, prevents their disengagement therefrom.

The possibility to continuously adjust the height or the level of the rotation pivots of the wheels 105 over the entire height of the vertical slots 115 is showed by the embodiment of figures 36 and 37. In this embodiment, the seats 116 can be provided either on the outer face of the side walls 102 and 103 of the frame or on their inner face, and the selector is constituted by a cylinder with an eccentric through hole 139, so that a rotation pivot 106 inserted in the holes 139 of two selectors 138 can be fixed in position by means of nut 108 in any position along the respective vertical slots 115.

If required, the selectors 138 can be provided with a manual actuation pawl 140 that can protrude outside the respective side wall through a circular slot 141, in which case the seats 116 must be provided on the inner face of the side walls 102 and 103.

It is evident that with a skate such as the ones described above it is possible to simply, rapidly, and safely "lower" all or some of the wheels both for skate maneuverability requirements and to compensate for the gradual wear of the tread of the wheels 105.

The above-described skate is susceptible of numerous modifications and variations within the protective scope defined by the content of the claims.

The materials and the dimensions may be various 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 interpretation of each element identified by way of example by such reference signs.

Claims

1. In-line roller skate comprising a supporting frame (1,101) having two side walls (2,3,102,103) and a plurality of wheels (4,105) arranged therebetween, characterized in that it comprises a plurality of pairs of oppositely arranged seats (8,115), pivots (5,106) adapted to engage said seats for supporting said wheels, supporting elements (9,117) for said pivots and adapted to engage respective said seats in order to place each pivot at a different height in said frame.

2. Skate according to claim 1, characterized in that each said seat (8) is formed by a vertical slot with parallel sides that is open downward, and in that each supporting element comprises a slider (9) that can be slidingly seated along the sides of a respective seat and is provided with an axially offset median through hole which is axially offset with respect to the vertical centerline of the slider to be inserted on a pivot.

3. Skate according to claim 1, characterized in that each seat is formed by a recess (13) provided in the respective side wall (2,3), extends upward from the lower edge of the inner face of the respective side, and comprises a lower blind portion (14) and a through slot (15) at an upper portion.

4. Skate according to claim 3, characterized in that said supporting element (16) comprises a sleeve that has a flanged end (17) and has, on the side directed towards the sleeve, a collar (19) that acts as spacer between a bearing (7) of said wheel and the side wall of the frame (1), and has, on the other side, a radial sector (20) that can be slidingly inserted in a seat (13), said sector being peripherally flush to the edge of the flanged end, and being curved, along its inner side, so as to follow the curve of the inner opening of the sleeve.

5. Skate according to claim 4, characterized in that the other end of said sleeve (16) is cut along a plane that lies at a preset angle with respect to the axis of the sleeve.

6. Skate according to claim 1, characterized in that each seat comprises a recess (25) that is directed towards the inner face of the respective side wall of the frame and is shallower than the thickness of said side wall; said recess, starting from the lower free edge of the respective side wall, extending upward and having two straight parallel lateral shoulders (26), which are affected by a groove, and a through slot that is directed towards the lateral shoulders.

7. Skate according to claim 6, characterized in that each supporting element comprises a slider (30) that has at least two parallel opposite sides (31) that have a groove (32) for snap-together male-female sliding insertion with a respective seat (28), and a through hole (33), proximate to the vertical centerline of the slider but out of its vertical centerline, for insertion on a pivot.

8. Skate according to claim 1, characterized in that each seat (36) is open downward, is recessed within the side wall, and has a through slot (29) and a recess (37) that is open downward and directed towards the inner face of said side wall, and in that each supporting element comprises a slider (38) that can be inserted in a respective seat (36) and is provided with an off-center through hole for insertion on a pivot.

9. Skate according to claim 7 or 8, characterized in that said slider comprises, at its face meant to be directed towards the inner space of the frame, a sleeve (34) with two outside diameters that is coaxial with respect to said through hole and ends with a truncated portion (35) that is inclined at a preset angle with respect to the axis of the hole.

10. Skate according to one or more of the preceding claims, characterized in that two supporting end elements and an intermediate spacer are inserted on each pivot, said spacer ending with truncated tip portions whose angle is complementary to the angle of the truncated end of each supporting element.

11. Skate according to claim 10, characterized in that said intermediate spacer has two outside diameters, a smaller one in its end portions and a larger one in its intermediate portion, so as to act as spacer also for two bearings provided in each skate wheel.

12. Skate according to claim 1, characterized in that each seat is constituted by a recess (40) that is open downward, is formed on the inner face of a side wall, and affects only part of its thickness, with an undercut peripheral portion (41) and with the internal part of the recess formed by a lower portion with undercut peripheral sides that are flared downward and by an upper portion that is in more deeply recessed with respect to the lower portion, with which it delimits a retention shoulder (42).

13. Skate according to claim 12, characterized in that each pivot supporting element comprises a slider (47) that has a chamfered side edge (48) so as to slidingly engage the undercut peripheral region (41) of a respective seat and is rigidly coupled to the tip of a respective pivot (44) but so that it is axially offset with respect to said pivot.

14. Skate according to claim 13, characterized in that said slider is symmetrical with respect to its horizontal centerline and comprises a spacer (49) on the side directed towards the respective pivot or axle (44).

15. Skate according to claim 12 or 13, characterized in that each pivot or axle for each wheel comprises two half-axles (44) that can be frontally coupled.

16. Skate according to claim 15, characterized in that each half-axle (44) comprises, on the side that is opposite to the one affected by the respective slider, at least one longitudinal sector that delimits a slot to allow frontal coupling of two half-axles by simply inserting them axially in each other.

17. Skate according to one or more of the preceding claims, characterized in that it comprises an enlargement (50) shaped above each seat and on the inner face of the respective side, said enlargement delimiting a peripheral undercut (51) of the underlying seat, in which the edge of said spacer (49) can be removably engaged.

18. Skate according to claim 1, characterized in that it comprises a cylindrical seat (116) on the inner or outer face of the side walls (102,103), at each supporting slot (115), and a selector (117) with a cylindrical contour for supporting an end of a pivot (106) for the rotation of a wheel (105), each selector being rotatably mounted within said respective seat (116) to vary the position of the respective pivot along its pair of supporting slots.

19. Skate according to claim 18, characterized in that the center of each cylindrical seat (116) is located above the respective slot (115) on the axial plane thereof that is perpendicular to the side wall (102,103).

20. Skate according to claim 19, characterized in that each selector (117) has an internal hole (118) for the engagement of an end of a respective pivot (106) that is eccentric with respect to its circular contour.

21. Skate according to claim 20, characterized in that each selector (117) is provided with at least one peripheral radial notch (119,120) acting as a support at a preset level for a respective rotation pivot (106).

22. Skate according to one or more of the preceding claims, characterized in that each selector (117) comprises means (122,123) for rigidly

coupling and retaining it to the respective seat, said means allowing angular strokes of the selector within its seat and preventing its exit therefrom.

23. Skate according to one or more of the preceding claims, characterized in that each wheel (105) comprises an annular tread (109), provided with an axial central hole (110), and one or two rolling bearings (111) accommodated, coaxially with respect to the hole, in appropriate lateral seating cavities (112) provided in the tread.

24. Roller skate according to claim 23, characterized in that said bearings support a respective bush (113) with a flanged outer end (114) which acts as a spacer between the bearing and the inside face of a respective side wall (102,103).

25. Skate according to claim 23, characterized in that said bearings support a respective half-pivot (131) provided with an intermediate flange (132), that acts as a spacer between the bearing and the side wall, and with an axial portion, which is located beyond its own flange and is adapted to engage a respective selector.

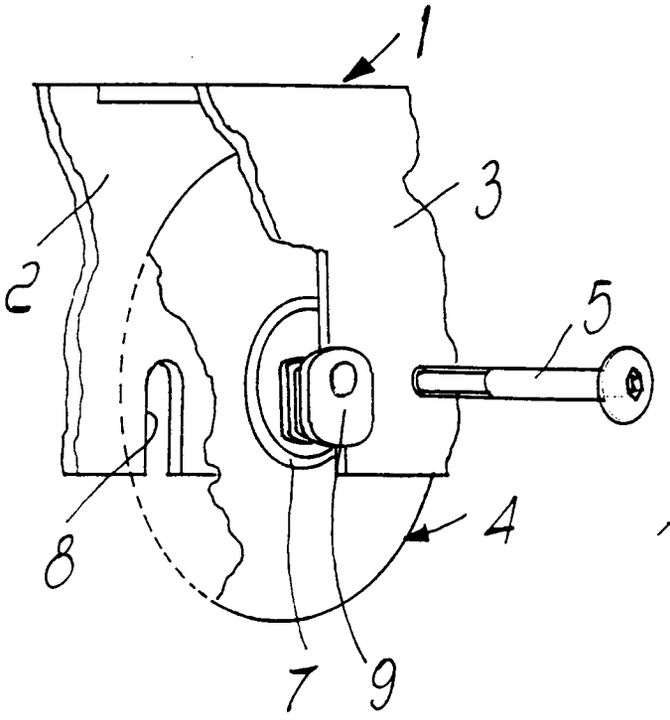


Fig. 1

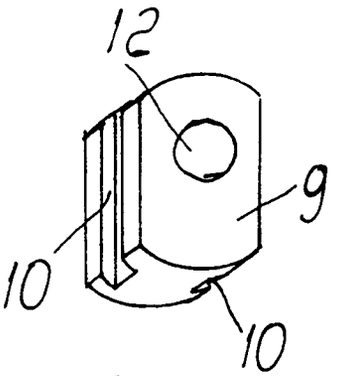


Fig. 2

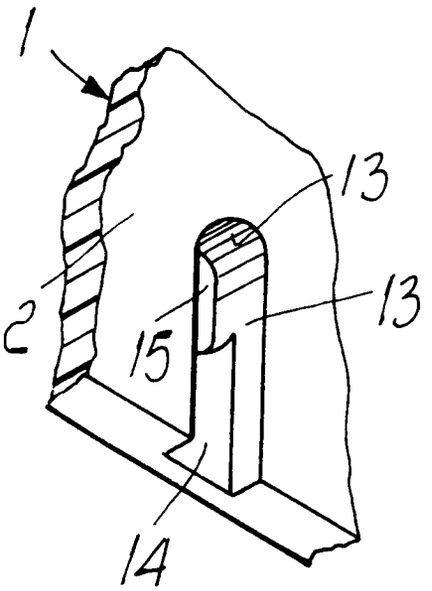


Fig. 3

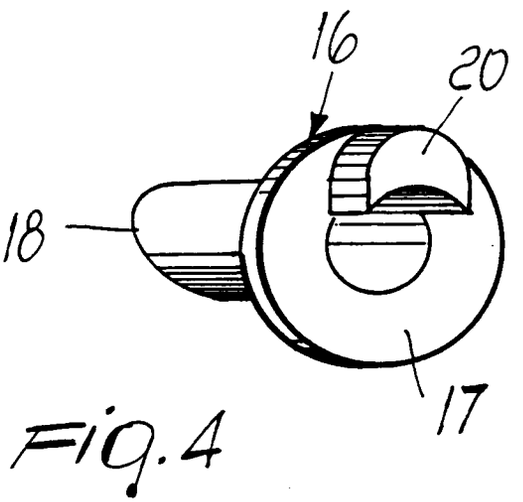


Fig. 4

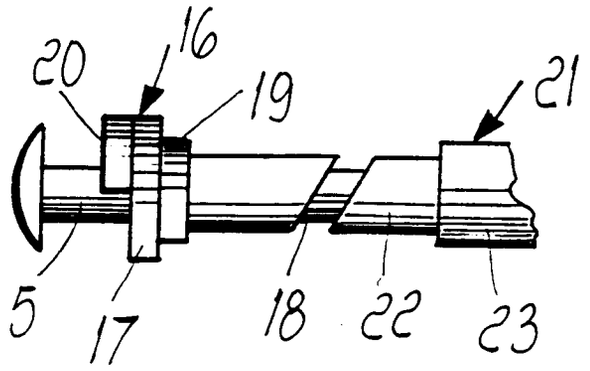


Fig. 5

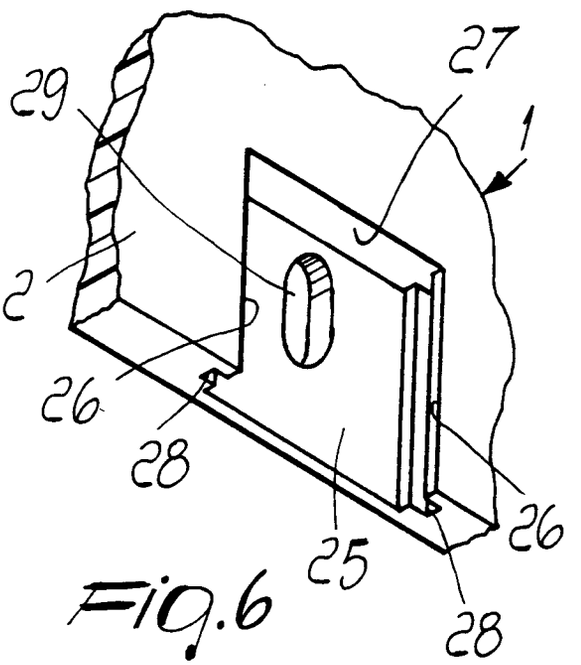


Fig. 6

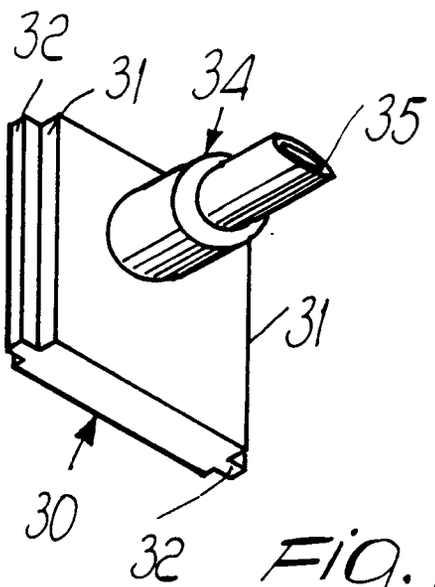


Fig. 7

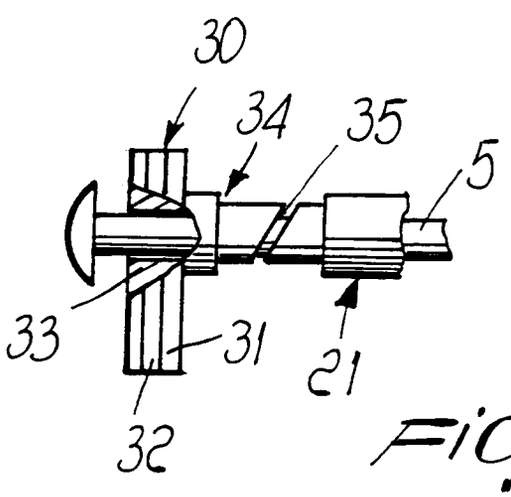


Fig. 8

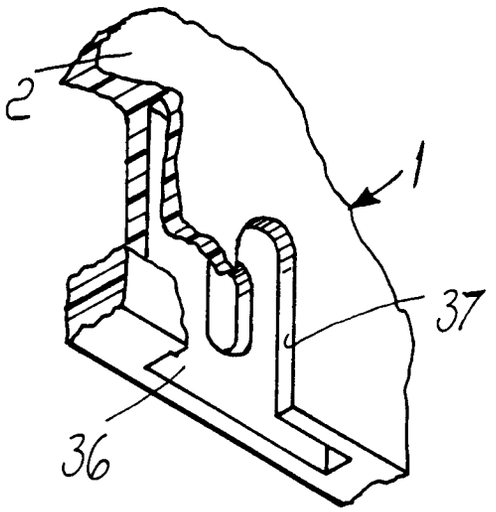


Fig. 9

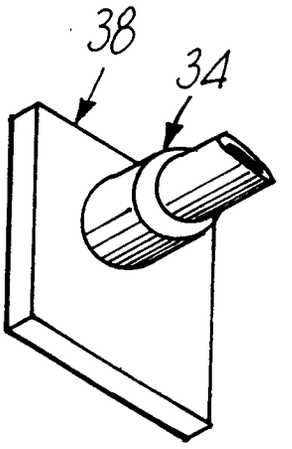


Fig. 10

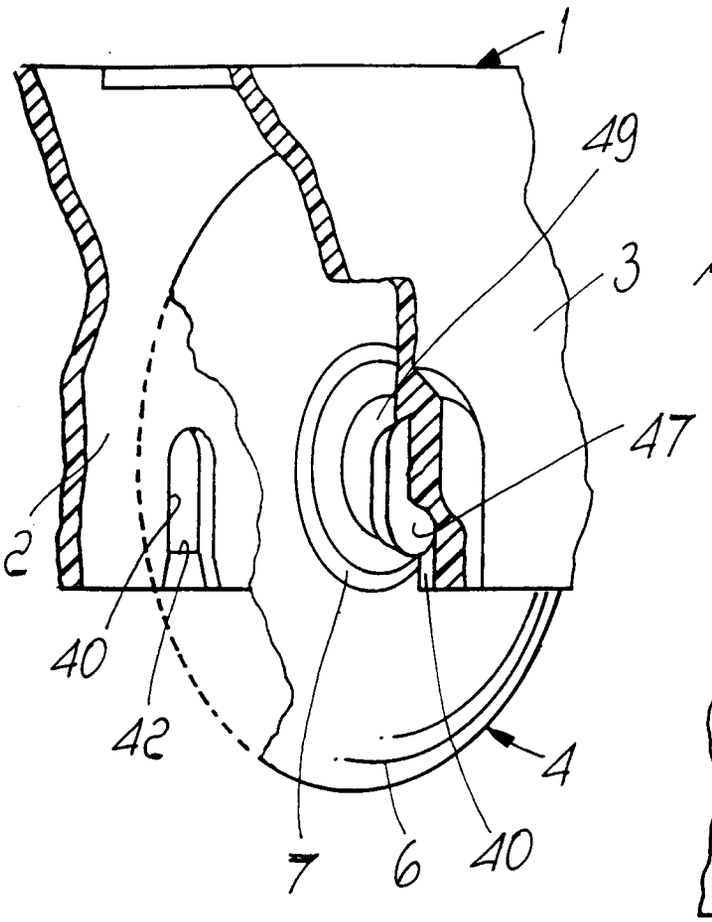


Fig. 11

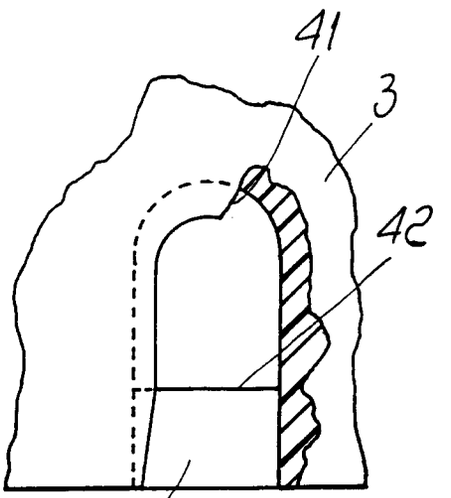


Fig. 12

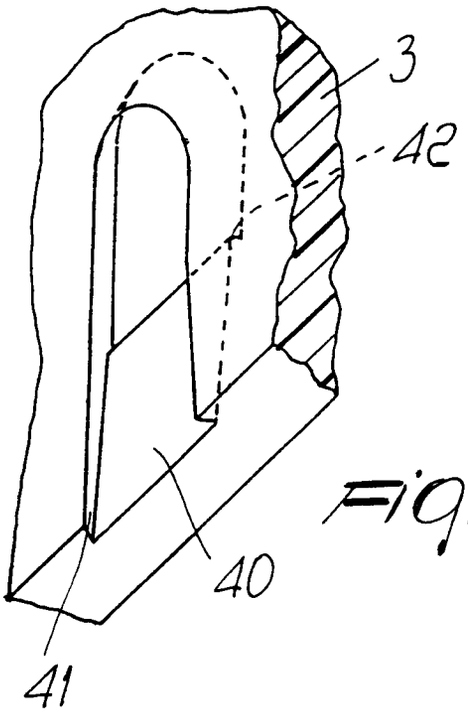


Fig. 13

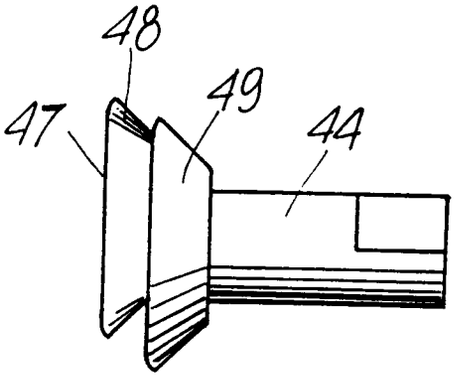


Fig. 14

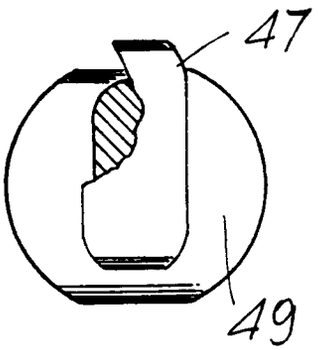


Fig. 15

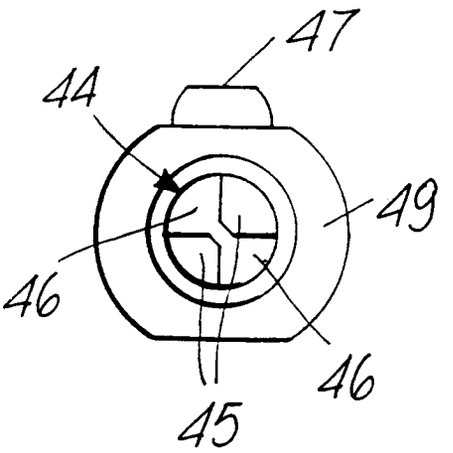


Fig. 16

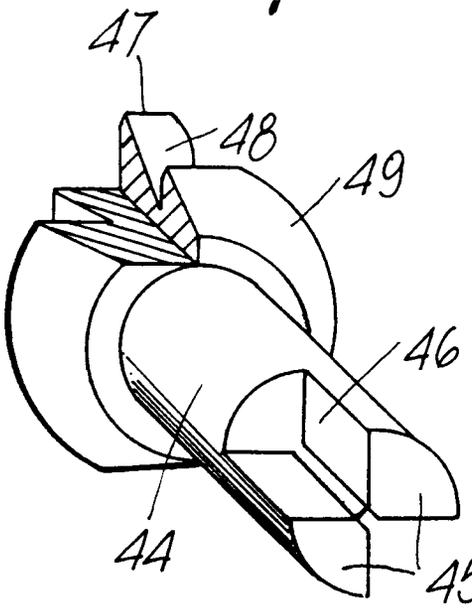


Fig. 17

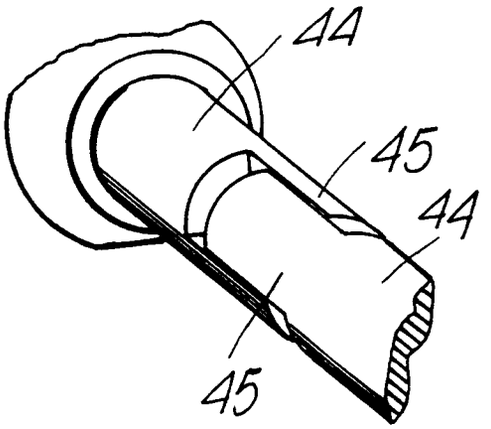


Fig. 18

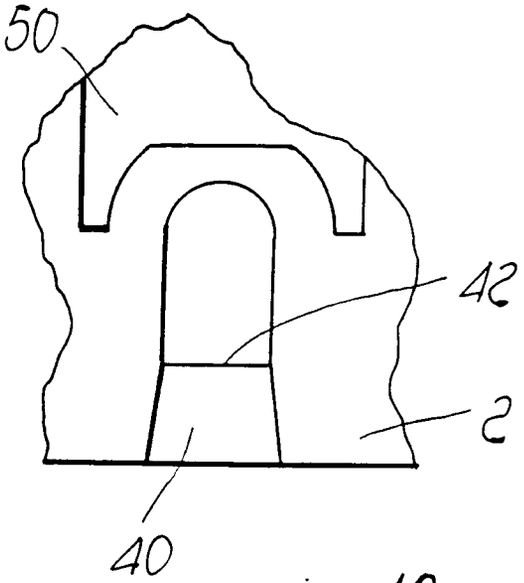


Fig. 19

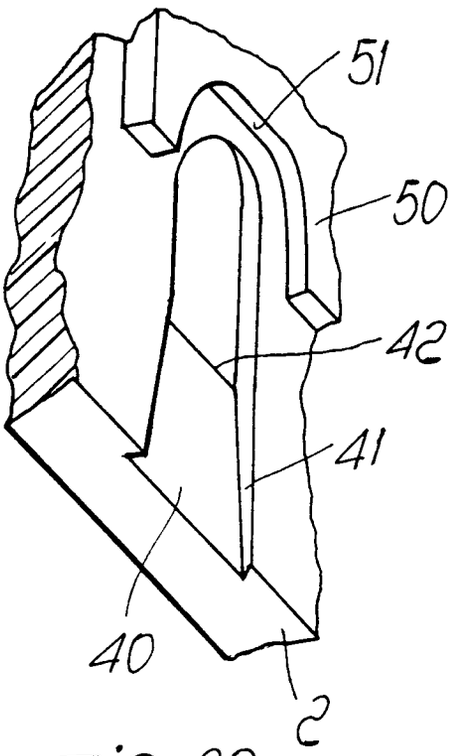


Fig. 20

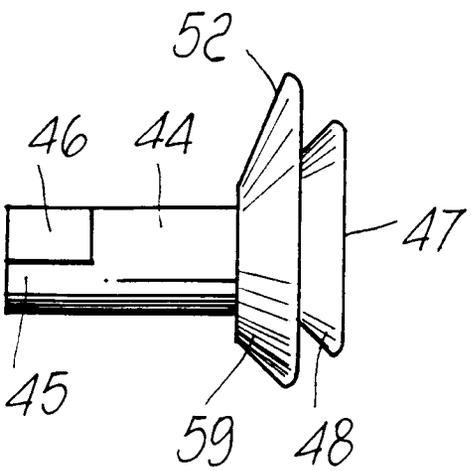


Fig. 21

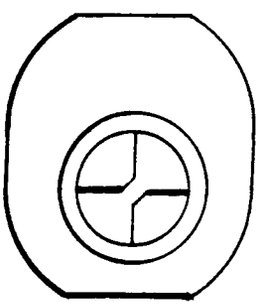


Fig. 22

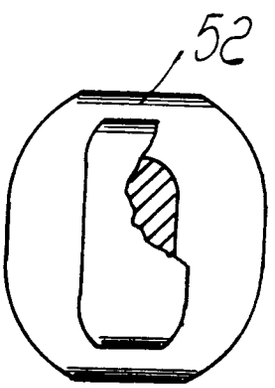


Fig. 23

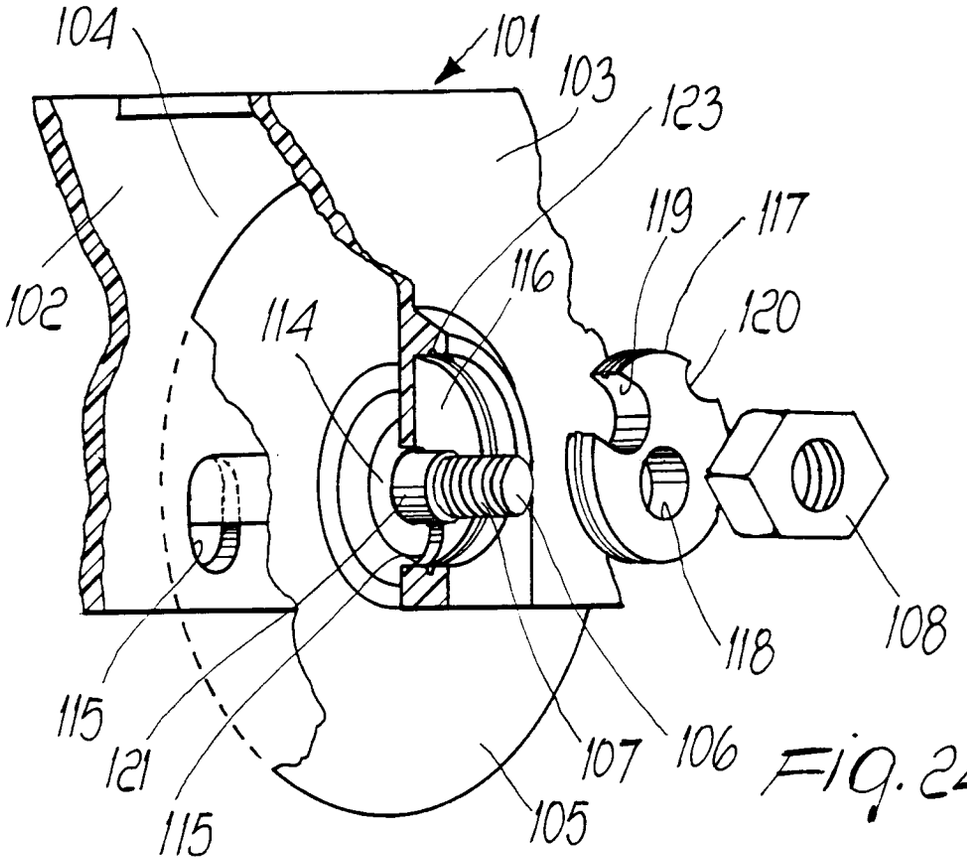


Fig. 24

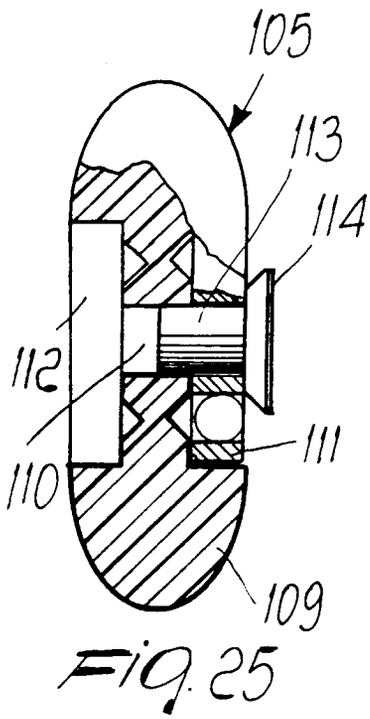


Fig. 25

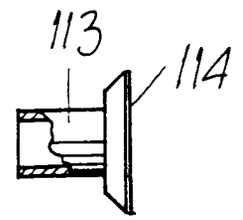


Fig. 26

Fig. 27

Fig. 28

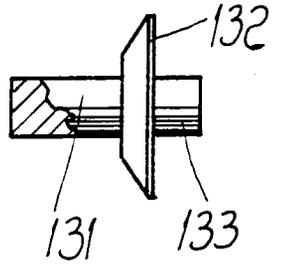


Fig. 29

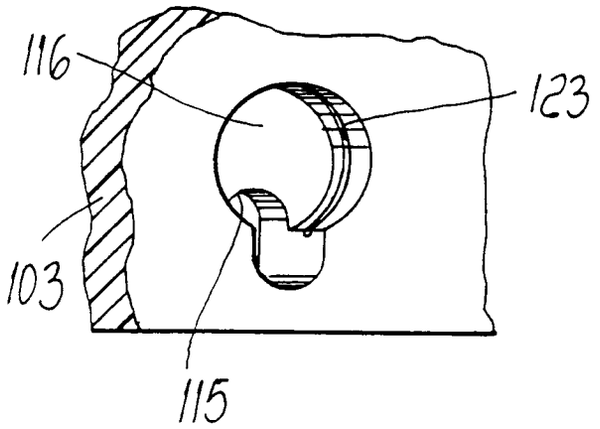
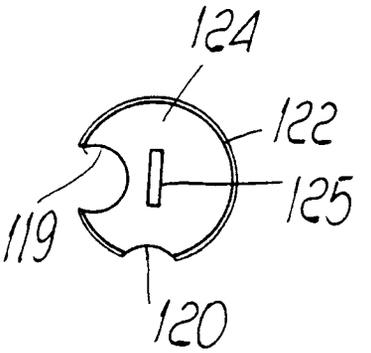


Fig. 30

Fig. 31



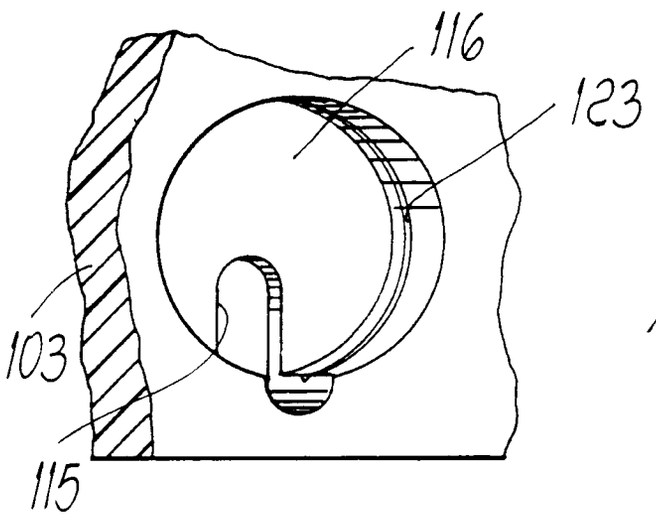
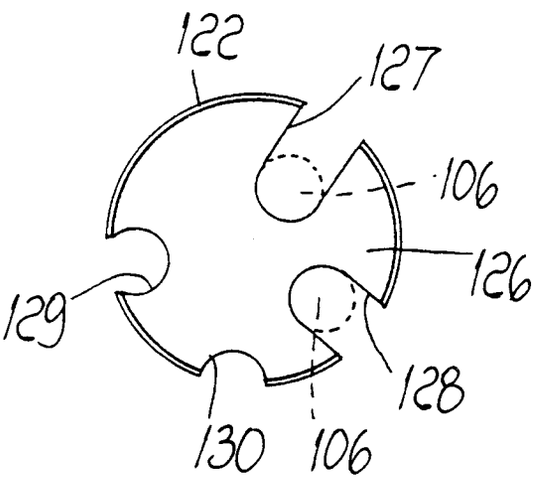


Fig. 32

Fig. 33



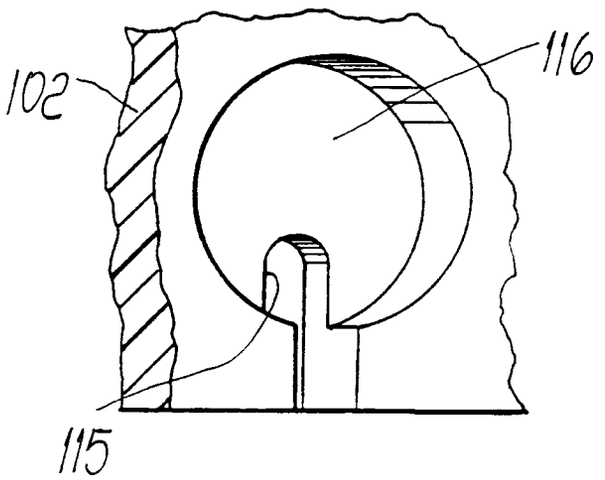


Fig. 34

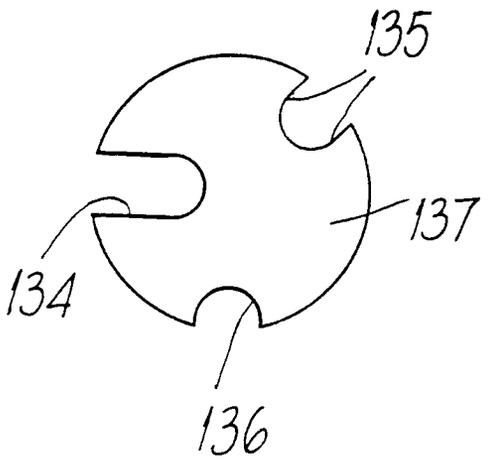


Fig. 35

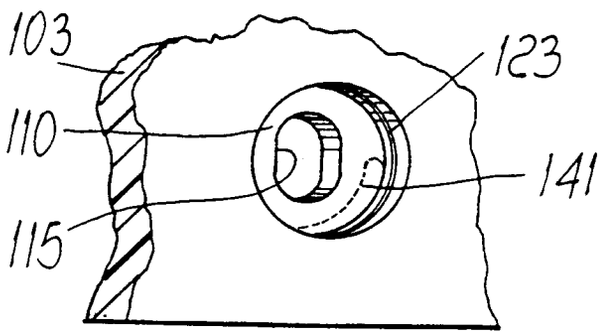


Fig. 36

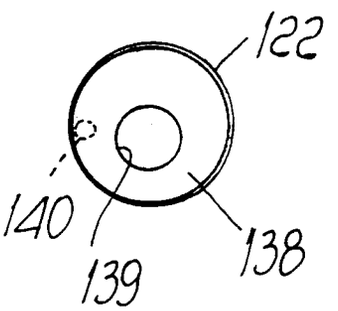


Fig. 37

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 95 10 7804

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
P,A	EP-A-0 652 034 (NORDICA S.P.A.) * column 1, paragraph 6 * * column 3, line 36 - line 44; figures 1-10 *	1,3,4	A63C17/06
A	EP-A-0 469 639 (ROLLERBLADE INC.) * figures 4,9,10 *	1,7,8	
A	US-A-5 046 746 (GIERVELD) * figures 10,11 *	1	
A	DE-A-29 42 969 (HESS) * figure 1 *	1	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

A63C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	1 September 1995	Steegman, R

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)