

19



Europäisches Patentamt  
European Patent Office  
Office européen des brevets



11 Publication number:

**0 652 034 A1**

12

### EUROPEAN PATENT APPLICATION

21 Application number: **94116551.6**

51 Int. Cl.<sup>6</sup>: **A63C 17/06**

22 Date of filing: **20.10.94**

30 Priority: **25.10.93 IT VR930079**

43 Date of publication of application:  
**10.05.95 Bulletin 95/19**

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

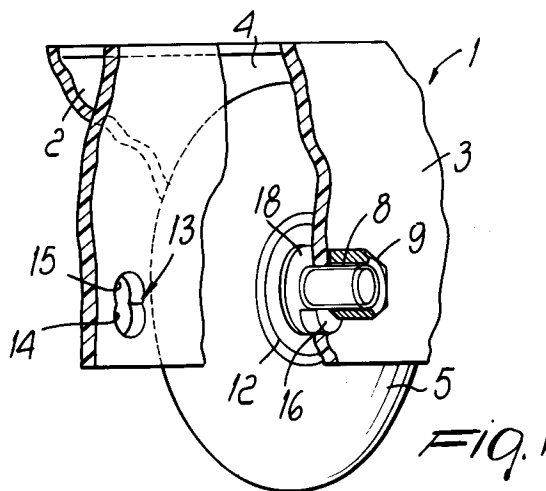
71 Applicant: **NORDICA S.p.A.**  
**Via Montebelluna 5/7**  
**I-31040 Trevignano (Treviso) (IT)**

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.**

57 An in-line roller skate which has a supporting frame provided with two side walls (2,3) that delimit, between them, a recess (4) for mounting at least three aligned wheels (5), each wheel being mounted so that it can rotate about a respective axle or pivot (6) with at least one bearing (10) interposed, and with two supporting seats (13) for each axle which are formed so as to face each other in the side walls (2,3) in order to accommodate a hub of the axle of a respective wheel. Each seat (13) has an opening with two circular lobes (14,15) that have the same diameter but have centers that are spaced by less than one diameter. A detachable insert (16) is meant to close at least part of the opening of one of the lobes (14, 15) of each seat and to act as partial abutment for the hub seated directly in the other lobe.



**EP 0 652 034 A1**

The present invention relates to an in-line roller skate.

Various in-line roller skates provided with wheel axle supporting devices have already been proposed: reference should be made in particular to US patent no. 5 048 848 (Brennen J. Olson et al.), filed on June 12, 1987. This patent teaches to insert bush-like plugs in adapted pairs of oppositely arranged openings, formed in two rigid parallel spaced side walls of the frame of the skate which are meant to support the axles of the aligned wheels. A respective hub of an axle is inserted in each plug so that it is detachably supported. The bush in each plug is arranged off-center or away from the centerline with respect to the opening in the frame that is meant to accommodate it, so that by extracting each plug and inserting it after turning it, for example upside down, it is possible to change the distance of the respective axle from the ground or to shift it away from the plane of arrangement of the remaining axles of the skate.

The bush-fitted plug is meant to fully bear all the load stresses applied to the hub which is arranged in it, and as it is made of plastics it is subjected to fatigue and thus to wearing in a relatively short time, and this can cause breakage.

The aim of the present invention is to provide an in-line roller skate in which the hubs of the axles rest directly on portions of the frame, with a consequently more precise assembly that leads to an improved performance of the skate as a whole.

An object of the present invention is to provide a skate that is extremely simple both to make and to use and can be manufactured at competitive costs.

This aim, this object, and others which will become apparent hereinafter are achieved by an in-line roller skate having a supporting frame provided with two side walls that delimit, between them, a recess for mounting at least three aligned wheels, each wheel being mounted so that it can rotate about a respective axle or pivot with at least one bearing interposed and provided with two supporting seats for each wheel axle, said seats being formed so as to face each other in said side walls in order to accommodate a hub of the axle of a respective wheel; characterized in that each one of said seats has an opening with two circular lobes that have the same diameter but have centers that are spaced by less than one diameter, and in that said skate comprises a detachable insert that is meant to close at least part of the opening of one of the lobes of each seat and to act as partial abutment for the hub seated directly in the other lobe.

Advantageously, the axes of the lower and upper lobes of each pair of facing supporting seats are arranged on two parallel planes.

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

- 5 figure 1 is a schematic perspective view, with some parts shown in cross-section, of a portion of a frame for an in-line roller skate;
- 10 figure 2 is a schematic perspective view, in enlarged scale, of a wheel axle hub of figure 1;
- figure 3 is a front partial view of a frame according to a second aspect of the invention;
- 15 figure 4 is a schematic perspective view of a supporting seat, provided in one side wall of the frame, according to the embodiment shown in figure 3;
- figure 5 is a sectional view, taken along the plane V-V of figure 3;
- 20 figure 6 is a perspective view of another embodiment of the insert;
- figure 7 is a view of a supporting seat, modified for use with the insert of figure 6;
- 25 figures 8 and 9 are schematic perspective views of two other embodiments of the insert according to the invention; and
- figure 10 is a perspective view of yet another embodiment of the insert according to the present invention.

30 In the drawings, identical or similar parts or components have been designated by the same reference numerals.

With reference to figures 1 and 2, an in-line roller skate, generally designated by the reference numeral 1, has a supporting frame which has two side walls 2 and 3 which are for example mutually parallel and delimit, between them, a recess or free space 4 for mounting three or more aligned wheels 5, which have the same diameter. Each wheel 5 is mounted so that it can rotate about a respective axle or pivot 6 which may have an enlarged head 7 at one end and, at its other end, a thread 8 on which a locking nut 9 can be screwed. Typically, each wheel 5 is mounted on the respective axle 6 with the interposition of two ball bearings 10 (one adjacent to the head 7 and the other adjacent to the threaded end 8) which have an internal cage 11 and an external cage 12.

Two mutually opposite supporting through seats or openings 13 are provided for each axle or pivot 6 in the side walls 2 and 3. Each seat 13 has a through opening with two circular lobes, a lower one 14 and an upper one 15, which have the same radius but have centers that are spaced by less than one diameter. The diameter of the lobes or holes 14 and 15 is slightly greater than the diameter of the respective pivot 6, so that said pivot can be inserted snugly either in the two lower lobes or

in the two upper lobes of a pair of opposite seats 13.

A removable closure insert 16 is applied in each supporting seat 13, formed directly in the side walls 2 and 3, inside the lobe that is not occupied by the respective pivot 6 accommodated in its seat. The insert is shaped like a cylindrical portion whose radius is slightly smaller than the radius of the lobes 14 and 15, and has a flat portion 17 that is directed towards the lobe where the pivot is seated, so as to act as abutment for the corresponding hub of the axle.

It is evident that each insert 16 is merely meant to abut against the hub, as said hub is arranged and snugly supported substantially throughout (generally over approximately three quarters of its circumferential surface) directly in a lobe of its supporting seat 13. The length of each insert 16 is substantially equal to, or slightly greater than, the thickness of a side wall 2 or 3. A washer 18 is provided between each wheel 5 and the side walls 2 and 3; said washer is made of any suitable material and is meant to act as spacer between the inner cage 11 of a bearing 10 and the adjacent side wall of the skate, and also constitutes an abutment element for the insert 16, which is also adjacent to it. Said insert is thus blocked in position during use as it is secured, at its end face that lies outside the side wall in which it is accommodated, by a head 7 or by a nut 9, whereas its inner face abuts against the respective washer 18.

Of course the axes of the lobes 14 and 15 of all the pairs of opposite supporting seats 13 are arranged on two parallel planes so that all the aligned wheels 5 can be mounted at the same level. However, if one of the wheels 5, for example the intermediate wheel, must be raised or lowered with respect to the others to allow the user to skate better on slalom courses, it is sufficient to simply unscrew its locking nut 9, extract the pivot 6, remove the inserts 16, reposition the pivot 6 in the other two lobes, place the inserts 16 in the lobes that have been left free, and tighten the nut 9 again.

In the embodiment of figures 3 to 5, the wheels are kept spaced from the side walls 2 and 3 by two protrusions 19 and 20 of said side walls, which are arranged side by side on either side of each supporting seat 13. Advantageously, the protrusions 19 and 20 have a trapezoidal shape, and each one delimits a front face 21, whose dimensions and position are such that it abuts against the inner cage or ring of a bearing 10, and two faces 22 and 23 which are shaped like an inclined plane and allow easy extraction from the mold if the side walls 2 and 3 are obtained by molding monolithically with a bridge-like transverse connecting component 24.

In this embodiment, the length of the inserts 16 slightly exceeds the thickness of the side walls 2 and 3, so that the inserts are pressed by the heads 7 or by the nuts 9 against the inner ring or cage 11 of the bearings 10 (figure 3).

Figures 6 and 7 illustrate an embodiment in which the inserts 16 have a cantilevered protrusion or wing 25 which is meant to engage in respective slots 26 and 27, formed at the lobes 14 and 15 respectively, in order to keep the insert fixed in position in the lobe in which it is seated.

Figures 8 to 10 are views of a corresponding number of embodiments of inserts, with a portion meant to act as spacer between the wheel and the side wall. More particularly, the transverse cross-section of the insert 16 of figure 8 is semi-cylindrical or slightly larger than a half-cylinder, and its flat face 17 is meant to abut against a corresponding flat region provided both in the threaded hub-like portion 8 and proximate to the head 7 of each pivot or axle 6. Each insert 16 has, at its end directed towards a respective wheel 5, an extension 28 that continues the abutment surface 17 and is meant to abut against the inner cage or ring 11 of a bearing 10 of the wheel.

The insert 16, shown in figure 9, is similar to the insert shown in figure 8, except that the surface 17a for abutment against the pivot 6 is curved like a cradle, so that flattened portions are not provided on the pivot.

The insert 16 shown in figure 10 has, at its end meant to be directed towards a wheel 5, a curved portion 30 which is suitable to act as spacer between the wheel and the side wall but has no supporting or abutment function as regards the pivot 6. If required, one end of the curved portion 30 can have a tab 31 which is directed towards the insert 16 and is meant to be accommodated in a corresponding recess (not shown in the drawing but fully evident to an expert in the field).

It is evident that the pivots or axles 6 are supported directly and substantially entirely by the respective seating lobes 14 or 15, whereas the inserts 16 are mainly meant to close, in a plug-like manner, the lobe that is adjacent to the lobe where the axle is arranged, with a limited function of abutment against the axle which is limited indeed by virtue of the specific two-lobed shape of the seats 13.

The assembly and disassembly of a wheel with the use of the inserts described above is extremely simple and rapid. The axles 6 are mounted snugly within the respective seating lobes and therefore are not subject to unwanted plays.

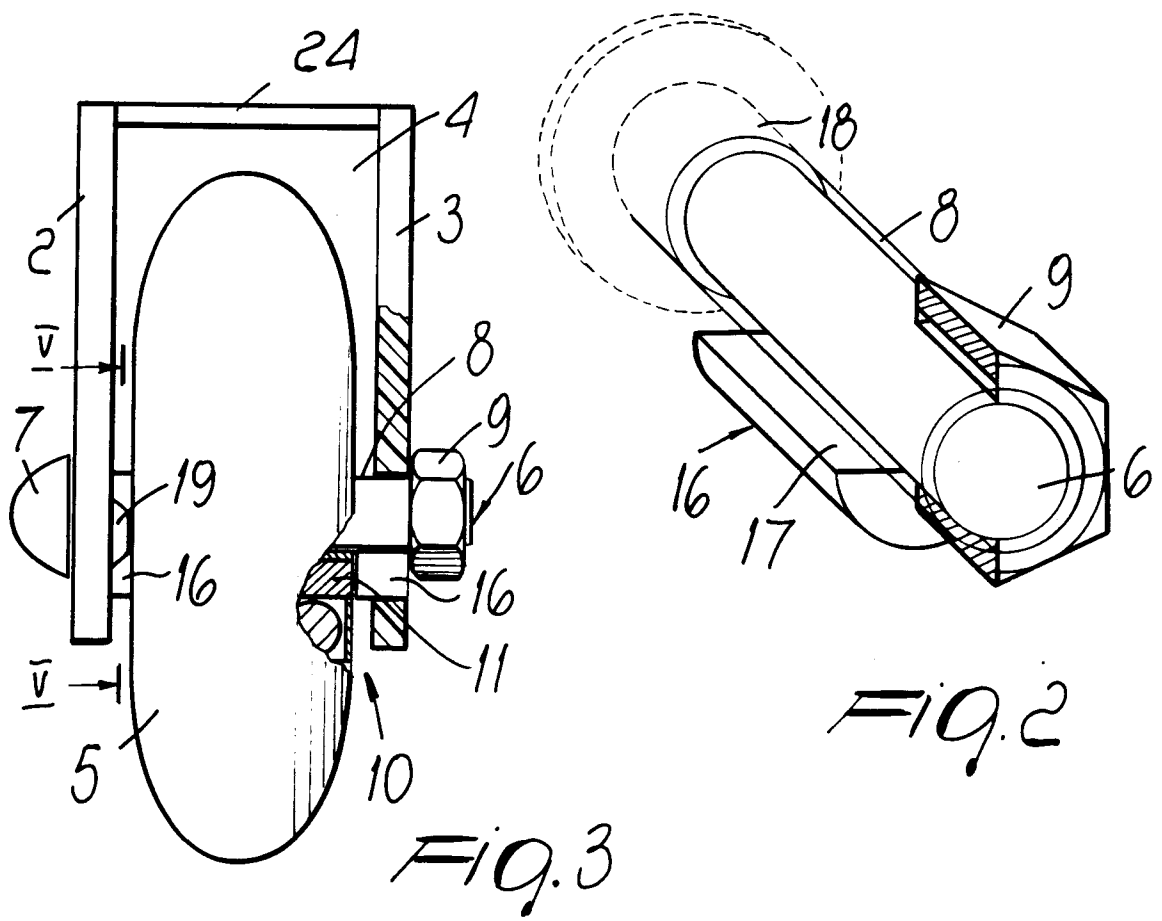
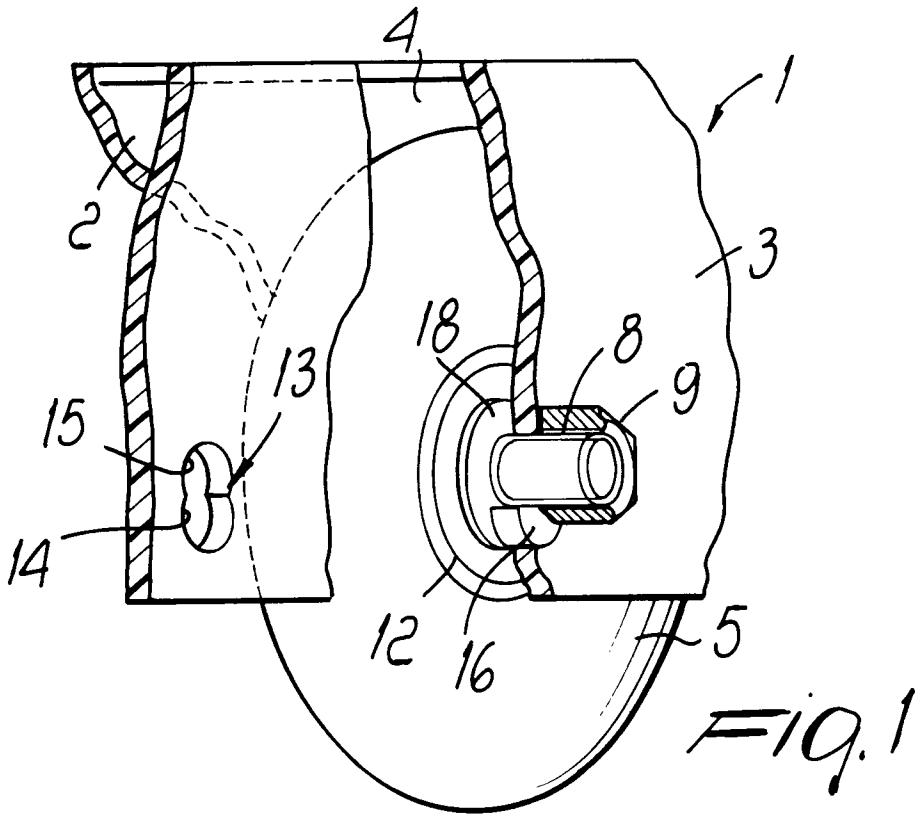
An in-line roller skate configured as described above is susceptible to numerous modifications and variations within the protective scope defined by the content of the claims that follow.

The materials and the dimensions may vary according to the requirements.

Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the scope of each element identified by way of example by such reference signs.

### Claims

1. In-line roller skate having a supporting frame provided with two side walls (2,3) that delimit, between them, a recess (4) for mounting at least three aligned wheels (5), each wheel being mounted so that it can rotate about a respective axle (6) or pivot with at least one bearing (10) interposed and provided with two supporting seats (13) for each wheel axle (6), said seats being formed so as to face each other in said side walls (2,3) in order to accommodate a hub of the axle of a respective wheel; characterized in that each one of said seats (13) has an opening with two circular lobes (14,15) that have the same diameter but have centers that are spaced by less than one diameter, and in that said skate comprises a detachable insert (16) that is meant to close at least part of the opening of one of the lobes of each seat and to act as partial abutment for the hub seated directly in the other lobe. 15 20 25 30
2. Skate according to claim 1, characterized in that said lobes (14,15) of each supporting seat (13) are arranged one above the other and in that the axes of the lower and upper lobes of the pairs of opposite supporting seats are arranged on two parallel planes. 35 40
3. Skate according to claim 1, characterized in that said insert element (16) is shaped like a cylindrical portion. 45
4. Skate according to claim 1, characterized in that it comprises a washer (18) which is inserted on each hub of each pivot or axle and acts as spacer between the side wall (3,4) and the wheel (5). 50
5. Skate according to claim 1, characterized in that each supporting seat (13) is flanked, at the surface of the side walls (2,3) that is directed towards the mounting recess, by two raised portions (19,20), or protrusions, which are meant to act as fixed spacers between the side wall and the wheel (5). 55
6. Skate according to claim 1, characterized in that said insert (16) has a longitudinal extension that has a reduced thickness and is meant to protrude towards said mounting recess to act, during use, as a spacer between said side wall and said wheel. 5
7. Skate according to claim 1, characterized in that said insert (16) has a curved end portion which is meant to remain, during use, in said mounting recess to act as spacer between the side wall and the wheel. 10
8. Skate according to claim 1, characterized in that said insert (16) has a flat longitudinal surface (7) that is directed, during use, towards a hub (8) of the axle (6). 15
9. Skate according to claim 8, characterized in that each pivot (6) has two flat regions at its ends which are meant, during use, to abut against the longitudinal surface (7) of a respective insert (16). 20
10. Skate according to claim 1, characterized in that said insert (16) has a longitudinal cradle-like surface (17a) which is directed, during use, towards a hub of the axle or pivot. 25
11. Skate according to claim 1, characterized in that said insert (16) comprises a transverse raised portion (25) or tab which is suitable to engage in a corresponding slot (26,27) in each side wall (3,4). 30



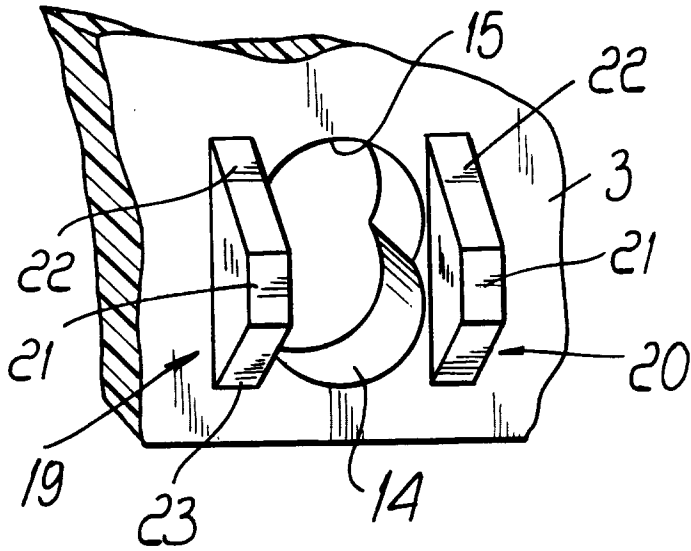


Fig. 4

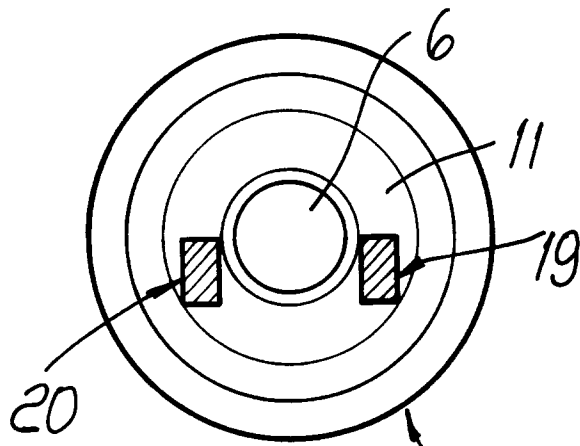


Fig. 5

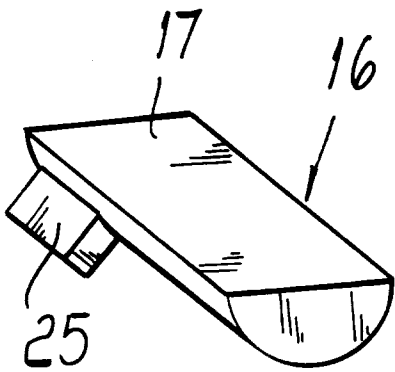


Fig. 6

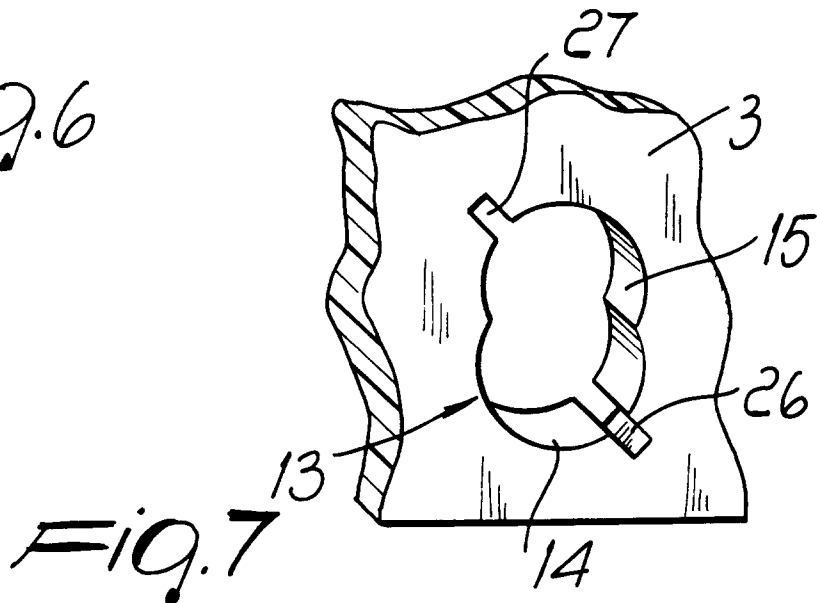
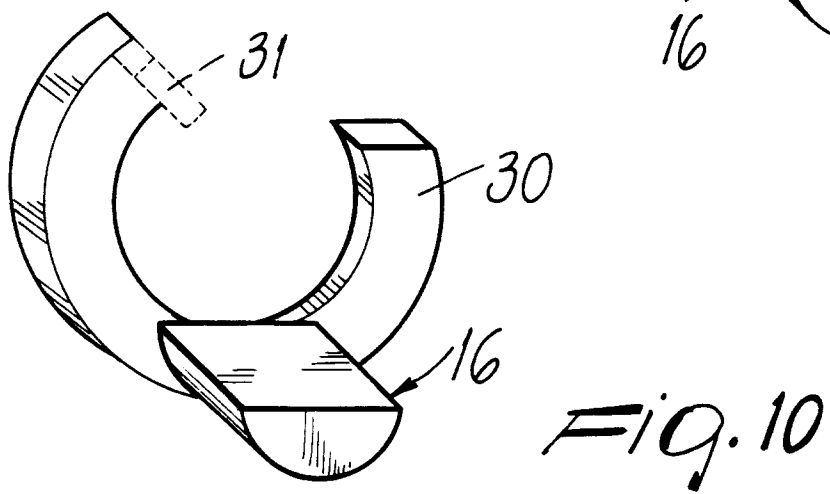
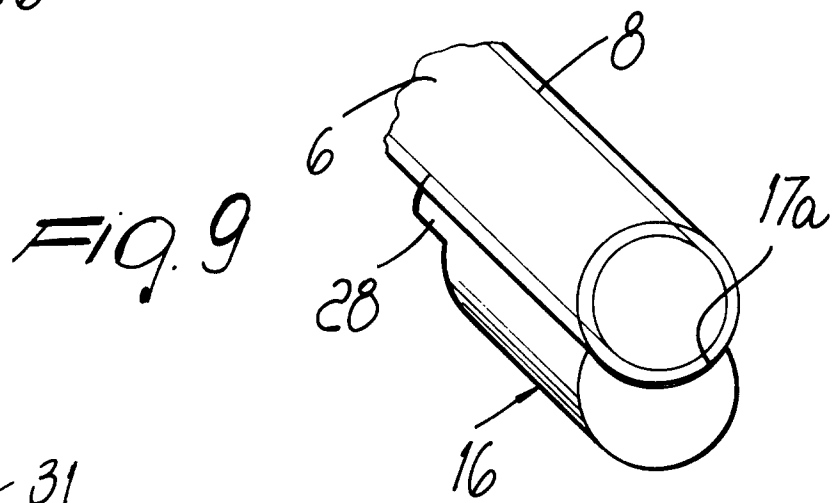
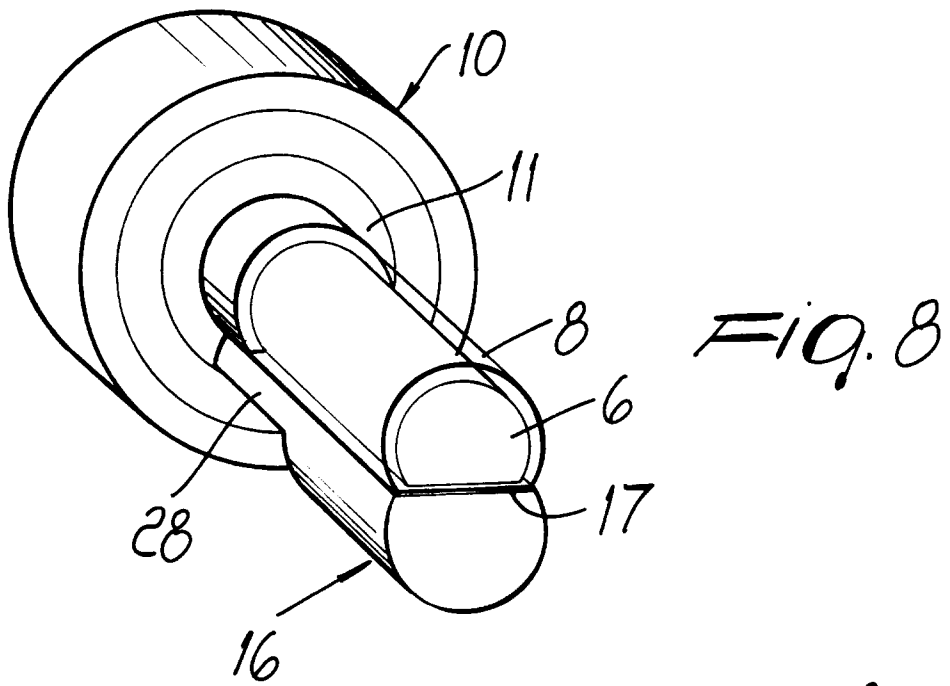


Fig. 7





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)
A	DE-A-19 52 714 (ROMBOY) * figures 1,4 * ---	1	A63C17/06
A	FR-B-1 336 926 (SEKUR-ALL CORPORATION) * figure 10 * ---	1	
D,A	US-A-5 048 848 (BRENNAN ET AL.) -----	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		24 January 1995	Papa, E
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	