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(54) Adjustable plate for fixing to the sides of a seat with its relative back and accessories, used particularly for wheelchairs for disabled people, and wheelchairs made with this system

(57) Adjustable plate for fixing to the sides of a seat with its relative back and accessories, used particularly for wheelchairs for disabled people and wheelchairs with this system. It is made up of two equal and opposite sides, with each side made up of a tubular element bent accordingly to shape and supported on its back part by a corresponding large wheel. The said element laterally supports a foldable seat and relative back, while on the front side, by means of an extension, holds a corresponding swivelling wheel and the lateral extremity of a footrest. Each side is joined to an adjustable plate that has, around its perimeter:

- two straight bars, at least one of which, being manufactured with a series of through holes, acts as an adjustment rod. The said bars come together on one side to form a hole in common with each other where a large wheel is attached;

- a third adjustment bar manufactured with a series of through holes and with a curved section, that joins the opposite ends of the said straight bars.

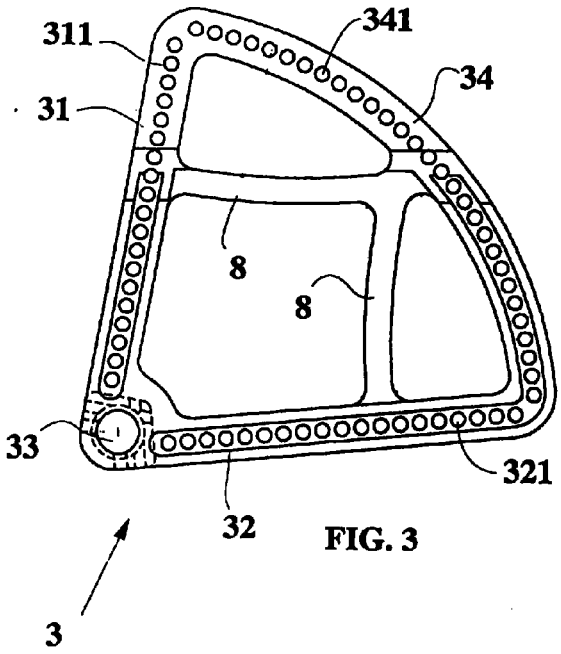

FIG. 3

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Description

[0001] The object of the invention contained herein is an adjustable plate for fixing the sides of a seat with its relative back and accessories, used particularly for wheelchairs for disabled people and wheelchairs with this system.

[0002] The invention has particular, but not necessarily exclusive, application in the sector of "active"-type wheelchairs for disabled people.

TECHNICAL FIELD

[0003] There are various types of wheelchairs for disabled people. They are basically made up of a seat part and a back part joined to a rigid frame, with a footrest attached to the front. The frame, which is static, is made up of a series of uprights and cross-members for the most part in tubular metal, that have the function of attaching two large-diameter wheels with hand-rails to the sides, and two smaller wheels that rotate and swivel on the front part of the wheelchair. Finally, there are attachments fastened to the back part, so that third parties may grip the said attachments in comfort to push and direct the wheelchair.

[0004] The logical evolution of the technology involved in the successive years, along with the particular requirements of disabled people that use wheelchairs, has led to the development and introduction on the market of new types of folding wheelchairs, although the rigid type of wheelchair, which has also been further developed, is still widely used.

[0005] From a structural point of view this type of wheelchair, as opposed to the static or rigid type, has a jointed cross-member that joins the two sides of the wheelchair which support the seat. The jointed cross-member, generally made out of tubular material, consists of joining and hinging two straight tubular elements in an intermediate position, with other straight, secondary elements orthogonal to the first elements, attached at the lower and upper ends. Regarding the secondary tubular elements, the ones at the lower end are used for attaching the sides of the wheelchair, while the other ends support the seat. The seat is made out of padded cloth or other flexible material, so that it can be folded around the central part.

STATE OF THE ART

[0006] A particular specialist sector of the market is the "active" type of wheelchairs. These are different from the traditional type in that they have a lighter structure, are smaller and, above all, can be regulated in various points so that the user can find the ideal position according to the activity to be carried out. This type of wheelchair, that is also used for sporting activities, must guarantee above all increased stability, because of the speeds reached and the sudden changes of direction carried out with the wheelchair. This stability is given by the camber or, as in horse-riding, wheels similar to those used in car racing which allow the user to increase or reduce the amount that the wheelchair is leaned over according to requirements.

[0007] From a structural point of view, the wheelchairs in question are made up of two sides and a hinged cross-member for joining the seat and the back part, with each one made up of a pair of more or less horizontal, parallel tubular elements. The upper one, which comes out inclined from the front part, along with the symmetrical side, makes up a fixing point for the footrest. The lower tubular element is attached to the upper one by means of straight, perpendicular elements. At least two of these elements are positioned close to the swivel points for the large wheels to form the quadrilateral for the system for the swivel and regulation points for the large wheels. This latter area usually has a transversal plate that can be adjusted vertically in height, and can be joined to the ends along the perpendicular elements which have holes, to determine the height of the seat from the ground. This means that the centre of gravity of the wheelchair and the camber of the wheels may be varied.

[0008] The purpose of the upper horizontal element of each side is mainly to act as a fixing point for the seat and other parts, such as the arm rests and the brakes, while the lower element forms a vertical jointing means at the front for a corresponding swivelling wheel.

[0009] The solution illustrated has various drawbacks. The first one is that the system for adjusting the seat is extremely complicated and at the same time limited, in that it is not possible to apply a certain inclination directly to the seat. Also, the addition of further tubular elements to form the sides lead to a heavier structure that mean higher manufacturing costs and a bulkier wheelchair.

[0010] Recent developments that are technically more "active" than the previous one (see other proposals by European companies) propose a wheelchair that has been lightened by using a single tubular element for each side. This tubular element, that is folded with a very open angle to apply the footrest at the end, forms the support for the seat. Going more into detail, there is a part that of the element, basically a rectangular plate, that hangs downwards and to which a fastener is attached that, on the opposite side, joins one of the two corresponding large wheels. The said fastener is adjustable along the vertical axis only, more or less copying in a simplified manner the adjustment system for less active wheelchairs, of the type made with more complex sides.

DRAWBACKS

[0011] Similarly with this latest and innovative solution there are various drawbacks, which are mainly the lack of flexibility and the ease at which adjustment of the

seat is carried out.

[0012] Regarding the most widely used solutions, there are also problems connected with the time required to assemble the sides which, have a large number of components. They are also quite cumbersome which makes moving and handling them more difficult, and makes it more difficult to manoeuvre them, especially in tight spaces.

[0013] The aim of the invention described herein is to overcome the aforementioned drawbacks.

SUMMARY OF THE INVENTION

[0014] This and other aims are achieved through the use of this invention according to the characteristics in the attached claims, solving the problems described by means of an adjustable plate for fixing the sides of a seat with its relative back and accessories, used particularly for wheelchairs for disabled people and wheelchairs with this system. It is made up of two equal and opposite sides, with each side made up of a tubular element bent accordingly to shape and supported on its back part by a corresponding large wheel. The said element laterally supports a foldable seat and relative back, while on the front side, by means of an extension, holds a corresponding swivelling wheel and the lateral extremity of a footrest. Each side is joined to an adjustable plate that has, around its perimeter:

- two straight bars, at least one of which, being manufactured with a series of through holes, acts as an adjustment rod. The said bars come together on one side to form a hole in common with each other where a large wheel is attached;

- a third adjustment bar manufactured with a series of through holes and with a curved section, that joins the opposite ends of the said straight bars.

ADVANTAGES

[0015] In this way, through the creative contribution of the system which leads to an immediate technical progress, various advantages are achieved.

[0016] First of all, a wheelchair can be constructed that is particularly appreciated by the consumers, in that the seat part can be adjusted in a wide range of positions by simply operating on the set up of the sides of the wheelchair, and at the same time optimise the seat position according to the requirements, even temporary, of the user.

[0017] In a certain sense, the presence of the fixing plates means that there is a better interaction between the various camber options and the set up of the wheelchair, allowing the sides of the wheelchair to be positioned according to the amount of inclination required for the large wheels. it is also worth mentioning that the overall adjustment of the wheelchair is very simple, by simply acting upon the four fixing points for the sides. Regarding the brakes and the footrests, they remain in the correct position because they are fixed to the regulation plate itself. Finally, the camber can be corrected by acting upon at least two of the bolts that fasten the sides to the adjustment plate.

[0018] Secondly, the conformation of the plate means that the wheelchair is considerably less bulky and lighter compared with the previous solutions, which means manoeuvring of the wheelchair is easier and that it can be stored in smaller spaces. In particular, in whatever position the regulation plate is placed, there are no components that stick out below the wheel bolt.

[0019] The third and final aspect is the fact that there are fewer components and the ease of assembly of the sided to their respective plates. This aspect make this type of wheelchair particularly favourable from a productive point of view, since it can be manufactured quickly and at a low cost.

[0020] These and other advantages will be illustrated in the following detailed description and attached drawings of a preferential application of the invention, which is to be considered simply an example, and not a limitation.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021]

Fig. 1 is a side view of the assembly of an "active" wheelchair.

Fig. 2 is a front view of the assembly of the active wheelchair as shown in fig. 1.

Fig. 3 is a side view of an adjustment plate, on a wheelchair of the type illustrated in the previous figures.

Figs. 4 and 5 are three-dimensional views of the front and back of the plate illustrated in the previous figure.

Fig. 6 is a sectional view of the plate illustrated in fig. 3.

Fig. 7 is a three-dimensional view of an inter-changeable sleeve for attaching at least one of the two large wheels.

Figs. 8 and 9 are further views of an inter-changeable sleeve as illustrated in fig. 7.

DESCRIPTION OF A TYPICAL APPLICATION OF THE INVENTION

[0022] By referring to the illustrations, a wheelchair for disabled people (A), of the type known as "active", is

made up mainly of two equal and opposite tubular elements (1), one that forms the right hand side and one that forms the left hand side, along the rear part (11) of which the foldable seat (2) and back (21) are supported.

[0023] Referring to the rear part (11) of each of the said tubular elements (1), there are two connection means that are fastened to a corresponding adjustment plate (3), to the lower part of which a large wheel (4) is fastened.

[0024] Going into detail, the said adjustment plate (3) is metallic and monolithic and has an angular shape, the top of which coincides with the fixing point of a respective large wheel (4). In this particular case, around the perimeter of the said plate (3) there is a first bar (31) that forms the vertical adjustment rod for the side (1) and of the seat (2), and a second bar (32) at approximately 75° from the first one, so that the two lower ends converge in the same position (33). This position (33) has a fixing hole, by means of at least one sleeve (5) of a large wheel (4).

[0025] Both of the peripheral bars (31) and (32) of each plate (3) are straight and are manufactured with a series of evenly pitched through holes in them (311) (312). There is a third bar (34) that is curved with a similar series of holes (341) positioned longitudinally, which in this case permit the adjustment of the side (1) inclination and, therefore, of the seat (2).

[0026] As a result, there are two fixing points of each side (1) to the plate (3), and in particular the rear part (11), respectively a first one (312) for vertical adjustment (31) and a second one (342) corresponding to any of the positions (341) along the portion of arc (34) that acts on the inclination of the side (1). Regarding the third holed bar (32), its purpose is for fixing a wheel guard (6) that doubles as an armrest and other accessories such as, in this case, a brake (7).

[0027] åßIn an optimised solution, the adjustment plate (3) is lightened by reducing the full areas of material. In this way, there will be two central reinforcement portions (8), with each one stretching along the internal perimeter from its respective lateral bar (31) (32) to the connecting portion of the arc (34).

Claims

1. Adjustable plate for fixing the sides of a seat with its relative back and accessories, and wheelchairs with this system, characterised by the fact that it has:

   - two straight bars (31), (32) of which at least one (31) forms the adjustment axis by means of a series of through holes (311). The said bars (31), (32), converging on one side, form a common through hole (33) for attaching a corresponding large wheel (4);

   - a third adjustment bar (34) with a series of holes (341), with a curved portion, that joins the opposite ends of the said straight bars (31), (32).

2. A plate according to claim 1, characterised by the fact that, being monolithic, it has areas that are free of excess material, that results in reinforcement portions (8), at least one of which stretches along the internal perimeter of its respective adjustment bar (31), (32) to the connecting portion of the arc (34).

3. Wheelchair for disabled people according to claims 1 and 2, including two equal and opposite sides (1), with each side made up of a tubular element bent accordingly to shape and supported on its back part by a corresponding large wheel (4), with the said element laterally supporting a foldable seat (2) and relative back (21), while on the front side, by means of an extension, holds a corresponding swivelling wheel (9) and the lateral extremity of a footrest (10), characterised by the fact that each side (1) is joined to an adjustable plate (3) that has, around its perimeter:

   - two straight bars (31), (32), at least one of which (31), being manufactured with a series of through holes (311), acts as an adjustment rod, with the said bars (31), (32) that come together on one side to form a hole in common with each other (33) where a large wheel (4) is attached;

   - a third adjustment bar (34) manufactured with a series of through holes (341) and with a curved section, that joins the opposite ends of the said straight bars (31), (32).

4. Wheelchair for disabled people according to the previous claims, characterised by the fact that around the perimeter of the said plate (3) there is a first bar (31) that forms the vertical adjustment rod for the side (1) and of the seat (2), and a second bar (32) at approximately 75° ±15° from the first one, so that the two lower ends converge in the same position (33). This position (33) has a fixing hole, by means of at least one sleeve (5) of a large wheel (4).

5. Wheelchair for disabled people according to the previous claims, characterised by the fact that both of the peripheral bars (31) and (32) of each plate (3) are straight and are manufactured with a series of evenly pitched through holes in them (311) (312), and that there is a third bar (34) that is curved with a similar series of holes (341) positioned longitudinally, and which in this case permit the adjustment of the side (1) inclination and, therefore, of the seat

(2).

6. Wheelchair for disabled people according to claim 4, characterised by the fact that, in an adjustment plate (3), the sleeve (5) has an out of line hole to define the camber of the relative large wheel (4).

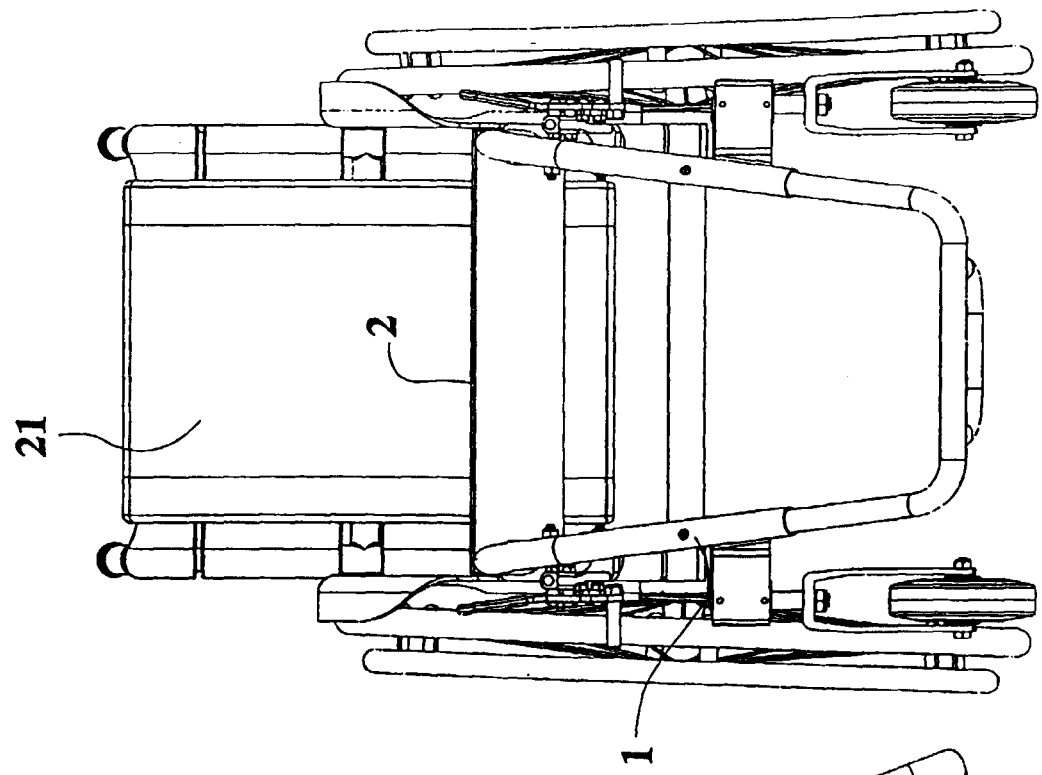


FIG. 2

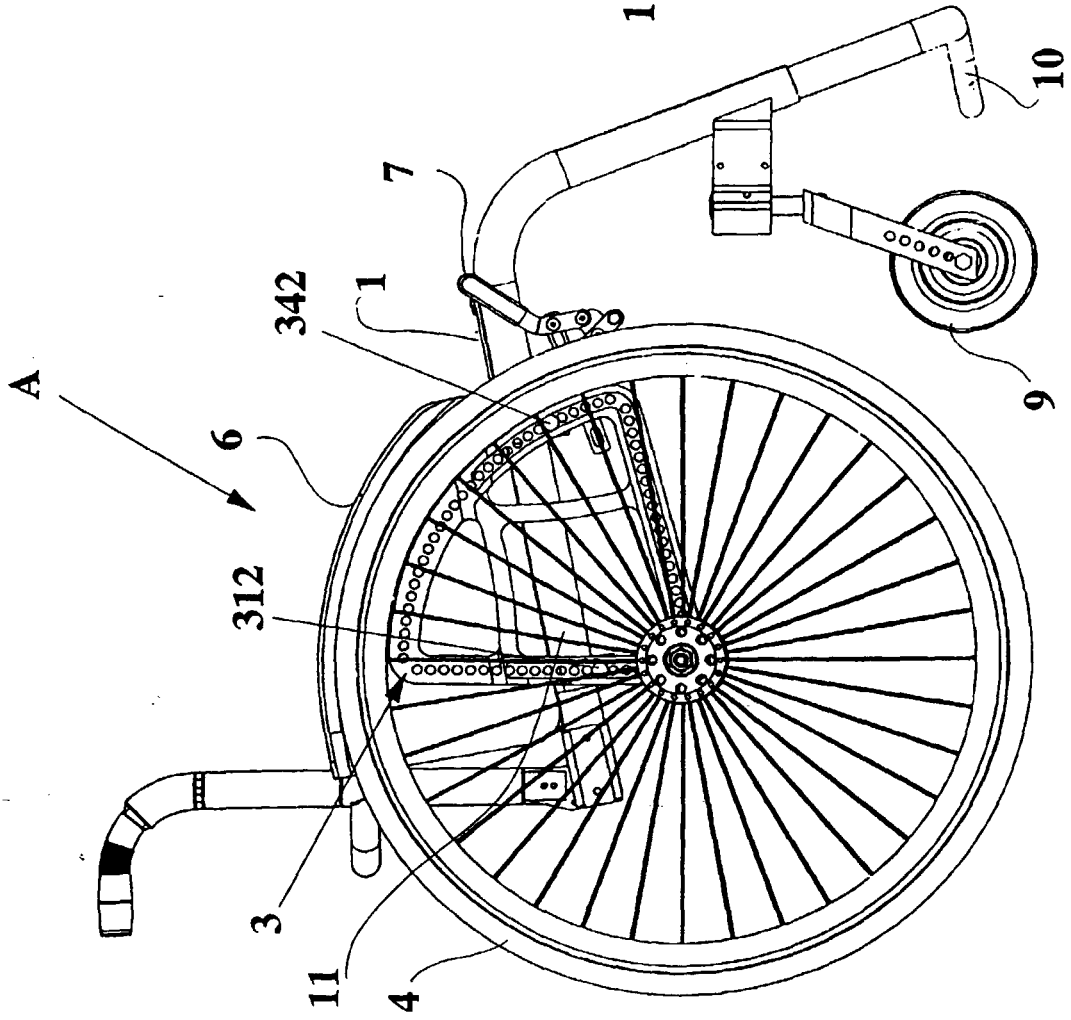


FIG. 1

FIG. 6

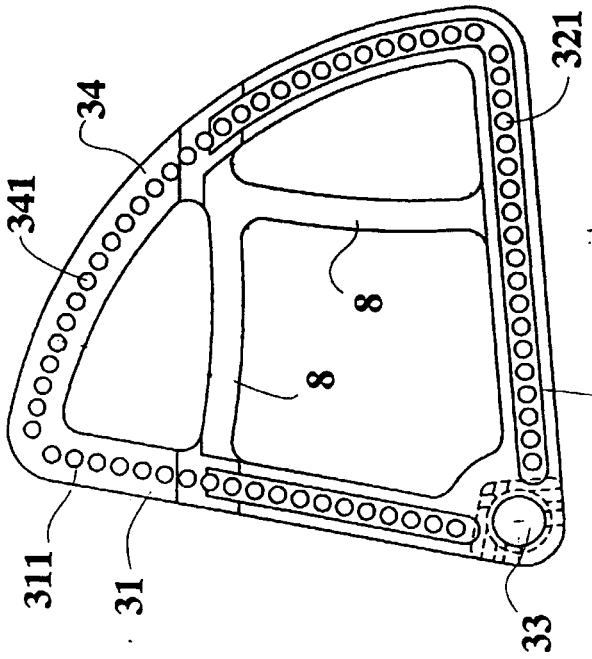


FIG. 3

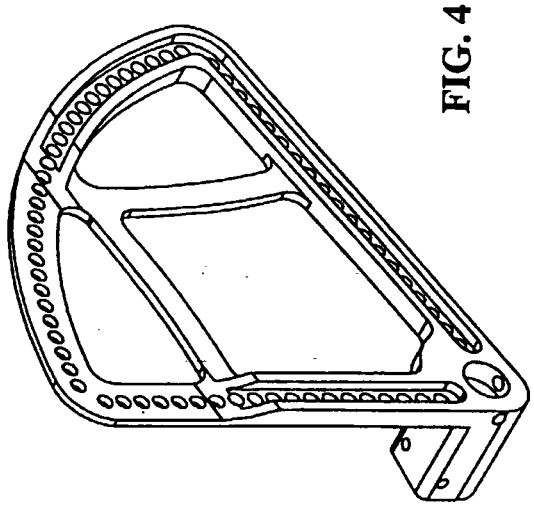


FIG. 4

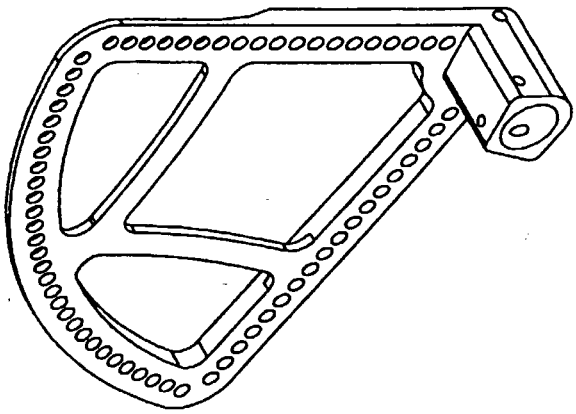
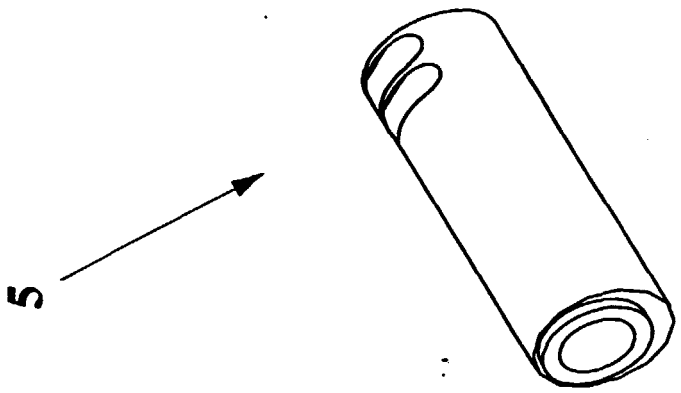


FIG. 5

FIG. 7



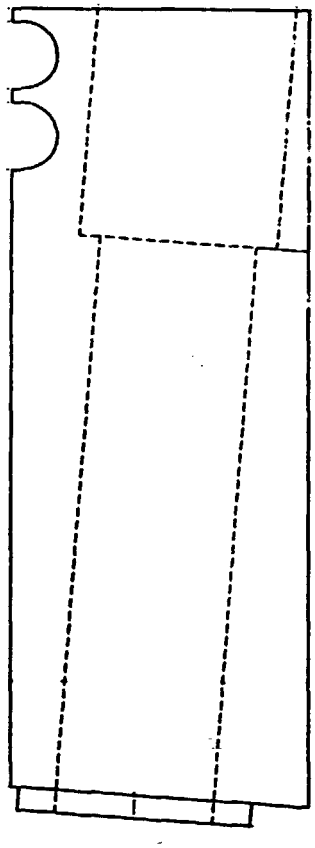


FIG. 8

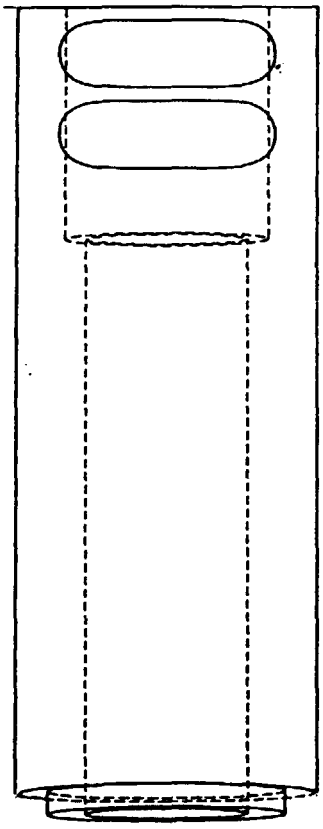


FIG. 9