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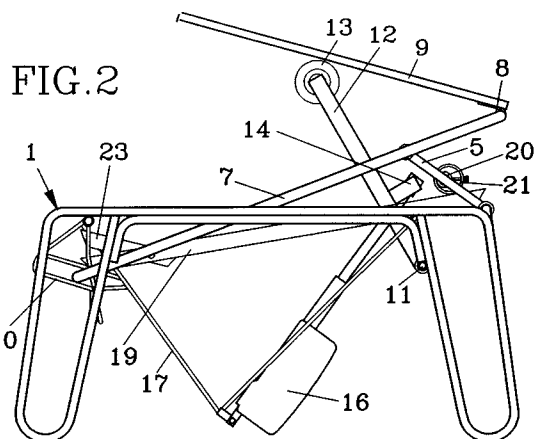
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**Adjustment device for a tiltable armchair.**

Adjustment device for tiltable sitting furniture with a stand (1) and a seat board (9) pivoting at the front side of the stand (1) as well as driving device (16) arranged to convey the seat board (9) its tilt motion, where the seat board (9) at the front is pivotally arranged at the front edge of a fork (7) articulately suspended via arms (5) at the front part of the stand (1), which fork (7) is in rear the part of the stand (1) and at the rear is guided slidably against a slide rail (10), and the driving device (16) of which via a pressure arm (12) pivotally arranged at the stand (1) transfers motion to the seat board (9), in addition to the pressure arm (12) is pivotally connected a control bar (19) between its pivot point and its end with the seat board (9), which control bar (19) during work of the driving device (16) with its front part first is brought to bearing on a position adjustable backing roller (21) connected to the arms (5) of the fork (7) and subsequently with its rear part (23) in different positions adjustable against a rear cross bar (4b) acting as counter surface, whereupon

the movement surpasses to a pure tilt about the pivot axis (8) of the seat board (9).



## Background of the invention

The present invention refers to an adjustment device for a tiltable armchair or a similar sitting furniture.

Disabled persons often have great difficulties to sit down and to get up from chair seats if they can't get assistance or support from another person. It is evident that this not always can be offered when the disabled person wishes to get up from a sitting position or to get seated from a standing position.

For this purpose earlier has been developed mechanisms arranged from a sitting position to be able to tilt the rear part of the seat upwards/ahead about a front axis from a sitting position. Such previously known designs have been cumbersome and complex and have furthermore lacked adjusting possibilities for giving a natural and adapted movement pattern according to individual, of height and possibly of handicaps dependent needs.

## Object and most essential features of the invention

The object of the present invention is to offer an adjustment device by means of which a well functioning and easy adaptable accessory of this type is provided and the characteristics of the device are evident from claim 1.

## Specifications of drawings

The invention will be described in the following in closer detail with reference to an embodiment illustrated in the enclosed drawings, whereby the drawings only show the chair stand with the seat board and its adjustment means connected thereto.

Fig. 1 in a lateral view shows a chair stand with the control device according to the invention in sitting position.

Fig. 2 is a corresponding view with the seat board completely folded up.

Fig. 3 is a view corresponding to Fig. 2 with a deviating setting of the adjustment means of the seat board.

Fig. 4 is a view corresponding to Fig. 3 with a further different setting of the adjustment means, and

Fig. 5 is a front view of the setting position shown in Fig. 3.

## Specification of the preferred embodiment

The device shown in the figures includes a stand 1 in the shape of two tube frames 2, each in the form of a tube with the ends bent to equally long double folded legs 3. These tube frames 2 are mutually connected by means of a horizontal front

cross bar 4a and a rear cross bar hinted at 4b whereby the stand 1 constitutes an essentially horizontal, rectangular frame supported by four legs 2. Provided at the front cross bar 4a are pivotally connected one end of each of two at a distance from each other arms 5, which, as is evident from Fig. 5, with their opposite ends are pivotally connected with two shaft bars 6 opposite directed and provided in line with each other which shaft bars are placed on the insides of the shanks of an U-shaped fork 7, on which base portion situated between the shanks, a front edge of a seat board 9 is pivotally journalled via hinges 8, which seat board thereby has its pivot axis provided transverse at the front end of the stand 1. The U-formed fork 7 extends on the opposite side of its bearing on the shaft bars 6 obliquely downwards/backwards to the proximity of the rear part of the stand, where its end portion supports against a slide rail 10 provided obliquely upwards in level with the rear part of the stand, against which slide rail, said end portion is slidable in its longitudinal direction. On the front part of the stand 1, but behind the cross bar 4a bound to the stand, a transverse axis 11 is placed on a lower level, which axis centrally supports a pressure arm 12 pivotally hinged thereon, which pressure arm at its opposite end ends with a wheel 13 the axis of which is parallel to the transverse axis, and which in operative position bears against the underside of the seat board 9 and is arranged to adjust the seat board into different oblique positions under pressure.

The pressure arm 12 for this purpose is equipped with an attachment bracket 14 perpendicular to the pressure arm which bracket is attached to the piston rod 15 of an electric actuator 16, which is pivotally suspended at its opposite end in a support structure 17 in the shape of cooperative rods, which are fastened to the stand and go together at a low point of attachment near the center of the stand, where the actuator is pivotally connected. The electric actuator 16 is naturally equipped with a power supply cable as well as cables (not shown in the figures) for controlling the actuator, which cables preferably are provided within an arm of the chair, in which the device shall be included, or to another appropriate position from an operational point of view. At the pressure arm 12 furthermore, at a position 18 in the proximity of the attachment bracket 14, a cantilever control bar 19 is pivotally connected, which bar extends in the longitudinal direction of the stand along the major part of the stand. This control bar 19 is arranged to be turned during the movement of the rod piston 15 and the tilt of the pressure arm 12 caused thereof, but its rotational movement upwards is limited at the front by a horizontally extending axis 20, arranged between the arms 5, with a backing

roller 21 provided on said axis, which by means of a locking screw is lockable in different eccentric positions onto the axis, whereby the front stop face of the control bar is settable. At the rear the movement of the control bar 19 is limited upwards by the rear cross bar 4b provided in connection with the mentioned slide rail 10 for the end portions of the fork 7. The control bar 19 is at its rear part furthermore equipped with a second arm portion 23, which is rotatably pivoted at point 22 on the control bar 19 and lockable in different tilting positions with respect to this point.

By means of the adjustability of the backing roller 21 and adjustability of the second arm portion of the control bar 23, the movement path of the control bar can be adjusted after desiderata, to control the angle of elevation, to determine when the movement of the seatboard shall be transferred from a pure lifting movement to a combined lift-and-tilting movement and even to adjust the sitting height of the chair, so that the height of the chair in a simple way can be adapted to different desiderata.

The function of the device according to the invention is described in the following: In Fig. 1 is shown a lateral view of the chair stand 1 in its sitting position, ie. the seat board 9 is in a horizontal, and even in a back leaned position. The front part of the chair stand in the figure is turned to the right while the side that supports the back is the left side in the figures. In this position the piston rod 15 of the actuator is maximally withdrawn.

When the actuator 16 now goes into operation its piston rod 15 moves out and thereby develops an upward directed force onto the attachment bracket 14 and thereby onto the pressure arm 12. At its motion, the control bar 19, which is pivoting about the axis 18 will at first with its front end move to stop against the backing roller 21. During this phase of the movement the wheel 13 of the pressure arm presses onto the seat board 9 so that this from its- slightly back leaned position pivotes to a horizontal or even slightly forward leaning position and simultaneously carrying the fork 7 and the arms 5. When the control bar 19 is in contact with the backing roller 21, the rear part of the control bar respectively its other arm portion 23 will be lifted during simultaneous lift of the seat board 9 until the rear arm portion respectively the other arm portion 23 come in contact with the rear cross bar 4b and in its further motion is prevented by this.

In this position action from the pressure arm wheel 13, will only tilt the seat board 9 about the hinges 8 of the fork 7 during the further motion of the rod piston upwards. When the seat board is maximally tilted up, it is in such a position, that a person sitting in the chair in a natural posture will be standing somewhat leaned backwards without

thereby needing to execute bending and stretching movements with his knees and hips.

In a corresponding manner a person who is going to sit down, can lean himself slightly backwards against the chair seat and subsequently start the actuator 16 from the position where the seatboard is maximally folded up so that this will be reversed and in an inverted manner tilt down and lower the seat board to the sitting position.

In order to be able to adjust the chair height to suit persons with different length partly the backing roller 21 can be turned eccentric about its horizontal axis 20 and be locked in an optional position by means of its adjusting screw, and partly the other arm portion 23 of the control bar can be biased upwards in respect with the control bar 19 and likewise be locked in the desired position with its locking screw. Through such adjustment possibilities one can decide at which height and when in the motion path the front part of the control bar comes in contact with the backing roller 21 and thereby begins to exert a lifting force onto the fork 7 and thereby associated parts and when the rear part of the control bars comes to bear against the rear cross bar 4b and thereby interrupts the lifting movement of the seat board.

The actuator 16 can of course be stopped in each desired position of motion, whereby one even through this function can adapt the height of lift and the tilt motion exactly after individual desiderata, and the movable parts can thus thereby be continuously stopped anywhere in its movement path.

With this structural design and thereby following functions has been achieved a chair, that constitutes a well functioning accessory for persons, who have difficulties to sit down in a chair or armchair and who have difficulties to get up from the same, and which furthermore is easy adjustable to adapt the movement pattern and the sitting height of the seat board after individual height and bodily constitution of each person.

The invention is not limited to the embodiment shown in the drawings and described in connection thereto, but modifications and variants are possible within the scope of the following claims.

## Claims

1. Adjustment device for a tiltable armchair or the like sitting furniture with a stand (1) and a seat board (9) pivotally arranged about an axis (8) at the front side of the stand, as well as a driving device (16) provided within the stand and arranged to act on the seat board (9) to cause its tilting motion,  
**characterized therein,**  
that the seat board (9) at its front side-edge is pivotally provided at the front-edge of a fork

(7), which via arms (5) is articulatedly suspended at the front part of the stand and at its rear part is guided slidably against a slide rail (10) at the rear part of the stand, that the driving device (16) is arranged to transfer motion to the seat board via a pressure arm (12) pivotally provided at the stand, and that to the pressure arm (12) between its pivot point and its end cooperative with the seat board a control bar (19) is pivotally connected and arranged so that during the work of the driving device (16) with its front part is brought to bear against a position adjustable backing roller (21) connected to the arms (5) of the fork (7) and with its rear part (23) adjustable in different positions against a rear cross bar (4b) acting as a counter face, whereby the construction is such that the front part of control bar (19) at the elevation movement of the seatboard is provided to first come to bear against the backing roller (21) and after further elevation movement with its rear part (23) against its counter face (4b), whereby the movement subsequently is transferred to a pure tilt about the pivot axis (8) of the seat board.

2. Device according to claim 1,  
**characterized therein,**  
that the backing roller (21), which constitutes application surface for the front end of the control bar (19) is formed as a sleeve which is eccentric lockable in different positions onto an essentially horizontal axis (20) connecting the arms (5).
3. Device according to the patent claim 1 or 2,  
**characterized therein,**  
that the control bar (19) at its rear part is equipped with an adjustable arm portion (23) which is lockable in longitudinal direction in different angle positions with respect to the handle bar for setting of the motion distance of the control bar (19) between neutral position and its contact point with its counter face (4b).
4. Device according to any of the preceeding claims,  
**characterized therein,**  
that the driving device is constituted by an electric actuator (16) articulatedly attached with its one end in a means of attachment (17) located low in the stand, the piston rod of which actuator is provided to act on the pressure arm (12).

FIG.2

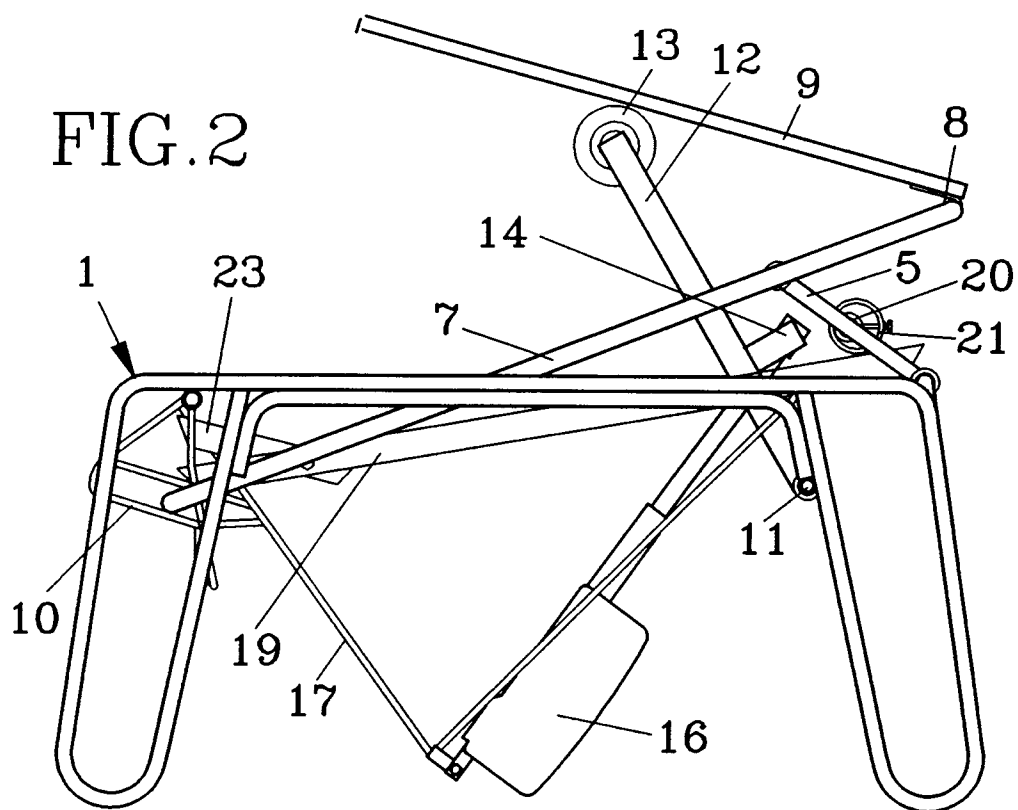


FIG.1

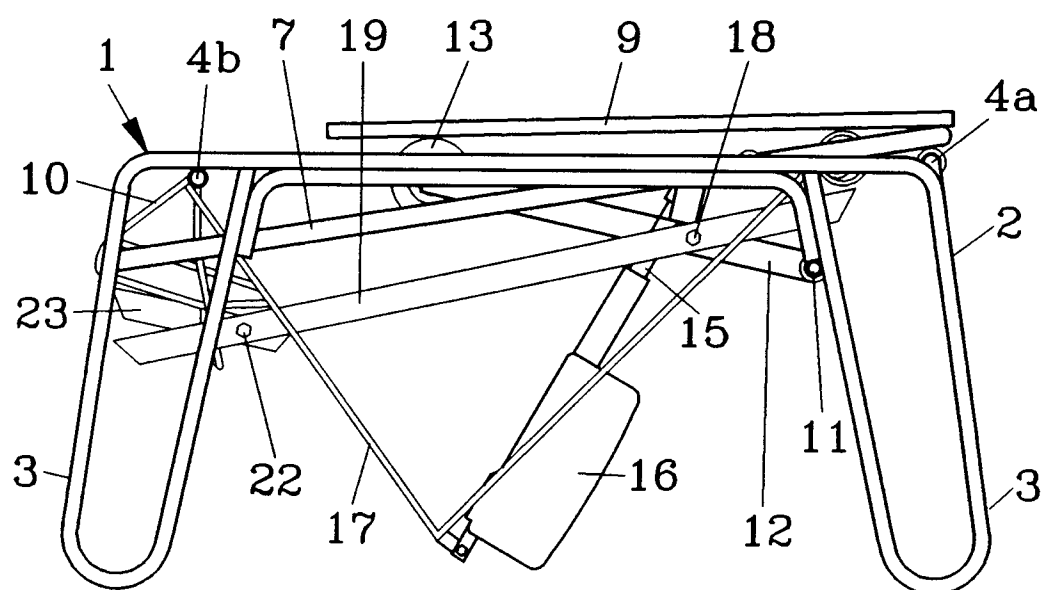


FIG.3

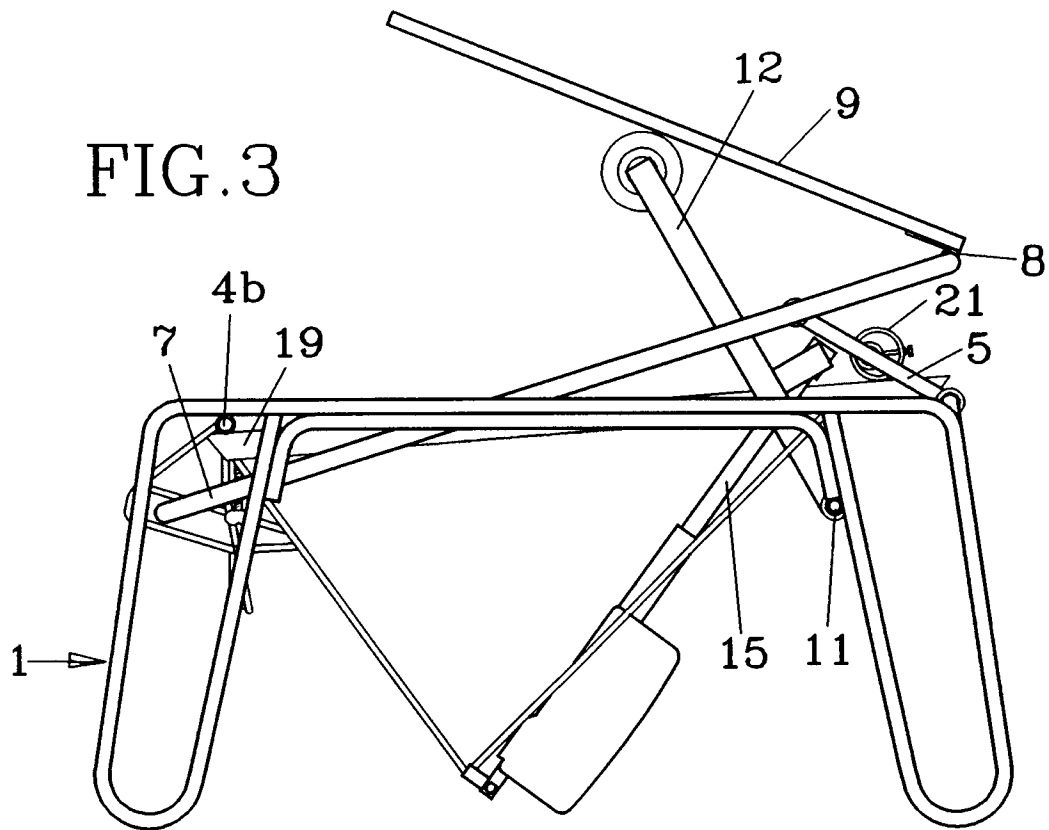


FIG.4

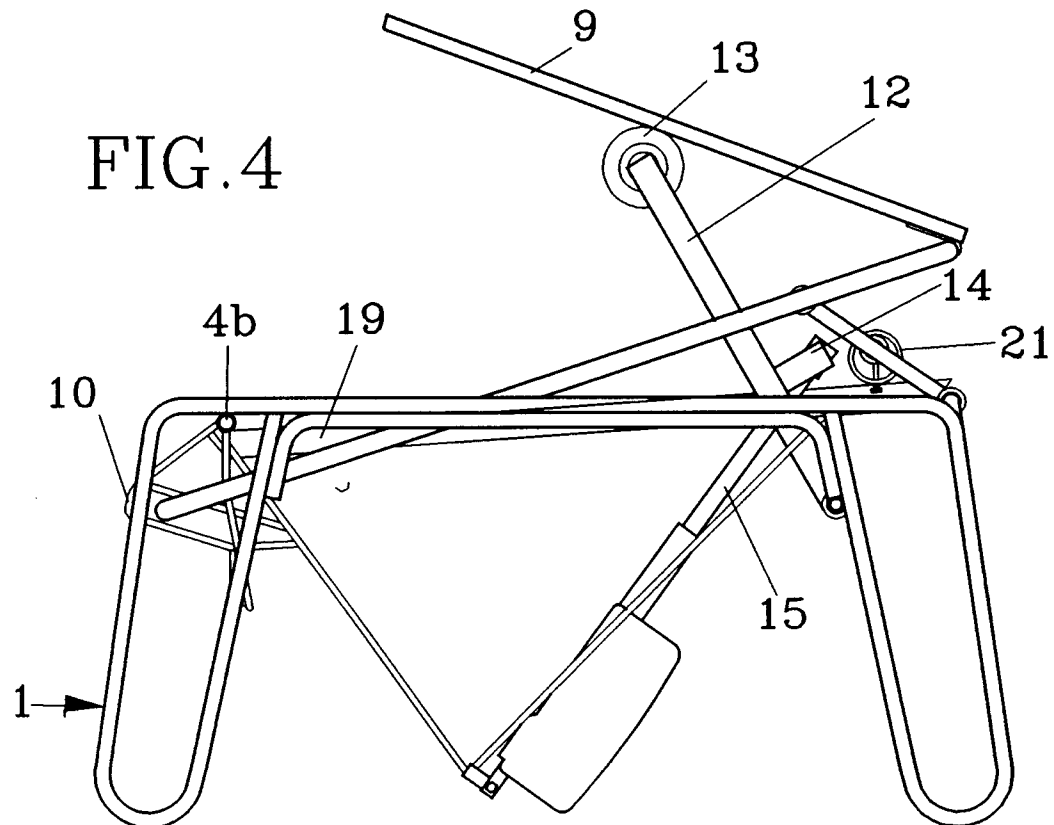
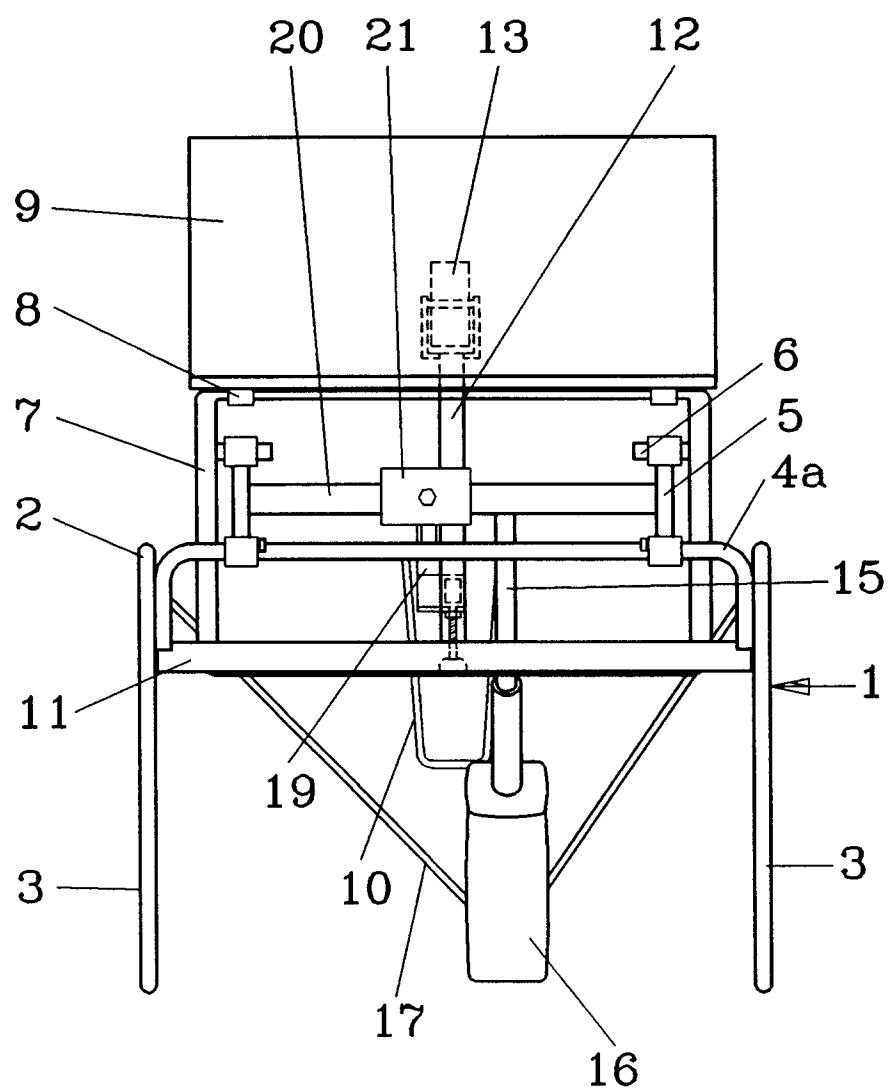


FIG.5





European Patent  
Office

## EUROPEAN SEARCH REPORT

Application Number

EP 92 85 0282

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.5)
A	US-A-4 637 654 (BOARDMAN) * column 2, line 17 - line 57; figure 2 * ---	1	A61G5/14
A	WO-A-8 203 320 (BERGENWAL) * page 5, line 13 - line 21; figures 1-3 * ---	1	
A	US-A-4 453 766 (DIVITO) * column 2, line 31 - column 3, line 10; figures 1-3 * ---	1,4	
A	CH-A-553 56I (BENMAX) * the whole document * -----	1,4	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			A61G
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 30 JUNE 1993	Examiner BAERT F.
<b>CATEGORY OF CITED DOCUMENTS</b> 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 I : document cited for other reasons ..... & : member of the same patent family, corresponding document			