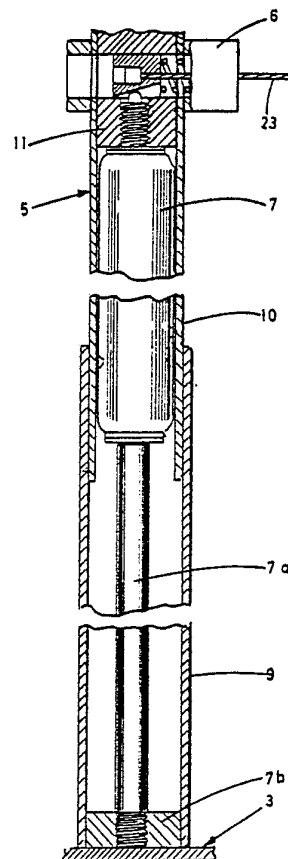




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(54) Title: WALKER (57) Abstract Walker of the kind that comprises an arm support (2) journaled in a base (3) provided with wheels (4), the arm support being adjustable vertically relative to the base. According to the invention the arm sup- port is connected to the base (3) over a controllable raise/lower device (5), which, in a deactivated state, locks the arm support vertically rela- tive to the base, but which, in an activated state, exerts a force on the arm support, which force urges to raise the arm support relative to the base.		



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WALKER

BACKGROUND OF THE INVENTION

The present invention relates to a walker having an arm support journaled in a base provided with wheels, the arm support being adjustable vertically relative to the base.

Walkers of the above kind are previously known of different designs. What is common for these known walkers is however, that they, in an unloaded state, are only, and by steps, adjustable vertically, not providing any possibility for the user to receive a lifting aid when raising himself from a sitting position in order to move by means of the walker. In reverse, neither do these known walkers provide any aid to the user when he, after having moved around with the walker, is to sit down again.

Walkers of this common kind are used by persons with reduced strength in arms or legs or with difficulties maintaining balance, i.e., mostly by persons with such serious ambulatory handicaps that use of crutches is totally out of the question. One drawback with the earlier known walkers is that, in use, their height can not be adjusted. Thus, each walker has to be adjusted for a height that is adapted to the user, and the accomplished adjustment is not altered as long as the same person uses the walker. However, it is even more aggravating that a person with serious ambulatory handicaps without aid, lacks the possibility to rise from a sitting position to the walker, which is fixedly adjusted at a level that is adapted according to the height of the upright standing user. Likewise, it can be very difficult for the user to move, without any aid, from an upright position by the walker to a sitting position. Since persons with serious ambulatory handicaps, if not being helped, even may feel forced to "throw themselves down" from

the walker and onto an arm-chair or similar, there is an additional risk that they will hurt themselves and/or will damage for example the arm-chair.

SUMMARY OF THE INVENTION

The object of the invention is therefore to provide a walker of the above kind, by the help of which the above presented drawbacks with conventional walkers, can be eliminated.

This objective will be achieved with the help of a walker according to the appended patent claims. From these claims it will also be evident what in particular is characteristic of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

Exemplary embodiments of the invention will be described more in detail below, with reference to the accompanying drawings, wherein:

Figure 1 shows a perspective view of a walker according to the invention,

Figure 2 shows a cross section through the raise/lower device according to the invention,

Figure 3a shows a view in detail, also in a cross section, of the upper part of the raise/lower device including the valve mechanism, and

Figure 3b shows the valve mechanism in a plan view according to Fig. 3a, and

Figure 4 shows an alternative embodiment of the valve mechanism, also in a cross section.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

The invention is shown in Fig. 1 in conjunction with a known type of a walker. It should, however, be clear that the invention can as well be used for other types of walkers having the common basic features as stated in the preamble of the accompanying claim 1.

With reference to Fig. 1 the walker, thus, comprises a base 3 provided with wheels 4, from which base two support tubes 9 extend upwardly. The support tubes 9 being tubular are adapted, each one of them, to receive a leg 8 extending downwardly from an arm support 2.

The arm support 2 is, seen from above, U-shaped and has a padded upper surface, so that the user can be standing in the U-opening with both arms resting on the arm support and the hands placed on the handles 2a, which are fixed in connection to the web of the U-shape. In the embodiment shown in Fig. 1 a control handle 14 is fixed in connection to the handles 2a, the function of which is to operate a valve mechanism 6, which in turn actuates a raise/lower device, which will be described more in detail further below. Alternative options for the operation of the valve mechanism will also be discussed below.

As most clearly appears from Fig. 2 the raise/lower device 5 according to the invention is mounted in the legs 8 of the arm support constituting the actual connection between this leg 8 and the support tube 9 of the base 3. It is conceivable, however, to mount a raise/lower device 5 in one of the arm support legs 8 only, but in order to attain a reliable function, it is of an absolute preference that the raise/lower device is arranged in each of the arm support legs.

The raise/lower device 5 comprises a gas spring 7 which is of a conventional type, and therefore needs no further description.

For explanatory purposes it should be said that gas springs of this kind contain a compressed gas, which continuously exerts a force that urges the piston rod to extend toward its outermost position. At the piston end opposing the piston rod end, the piston has a pin 7c, which when being unloaded, automatically locks the piston in the position it has reached. By depressing the pin the piston is activated, so that the compressed gas urges the piston rod to extend. In the shown embodiment the gas spring is at its rear end and through a male thread mounted in an end piece 11 which is fixedly provided in the upper end of a slide tube 10 forming the arm support leg. The piston rod 7a of the gas spring extends downwardly from the slide tube 10 and into the support tube 9 of the base 3, having at its free end a guiding block 7b, preferably of aluminium, which is a tight fit in the support tube 9 for fixing the piston rod transversely, but which yet is provided with an outer dimension that is somewhat smaller than the inner diameter of the support tube 9, so that it can be readily withdrawn therefrom. During operation of the raise/lower device the guiding block 7b is in a constant contact with the base 3 at the bottom of the support tube 9, whereby the base functions as a stop face. As is shown in Fig. 2 the slide tube 10 of the arm support is tightly received inside the support tube 9 of the base 3 so as to be slidably guided therein when the raise/lower device 5 is operated.

As is best shown in Fig. 3a the end piece 11, which is fixedly arranged in the slide tube 10, is at its lower end provided with a female threaded bore 11b, in which the gas spring 7 is mounted in the above indicated way. The female threaded bore 11b debouches into a bore 16, which is transversely made through the end piece 11 and which is intended to cooperate with a valve mechanism, which will be described later on. It is also realized, that when the gas spring is mounted in the end piece, its pin 7c protrudes a distance into the transverse bore 16 of the end piece 11. In the upper portion of the end piece 11 there is also provided a threaded bore 11a, in which a bolt

12, which is fixed to the arm support and protrudes downwardly therefrom, is engagable for the detachable mounting of the end piece and, thus, the slide tube 10 to the arm support 2.

By the described arrangement the whole raise/lower device 5 including the slide tube 10 and the end piece 11 connected thereto, can be exchanged, when needed, as a complete cassette. This possibility of a simple changing of the complete cassette permits a smooth and easy way of adapting the walker according to patients of different weights. For this purpose there are preferably provided ready-to-use cassettes, which are equipped with gas springs of varying power. In this context it should be mentioned that it is very important that the lifting aid be adapted carefully according to the user of the walker, on the one hand, because the lifting force must not be greater than to permit the person to press down the walker, without any problem, in order to sit himself down and, on the other hand, because the lifting force yet should be sufficient to make it possible for the person to rise and sit down without help. As for the case with the seriously ambulatory handicapped persons, it is additionally of a great importance that they are not rendered too great a lifting aid by the walker, since, in many instances, it is necessary for these persons to keep on being active and training their muscles according to ability, so that the muscles do not undergo atrophy. It has proven in practice that the best function, with regard to the above, is achieved if the raise/lower device 5 has a lifting power that is lower than the weight of the user by approximately 20 kilograms.

As is mentioned above the activating pin 7c of the gas spring extends into the transverse bore of the end piece 11, and for the operation of this pin there is mounted a valve mechanism to the slide tube 10. In the embodiment shown in Figs. 1 - 3, the valve mechanism comprises a valve body 17 with a through bore 18 (Fig. 3b) having a diameter adapted to the outer diameter of the slide tube. The valve body 17 is mounted onto the slide

tube, which is inserted into the through bore 18 and secured to the slide tube by means of not shown lock screws. Furthermore, the valve body 17 has a valve bore 20 which, with the valve mechanism being mounted, is in alignment with the transverse bore 16 of the end piece 11, and has the same cross section dimension as the transverse bore, so that these bores integrally form a passage for a valve slide 19, which by means of a spring 21 is biased to the left in Fig. 3a. It is also realized, that in the embodiment shown in Figs. 3a, b, openings 10a, the dimension of which corresponds to the transverse bore 16, are made in the slide tube 10 in connection with the ends of the transverse bores. The valve slide 19 has at its underside an oblique groove 22, the depth of which increases from left to right in Fig. 3a. As is mentioned above, the pin 7c of the gas spring 7 extends into the transverse bore 16 of the end piece 11, and it is now obvious that the pin 7c is received in the groove 22 of the valve slide 19 and is depressed gradually as the slide is brought to the right in Fig. 3a. In the shown embodiment the valve slide 19 is operated by means of the handle 14 through a cable 23, one end of which is fixed to the valve slide. In the shown embodiment where the valve slide is operated by means of a cable, the left end, according to Fig. 3a, of the valve bore 20 is closed by means of a not shown plug, which at the same time serves as a stop for the valve slide and restricts its movement to the left. In a not illustrated, alternative embodiment a servo motor can, however, be mounted in the left end, according to Fig. 3a, of the valve bore, which servo motor drives the valve slide to the right in the figure when being activated. The embodiment with a servo motor is preferably used in those cases, when the walker is to be used by a patient, who lacks sufficient hand strength in order to operate the valve slide in the described way by means of a handle and a cable. It is well known in a similar context to use servo motors operated by the patient for example blowing air into a tube. These known operative devices are not, per se,

part of the invention, and are therefore not described any further.

Fig. 4 shows another, simpler embodiment of the valve mechanism 6', which in this case comprises an operating arm 13 pivoted by a trunnion in the end piece 11', which operating arm via the control handle 14 arranged in connection to the arm support, and the cable 23, is brought to rotate around its pivot so as to engage the pin 7c of the gas spring 7 for raising or lowering, respectively, the arm support.

The described walker functions in the following way:

When a patient, who moves by means of the walker, wants to sit down, he maneuvers himself so that he is standing with his back turned to the chair, the bed or similar, where he wants to sit down, after which he actuates the control handle 14. By actuation of the handle, the gas spring 7 is activated and by putting his weight onto the arm support which, thus, is being pressed down, the patient can smoothly and safely lower himself down toward the seat. Thereafter, he lets go of the control handle 14, before unloading the arm support, so that the gas spring is blocked in position and, thus, the arm support is also restrained in the position to which it has been forced down.

Since the arm support remains in the depressed position, it is easy for the patient to reassume the arm support position whenever he wishes to rise. In an analogous way the patient once again operates the control arm 14 and by not pressing down against the arm support, using all his weight, but instead, according to ability, trying to raise himself, the patient will get sufficient lifting aid from the gas compressed in the gas spring, so that he, without any assistance from another person, can rise. After the arm support has reassumed a height level appropriate to the patient, the patient will let go of the

control handle, whereby the gas spring once again will be locked. It is also to be mentioned, that for practical reasons a gas spring without damping should preferably be used, i.e., a gas spring which is completely rigid in a locked position. This will make it easier for the patient to move by means of the walker.

Even if appropriate embodiments of the invention have been shown and described herein, this invention should not be regarded as limited to the shown and described exemplary embodiments, but the invention should also be regarded as encompassing modifications and variations thereof, which are obvious to a person skilled in this technical field art. The scope of the invention should, thus, only be restricted by the accompanying patent claims.

CLAIMS

1. A walker having an arm support (2) journaled in a base (3) provided with wheels (4), the arm support being adjustable vertically relative to the base, **characterized in that** the arm support is connected to the base by a controllable raise/lower device (5), which, in a deactivated state, locks the arm support vertically relative to the base, but which, in an activated state, exerts a force on the arm support, which force urges to raise the arm support relative to the base and is dimensioned to offer the user lifting aid when rising, and a yieldable support when moving from a standing to a sitting position.
2. A walker according to Claim 1, **characterized in that** the raise/lower device (5) comprises a controllable gas spring (7), which is controllable over a valve device (6, 6') and mounted in at least one of two legs (8) of the arm support, which legs are adapted to be received by support tubes (9) extending upwardly from the base.
3. A walker according to Claim 2, **characterized in that** the arm support legs (8) and the gas spring (7) with the valve device (6, 6') for the possibility of being replaceable are arranged in the form of a detachable cassette which is mounted at the arm support by a bolted joint.
4. A walker according to Claim 3, **characterized in that** the arm support legs (8) comprise a slide tube (10) in the upper portion of which an end piece (11, 11') is fixedly arranged, which, in turn, in the upper end has a threaded bore (11a) for receiving a bolt (12) for the mounting of the slide tube at the arm support, and at the lower end has a threaded bore (11b) for the mounting of the gas spring (7).

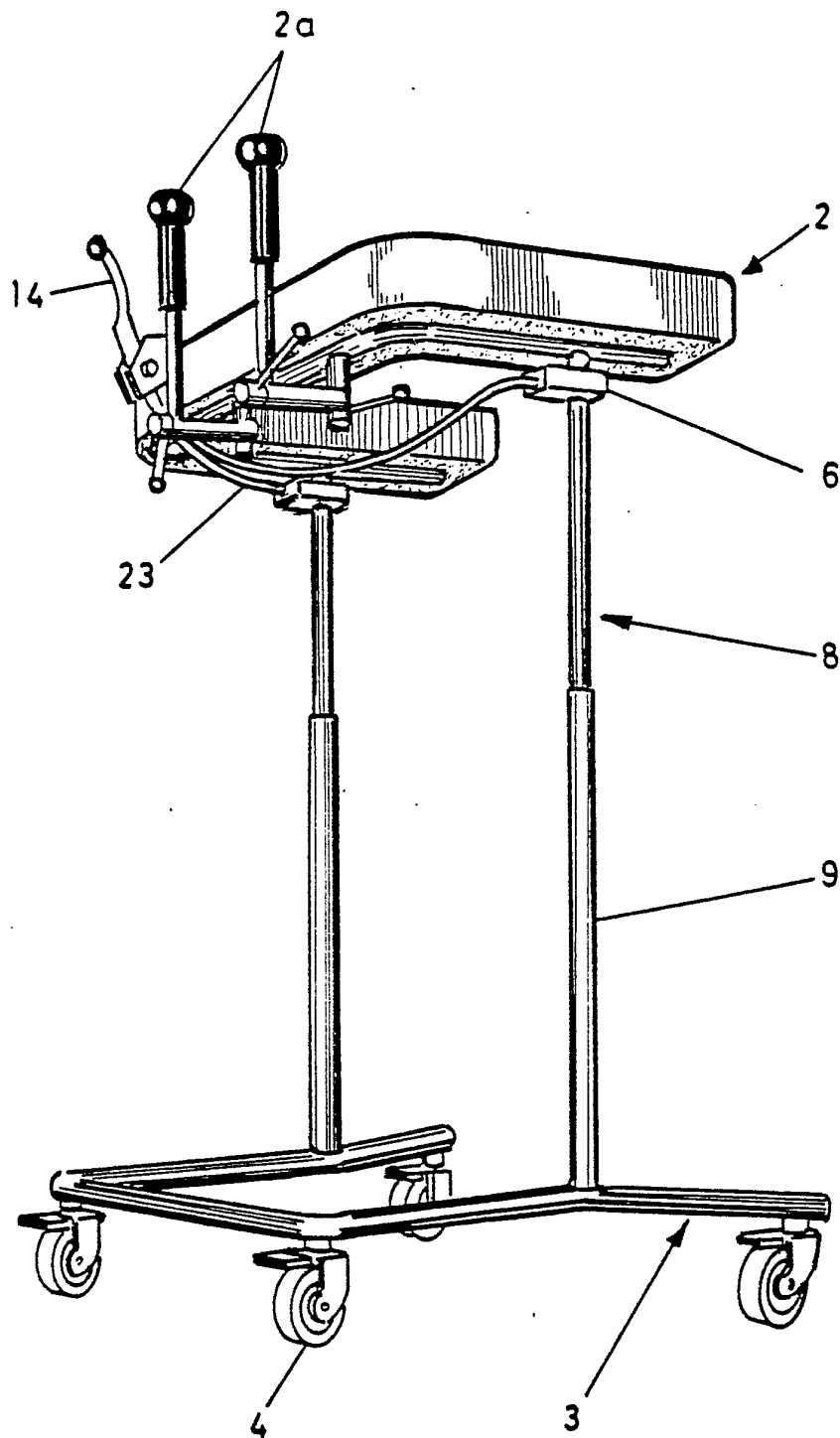
5. A walker according to Claim 4, characterized in that the slide tube (10) is slidably received in the support tube (9) of the base, that the gas spring piston (7a) protrudes into the support tube (9) and at its free end has a guiding block (7b) preferably of aluminium, which is a tight fit in the support tube for fixing the piston rod transversely, but which is extractable from the support tube together with the gas spring.

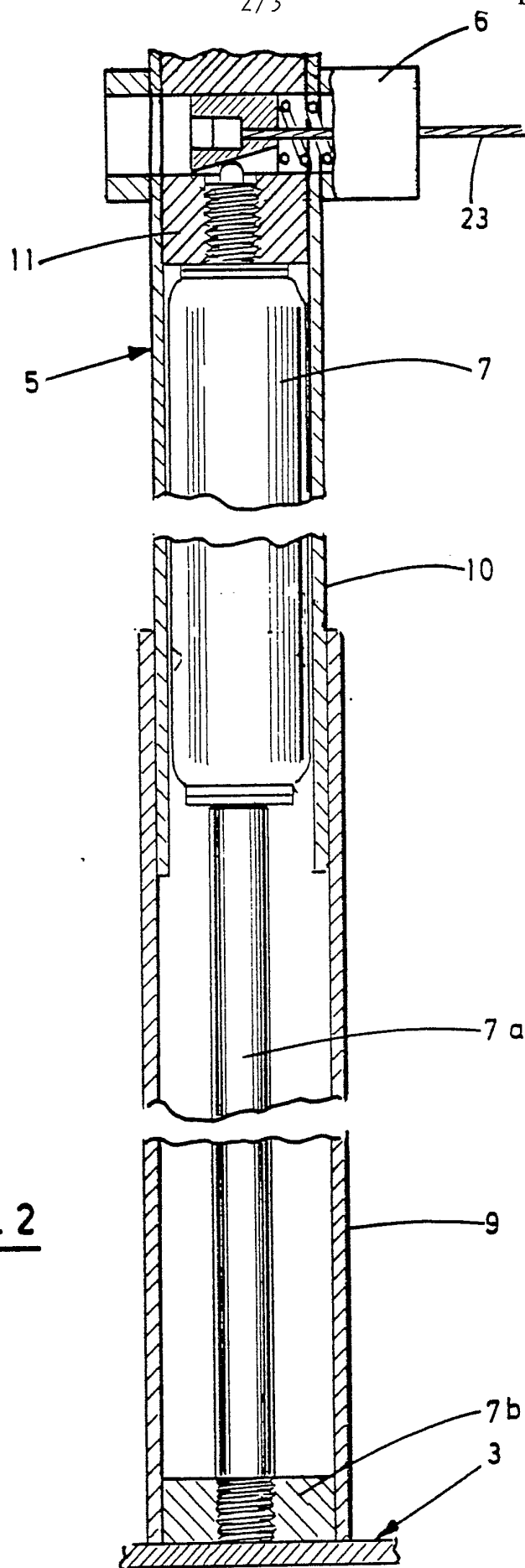
6. A walker according to Claim 4 or 5, characterized in that the valve device (6') comprises an operating arm (13), which is articulately arranged in the end piece (11') and which over a control handle (14), that is arranged in connection to the arm support, and over a cable (23) is brought to activate the gas spring (7) for raising and lowering, respectively, of the arm support.

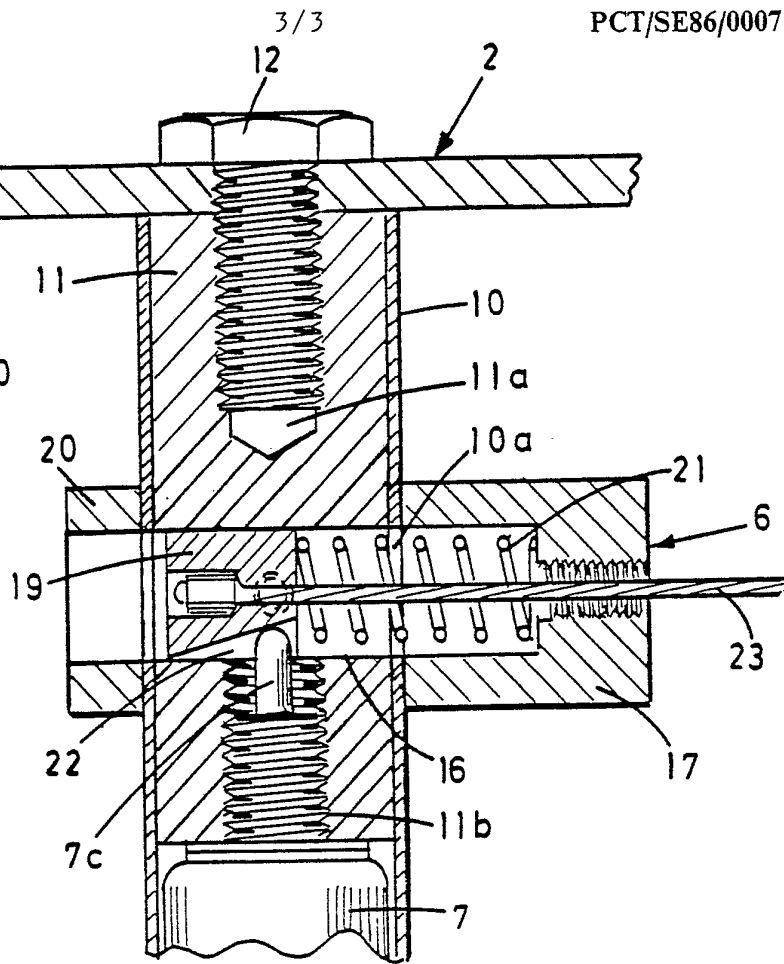
7. A walker according to Claim 4 or 5, characterized in that the valve device (6) comprises a valve body (17) mounted on the slide tube (10) and securely fixed thereto, in which valve body a spring (21) biased valve slide (19) is slidably journaled for activating the gas spring (7) for raising and lowering, respectively, of the arm support.

8. A walker according to Claim 7, characterized in that the valve slide (19) over a control handle (14), which is arranged in connection to the arm support, and over a cable (23) is brought to activate the gas spring (7).

9. A walker according to Claim 7, characterized in that the valve slide (19) is maneuvered by a per se known servo motor.

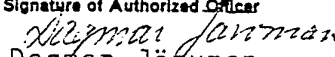
FIG. 1





INTERNATIONAL SEARCH REPORT

International Application No PCT/SE86/00071

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ⁶ According to International Patent Classification (IPC) or to both National Classification and IPC ⁴ A 61 H 3/04		
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁷		
Classification System	Classification Symbols	
IPC 4 US C1	A 61 H 3/00, /04; A 61 G 7/10 5:81, 83-88; 297:5, 6; 272:70.3, 70.4	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ⁸		
SE, NO, DK, FI classes as above		
III. DOCUMENTS CONSIDERED TO BE RELEVANT ⁹		
Category ⁹	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
X	GB, A, 2 105 677 (RICHARD KENNETH BAER) 30 March 1983 & US, 4443902 CA, 1176199	1
X	US, A, 3 596 298 (JOHN A. DURST, JR) 3 August 1971	2
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IV. CERTIFICATION		
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	
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