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(54) **Mechanised toilet seat.**

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EP 0 306 572 B1

Description

This invention relates to a toilet seat, with or without a hinged lid, which can be elevated into a generally vertical position by one mechanical action, and back into a generally horizontal rest position by another.

Toilet seats, especially those used in a communal situation, are often regarded by the majority of users as objects which are suspect from the bacteriological point of view. As a result of this aversion, male users of communal toilets do not regularly lift the seat into the vertical position before urination, and as a consequence of this inaction there frequently occurs a degree of contamination of the seat which supplies the nutrients for subsequent bacterial growth.

A mechanism according to the pre-characterising part of claim 1 is described in United States Patent Specification 2,842,779. However, in this case the bag which raises the seat is located under the toilet seat at the rear. In this position the bag and associated tubing are largely exposed and located where they are very likely to become contaminated with urine when the seat is raised.

The object of the present invention is accomplished by the combination of features claimed in claim 1.

The invention may further comprise an additional actuating lever for connection to the flushing mechanism for the toilet; an inflatable bag operable to act on the lever to actuate the flushing mechanism; and means for supplying fluid under pressure to said bag, whereby the impulses in the pneumatic system can be further used to flush the water which has been stored in the cistern.

A specific embodiment of the invention will now be described by way of example with reference to the accompanying drawings in which:

Figure 1 shows, in front and side elevations, a toilet bowl fitted with housing in the form of quadrant boxes which carry the pneumatic mechanism which activate the toilet seat and its lid;

Figure 2 illustrates the mechanical connections between the pneumatic mechanism in the quadrant boxes and the axle system of the toilet seat and lid;

Figure 3 shows the actuator lever within the quadrant box with the outlines of the large and small rubber air bags;

Figure 4 shows the counterbalancing weight of the seat and lid system of the toilet bowl and how adjustment thereof is accomplished by means of a screwdriver inserted into a spring tensioner;

Figure 5 shows how the pneumatics of the quadrant boxes can be connected into the axle of a conventional all-plastic toilet seat and lid;

Figure 6 shows a version of metal hinge which is preferable for use with the sturdy wooden seats and lid of communal toilet bowl;

Figure 7 shows details of the bellows used to operate the lifting mechanism; and

Figure 8 shows a tap lever for a wash-up basin, the tap lever being within a quadrant box, the tap lever being shown in an open position.

Referring to the drawings, the mechanised toilet seat comprises one, or two housings in the form of, quadrant boxes 1 which are attached to a toilet bowl 7 by means of a pair of brackets 5 which are secured to the seat shaft bosses 2 with nuts 4 which engage the threaded studs of the bosses.

In Figure 2 a common shaft 3 is provided with axle sleeves 6 at each end which are associated externally with the hinge movements of the toilet seat and lid respectively and internally with levers 9 disposed within the quadrant boxes 1. When the sleeves 6 are welded, as shown, to the hinges 6a of the seat and lid then the movement of the levers 9 in the quadrant boxes 1 is capable, when the suitably counterbalanced, of lifting the lid and seat in either one, or two operations as desired. By way of further illustration the position of the seat, or lid, is shown upright at 8.

Figure 3 shows a side elevation of the quadrant box 1, with the cover removed, showing the pneumatic mechanism which freely moves the toilet seat, or lid, because the effort required has been greatly reduced by a counterbalancing action of the spring 14 which has been suitably tensioned by means of the adjustor 13. From the energy point of view the pneumatic medium is air which is fed to the quadrants by means of tubes 10 (Fig. 2) and acts upon the lever 9 by expanding the pleated rubber bags 11 and 12. The inflation of bag 11 moves the lever past the dotted position near bag 12 to raise the seat or lid and the inflation of bag 12 acts to push the lever back to its original position and return the seat, or lid, to the rest position on the toilet bowl. In this illustration it is important to note that the metal air tube 10 penetrates well into the bag 11 in order to act as a rigid support for the bag along the straight wall of the quadrant box 1.

Figure 4 shows how the weight of the toilet seat or lid, on axle sleeves 6 is counterbalanced by means of the spring 14 the tension of which in practice, depending upon the weight of the seat used, can be finely adjusted by movement of screw device 13. By this spring means 14 the effort required to move the lever 9 is reduced to the minimum thus reducing the air pressure required to sufficiently inflate the bags 11 and 12 to render the mechanism operative.

By way of further utility for the invention there

is illustrated at Figure 5 a means by which the mechanism can be attached to the now more common plastic toilet seat and lid. The principle is the same as in the previous descriptions for the wooden seat except that the sleeves 6 which rotate on the shaft 3 and which were welded to the hinges 6a of the wooden seat and lid are instead serrated at 17 and fit into similar serrations which are provided in the plastic either as mouldings or as brass inserts. The serrations 17 on the sleeves and plastic seat inserts can be of different pitches for the individual seal and lid parts.

Wooden toilet seats are now an up-market product and their water stability and hygene characteristics have been greatly improved by using plastic impregnated timbers. In the development of this invention there is a preference for timber which has been impregnated with a thermosetting resin of the kind sold under the "Beetle" trade mark which has been low temperature polymerized, after impregnation, by the use of gamma radiation. Very suitable timber is available from the Lignostone Company Limited of Church, near Accrington in England. With wooden seats, specially designed hinges are required for fitting to the quadrant box mechanism and such a hinge is illustrated in Figure 6 where the parts 15 rotate on the axle sleeve 6 and are inset into the wood of the seat and held by screws 16. In Figure 6 the reference 18 is the wooden seat and 19 is a plan projection of the metal hinge.

A considerable amount of experiment and design has been put into the manufacture of a suitable rubber or polymer air bag for the actuation of the lever 9, and by way of example of suitable form is shown in Figure 7 which illustrates the moulded expansion pleats 22 in the bag 11 and indicates the point 10a where the metal air pipe enters the bag 11.

The invention can be attached to a toilet bowl in two different modes, depending on whether or not the two quadrant boxes on either side of the systems are activated with air bags and levers in each case. As can be seen from Figure 2, it is possible to use the left hand quadrant 1 to raise and lower the toilet seat and allow the mechanism in the right hand quadrant to similarly control the movement of the toilet lid.

The air which is needed to activate each quadrant mechanism is readily obtained from neat hemispherical foot bellows which rest on the toilet floor and are connected by PVC tubing to the respective air inlet tubes 10 at each quadrant, or alternatively in large communal areas the system can be served from a central low pressure air supply via foot valves.

A further important use of the quadrant actuators of the invention is to render the entire action of the water closet fully automatic, as far as the user is concerned, by fitting a quadrant box to the handle of the flushing cistern. In this way the lid and seat of the toilet bowl can be either lowered or lifted by the use of foot bellows, or air valves, and ultimately the bowl can be flushed by a foot switch causing, in the manner already described in relation to the toilet seat and lid mechanism, rotation of the flushing handle axle of the cistern.

While the mechanism of the present invention has been described and is claimed in relation to its use as a toilet seat and lid mechanism it will be understood that the mechanism has other uses which however are not considered to be embodiments of the present invention - for example, as an opening and closing mechanism for a tap lever for use with a wash-up basin of the type commonly used in hospitals. In such wash-up basins one moves a lever to open the tap and one may engage the lever in an associated slotted plate to hold the lever in one of different open positions of the tap to regulate the level of constant supply of water from the tap.

Referring to Figure 8 of the accompanying drawings the mechanism consists of a quadrant box 1 housing a tap lever 9 having a return spring mounting 14. The free end 9a of the tap lever 9 projects through a slotted portion 20 of the quadrant box 1 such that on depressicn of the lever 9 to open a water tap the lever may be manually engaged in any one of a number of slots 21 to hold the lever 9 in a depressed position against the spring pressure and the tap open at a particular setting complementary to the lever position.

A bag 11 with an air tube 10 is located within the quadrant box. The bag 11 operates in the same manner as previously described - the air being sourced from a foot actuated air bellows. In use when one has "scrubbed up" or is finished washing one's hands, the foot bellows is actuated to expand the bag 11 which acts to move the lever 9 out of the slot 21 to allow the lever 9 return under spring action to its original position to close the water tap.

Claims

1. A toilet seat or lid mechanism operable to move a toilet seat or lid beteen lowered and raised positions, comprising means (10) for supplying fluid under pressure to a bag (11 or 12) thereby to inflate the bag and cause the seat or lid to be raised, characterised in that the mechanism comprises a housing (1) fixed at one side of the toilet bowl (7), an actuating lever (9) enclosed within the housing (1) and connected to the hinge (3) carrying the seat or lid, a first inflatable bag (11) disposed within

the housing (1) and operable to act on the actuating lever (9) to cause it to rotate the seat or lid in one direction, and a second inflatable bag (12) also disposed within the housing (1) and operable to act on the actuating lever (9) to cause it to rotate the seat or lid in the other direction, and means (10) for supplying fluid under pressure to the bags (11,12) for raising or lowering the seat or lid.

2. A mechanism as claimed in Claim 1, further comprising counterbalancing means (14) within said housing adapted to counterbalance the weight of the toilet seat or lid.

3. A mechanism as claimed in Claim 2, wherein said counterbalancing means comprises a coil spring (14) one end of which is operatively connected to the actuating lever (9) and the other end of which is connected to an adjustable tensioning device (13).

4. A mechanism as claimed in any preceding claim, wherein bracket means (5) are provided for mounting the housing onto a conventional toilet bowl, said bracket means being engageable with the studs used to mount the seat shaft onto the bowl.

5. A mechanism as claimed in any preceding claim, wherein the working fluid is air and means are provided for connecting said bags to a foot bellows or a central low pressure air supply.

6. A mechanism as claimed in any preceding claim, wherein said hinge comprises a splined surface (17) adapted to engage a corresponding splined surface on a seat or lid.

7. A mechanism as claimed in any preceding claim, wherein the inflatable bags comprise bellows folded in concertina fashion.

8. A mechanism as claimed in any preceding claim, further comprising an additional actuating lever for connection to the flushing mechanism for the toilet; an inflatable bag operable to act on the lever to actuate the flushing mechanism; and means for supplying fluid under pressure to said bag, whereby the impulses in the pneumatic system can be further used to flush the water which has been stored in the cistern.

Revendications

1. Mécanisme de siège ou de couvercle de W.-C. actionnable pour déplacer un siège ou un couvercle de W.-C. entre des positions abaissée et relevée, comprenant des moyens (10) pour fournir un fluide sous pression à un sac (11 ou 12) pour gonfler ainsi le sac et amener le siège ou couvercle à être relevé, caractérisé en ce que le mécanisme comprend un logement (11) fixé d'un côté de la cuvette de W.-C. (7), un levier d'actionnement (9) contenu dans le logement (1) et relié à la charnière (3) portant le siège ou couvercle, un premier sac gonflable (11) disposé dans le logement (1) et actionnable pour agir sur le levier d'actionnement (9) pour l'amener à faire tourner le siège ou couvercle dans une première direction et un second sac gonflable (12), également disposé dans le logement (1) et actionnable pour agir sur le levier d'actionnement (9) pour l'amener à faire tourner le siège ou couvercle dans l'autre direction, et des moyens (10) pour fournir un fluide sous pression aux sacs (11, 12) pour relever ou abaisser le siège ou couvercle.

2. Mécanisme selon la revendication 1, comprenant en outre des moyens de contre-poids (14) dans le logement adaptés à équilibrer le poids du siège ou couvercle de W.-C.

3. Mécanisme selon la revendication 2, dans lequel les moyens de contre-poids comprennent un ressort spiral (14) dont une extrémité est connectée opérativement au levier d'actionnement (9) et dont l' autre extrémité est connectée à un dispositif de tension réglable (13).

4. Mécanisme selon l'une quelconque des revendications précédentes, dans lequel des moyens de console (5) sont prévus pour monter le logement sur une cuvette de W.-C. classique, la console pouvant être liée aux boulons utilisés pour monter l'axe du siège sur la cuvette.

5. Mécanisme selon l'une quelconque des revendications précédentes, dans lequel le fluide d'actionnement est de l'air et dans lequel des moyens sont prévus pour relier les sacs à un soufflet à pied ou à une alimentation centrale en air basse pression.

6. Mécanisme selon l'une quelconque des revendications précédentes, dans lequel la charnière comporte une surface cannelée (17) adaptée à entrer en engagement avec une surface cannelée correspondante sur un siège ou couvercle.

7. Mécanisme selon l'une quelconque des reven-

dications précédentes, dans lequel les sacs gonflables comprennent des soufflets repliés en accordéon.

8. Mécanisme selon l'une quelconque des revendications précédentes, comprenant en outre un levier d'actionnement supplémentaire destiné à être relié au mécanisme de chasse d'eau du W.-C. ; un sac gonflable actionnable pour agir sur le levier pour actionner le mécanisme de chasse d'eau ; et des moyens pour fournir du fluide sous pression à ce sac, d'où il résulte que des impulsions dans le système pneumatique peuvent en outre être utilisées pour faire s'écouler l'eau qui a été stockée dans le réservoir.

Patentansprüche

1. Toilettensitz- oder Toilettendeckelvorrichtung zur Bewegung eines Toilettensitzes oder eines Toilettendeckels zwischen einer abgesenkten und einer aufgerichteten Position mit einer Einrichtung (10) zur Zuführung eines unter Druck stehenden Fluids in eine Tasche (11, 12), um so die Tasche aufzublähen und den Sitz oder Deckel aufzurichten, dadurch gekennzeichnet, daß die Vorrichtung ein auf einer Seite des Toilettenbeckens (7) befestigtes Gehäuse (1), einen vom Gehäuse (1) aufgenommenen und mit dem den Toilettensitz oder Toilettendeckel tragenden Drehgelenk (3) verbundenen Betätigungshebel (9), eine erste, im Gehäuse (1) angeordnete aufblähbare Tasche (11) zur Betätigung des Betätigungshebels (9) derart, daß er den Sitz oder Deckel in eine Richtung verschwenkt und eine zweite, ebenfalls im Gehäuse (1) angeordnete aufblähbare Tasche (12) zur Betätigung des Betätigungshebels (9) derart, daß er den Sitz oder Deckel in die andere Richtung verschwenkt, und eine Einrichtung (10) zur Zuführung eines unter Druck stehenden Fluids in die Taschen (11, 12) zur Aufrichtung oder Absenkung des Sitzes oder Deckels, aufweist.

2. Vorrichtung nach Anspruch 1, mit einer Ausgleichseinrichtung (14) im Gehäuse zum Ausgleichen des Gewichts von dem Toilettensitz oder Toilettendeckel.

3. Vorrichtung nach Anspruch 2, in der die Ausgleichseinrichtung eine Schraubenfeder (14) aufweist, die mit einem Ende wirksam mit dem Betätigungshebel (9) und mit dem anderen Ende mit einer verstellbaren Vorspanneinrichtung (13) verbunden ist.

4. Vorrichtung nach einem der vorhergehenden Ansprüche, in der Befestigungseinrichtungen (5) vorgesehen sind zur Befestigung des Gehäuses auf einem konventionellen Toilettenbecken, wobei die Befestigungseinrichtungen mit den für die Befestigung der Toilettensitzachse auf dem Toilettenbecken verwendeten Bolzen in Eingriff bringbar sind.

5. Vorrichtung nach einem der vorhergehenden Ansprüche, in der als Arbeitsfluid Luft verwendet wird und Mittel vorgesehen sind, zur Verbindung der Taschen mit einem fußbetätigten Blasebalg oder einer zentralen Niederdruckversorgung.

6. Vorrichtung nach einem der vorhergehenden Ansprüche, in der das Drehgelenk eine profilierte Oberfläche (17) aufweist, die zum Eingriff in eine korrespondierend ausgeführte profilierte Oberfläche an einem Toilettensitz oder Toilettendeckel geeignet ist.

7. Vorrichtung nach einem der vorhergehenden Ansprüche, in der die aufblähbaren Taschen ziehharmonikaartig gefaltete Faltenbalge aufweisen.

8. Vorrichtung nach einem der vorhergehenden Ansprüche, mit einem zusäzlichen Betätigungshebel zur Verbindung mit der Spülvorrichtung der Toilette; einer aufblähbaren Tasche zur Betätigung des Hebels, um so die Spülvorrichtung zu betätigen; und einer Einrichtung zur zuführung eines unter Druck stehenden Fluids zur Tasche, wobei die Impulse im pneumatischen System zur Spülung mit dem im Spülkasten gespeicherten Wasser nutzbar sind.

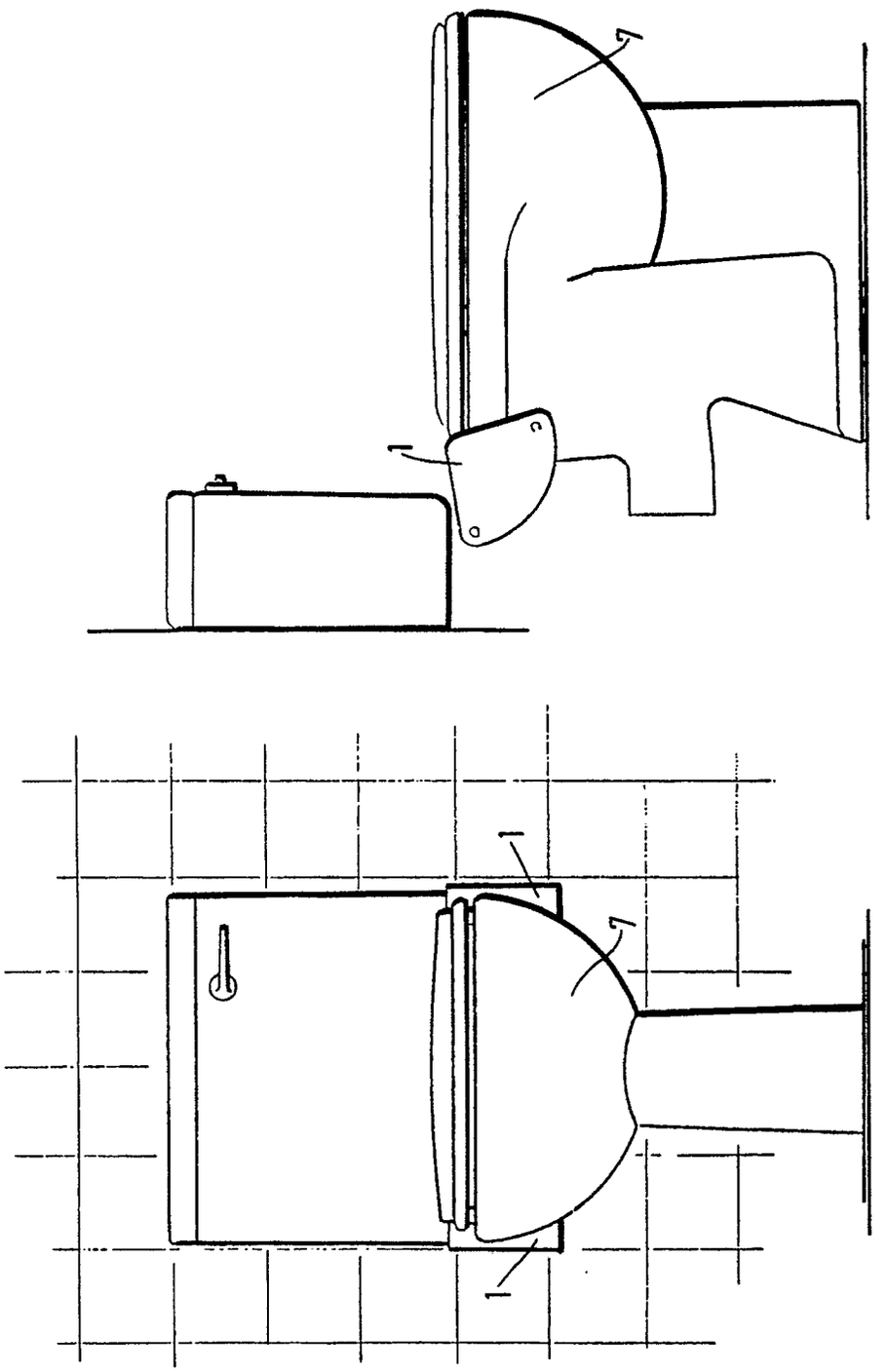

FIG 1

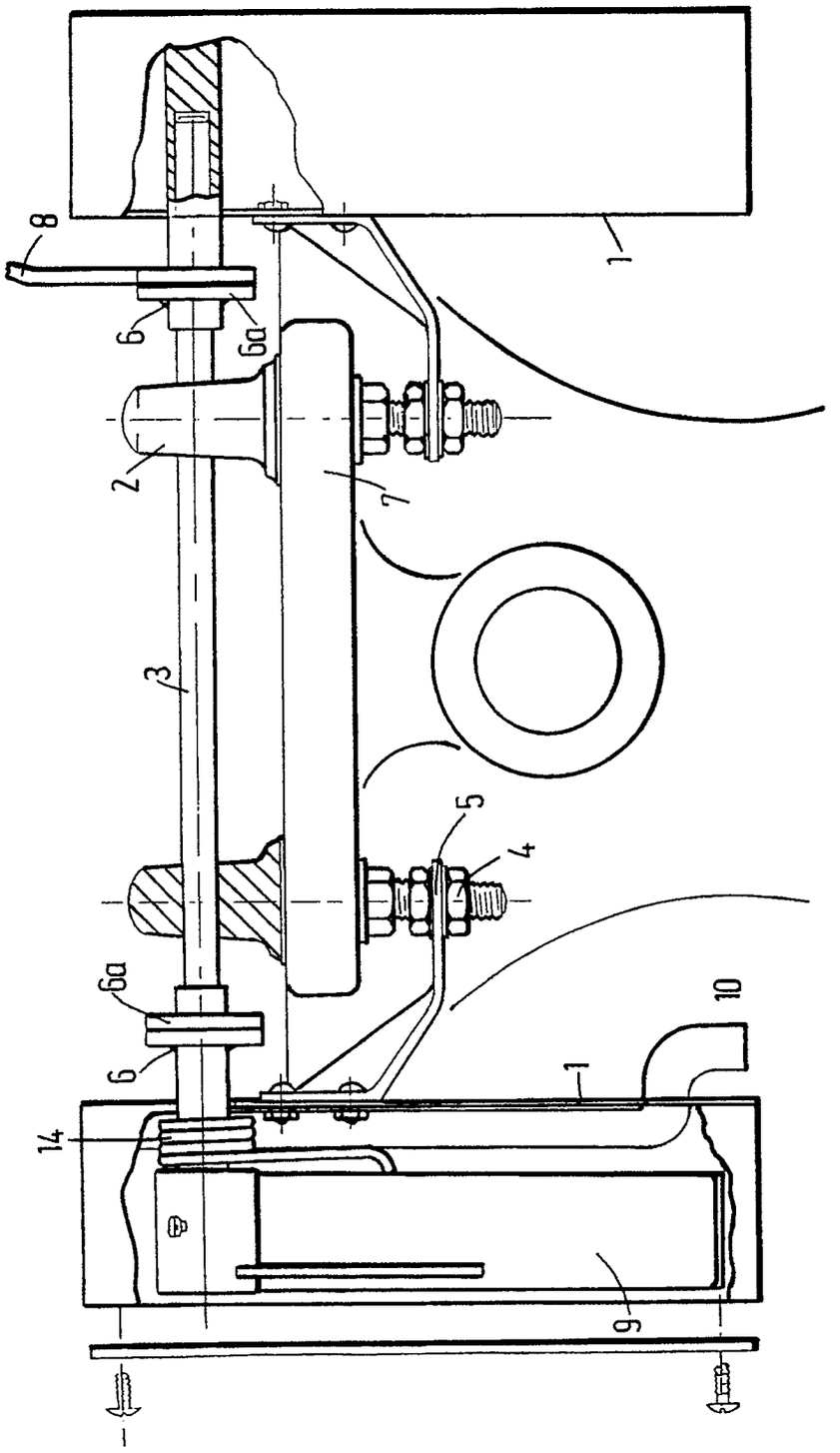

FIG.2

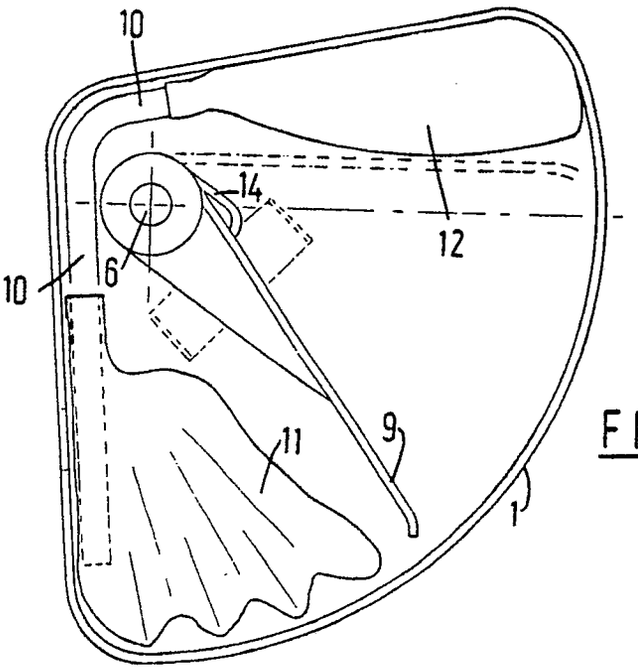

FIG.3

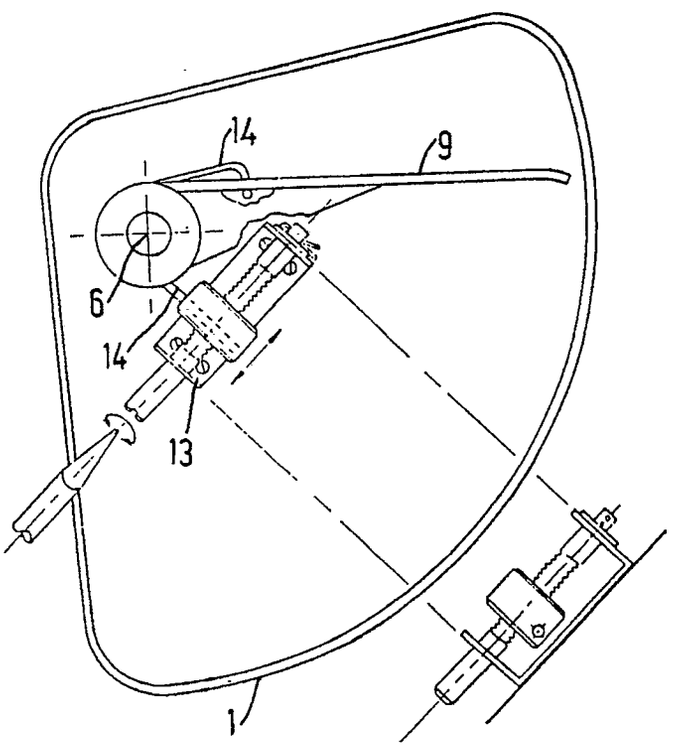

FIG.4

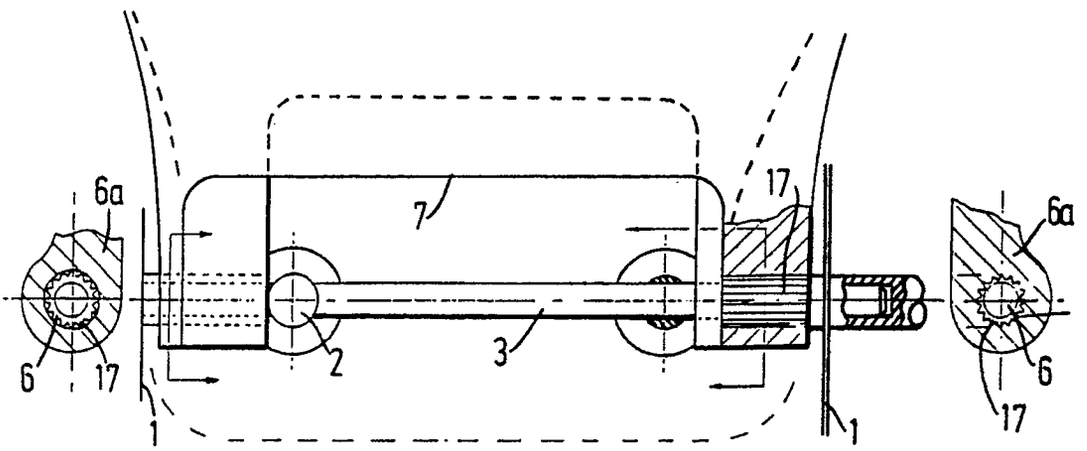

FIG.5

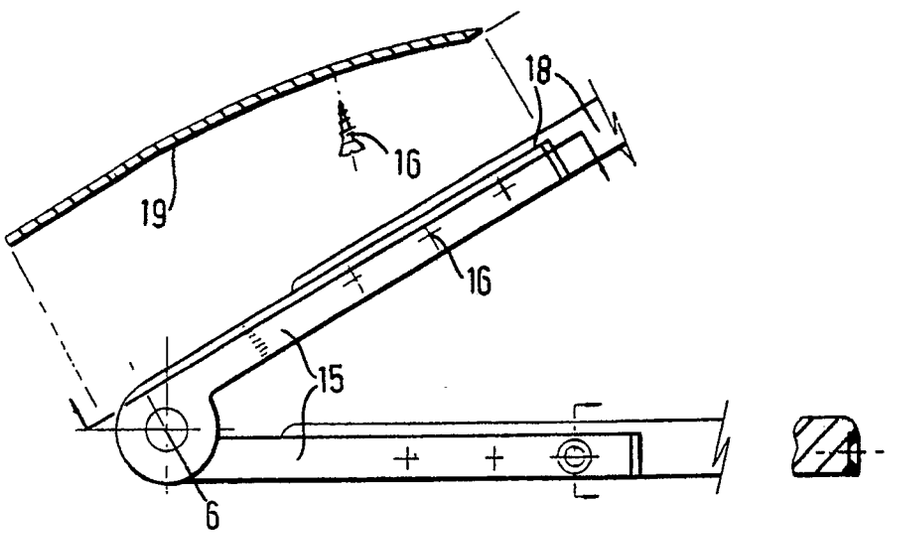

FIG.6

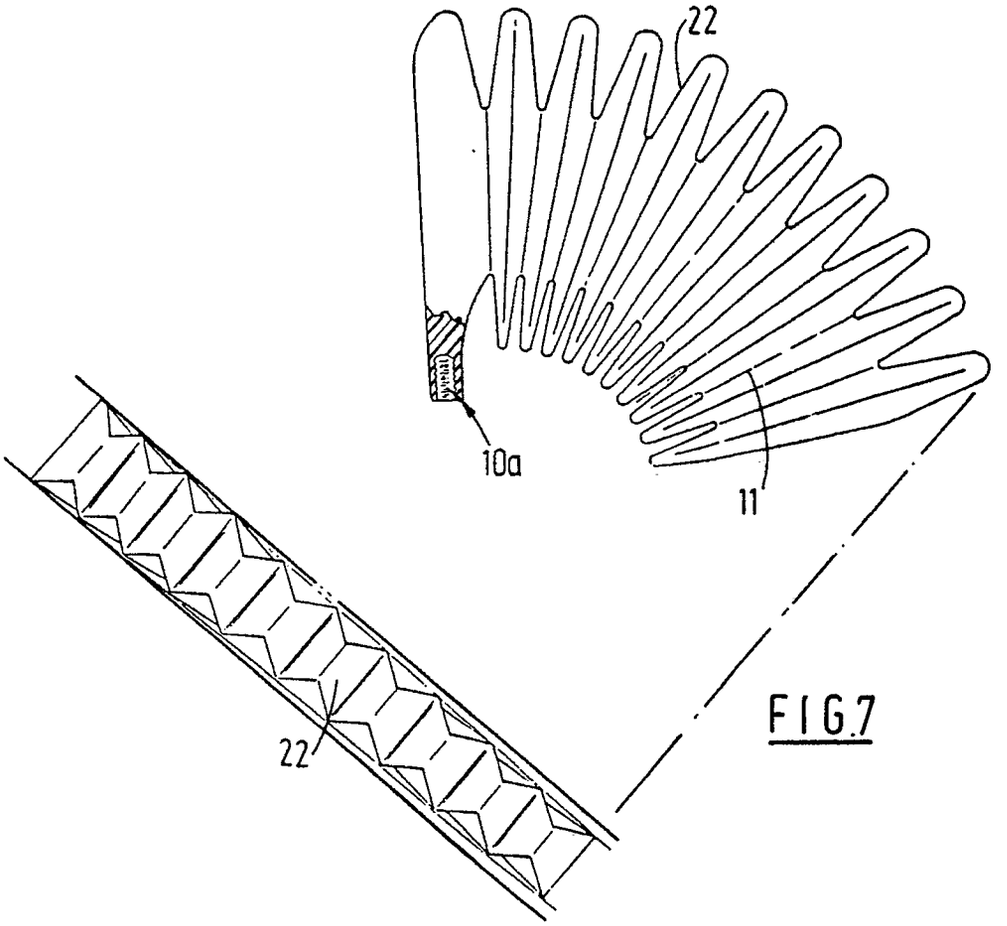

FIG.7

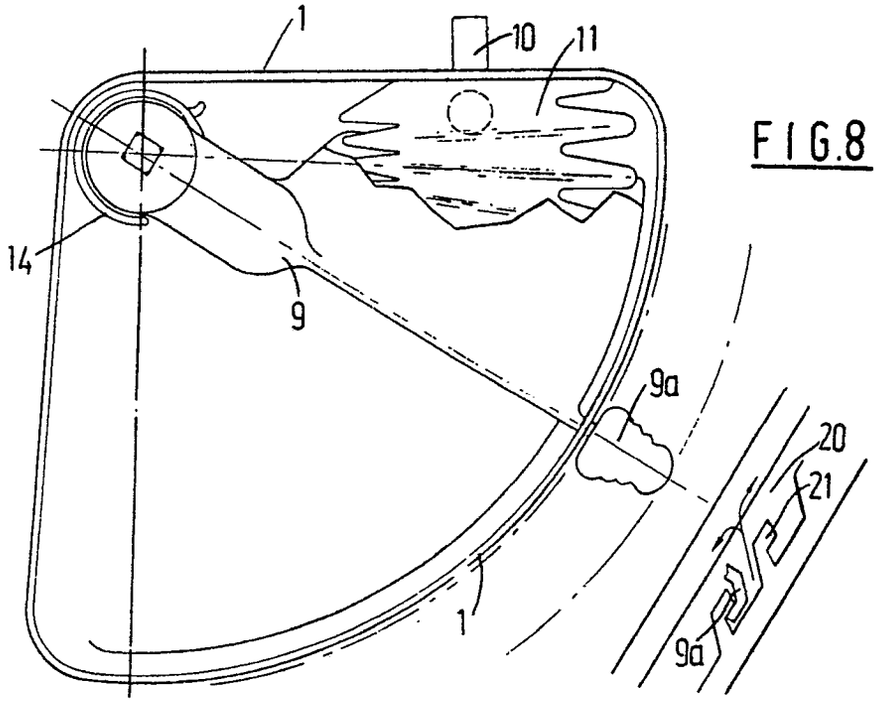

FIG.8