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**WO-A1-2009/084915**  
**DE-A1- 1 931 012**  
**US-A1- 2008 014 015**



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## DESCRIPTION

## TECHNICAL FIELD

5 The present invention relates to a device for triggering a gas spring, comprising an actuating device, an actuating element, which is operatively connected to the actuating device and acts on an end-side trigger of the gas spring, wherein the actuating element acts directly or indirectly on the trigger  
10 and is formed in particular as a lever arrangement, which reduces or increases the transmitted force and/or displacement, comprises an actuating lever and is in operative connection with the actuating device, and at least with one trigger lever, which interacts directly or indirectly with the  
15 actuating lever and acts on the trigger, and a housing, wherein the housing has a gas spring connection recess, via which the upper end region of the gas spring is connectable to the trigger, which is guided through said recess into the interior of the housing, the gas spring connection recess is  
20 designed as a continuous recess, with an internal thread, the upper end region of the gas spring comprises an external thread screwed in the internal thread of the gas spring connection recess and there are means for the clamping fixing of the upper end region of the gas spring, which upper end  
25 region is screwed into the recess.

## PRIOR ART

Gas springs are known from practice in a wide variety of  
30 embodiments. Many gas springs comprise an integrated valve system, whereby the gas spring can be fixed or locked infinitely variably in any position. In this case, the piston is sealed off at a pressure tube and separates two gas chambers from one another. When the valve is closed, the gas  
35 spring is arrested and allows locking in the desired position. By actuation of the trigger, usually embodied as a trigger

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tappet, the valve is opened and the gas spring can thus be positioned infinitely variably. The extending speed and damping can in this case be varied appropriately by choice of the nozzle in the piston.

5

Gas springs of the type in question here are used in a wide variety of ways. The use of such gas springs in office chairs is known from practice. Similarly, car seats or aircraft seats can be adjusted or parts of sunbeds can be moved by gas  
10 springs. Office desks can also be adjusted in height by gas springs.

The gas springs known from practice require an actuating element, which is operatively connected to an actuating device  
15 and acts directly on the trigger provided on the end side of the gas spring. In the case of office chairs, for example, this involves using actuating elements that take the form of simple levers which generally press directly on the trigger with an end-side region. Such a configuration of the actuating  
20 element has the great disadvantage that considerable forces are still required for triggering the gas spring. In addition to this there is the further disadvantage that it is only with difficulty that the triggering can be performed in stages, so that it is virtually impossible to regulate the speed of the  
25 gas spring under considerable triggering forces.

EP 0 907 842 B1 discloses a device for triggering a gas spring of the type mentioned at the beginning. Apart from the trigger lever, the actuating element of the known device also  
30 comprises two further levers, which are pivotably coupled to the trigger lever.

Furthermore, DE 197 16 720 A1 and EP 1 328 738 B1 disclose further devices for triggering a gas spring in which a lever  
35 mechanism is likewise used. In the case of the device known from DE 197 16 720 A1, there are two levers, which interact by

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way of a contact region. The operative connection between the levers is realized either by way of a tothing or by way of frictional surfaces lying against one another. The device according to EP 1 328 738 B1 is formed in such a way that the contact region and/or the actuating lever of the lever mechanism has a freely rotatable roller or ball for rolling on the actuating region and/or the contact region.

A device for triggering a gas spring according to the features of the preamble of claim 1 is known from DE 20 2013 006 582 U1. To secure the end region of the gas spring that is inserted into the housing, a threaded pin is screwed in via a transverse connection recess and acts directly on the end region of the gas spring.

DE 1 931 012 A1 as nearest state of the art discloses a device for continuously adjust the height of the seating of chairs with a frustconical hollow hub under the seating which hollow hub comprises at the bottom side a cylindrical part, in which the housing of a gas spring is guided till a stop. The hollow hub is pivotable connected to a operating lever, which operates with the release pin of the gas spring. The position of the gas spring and the release pin respectively relativ to the hollow hub and therefore to the operating lever is defined by the stop. A vernier adjustment is not possible. The fixing of the housing of the gas spring at the hollow hub is realized by clamping units arranged on both sides of the hollow hub along a slit, which clamping units realize with a clamp screw the clamping fixation of the housing of the gas spring within the cylindrical part of the hollow hub.

WO 2009/084915 A1 and US 2008/0014015 A1 disclose a mechanism for two into one another connected hollow profiles, whereby the clamping mechanism is built as a pipe clamp and the clamping of the hollow profiles is made by a clamp screw of the pipe clamp.

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## SUMMARY OF THE INVENTION

Proceeding from the cited prior art, the present invention is  
5 based on the object or addresses the technical problem of  
configuring and developing a device for triggering a gas  
spring of the type mentioned at the beginning that can be used  
under a wide variety of geometrical space conditions of the  
surrounding components, can be produced cost-effectively,  
10 ensures a permanently reliable function, is formed in a space-  
saving manner and ensures a reliable compact connection of the  
gas spring with high precision.

The device according to the invention for triggering a gas  
15 spring is provided by the features of independent claim 1.

Advantageous refinements and developments are the subject  
matter of the claims that are directly or indirectly dependent  
on independent claim 1.

20

The device according to the invention for triggering a  
gas spring, which device ensures a compact realization  
with a simultaneously permanently reliable function, is  
distinguished in that the housing has an open slot  
25 which runs from the gas spring connection recess to the  
front outer side of the housing and runs at least in  
regions over the length of the gas spring connection  
recess, a left and right projecting side wall region  
are formed by the slot, the clamping and fixing means  
30 are present in the region of the left and right side  
wall region and brace the left and right side wall  
region together, as a result of which a clamping force  
is exerted on the end region of the gas spring that is  
inserted into the gas spring connection recess, whereby  
35 the clamping means are designed as releasable means, in the  
region of the slot the left and right side wall region has a

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respective transverse recess aligned with each other, the clamping fixing means are guided through the recess.

The device according to the invention is distinguished by a compact construction which can be produced economically and ensures a permanently reliable fixing of the end region of the gas spring after said end region is introduced into its precise end position within the gas spring connection recess.

The elastic properties of the side wall regions ensure reliable clamping.

An advantageous refinement of a first variant embodiment is distinguished in that the clamping fixing means are designed as a screw and the recess(es) has/have an internal thread in which the external thread of the screw engages in a meshing manner.

A particularly preferred refinement which permits a compact construction with a low construction volume is distinguished in that the screw ends on the outer side substantially with the outer wall of the left and right side wall region, and the screw head of the screw is arranged in a recess of a side wall region.

An advantageous second variant embodiment of the device according to the invention is distinguished in that the clamping fixing means are designed as a screw with a nut, wherein, in an advantageous manner in order to ensure reliable clamping, the screw head of the screw and the nut each lie against the outer side of the left and right side wall region.

In order to facilitate the handling during the assembly or the installation, a particularly advantageous refinement is distinguished in that the screw head of the screw has a form-fitting internal contour for attaching a tool.

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Further embodiments and advantages of the invention emerge from the features that are further presented in the claims and from the exemplary embodiments specified below. The features  
5 of the claims may be combined with one another in any desired way as long as they are not clearly not mutually exclusive.

#### BRIEF DESCRIPTION OF THE DRAWING

10 The invention and advantageous embodiments and developments of same are described and explained in more detail below with reference to the examples represented in the drawing. The features that can be taken from the description and the drawing may be applied according to the invention individually  
15 on their own or multiply in any desired combination. In the drawing:

Fig. 1 shows a schematic longitudinal cross section through a first exemplary embodiment of a device for  
20 actuating a gas spring with a partial illustration of an actuating device, with the end region of a gas spring and an actuating element, which is illustrated symbolically in the form of an arrow, between the actuating device and the trigger in the end region of  
25 the gas spring,

Fig. 2 shows a schematic side view of the device according to fig. 1,

30 Fig. 3 shows a schematic end view of the device as seen in the direction of the arrow A of fig. 2,

Fig. 4 shows a schematic end view of the device as seen in the direction of the arrow B of fig. 2,  
35

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Fig. 5 shows a schematic longitudinal cross section through a second exemplary embodiment of a device for actuating a gas spring with a partial illustration of an actuating device, with the end region of a gas spring and an actuating element, which is illustrated symbolically in the form of an arrow, between the actuating device and the trigger in the end region of the gas spring,

Fig. 6 shows a schematic side view of the device according to fig. 5,

Fig. 7 shows a schematic end view of the device as seen in the direction of the arrow A of fig. 6,

Fig. 8 shows a schematic end view of the device as seen in the direction of the arrow B of fig. 6, and

Fig. 9 shows a highly schematized illustration of an exemplary field of use of the device for triggering a gas spring for a seat with an adjustable backrest.

#### WAYS OF IMPLEMENTING THE INVENTION

Fig. 9 illustrates in highly schematized form an exemplary case of use of a device 10 for triggering a gas spring 1 for a seat 30 with an adjustable backrest 34. The backrest 34 is mounted rotatably (arrow D) about an axis of rotation 66 and is coupled with the piston rod via a lever mechanism to the gas spring 1. In the non-activated state of the device 10, the gas spring 1 locks the rotational position of the backrest 34 via the lever mechanism. The device 10 is coupled to a switching unit 32 via an actuating device 2 and acts on the trigger of the gas spring. As soon as the switching unit 32 is actuated, the device 10 acts on the trigger of the gas spring, as a result of which a rotational movement D of the backrest

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34 is activated. As soon as the switching unit 32 is deactivated, the gas spring 1 locks a further rotational movement D of the backrest 34.

5 A first exemplary embodiment of a device 10 for triggering a gas spring is illustrated schematically in figures 1 to 4.

The device 10 has a housing 20.

10 In the left lower end edge region, the housing 20 has a first housing connection unit 22 which is designed as a recess 36 with an internal thread 38. The end region of an actuating device 2 is screwed into said recess 36 via an external thread 39, wherein the actuating device 2 in the exemplary embodiment  
15 illustrated is designed as a Bowden cable having a cable 16. The cable 16 is guided into the interior of the housing 20 and connected to an actuating element 4 which is illustrated symbolically in the form of an arrow in the illustration of fig. 1. The actuating element 4 is designed as a lever  
20 mechanism (not illustrated specifically) with an actuating lever and trigger lever, wherein the lever mechanism is known per se and is described, for example, in DE 20 2013 006 582 U1. The actuating element 4 acts on a trigger 3 of the gas spring 1, the trigger being present in  
25 the end region of the gas spring 1. The end region of the gas spring 1 is via a second housing connection unit 24, which is designed as a gas spring connection recess 70 with an internal thread 71, wherein, for the exact positioning in the second housing connection unit 24, the end region has an external  
30 thread 72 which is screwed into the internal thread 71 of the gas spring connection recess 70.

The housing 20 has a slot 60 which is present in a manner running from the gas spring connection recess 70 of the second  
35 housing connection unit 24 as far as the end side on the right in fig. 1, wherein said slot 60 is present over the entire

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height of the second housing connection unit 24. As a result, a side wall region 68.1, 68.2 is in each case formed on both sides of the slot 60 which acts virtually as a cantilever plate. In each side wall region 68.1, 68.2 there is a continuous transverse recess 62.1, 62.2 which has an internal thread. A continuous threaded screw 50.1 is screwed into the two transverse recesses 62.1, 62.2 in the transverse direction. By means of the screwing in of the threaded screw 50.1, the two side wall regions 68.1, 68.2 are moved toward each other because of their elastic properties, and therefore, as a result, a clamping force acts on that end region of the gas spring 1 which is screwed into the second housing connection unit 24 and thereby reliably fixes the installed position of the gas spring within the housing 20.

A side wall region 68.1 has a step-shaped transverse recess 62.1 which is designed in such a manner that the threaded screw 50.1 does not project with its screw head beyond the outer side of the housing 20. The threaded screw 50.1 itself has a length in such a manner that, in the screwed-in state, said threaded screw does not project with its screw stem beyond the outer side of the housing 20. As a result, a compact construction which ensures a permanently reliable clamping function is possible.

To facilitate the installation, the screw head of the threaded screw 50.1 has an internal circumferential edge contour, for attaching a tool.

Figures 5 to 8 illustrate a second exemplary embodiment of a device for triggering a gas spring 1. This device 10 has in principle the same design as the device 10 according to figures 1 to 4. Identical components bear the same reference sign and are not explained once again.

- 10 -

However, in contrast to the device 10 according to fig. 1, the two transverse recesses 62.1, 62.2 of the side wall regions 68.1, 68.2 do not have an internal thread. In this exemplary embodiment, the bracing of the side wall regions 68.1, 68.2 for producing the clamping force takes place via a screw 50.2 which is guided through the transverse recess 62.1, 62.2 and the screw head of which lies on the outer side against a side wall region 68.1 and which is locked via a nut 52 screwed onto the outer side of the opposite wall region 68.2. The production of the clamping force also takes place here by simple screwing together of the screw 50.2 to the nut 52.

**P a t e n t k r a v**

1. Indretning (10) til udløsning af en gasfjeder (1) med

- en betjeningsindretning (2),

5 - et betjeningsorgan (4.1, 4.2), der er funktionsforbundet med betjeningsindretningen (2) og påvirker en udløser (3) af gasfjederen (1) i enden,

- hvor betjeningsorganet (4.1, 4.2) påvirker udløseren (3) direkte eller indirekte og især er udformet som kraft- og/eller strækningsmæssig under- eller oversættende armindretning med en betjeningsarm, hvilken armindretning er funktionsforbundet med betjeningsindretningen (2), og i det mindste med en udløserarm, der arbejder direkte eller indirekte sammen med betjeningsarmen og påvirker udløseren (3), og

- et hus (20), hvor

15 - huset (20) omfatter en gasfjedertilslutningsenhed (70), ved hjælp af hvilken det øvre endeområde af gasfjederen (1) kan forbindes med udløseren (3), der er ført ind i husets (20) indre,

- gasfjedertilslutningsenheden (70) er udformet som en gennemgående udsparring, og

20 - midler til klemmende fastgørelse af det øvre endeområde af gasfjederen (1), der kan indføres i udsparringen, hvor

- huset (20) har en åben slids (60), som forløber fra gasfjedertilslutningsudsparringen (70) til endefladeydern (66) af huset (20) og i det mindste områdevist hen over gasfjedertilslutningsudsparringens (70) længde,

25 - der dannes et venstre og højre udragende sidevægområde (68.1, 68.2) ved hjælp af slidsen (60),

- midlerne til klemning og fastgørelse forefindes i området ved det venstre og højre sidevægområde (68.1, 68.2), hvilke spænder det venstre og højre sidevægområde (68.1, 68.2) fast med hinanden, hvorved der udøves en klemmekraft på det i gasfjedertilslutningsudsparringen (70) indførte endeområde af gasfjederen (1), hvor

30 - midlerne til klemning er udformet som midler, der kan løsnes,

- det venstre og højre sidevægområde (68.1, 68.2) i området ved slidsen (60) har hver deres tværgående udsparring (62.1, 62.2), der flugter med hinanden,

- midlerne til klemmende fiksering er ført ind igennem udsparingen (62.1, 62.2), og **kendetegnet ved, at** gasfjedertilslutningsudsparingen er udformet som en gennemgående udsparing med et indvendigt gevind, som et udvendigt gevind af det øvre endekområde af gasfjederen kan skrues ind i.

5

**2.** Indretning ifølge krav 1,

- **kendetegnet ved, at**

- slidsen (60) forløber hen over gasfjedertilslutningsudsparingens (70) samlede længde.

10

**3.** Indretning ifølge krav 1,

- **kendetegnet ved, at**

- midlerne til klemmende fastgørelse er udformet som skrue (50.1), og udsparingen/udsparingerne (62) har et indvendigt gevind, som skruens (50.1) udvendige gevind griber ind i på en tandhjulslignende måde.

15

**4.** Indretning ifølge krav 3,

- **kendetegnet ved, at**

- skruen (50.1) på den udvendige side slutter med ydervæggen af det venstre og højre sidevægområde (68.1, 68.2), og skruens skruehoved (50.1) er anbragt i en udsparing af et sidevægområde.

20

**5.** Indretning ifølge krav 4,

- **kendetegnet ved, at**

- midlerne til klemmende fastgørelse er udformet som en skrue (50.2) med møtrik (52).

25

**6.** Indretning ifølge krav 5,

- **kendetegnet ved, at**

- skruens (50.2) skruehoved og møtrikken (52) hver især ligger an mod ydersiden af det venstre og højre sidevægområde (68.1, 68.2).

30

**7.** Indretning ifølge et eller flere af de foregående krav 3 til 6,

- **kendetegnet ved, at**

- skruens (50.1, 50.2) skruehoved har en formsluttende indvendig kontur, som et værktøj kan sættes an mod.

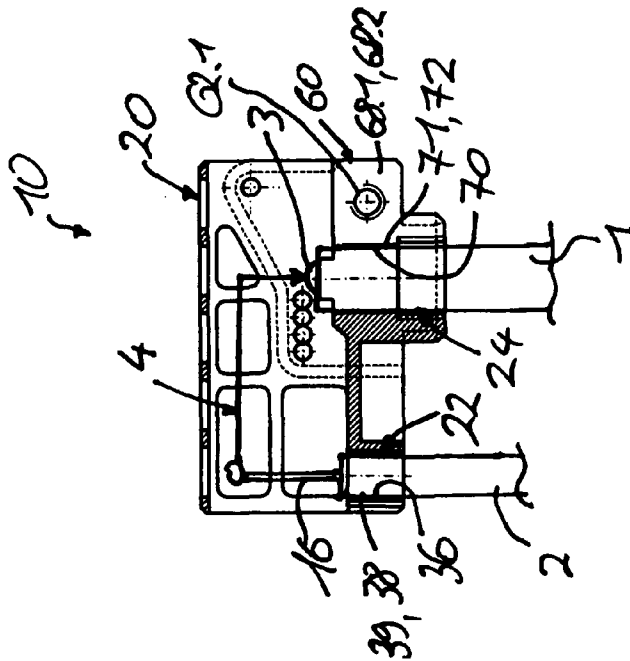


Fig. 7

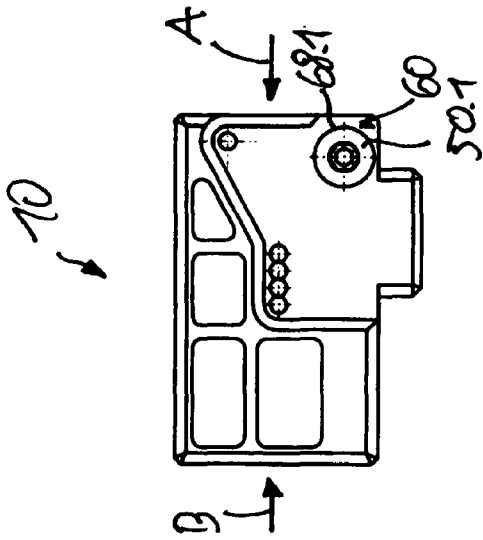


Fig. 2

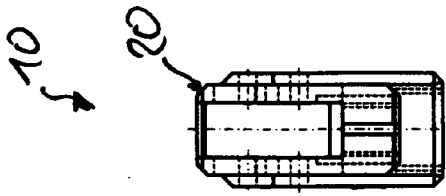


Fig. 4

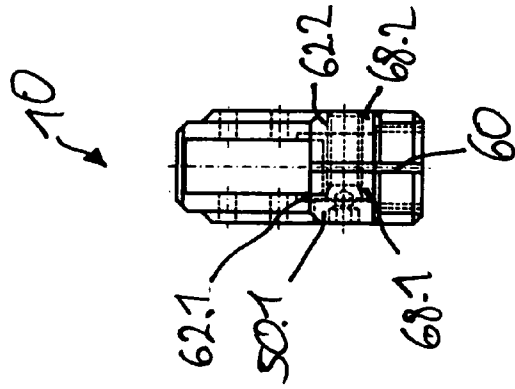


Fig. 3

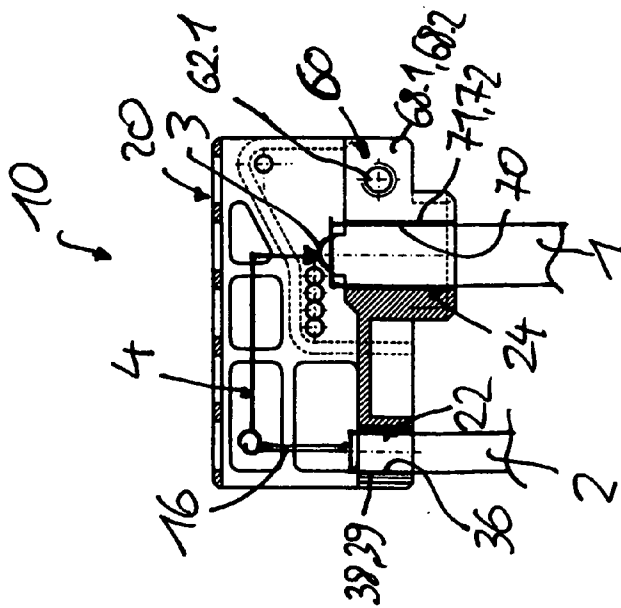
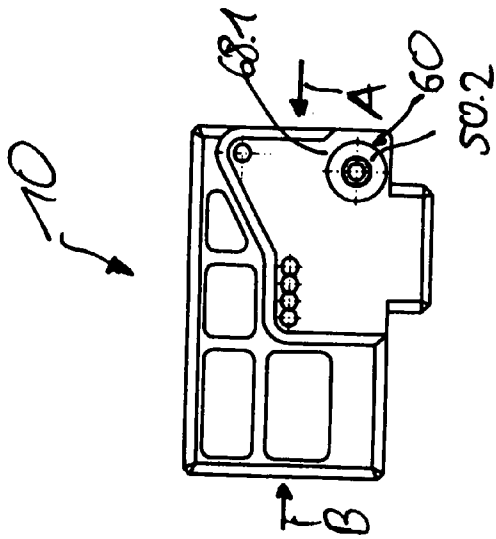


Fig. 5

6.  
Fig.

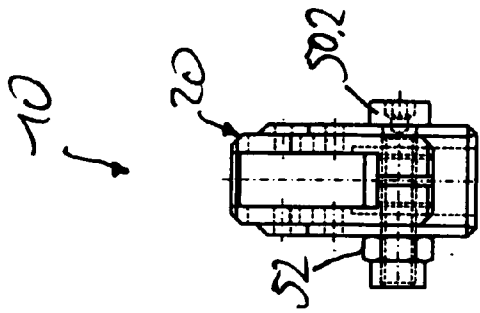


Fig. 8

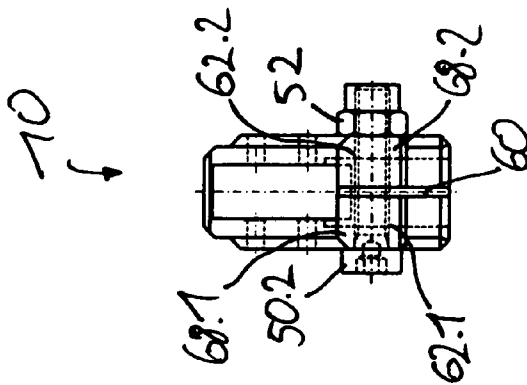


Fig. 7

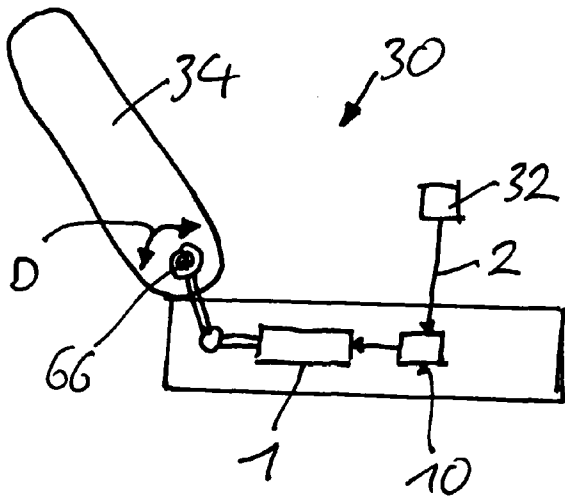


Fig. 9