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(54) Bar gate device with symmetrical actuator.

(57) A gate device (10) comprises a bar (21) moving between a horizontal position and a vertical position by means of two linear hydraulic actuators (12, 13) actuating in opposition a lever (16) having a central fulcrum consisting of the shaft (17) pivoted on the bar (21).

On the actuator (13) moving the bar in a horizontal position is placed a spring (22) which counterbalances moment produced by the weight of the bar on the shaft thus balancing the forces of the hydraulic actuators.

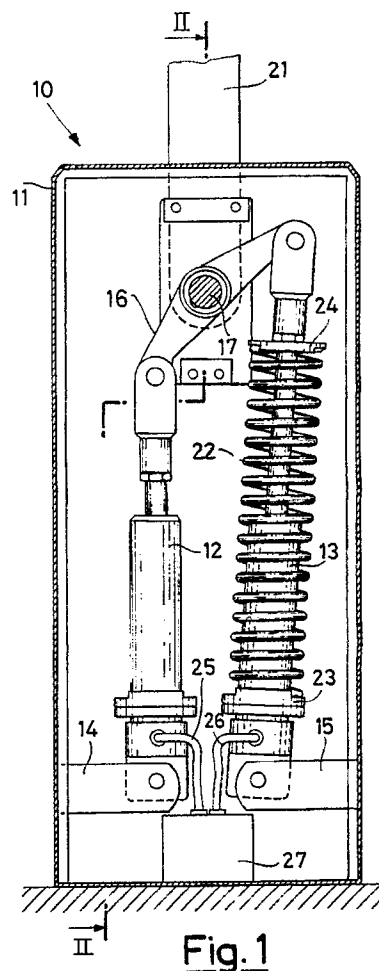


Fig. 1

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BAR GATE DEVICE WITH SYMMETRICAL ACTUATOR

The present invention relates to a device of the type embodying a gate with a bar raised and lowered by means of servomechanisms, e.g. to regulate the transit of vehicles for obligatory passages, e.g. access to parking lots, warehouses, etc.

In the known art there are often used hydraulic systems to provide servomechanisms. One solution adopted is to use a hydraulic actuator with a double-action piston to control the movements of raising and lowering of the bar. Unfortunately one considerable shortcoming of said solution is the complexity of the hydraulic system necessary to control said double-action actuators and their relatively high cost.

Another problem of the known art is that the force necessary to raise the bar is obviously different from that necessary to lower it and therefore for reasons of economy the servomechanisms employed to perform the two different operations are of different sizes. This requires that to raise the bar with clockwise or counter-clockwise rotation there are necessary two different bar gate devices of different design or it is necessary to provide a gate device with a shaft for rotation of the bar which allows fixing of the bar to one end or the other thereof. The first solution has the shortcoming of cost while the second has the shortcoming that the ends of the shaft must both project from the body of the device to allow fixing of the bar at one or the other of them with obvious problems of an aesthetic nature and the need to provide special covers for the unused end.

The general object of the present invention is to overcome the above mentioned shortcomings by providing a bar gate device without costly double-action actuators and which would allow installation both of clockwise opening bars and counter clockwise opening bars on the same end of the control shaft.

In view of said object there is provided in accordance with the invention a controlled gate device comprising a bar moving between a horizontal position to block a passage and a vertical position to free said passage by means of servomechanisms acting to rotate a horizontal shaft supporting the bar near one of its ends and characterized in that said servomechanisms comprise a lever with equal arms and its fulcrum pivoted on said shaft and two equal single-action hydraulic actuators each connected between a corresponding end of the lever and the structure supporting the device fixed to the ground, to control operation, a first actuator the movement of reaching the vertical position and the other actuator the return to the horizontal position of the bar, there being con-

nected to said lever means of reaction in the direction necessary to counterbalance the moment produced by the weight of the bar on the shaft balancing the forces of operation of the hydraulic actuators, the whole consisting of a lever and actuators being symmetrical in relation to the vertical plane passing through the shaft.

To clarify the explanation of the innovative principles of the present invention and its advantages compared with the known art there is described below a possible embodiment as an example of application of said principles. In the drawings:

FIG. 1 shows a partial cross section view along plane of cut I-I of FIG. 2 of a rear elevation of a bar gate device provided in accordance with the present invention, and

FIG. 2 shows a partial cross section view of a side elevation along plane of cut II-II of FIG. 1.

With reference to the figures a bar gate device (indicated generally in the figures by reference number 10) in accordance with the invention comprises a box 11 fixed to the ground and containing two single-action hydraulic actuators 12 and 13 with the ends of the cylinders connected by pivot to brackets (14, 15) to support respectively the box and the ends of the rods connected to pivots at the ends of a two-armed lever 16 pivoted on a shaft 17 supported in a rotating manner by means of bearings 18, 19 by a frame 20 fixed to the box 11.

The shaft 17 bears at one end projecting from the box a bar 21 partially shown.

The actuator 13 bears coaxially a thrust spring 22 reacting between the cylinder and the rod by means of spring stops 23, 24 respectively and acting by compensation of the moment produced by the weight of the bar 21 on the shaft 17 in such a manner that the two actuators 12 and 13 can be identical since they have to develop a virtually equal force. For this purpose the spring 22 must be selected with allowance for the weight and length of the bar 21.

The actuators are controlled alternately through flexible ducts 25 and 26 by a control circuit indicated generally by reference number 27 and not further represented nor described since it is an electrohydraulic circuit of the known art and hence easy to imagine by those skilled in the art.

As may be seen in the drawings the mechanism consisting of the actuators 12 and 13 and the linkage 16 is perfectly symmetrical except for the presence of the spring 22 in relation to the vertical plane containing the shaft 17. In this manner the device 10 can be used to advantage to operate a closing bar 21 lowering clockwise or counter-clockwise merely by moving the spring 22 and the

spring stop element 24 from one actuator to the other and rotating the position of the bar on the shaft by 90°.

Indeed, with the spring positioned as shown in the figures and fitted on the actuator 13 and the bar vertical when the actuator 12 is retracted the device closes the passage in a clockwise manner (passage to the right of the device 10) in accordance with the orientation shown in FIG. 1. With the spring fitted on the actuator 12 and the bar fixed to the shaft 17 in vertical position when the actuator 13 is retracted there is provided a counter-clockwise closing device (passage to the left of the device 10) in accordance with the orientation shown in FIG. 1.

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Claims

1. Controlled gate device comprising a bar moving between a horizontal position to block a passage and a vertical position to free said passage by means of servomechanisms acting to rotate a horizontal shaft supporting the bar near one of its ends and characterized in that said servomechanisms comprise a lever with equal arms and its fulcrum pivoted on said shaft and two equal single-action hydraulic actuators each connected between a corresponding end of the lever and the structure supporting the device fixed to the ground, to control operation, a first actuator the movement of reaching the vertical position and the other actuator the return to the horizontal position of the bar, there being connected to said lever means of reaction in the direction necessary to counterbalance the moment produced by the weight of the bar on the shaft balancing the forces of operation of the hydraulic actuators, the whole consisting of lever and actuators being symmetrical in relation to the vertical plane passing through the shaft.

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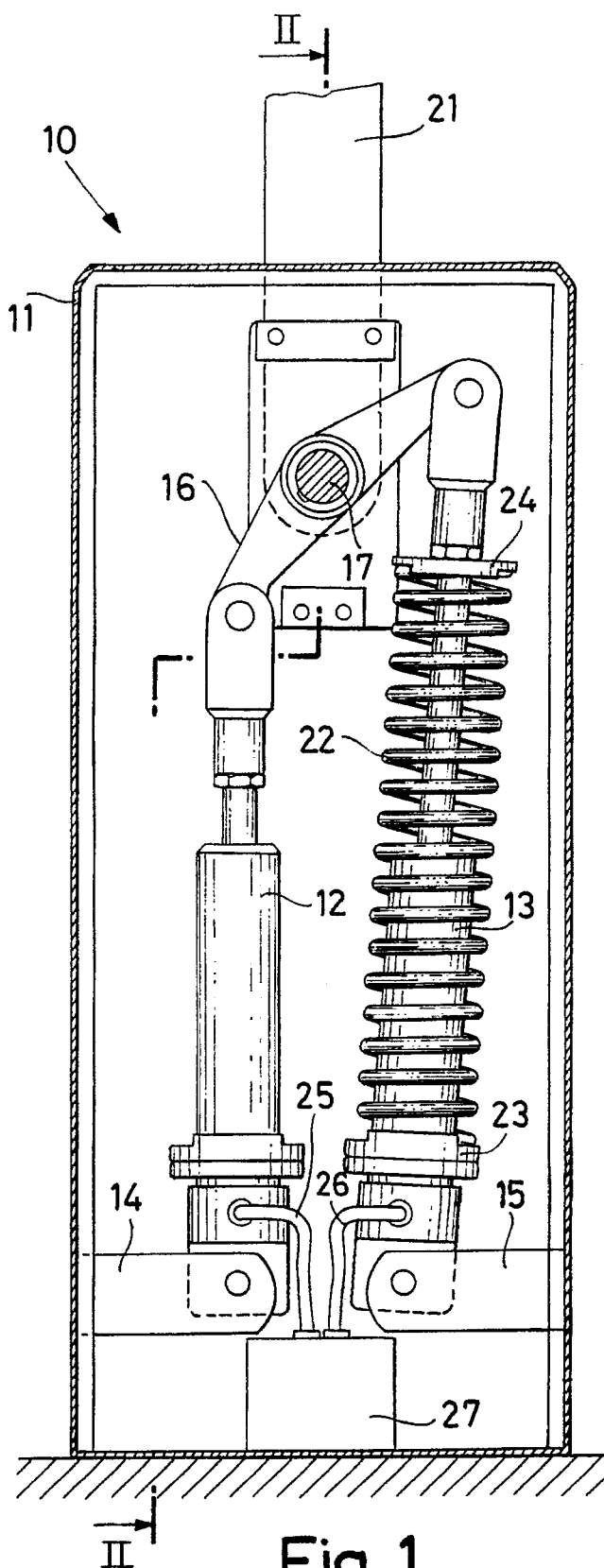
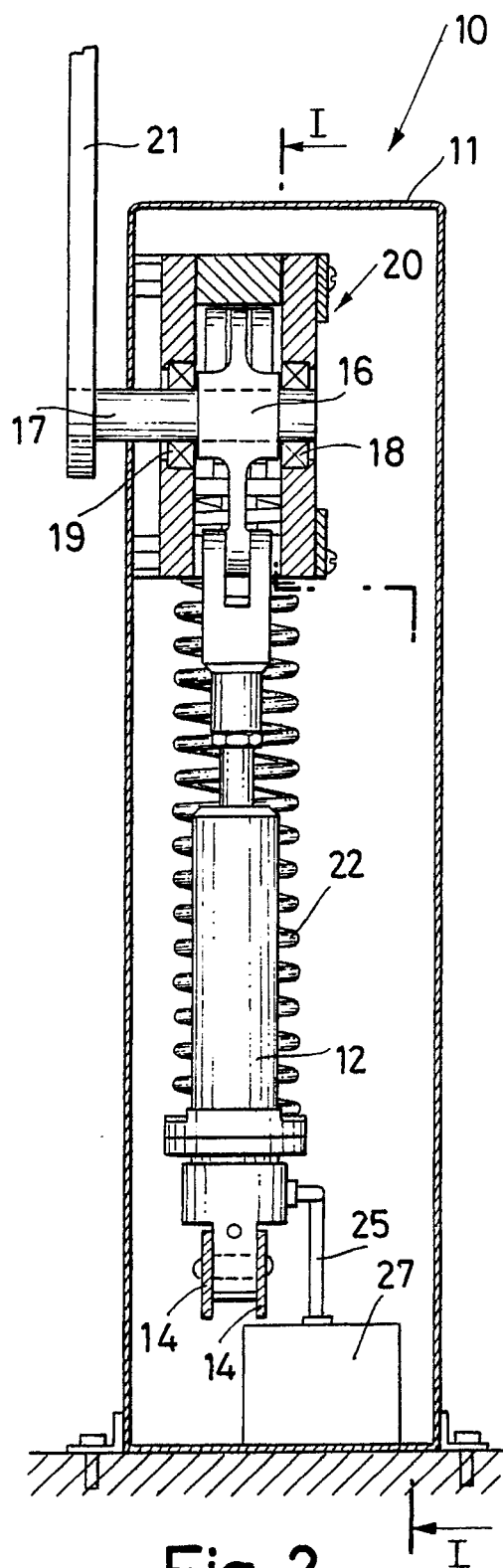
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2. Device in accordance with claim 1 characterized in that the means of reaction comprise a thrust spring fitted coaxially over the actuator controlling the movement of the bar to the vertical position and reacting between cylinder and rod of said actuator.

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EUROPEAN SEARCH REPORT

Application Number

EP 90 20 2556

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)
Y,A	FR-A-2 346 541 (HERBERG) * the whole document * - - -	1,2	E 01 F 13/00 E 05 F 15/04
Y,A	US-A-2 869 861 (M. CARLSON) * column 5, lines 44 - 64 ** column 9, lines 38 - 52 @ column 13, lines 6 - 11 @ column 13, lines 34 - 44; figures 1-4, 6 * - - -	1,2	
A	FR-A-2 073 589 (C. MALKMUS-DÖRNEMANN) * page 6, lines 10 - 19; figures 1, 6 * - - -	1	
A	GB-A-8 247 22 (G.W. HOULSBY JR.) - - -		
A	US-A-2 606 022 (J.H. VANDER VEER) - - -		
A	GB-A-1 002 313 (ELECTRO-HYDRAULICS) - - - - -		
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int. Cl.5) E 01 F E 05 F B 61 L
Place of search The Hague		Date of completion of search 15 January 91	Examiner VERVEER D.
<div>CATEGORY OF CITED DOCUMENTS</div> <div>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</div> <div>E: earlier patent document, but published on, or after the filing date D: document cited in the application L: document cited for other reasons ----- &: member of the same patent family, corresponding document</div>			