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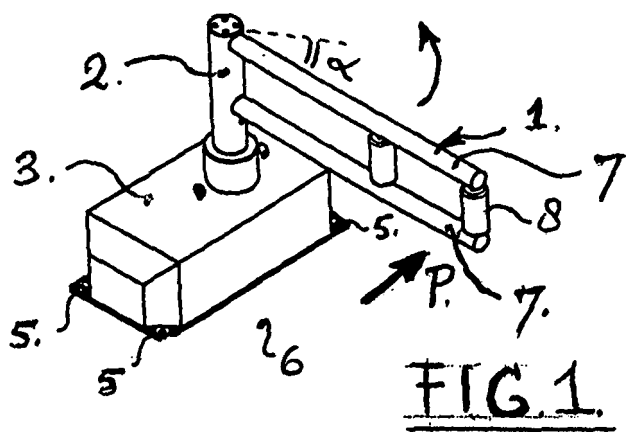
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(54) **Rotating mechanism for closing-off or stopping devices, such as barriers, gates etc.**

(57) The invention relates to a rotating mechanism (4) for automatically without energization or excitation complete opening after pushing the closing device (1),

such as, for example, a closing barrier by, for example, a vehicle and after passage of the vehicle the closing device closes again time delayed.



Description

[0001] The present invention relates to a rotating mechanism for closing-off or stopping devices, such as barriers, gates, valves and such, in which, for example, a barrier is placed in a horizontal rotating position for drawing attention to unauthorized persons with vehicles for unauthorized access to locations, areas or spaces, where, for example, in cities work is executed on tram tracks, or other locations, such as stock-yards, warehouses, car parks and such, in which said vehicle, mostly trams or trucks, bump into the stopping device with little speed to avoid damages to the vehicle and in which the stopping device then opens and after passage of the vehicle said closing device or barrier closes again, in which no electric or pneumatic energization or excitation sources for driving the rotating mechanism of the closing device is used.

[0002] In short, it concerns closing devices, such as, for example, barriers, gates, doors, flaps and such, provided with a rotating mechanism with springs and dampers, in which because of an executed force by a vehicle onto the closing device, the closing device opens itself at an angle α and then completely automatically opens further, whereafter after passage of the vehicle, such as, for example, a tram, truck and such the closing device closes itself time delayed.

[0003] A somewhat similar closing device or appliance is known from the American Patent document US 5,469,660, submitted on January 10th, 1994 from inventor Harry L. TAMENNE, 3811 Kentland Dr., Roanoke, Virginia 24018, titled: "Self-restoring railroad highway crossing gate device".

[0004] It concerns a kind of barrier, for example for railroads, which can be pushed open completely with little force by a traffic flow and then returns or slams back in its closed position.

[0005] The point of rotation of the gate in the shape of a barrier is kept in a closed position by an eccentrically applied draw spring and damper and, after opening, returns back because of the draw spring executed torque around the point of rotation.

[0006] The disadvantage of this device is, that opening the gate must be done with a continuous executed force and which after release quickly returns back into the closed position, by which possible passing vehicles get damaged by the sliding of the barrier against the vehicle and which closes immediately after driving through. Therefore, it is damaged by the constant spring loaded closing of the gate, after several vehicles have passed through.

[0007] The present trams in big cities have large windows at the front and sides and are provided with costly coatings, so that this closing gate or closing device for executing work on tram tracks for closing the area for other traffic, does not meet the demands of transport companies. The same goes for the contractors' trucks and other cars.

[0008] Also from the American Patent document US 6,681,525 a somewhat similar closing gate for the disabled in wheelchairs at railroad stations is known. Said patent document is submitted on November 15th, 2000 and from inventor David Edmond Dudley, 2673 Milkon Ct, San Jose, California 95148. The title is: "handicapped train station gate". The rotating mechanism of the gate around a vertical axis is provided with a pinion with a straight tooth bracket at both sides, which is coupled with a spring and damper, so that the gate can be opened quite easily and after passage of the disabled closes immediately in a slow fashion by means of the spring/damper system.

[0009] Because of the construction of the rotating mechanism, this gate would also scratch along a passing vehicle or wheelchair and damage or scratch it, which generally is not accepted by the public or users.

[0010] In short, the known appliances or closing devices with the accompanying rotating mechanisms always have the same disadvantages, being that when touched, opening does not commence automatically and closing does not provide enough delay. Obviously, an electronic or pneumatic source of motors, sensors and such for similar closing devices are undesirable, because power cables, wiring and such must be put on the street and this is often not possible or desired.

[0011] It is the aim of the present invention to provide such a closing device in the shape of a barrier, door, gate or valve, which does not touch and/or damage passing vehicles and after that automatically closes time laggedly.

[0012] Further, the closing device, mostly in the shape of a barrier for work on tram tracks in the city must be constructed compactly and put on the market in an economically responsible way.

[0013] For this, the closing device according to the invention is in an inventive way provided with a further developed and/or modified rotating mechanism, characterized in that, said closing device in rotating position is attached single-sidedly to a right angled placed axis of rotation with on the bottom side or mounting side a specific rotating mechanism is applied in a box, in which by said bumping with little speed and/or force the closing device is rotateable at an angle α , in which with said specific rotating mechanism with time delaying element the opening angle of the closing device is increasable with an angle of $90-\alpha$ degrees, in which after passage of the vehicle the complete return rotation of 90 degrees can be activated with a time delay element.

[0014] The advantage is, that the closing device according to the invention after touching with a certain force, opens at an angle α and after that automatically opens quickly completely by itself and after passage of the vehicle, closes time laggedly again, in which the rotating mechanism contained in a box with limited dimensions can be placed between, for example, two tram barriers.

[0015] Further, the rotating mechanism according to the invention is further developed in such a way, charac-

terized in that, said rotating mechanism consists of a first spring loaded driven piston with a partly with oil filled inner cylinder, which has been placed completely in a second open outer cylinder with circumferential spring, in which by means of a coupled lever or lifting rod connected with said axis of rotation said spring loaded driven partly with oil filled first cylinder with circumferential spring is completely tensionable and releasable by itself after bumping into the closing device, in which said coupled lever or lifting rod is provided with stop mechanisms and thus said closing device can be locked in two positions of 0 degrees and 90 degrees.

[0016] The advantage is a robust and reliable working closing device with rotating mechanism.

[0017] Further, the rotating mechanism according to the invention is further developed in such a way, characterized in that, said time delaying element consists of a composition of knockable plunger in a cylinder with oil and is connected with oil pipes to a first pressure vessel with a pressure up to X bar and a second pressure vessel with a pressure of 1/2x bar, in which said first and second pressure vessels are mutually connected with an adjustable regulating valve and non-return valve.

[0018] The advantage is a well adjustable time lag for closing the closing device for use in the city.

[0019] The preferred construction of the invention will be described by way of example, and with reference to the accompanying drawing.

[0020] In which:

- Fig. 1 shows a view in oblique projection of a closing barrier provided with the rotating mechanism according to the invention;
- Fig. 2 ditto as figure 1, but now with the box for attachment to the ground partly in exploded view to show the rotating mechanism;
- Fig. 3 shows a view across the line III of figure 4;
- Fig. 4 shows a front view of the closing barrier with an exploded view of the box with rotating mechanism according to a preferred embodiment of the invention;
- Fig. 5 shows a top view of the closing barrier with partly exploded view of the box with rotating mechanism according to the invention; and
- Fig. 6A up to 6D show step by step the working or operation of the rotating mechanism according to the invention.

[0021] Figure 1 shows a view in oblique projection of the closing barrier 1 with axis of rotation 2 and box 3 for the rotating mechanism 4. The box 3 is fixed to the ground 6 with screws 5.

[0022] The arrow P shows the pushing of the closing

barrier 1, which then turns at an angle α . The closing barrier 1 is, for example, constructed of two parallel tube-shaped elements 7, with in between protruding rolls 8 with rubber covering to avoid possible damage to the vehicle.

[0023] Figures 2 up to 5 show the same parts indicated with the same position numbers and especially the placed rotating mechanism 4 according to the invention is clearly shown.

[0024] Figures 6A up to 6D indicate step by step the working of the rotating mechanism 4.

[0025] In the position of the rotation mechanism 4 as shown in figures 6A and 6D the closing device, for example, in the shape of a closing barrier 1, is closed. The rotating mechanism 4 consists of an inner cylinder 9 with piston 10 and piston rod 11, in which the piston is spring loaded with compression spring 12. Further, the inner cylinder 9 is placed in a second open external cylinder 13.

[0026] The circumferential spring 14 tensions said inner cylinder 9 in relation to the second open external cylinder 13. The piston rod 11 is reversed at its end and hingeably connected to the bars 15 and 16. The last hingeable bar 17 is a lever and provided with a hook 18, which is liftable from a raised edge 19.

[0027] Figure 6B shows the closing device 1 in the shape of a closing barrier 1 opened by a vehicle at an angle α and the springs 12 and 14 are tensioned. The hook 18 loosens in figure 6C by raising the hingeable bar 17 according to the arrow and the inner cylinder 9 shoots back against the plunger 20, which activates the time reduction element 21 by means of oil movement.

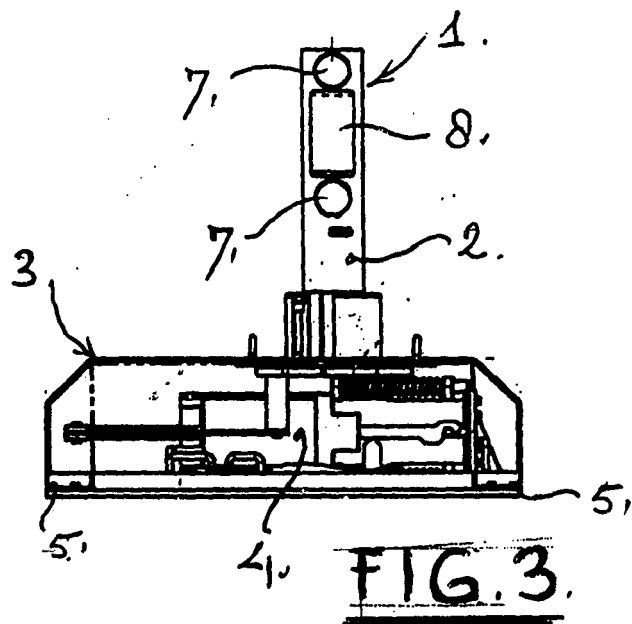
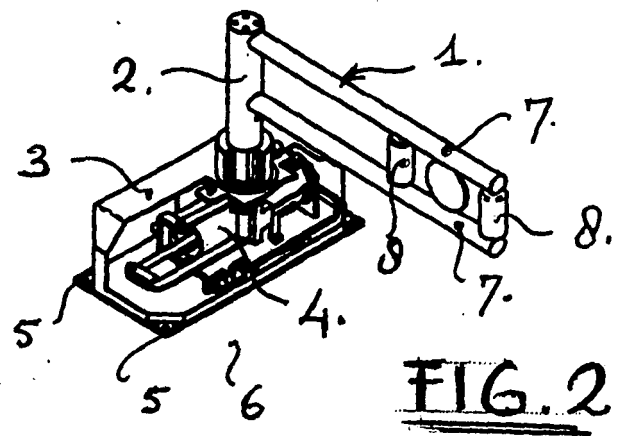
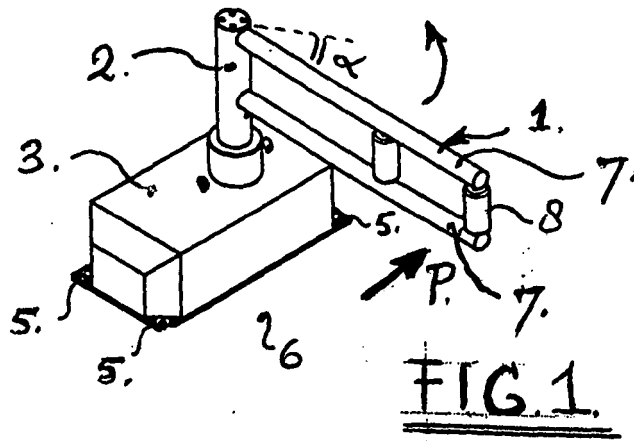
[0028] By means of bores, the oil runs from the right part of the inner cylinder 9 to the left part in figure 6B and the at one direction oil permeable piston 10 can move to the left, by which said closing device 1 opens completely automatically, in which the hook 18 lifts and in figure 6C the opening procedure is completed. Now, the oil runs from the left part of the inner cylinder 9, via the oil return pipe 22 to the right part of the inner cylinder 9 and is herewith controlled by the time delaying element 21. In figure 6D the turning back of the closing barrier 1 is completed.

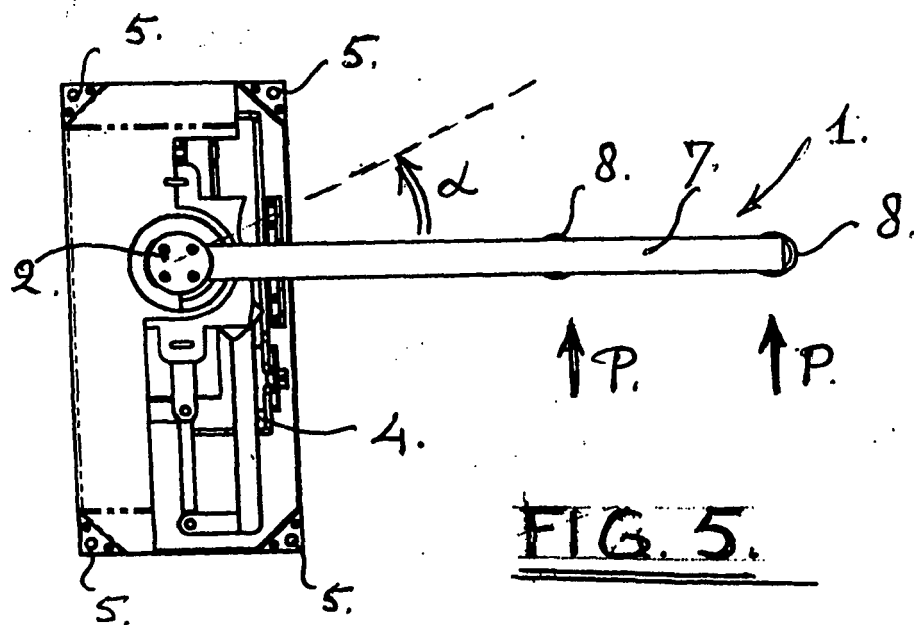
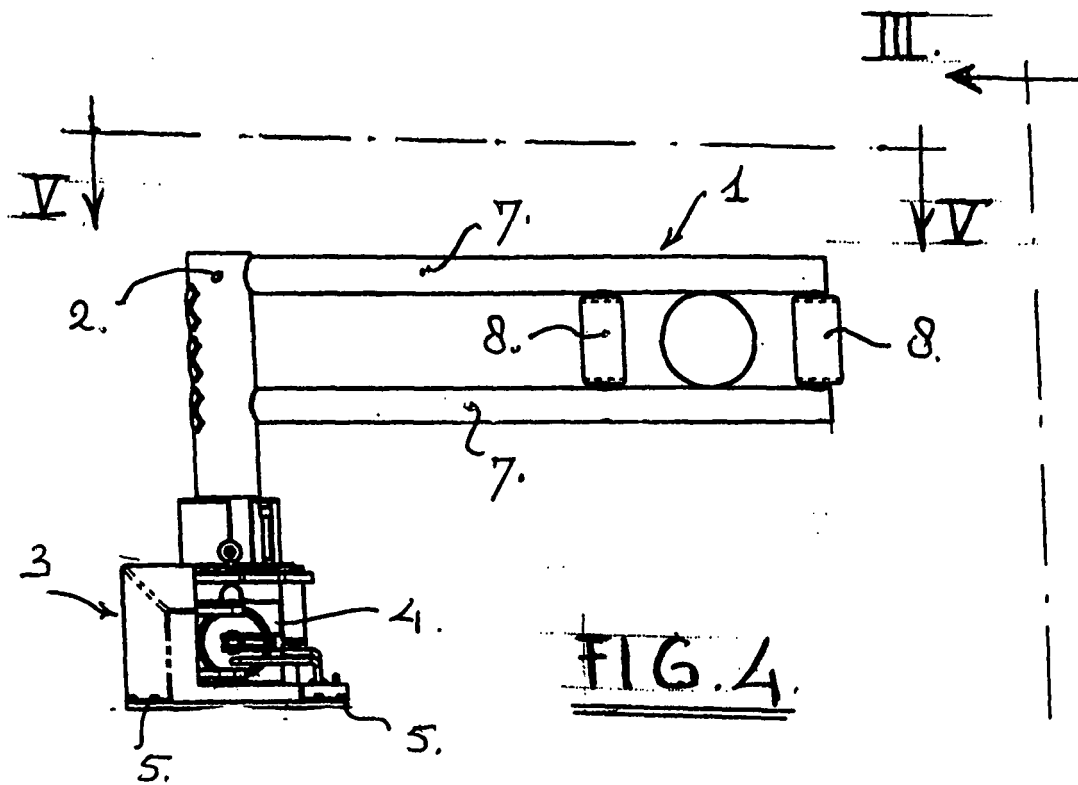
[0029] The time delaying element 21 consist of interconnected with oil pipes 23, a first pressure vessel 24 with a pressure of X bar in which X is approximately 4 and a second pressure vessel 25 with a pressure of 1/2x bar, being 2 bar. The time delaying element 21 controls a multiple valve 26 for regulating the oil flow in the oil pipe 22. The step by step indication of the working or operation of the rotation mechanism 4 for automatic control of the closing device 1 shown in figures 6A up to 6D is immediately obvious to an expert.

[0030] Finally it has to be emphasized, that the above description constitutes a preferred embodiment of the invention and that further modifications are possible without departing the scope of this patent description.

Claims

1. Rotating mechanism (4) for closing-off or stopping devices (1), such as barriers, gates, valves and such, in which, for example, a barrier is placed in a horizontal rotating position for drawing attention to unauthorized persons with vehicles for unauthorized access to locations, areas or spaces, where, for example, in cities work is executed on tram tracks, or other locations, such as stock-yards, warehouses, car parks and such, in which said vehicle, mostly trams or trucks, bump into the stopping device (1) with little speed to avoid damages to the vehicle and in which the stopping device then opens and after passage of the vehicle said closing device or barrier closes again, in which no electric or pneumatic energization or excitation sources for driving the rotating mechanism (4) of the closing device (1) is used, **characterized in that**, said closing device (1) in rotating position is attached single-sidedly to a right angled placed axis of rotation (2) with on the bottom side or mounting side a specific rotating mechanism (4) is applied in a box (3), in which by said bumping with little speed and/or force the closing device (1) is rotateable at an angle α , in which with said specific rotating mechanism (4) with time delaying element (21) the opening angle of the closing device (1) is increasable with an angle of $90-\alpha$ degrees, in which after passage of the vehicle the complete return rotation of 90 degrees can be activated with a time delaying element (21). 5
2. Rotating mechanism as claimed in claim 1, **characterized in that**, said rotating mechanism (4) consists of a first spring loaded driven piston (10) with a partly with oil filled inner cylinder (9), which has been placed completely in a second open outer cylinder (13) with circumferential spring (14), in which by means of a coupled lever or lifting rod (17) connected with said axis of rotation (2) said spring loaded driven partly with oil filled first cylinder (9) with circumferential spring (14) is completely tensionable and releasable by itself after bumping into the closing device (1), in which said coupled lever or lifting rod (17) is provided with stop mechanisms and thus said closing device can be locked in two positions of 0 degrees and 90 degrees. 10
3. Rotating mechanism as claimed in claims 1-2, **characterized in that**, said angle α is preferably approximately 45 degrees. 15
4. Rotating mechanism as claimed in claim 2, **characterized in that**, for said spring loaded driven piston (10) and circumferential spring (14), compression springs are used. 20
5. Rotating mechanism as claimed in claims 1, 2 and 4, **characterized in that**, of said first spring loaded driven piston (10) with a partly with oil filled cylinder both closed head ends are connected to each other externally by an oil return pipe (22) provided with a multiple valve (26), in which said multiple valve (26) is driven by said time delaying element (21). 25
6. Rotating mechanism as claimed in claim 5, **characterized in that**, said time delaying element (21) consists of a composition of knockable plunger (20) in a cylinder with oil and is connected with oil pipes (23) to a first pressure vessel (24) with a pressure up to X bar and a second pressure vessel (25) with a pressure of $1/2x$ bar, in which said first and second pressure vessels are mutually connected with an adjustable regulating valve and non-return valve. 30
7. Rotating mechanism as claimed in claim 2, **characterized in that**, said stop mechanisms are constructed as hingeable levers (17) with a hook (18) on the end which extends over an edge (19) and which lever can be lifted by displacement/movement of said first cylinder (9) with piston (10), the hook (18) with hingeable lever (17) can be lifted by passage of a cam. 35
8. Rotating mechanism as claimed in claim 1, **characterized in that**, said closing device (1) in the shape of a barrier consists of two mutually horizontally coupled tube-shaped elements (7), between which beside said tube-shaped elements (7) protruding rolls (8) with rubber covering are mounted to avoid damage to the bumping vehicle. 40
9. Rotating mechanism as claimed in claims 1-2, **characterized in that**, said box (3) is mechanically applied to the ground (6) or load bearing ground, mostly a road, in which said application is usually done with screws (5) turned into a bore with plug in the said ground (6). 45
10. Rotating mechanism as claimed in claim 1, **characterized in that**, said closing device (1), axis of rotation (2) and box (3) are constructed in desired company colours, and possibly provided with marks, logos etc. 50





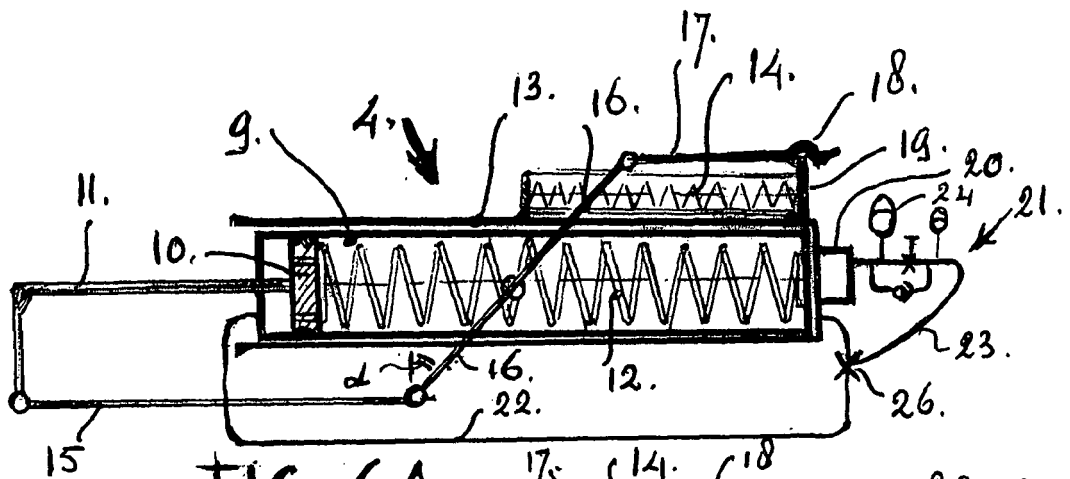


FIG. 6A.

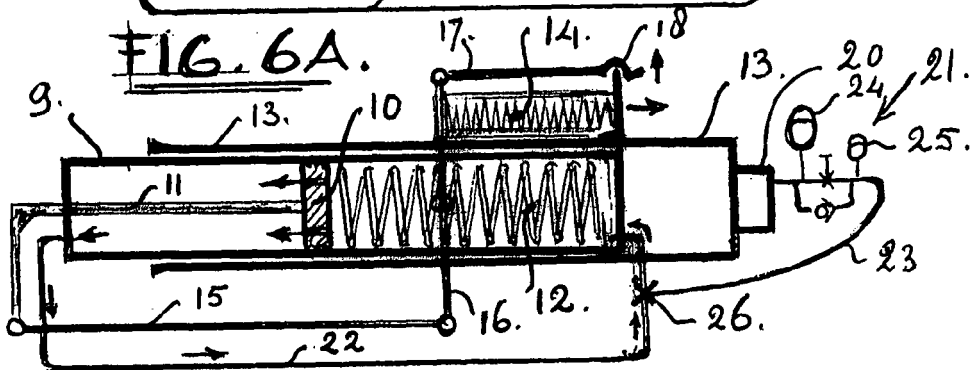


FIG. 6B.

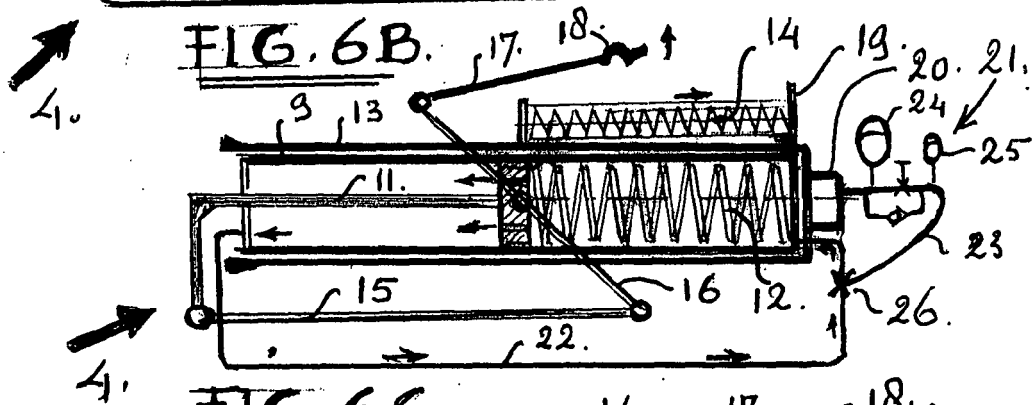


FIG. 6C.

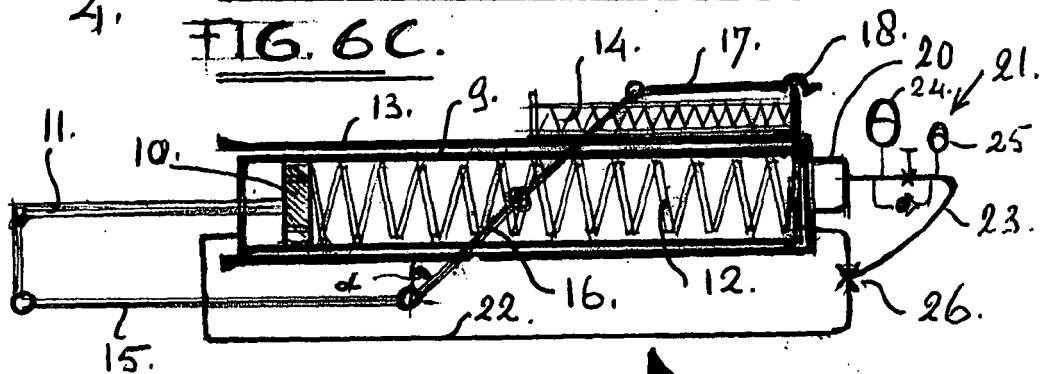


FIG. 6D.



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 06 07 5795

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 4 285 165 A (PERSSON ET AL) 25 August 1981 (1981-08-25) * the whole document *	1,3	INV. E01F13/06 E05F13/02
A	US 4 611 433 A (HEIZER, JR. ET AL) 16 September 1986 (1986-09-16) * column 4, lines 14-34; figures 1-7 *	1	
A	EP 1 467 027 A (TRULLI, ANTON) 13 October 2004 (2004-10-13) * column 1, lines 1-10; figures 1,2 *		
			TECHNICAL FIELDS SEARCHED (IPC)
			E01F E05F
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 26 September 2006	Examiner FLORES HOKKANEN, P
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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 06 07 5795

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26-09-2006

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 4285165	A	25-08-1981	NONE	

US 4611433	A	16-09-1986	NONE	

EP 1467027	A	13-10-2004	NONE	

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 5469660 A [0003]
- US 6681525 A [0008]