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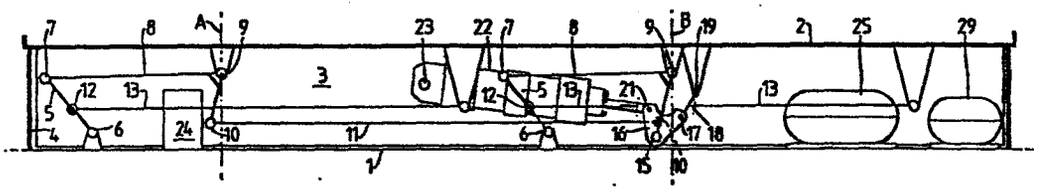
(54) Damping device for the stretchers of motor ambulances in general.

(57) The damping device comprises four identical articulated quadrilaterals disposed aligned coplanar in pairs, and each comprising a stretcher support table (2) and three bars (5, 8, 13), the shortest (5) of which, disposed opposite the stretcher support table (2), is hinged to the floor (1) at a point situated external to its own quadrilateral. Two corresponding bars (5 or 8) of one pair of coplanar quadrilaterals are connected together by a connecting rod (11), and one of said bars (8) is caused to rock by a pneumatic damping unit (22) by way of an intermediate element (13) provided with three hinges which are connected respectively to said rod (8), to a connecting rod connected to the table (2), and to the rod of the unit (22) which is itself hinged to the stretcher support table (2).

Fig. 1.



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DAMPING DEVICE FOR THE STRETCHERS OF MOTOR AMBULANCES IN GENERAL

This industrial invention patent relates to a device for absorbing and attenuating the shaking and jolting which during motor ambulance journeys are transmitted to the stretchers on which the ill or injured persons lie.

In order to make the journey more comfortable for ill or injured persons, damping devices for stretchers are available for this specific sector, but they have the drawback of requiring lengthy, complicated and costly modifications to the respective motor vehicles to which they are fitted, because of the fact that motor ambulances derive from van-type motor vehicles which are not specifically constructed for such use.

In this respect, in order to fit said known damping devices to a normal van-type vehicle, it is usually necessary to substantially modify or convert the vehicle, in particular the floor and the region below it, because in addition to the connection points for the damping device, housings must also be provided for its control and service means.

Moreover, some known damping devices have the drawback of being permanently in the sprung condition, which makes the stretcher loading and unloading operations difficult.

This patent provides and protects a device for obviating the aforesaid within the framework of a simple and rational structure.

According to the invention, the proposed device comprises a stretcher support table supported by the floor of a motor ambulance by means of four identical lever systems each comprising three bars, said lever systems being situated at the four corners of the stretcher support table in a manner aligned coplanar in pairs.

More particularly, each group of three bars constitutes, in combination with the stretcher support table, an articulated quadrilateral which together with the other three quadrilaterals moves the stretcher support table orthogonally to the floor so as to alternately dispose it in a lowered position in which the table rests on the floor, and in a raised position in which the table is damped.

In this respect, according to the invention the shortest bar of each articulated quadrilateral, namely the bar opposite the stretcher support table, is hinge-connected to the floor by way of an extension to said bar situated external to the quadrilateral to which it pertains.

Again, two corresponding bars of a pair of coplanar quadrilaterals are connected together by a connecting rod, and one rod of one of the quadrilaterals of said coplanar pair is caused to rock by a pneumatic cylinder-piston unit, of which the body is hinged to the stretcher support table and the rod is hinged to an intermediate element provided with two further hinges, of which one is connected to the aforesaid bar and the other to a connecting rod branching from the stretcher support table.

Finally, the pneumatic cylinder-piston unit for controlling said intermediate element according to the invention can comprise, connected between its operating chamber and the respective compressed air source, a buffer vessel which according to the invention provides an elastic cushion enabling the stretcher support table to adapt to the weight of the person lying on the stretcher, and also enabling the said table to undergo damping of the shaking and jolting to which the floor is subjected.

The characteristics and constructional merits of the invention will be more apparent from the detailed description given hereinafter with reference to the figures of the accompanying drawings which illustrate a particular preferred embodiment thereof by way of non-limiting example.

Figures 1 and 2 are two overall diagrammatic side views showing the invention in its completely lowered position in which it rests on the floor of the motor ambulance, and in its completely raised or sprung position.

Figure 3 is a plan view, with parts removed, showing that part of the device comprising the control unit.

Figure 4 is a section on the line IV-IV of Figure 3.

Figure 5 is a diagram of the control system for the invention.

Said figures show a flat connection surface 1 for the invention, said surface constituting the floor of a normal motor ambulance.

A stretcher support table 2, shown diagrammatically for reasons of clarity, is located on said floor 1 in such a manner as to be able to rise parallel to itself, orthogonally to said floor 1.

The table 2 is provided with suitable guides for sliding a stretcher, not shown, and convenient means for locking this latter.

Furthermore, the stretcher support table 2 is provided with two longitudinal descending walls 3, their purpose being to mask the devices situated below the stretcher support table 2 when this latter is raised (see Figure 4).

This masking is further supplemented by two longitudinal plates 4 which rise from the floor 1 and between which said walls 3 are received when the table is lowered (Figure 4).

Furthermore, from Figure 4 it can be seen that the height of the plates 4 is slightly less than the height of the walls 3 so that these latter rest directly on the floor 1 when the table is completely lowered.

As shown, said table 2 and said floor 1 are connected together by four identical lever systems situated at the corners of the stretcher support table 2, and aligned in pairs longitudinally so as to be coplanar.

The component elements of these four identical lever systems are therefore indicated by the same reference numerals, and each lever system, constituted by three levers or bars, defines together with the stretcher support table 2 an articulated quadrilateral as described in detail hereinafter.

From the figures it can be seen that each lever system comprises a longitudinally rocking lever 5 which is hinged at its base (Figures 1, 2) to the floor 1 on a transverse shaft 6, and at its top is hinged at 7 to the longer arm of a L-shaped lever 8 having its dihedron facing the floor 1.

At its bend, the lever 8 is hinged at 9 to the overlying stretcher support table 2, the shorter arms of two of the L-shaped levers 8 situated on the same side of the stretcher support table 2 being connected together by a connecting rod 11 provided with respective end hinges 10 (Figures 1 to 4).

Said connecting rod 11 causes the four articulated quadrilaterals of the invention to be subjected to the same movements.

In addition, a bar 13 has one end hinged to a central point 12 of each lever 5, and its other end hinged at 14 to the underside of the stretcher support table 2.

Consequently each group of four hinged connections (12, 7, 9, 14)

defines one of said articulated quadrilaterals.

The shorter arms of the two L-shaped levers 8 which are situated to the right in Figures 1 to 3 are connected together lowerly by a transverse pin 15, to which two salient triangular plates 16 are hinged.

The two plates 16 are connected together by a pair of transverse pins 17, 21, to the first of which there is hinged a connecting rod 18, the other end of which is hinged at 19 to a cross-member 20.

Finally, on the second pin 21 of said pair of pins there is pivoted the rod of a pneumatic cylinder-piston unit 22, this being connected at 23 (Figures 1, 2) to the stretcher support table 2.

A pneumatic service installation is provided for said cylinder-piston unit 22, said installation comprising as shown in Figure 5 a compressor unit 24 which is connected to a compressed air receiver 25 by way of a non-return valve 26.

Downstream of the receiver 25 there are provided two solenoid valves 27, 28, a buffer vessel 29 and, upstream of the operating chamber of the cylinder-piston unit 22, an adjustable air passage valve 30 and a non-return valve 31, these being connected in parallel as shown.

A raising/lowering switch 33 is connected into the electrical feed line 32 to the solenoid valve 28, and a raising pushbutton 35, a rise limit switch 36 and a corresponding warning lamp 37 are connected into the electrical feed line 34 of the solenoid valve 27.

Finally, an automatic cut-out device 39 for the compressor 24 is connected into the electricity supply 38 of this latter.

The lines 32 and 38 are connected respectively to the ambulance battery and to its instrument board.

As stated in the introduction, when the stretcher support table 2 is completely lowered, it rests on the floor 1 (Figures 1 and 4), and is consequently in a fixed or stable position which makes stretcher loading and unloading extremely comfortable and rapid.

In said lowered position, the solenoid valve 27 is closed and the solenoid valve 28 is connected to discharge.

When the stretcher support table 2 is switched to rise, which as stated initially it does by moving parallel and orthogonal to the floor 1 by virtue of the special connections and configurations of the articulated quadrilaterals which control its excursional movements, see in particular the vertical straight lines A, B shown on drawing I/3, the two solenoid valves 27, 28 switch-over to connect the receiver 25 to the buffer vessel 29 and to the cylinder piston unit 22.

As the stretcher support table 2 rises, it operates the limit switch 36, with the result that the warning lamp 37 lights and the passage of air to the buffer vessel 29 is halted by the closure of the solenoid valve 27.

This latter vessel therefore provides an air cushion which keeps the stretcher support table 2 sprung or damped, so making the journey of an ill or injured person particularly comfortable.

It should be noted that the purpose of the elements 16, 18 is to increase the damping resistance of the unit 22 during the terminal part of the downward sprung movements.

When the stretcher support table 2 is lowered by operating the switch 33, the two solenoid valves 27, 28 return to their previous positions in the sense that the valve 27 closes and the valve 28 becomes connected to discharge.

The invention is not limited to the single embodiment heretofore

described and represented, but covers all technical equivalents of the described means and their combinations, provided these conform to the following claims.

Finally, with particular reference to Figure 3, it will be noted that practically all the hinged connections of the invention incorporate an interposed elastic cylindrical member such as a rubber bush, so that the damping of the stretcher support table 2 is further improved, and the hinged connections are prevented from generating noise during the sprung movement of the table 2.

PATENT CLAIMS

1. A damping suspension device for stretchers in motor ambulances, characterised by comprising four identical articulated quadrilaterals disposed at the four corners of a stretcher support table (2) supported by the vehicle floor (1), and aligned longitudinally in coplanar pairs, the four articulated quadrilaterals each comprising said stretcher support table (2) and three consecutive bars (5, 8, 13), of which the shortest (5), situated opposite the stretcher support table (2), is hinged to the floor (1) at a point (6) external to the quadrilateral to which it pertains; two corresponding bars (5 or 8) of two coplanar quadrilaterals being connected together by a connecting rod (11), and at least one bar (8) of said coplanar quadrilaterals being caused to rock by a pneumatic damping unit (22) hinged to the stretcher support table (2), the rocking movements of said at least one bar (8) originating by way of an intermediate triangular member (16) provided with three hinges (21, 15, 17), respectively for the rod of the pneumatic unit (22), for said at least one bar (8), and for a connecting rod (18) hinged at its other end to the stretcher support table (2).

2. A device as claimed in claim 1, characterised in that a buffer vessel (29) is connected between the operating chamber of the pneumatic damping unit (22) and the respective compressed air source (24, 25).

Fig.1.

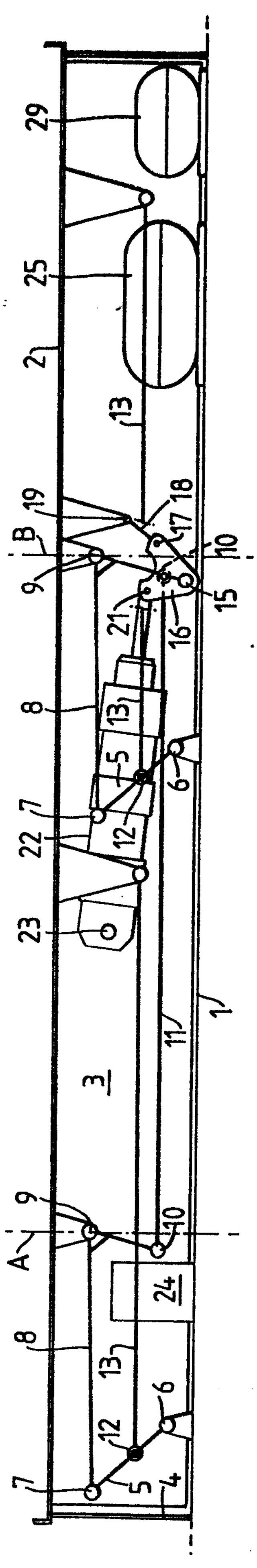
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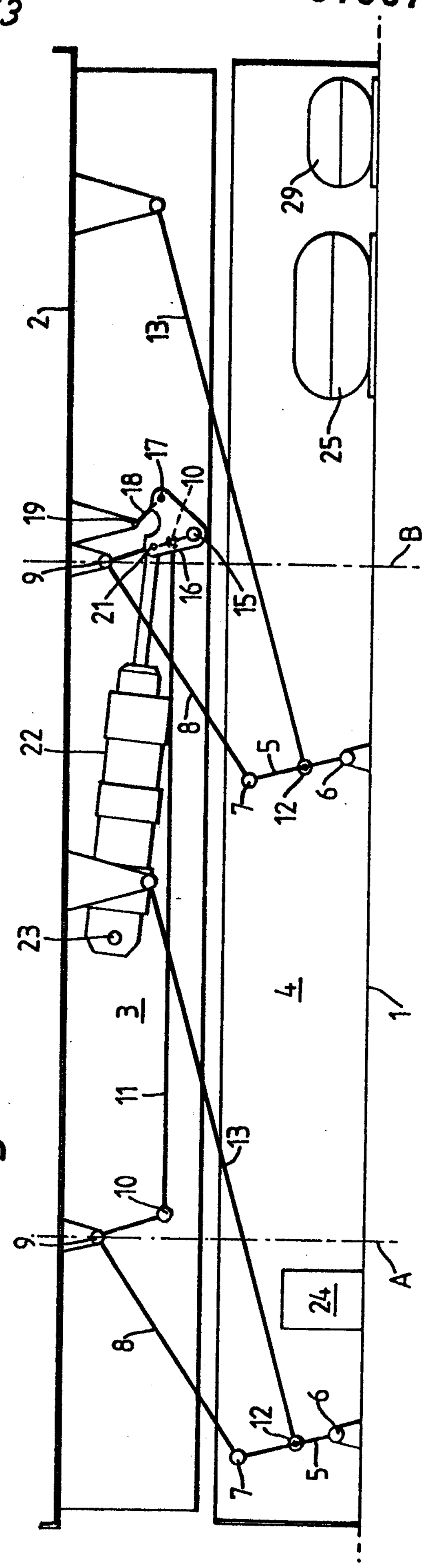
Fig.2.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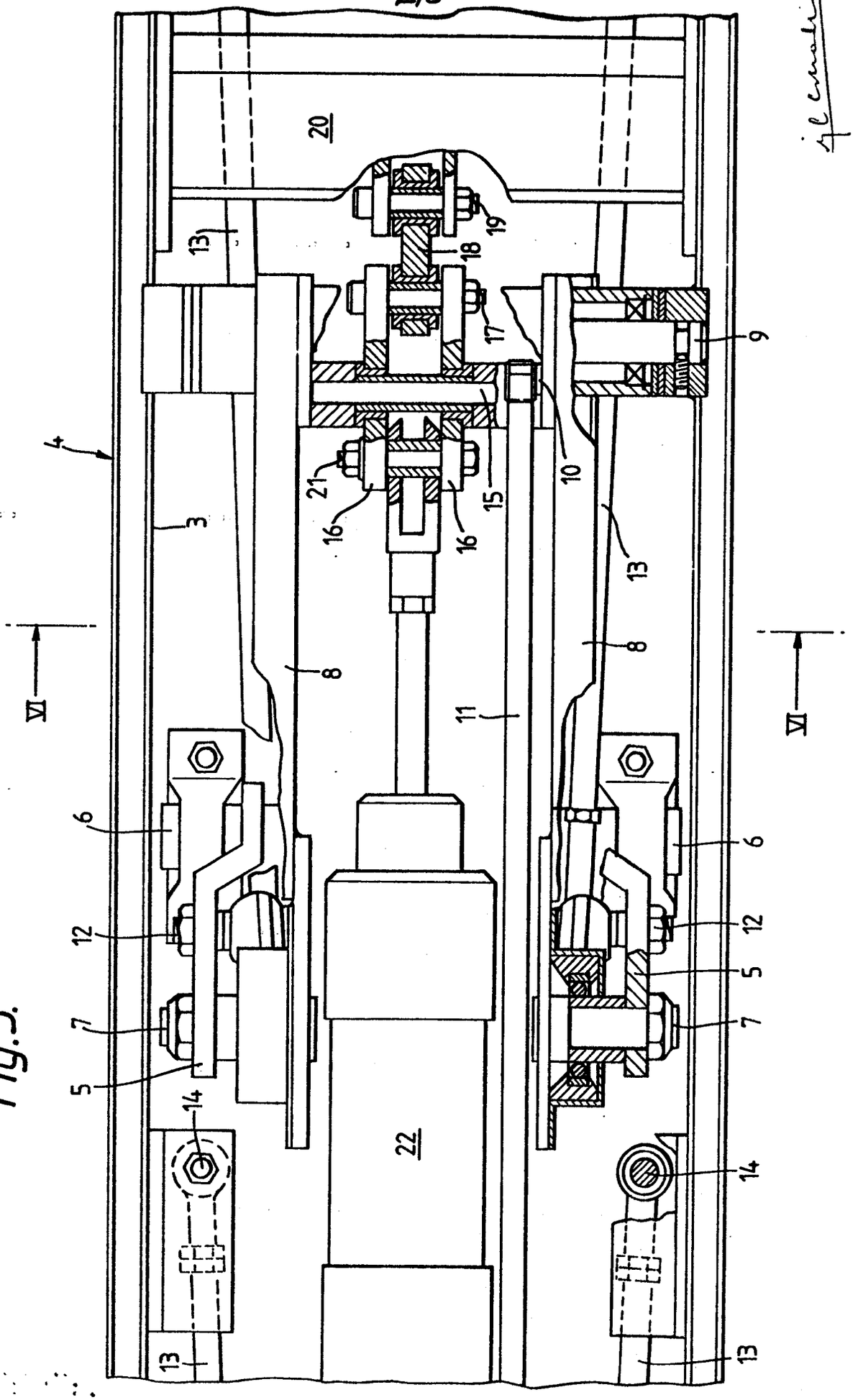

Fig.3.

Fig.4.

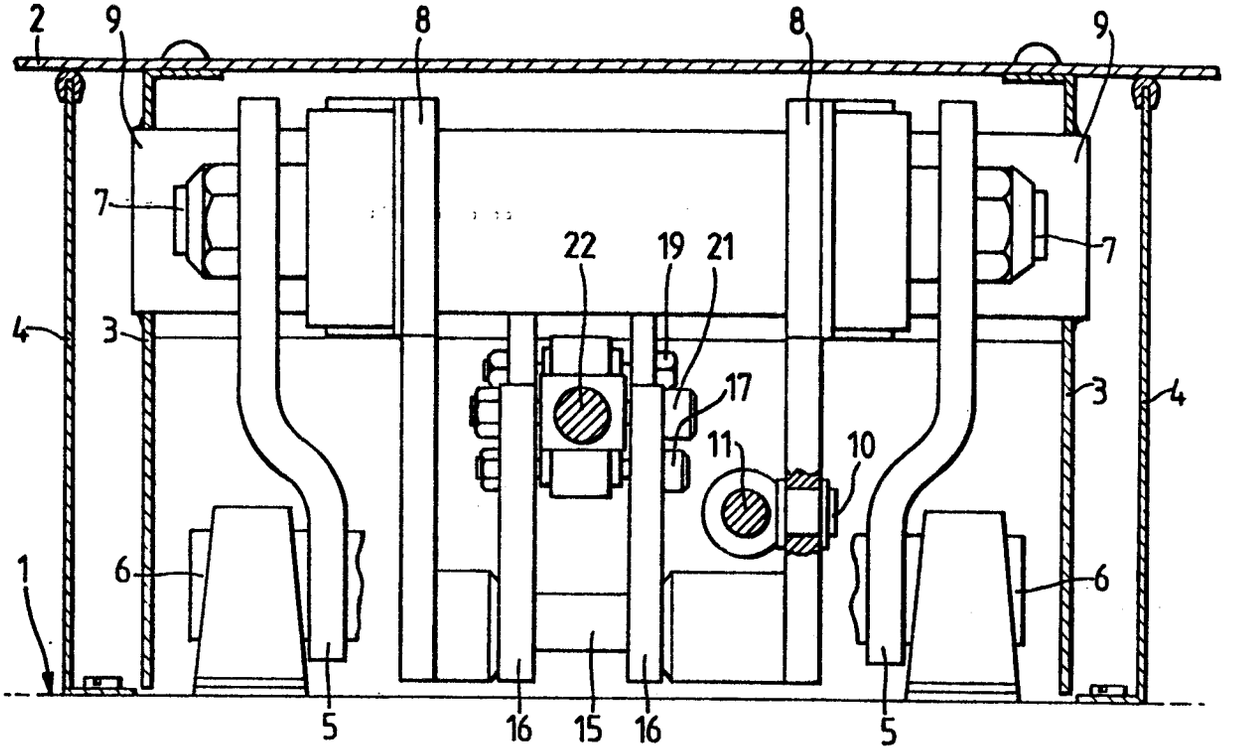
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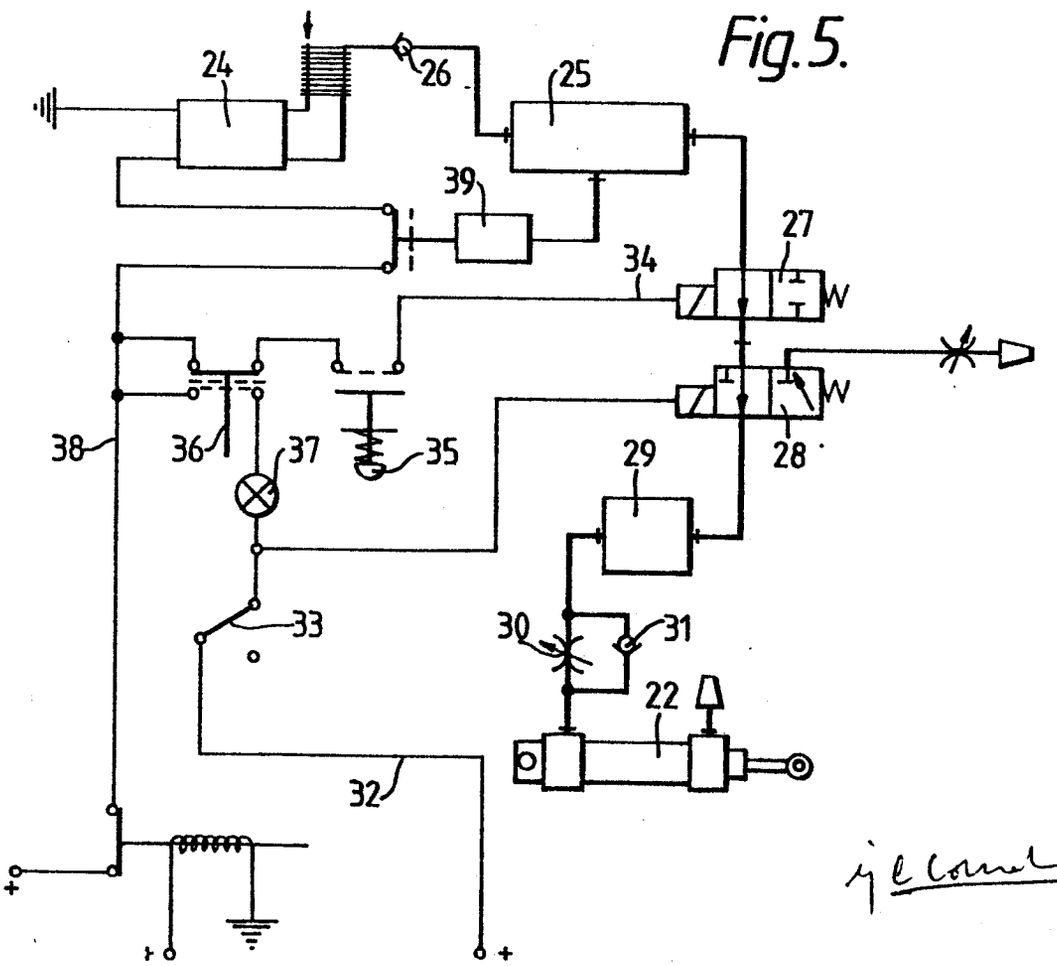
Fig.5.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