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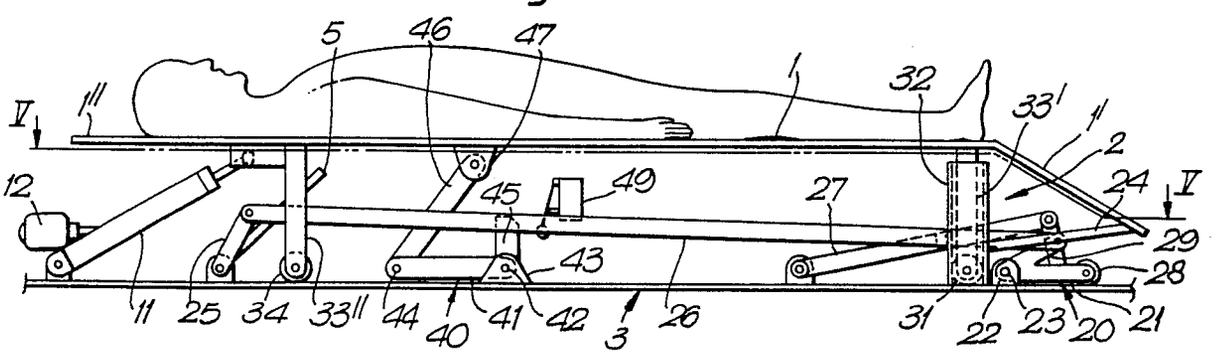
(54) Motor ambulance bed with damping and variable inclination.

(57) The bed comprises a first lifting device consisting of a lever mechanism (20) arranged to raise one end (1') of the bed surface (1), and a second lifting device consisting of a cylinder-piston unit (11) provided with a damping and elastic reaction element (12) and arranged to raise the other end (1") of the bed surface (1); the two lifting devices act independently, so enabling the inclination of the bed surface to be adjusted in both directions; the bed is also of simple and economical construction and can be fitted to its transporting vehicle in a simple and rapid manner.

Fig. 1.



EP 0 278 547 A2

MOTOR AMBULANCE BED WITH DAMPING AND VARIABLE INCLINATION

This invention relates to a motor ambulance bed.

Said beds generally consist of a frame supporting the bed surface, ie the surface on which the patients or casualties are laid, this surface being of either fixed type, or of removable type if consisting of the actual stretcher used to load and unload the patient or casualty into and from the ambulance.

Preferably, said beds must be able to damp the impacts and jolts to which their transporting vehicle is subjected in order to make the transportation of the patient or casalty more comfortable, and must also preferably be able to assume a rigid lowered position to enable the stretcher forming the bed surface to be more easily deposited on and removed from the bed support frame.

An object of the present invention is to provide a bed which satisfies the aforesaid requirements, is of simple and economical construction and can be fitted to its transporting vehicle in a simple manner without substantial modification to the ambulance floor on which it is to be mounted.

A further object of the present invention is to provide a bed, the surface of which can be inclined in both directions.

Said objects are attained by the present invention as characterised in the claims.

The invention is described in detail hereinafter with reference to the accompanying figures which show one embodiment thereof.

Figure 1 is a diagrammatic side view of the bed according to the invention.

Figures 2 to 4 are further analogous side views of a more diagrammatic kind showing the bed of Figure 1 in three different positions.

Figure 5 is a section on the line V-V of Figure 1.

The bed according to the invention is composed substantially of a surface 1 on which the patient or casualty is laid either directly or by way of a stretcher resting on the surface 1, a support frame 2 and a base 3 which is fixed to the mounting floor of the motor ambulance.

The frame 2 comprises a first lifting device consisting of a lever mechanism 20 arranged to lift a first end 1′ of the surface 1.

The lever mechanism 20 comprises a pair of levers 21, one for each side of the bed, which are pivoted to the base 3 about the same axis of rotation.

Specifically, the levers 21 are fixed at their lower end to a transverse shaft 23 pivoted by means of brackets 22 to the base 3. The upper ends of the levers 21 each slidingly support a respective substantially horizontal or inclined inflexible rod 24 which is rigid with the end 1′ of the surface 1. The upper ends of the levers 21 each comprise an idle wheel 28 slidable against the rods 24.

Said levers 21 are operated by a further lever 25 positioned at the other end 1″ of the bed and pivoted to the base 3. The lever 25 is connected by a connecting rod 26 to the pair of levers 21, and more specifically to a lever 29 rigid with the shaft 23 and disposed at an acute angle to the levers 21.

When the end 1′ is in its lowered position (as shown in Figures 1 and 2), the levers 21 are in a substantially horizontal position and the lever 25 is in a raised position. On rotating the lever 25 anticlockwise, the levers 21 undergo a corresponding rotation to move into a vertical position and raise the end 1′ of the surface 1 by means of the rods 24 (as shown in Figures 3 and 4). When in this position the lever 25 has passed beyond its dead centre and is in a laying position resting securely against the base 3. This position remains stable because the weight acting on the end 1′ (as described hereinafter) urges the lever 25 against the base 3. A hydraulic damper 27 is also provided, connected to the pair of levers 21, in order to brake the descent of the end 1′ from its raised position to its lowered position.

The surface 1 is coupled to the base 3 by way of a pair of idle wheels 31, one for each side of the bed, which are located on the same transverse axis and are rigid either with the surface 1 or with the base 3 and are slidable within respective vertical guides 32 rigid either with the base 3 or with the surface 1 respectively.

Specifically, two pairs of legs are rigid with the surface 1, these consisting of a pair of legs 33′ close to the end 1′ and a pair of legs 33″ close to the end 1″, and by which the surface 1 rests directly on the base 3 when in its lowered position. The legs 33′ carry the wheels 31 at their lower ends, and the guides 32 are of smaller length than the legs 33″. Further support wheels 34 are pivoted to the lower ends of the legs 33″.

The rods 24 are fixed at one end to the end 1′ of the surface 1 and at their other end to the legs 33′. When the levers 21 are in their raised position, their wheels 28 rest against the legs 33′ and do not reach the vertical position. This stabilises the position of the lever 25 (as heretofore described) as it keeps the connecting rod 26 constantly under tension.

The support frame 2 also comprises a second lifting device consisting of a hydraulic cylinder-piston unit 11 arranged to raise the other end 1″ of the surface 1. The cylinder-piston unit 11 is fixed at

one end to the base 3 and at its other end to the surface 1 in correspondence with the legs 33″, and comprises an element 12 (of known type) acting as a damper and elastic reaction means, consisting of a vessel containing a gaseous substance and communicating with the fluid of the cylinder-piston unit 11 through a construction which dissipates energy from the fluid passing between the vessel and the chamber of the cylinder-piston unit.

The surface 1 is also connected to the base 3 by an articulate frame 40, the purpose of which is to prevent transverse movement of the surface 1 about the base 3. Said frame 40 comprises a pair of bars 41 fixed at their lower end to a transverse shaft 42 which is pivoted by brackets 43 to the base 3. The upper ends of the bars 41 are fixed to a transverse shaft 44 on which there is mounted a sleeve 45 which is freely rotatable about 44 and to which the lower end of a bar 46 is fixed. The upper end of the bar 46 is pivoted to the surface 1 by brackets 47.

The bed according to the invention is of simple and economical construction and can also be fitted to its transporting vehicle in a simple manner. In this respect it is necessary only to fix the base 3 to the mounting floor of the motor ambulance. All the bed mechanisms lie within the space between the surface 1 and the base 3 and it is therefore not necessary to provide openings in the floor with the exception of the holes for the bolts used to fix the base 3.

The surface 1 can be variously inclined in one direction or the other.

When the cylinder-piston unit 11 is in its restricted configuration and the levers 21 are lowered, the surface 1 is in its lowered position (Figure 1). The suspension of the surface 1 is rigid in that the legs 33′ and 33″ rest directly on the base 3. This is the correct position for loading or unloading the patient or casualty onto or from the surface 1.

On operating the cylinder-piston unit 11, for example by means of a motorised unit feeding pressurised operating fluid (not shown because of known type), the cylinder-piston unit 11 extends to lift the end 1″ in a clockwise direction (Figure 2). This lifting ceases when the striker element 48, rigid with the shaft 42, operates a solenoid valve 39 which shuts off feed to the cylinder-piston unit 11, so stabilising its configuration.

The assembly comprising the cylinder-piston unit 11 and element 12 also acts as an elastic damped suspension, the damping effect of which can be adjusted by varying the pipe which connects the element 12 to the cylinder-piston unit 11.

The cylinder-piston unit 11 acts independently of the lever mechanism 20.

On rotating the lever 25 in an anticlockwise direction, for example by means of a manually operated bar 5 rigid with the lever 25, the end 1′ is raised in order to incline the surface 1 anticlockwise (Figure 4) if the cylinder-piston unit 11 is in its retracted configuration, or to obtain its fully raised positions (Figure 3) if the cylinder-piston unit 11 is in its extended configuration.

Numerous modifications of an applicational nature can obviously be made to the described elements of the invention; for example, the legs 33′ and 33″ can be fitted to the base 3 instead of to the surface 1; furthermore, for example, the lever mechanism 20 can be pivoted to the surface 1 instead of to the base 3.

Claims

1. A motor ambulance bed with damping and variable inclination, characterised in that its support frame comprises:
- a first lifting device consisting of a lever mechanism (20) arranged to raise a first end (1′) of the bed surface (1);
- a second lifting device consisting of a hydraulic cylinder-piston unit (11) with a damping and elastic reaction element (12) and arranged to raise the other end (1″) of the bed surface (1);
- said lifting devices acting independently of each other.

2. A bed as claimed in claim 1, characterised in that said first lifting device comprises a pair of levers (21), one for each said of the bed, which are pivoted to the base 3 of the bed on the same transverse axis of rotation, their upper ends each slidingly supporting a respective inflexible rod (24) which is rigid with the bed surface (1).

3. A bed as claimed in claim 2, characterised in that said pair of levers (21) is operated by a further lever (25) pivoted to the base (3) of the bed and connected to said pair of levers (21) by a connecting rod (26), said further lever (25) having passed beyond its dead centre when the first end (1′) of the bed surface is in its raised position.

4. A bed as claimed in claim 1, characterised in that the bed surface (1) is coupled to the bed base (3) by way of a pair of idle wheels (31), one for each side of the bed, which are located on the same transverse axis and are rigid either with the bed surface (1) or with the bed base (3) and are slidable within respective vertical guides (32) rigid either with the bed base (3) or with the bed surface (1) respectively.

5. A bed as claimed in claim 2, characterised by comprising two pairs of legs (33′) and (33″) which are rigid with the bed surface (1) and by which the surface (1) rests on the base (3) when in

its lowered position, the pair (33') of said legs carrying at their lower end said pair of idle wheels (31).

Fig. 1.

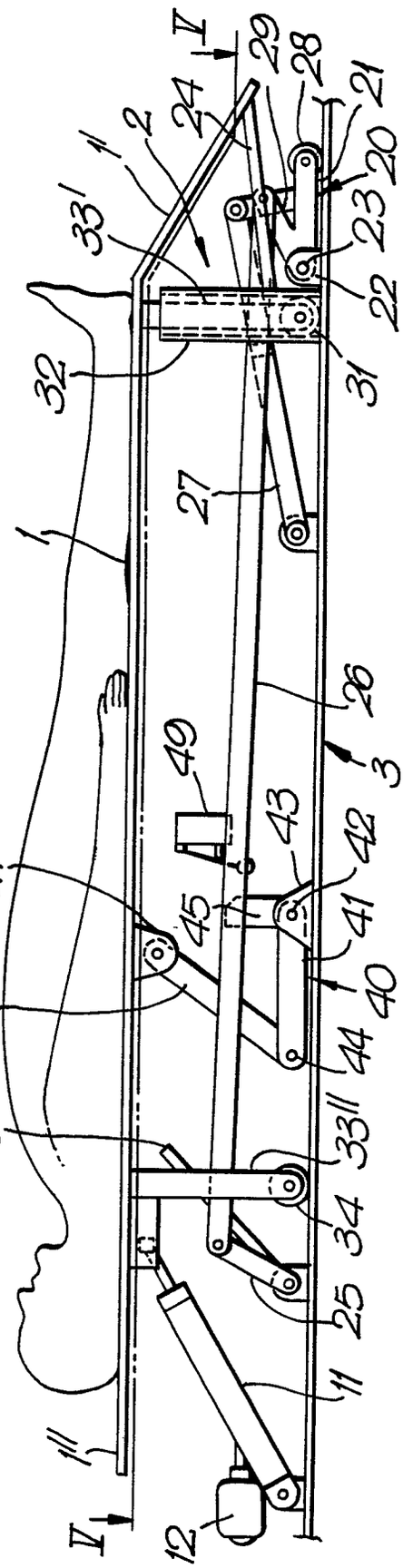

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Fig. 2.

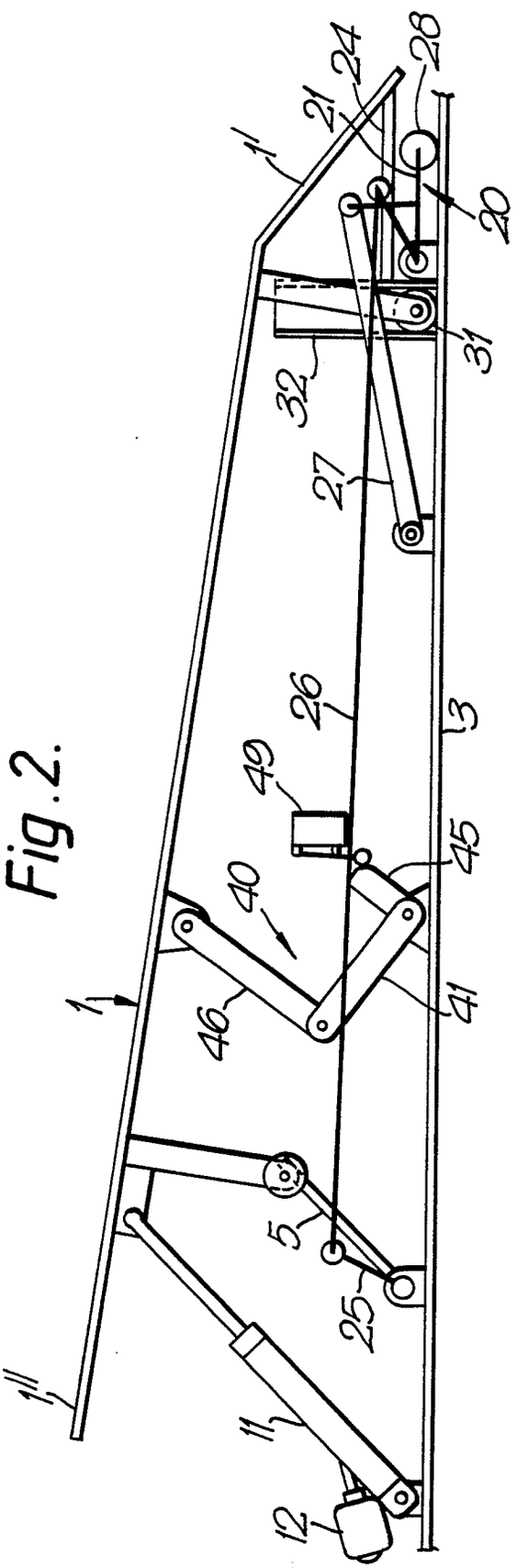
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Fig. 3.

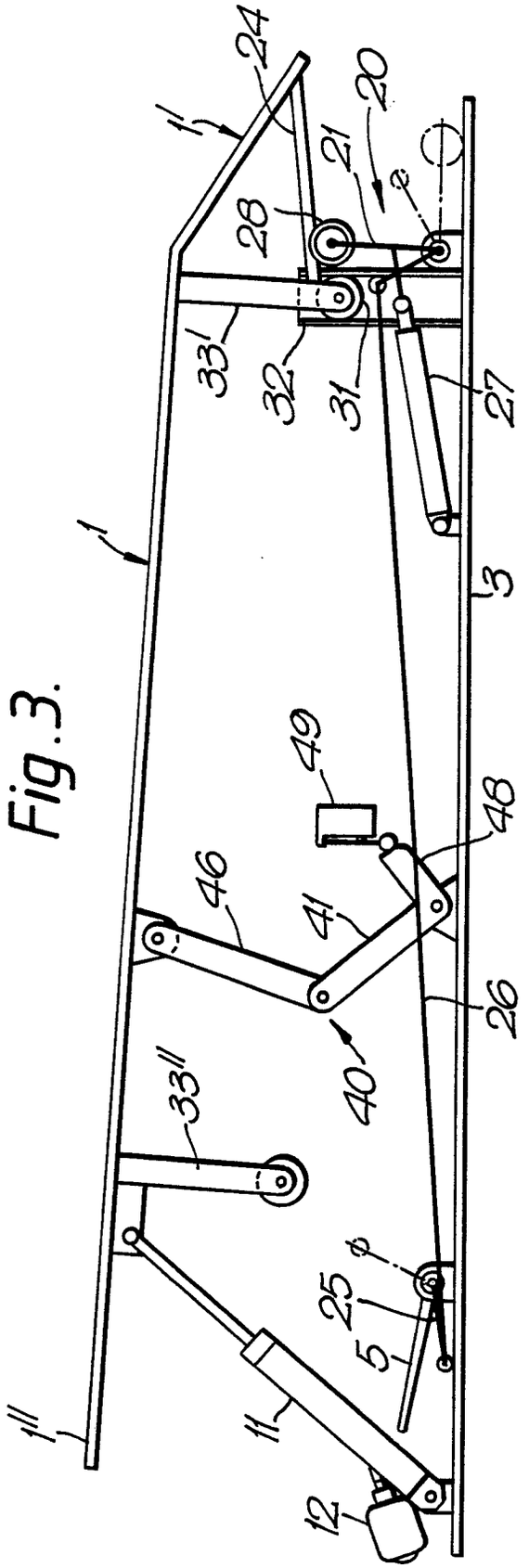
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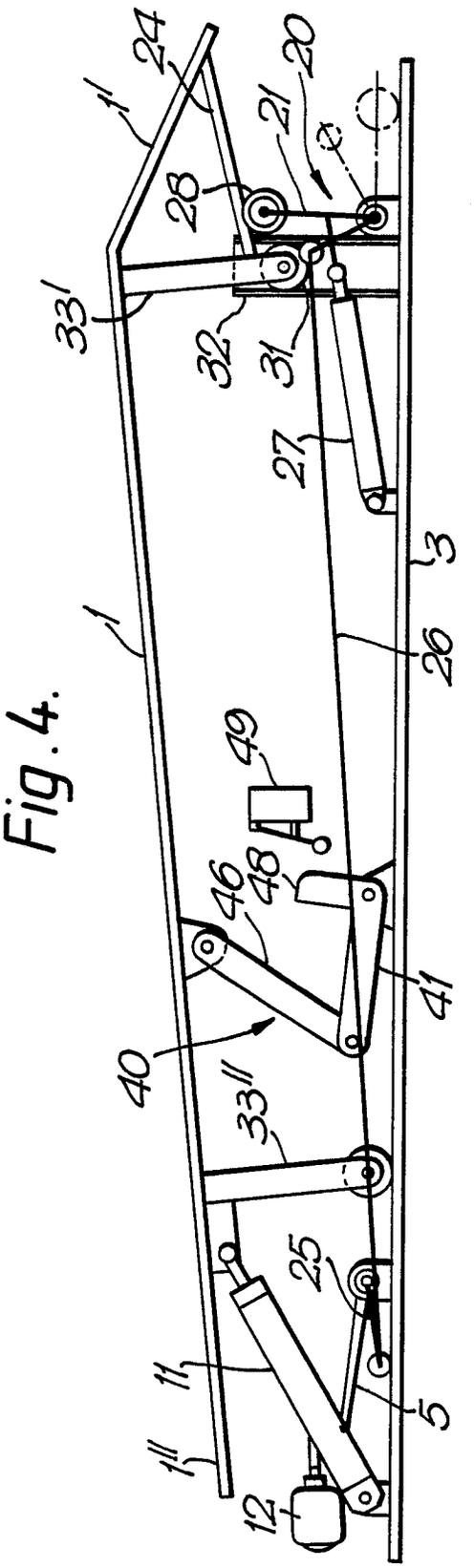
Fig. 4.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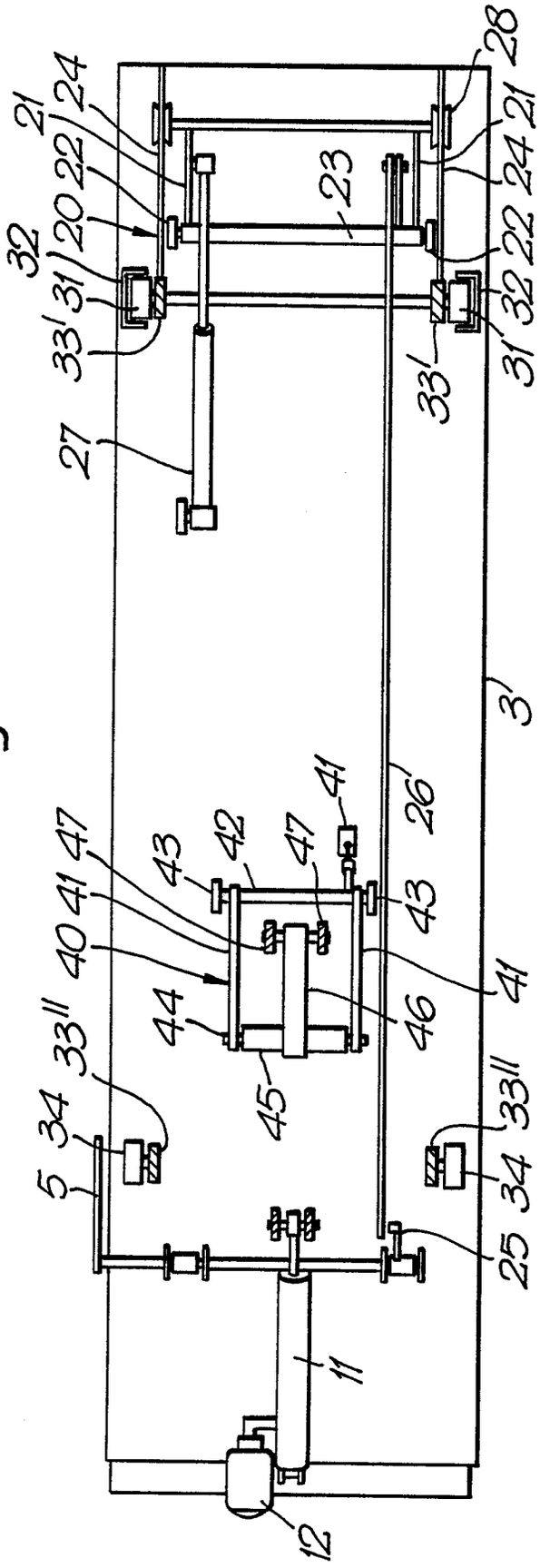
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Fig.5.