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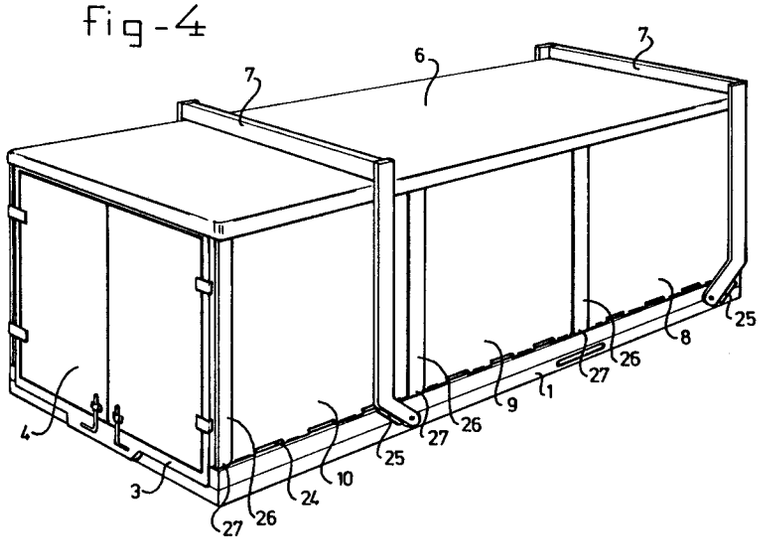
(54) Collapsible container, in particular for combined rail and road transport.

(57) A collapsible container comprises a base frame (1), a bottom element (2), a roof element (6), two long side walls (8, 9, 10), and hinged end portals (3) at the two narrow sides of the container. Doors (4) or walls are fitted in these end portals. The roof element (6) is suspended from at least four hoisting cables (11) running by way of pulleys (12 to 15) to a control mechanism (16 to 23) for pulling in the cables for hoisting the roof element or for paying out the cables for lowering the roof element. In order to prevent water which has collected on the roof element from leaking into the container, the container also comprises two or more hinged hoisting portals (7) which are higher than the end portals (3). Each of the hoisting cables (11) runs from the control mechanism in or along the uprights of a hoisting portal (7) to a pulley (12) at the top side of a hoisting portal.

Fig-4



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The invention relates to a collapsible container, in particular for combined rail and road transport, comprising a base frame, a bottom element, a roof element, two long side walls, and hinged end portals on the two narrow sides of the container, in which end portals doors or walls are fitted, while the roof element is suspended from at least four hoisting cables running by way of pulleys to a control mechanism for pulling in the cables for hoisting the roof element or for paying out the cables for lowering the roof element.

Such a container is known from US-A-3,612,330. In this known design the pulleys over which the hoisting cables run are fixed to the end portals. A consequence of this is that in the raised position the roof element comes to rest with its narrow sides below the girders of the end portals, with the result that rainwater could leak into the container through the gaps between those narrow sides of the roof element and the doors or walls of the end portals.

The first object of the invention is to overcome this drawback, and to this end, according to the invention, the container also has two or more hinged hoisting portals which are higher than the end portals, and each of the hoisting cables runs from the control mechanism in or along the uprights of a hoisting portal to a pulley at the top side of a hoisting portal.

A second drawback of the design according to US-A-3,612,330 is that each of the long side walls comprises a top and bottom plate which are hinged to each other, the top plate being hinged to the roof element, while the bottom plate is hinged to the base frame. A very great force is required for hoisting the roof element and simultaneously folding out the top and bottom plate of the long side walls.

This drawback can be overcome in two ways according to the invention: in a first design each of the long side walls is made up of a number of adjacent panels which are hinged to the base frame and are or can be fixed between vertical strips which are placed between the base frame and the roof element so that they are detachable and/or collapsible. In an alternative design each of the long side walls is made up of a number of adjacent panels, two of which are hinged to an end portal, while the remainder are hinged to a panel which is hinged to an end portal.

In order to be able to hoist up the roof element with the minimum of effort, the control mechanism comprises an element which can be moved hydraulically or mechanically, a number of sheaves connected to said element, and a number of sheaves connected to the base frame, each of the hoisting cables being passed back and forth a number of times over movable sheaves and fixed sheaves.

The hinged end portals can also be folded into the vertical position with a minimum of effort if one or more springs acting as a counterforce are fixed at the bottom side of each end portal.

The invention will now be explained in greater detail with reference to the figures.

Figure 1 shows a container according to the invention, almost completely collapsed.

Figure 2 shows a container during hoisting of the roof element.

Figure 3 shows a container in the last phase of folding out.

Figure 4 shows a container fully folded out and ready for use.

Figure 5 shows diagrammatically one of the hoisting cables with hoist transmission.

Figure 6 shows diagrammatically the hoist installation for hoisting the roof element.

Fig. 7 shows a detail of the bottom side of an end portal.

Fig. 8 shows a detail of the locking of a side strip of the side walls of the container relative to the roof element.

The container shown in the figures is suitable for both rail and road transport. The container is collapsible, and in the collapsed position takes up one sixth of the volume of the opened-out position. It is therefore cheap to return the empty container.

The container comprises a rectangular base frame 1, a bottom element 2 fitted inside said base frame, two end portals 3 which are provided with doors or panels 4, and which at 5 (Figure 7) are hinged to the base frame 1, a roof element 6, two hoisting portals 7, and two long side walls which are each composed of panels 8, 9 and 10.

The roof element 6 is suspended from four cables 11, each running over a pulley 12 at the top side of a hoisting portal 7, two pulleys 13, 14 at the bottom side of an upright of a hoisting portal 7, and a corner pulley 15 to an operating hoist 16, each comprising a number of sheaves 17 and a number of sheaves 18 connected to the base frame and movable to and fro. In order to be able to move the sheaves to and fro, they are connected to a strip 19, which is in turn fastened to the piston rod of a hydraulic cylinder 20 (Figure 6). Oil can be pumped out of the reservoir 23 into the cylinder 20 by means of a pump 22 operated by a handle 21, and the piston rod can be pushed out of the cylinder. Since each of the cables 11 runs three times back and forth over the sheaves 17 and 18, a displacement of the piston rod will produce six times the displacement of the cables 11. If the roof element 6 has to be hoisted 240 cm, a piston rod displacement of 40 cm will be adequate. The panels 8, 9 and 10 are hinged at 24 to the base frame

1 and can be pivoted from the horizontal position into a vertical position, and vice versa.

The sequence of operation for folding out the container into the ready position is as follows:

First, the hoisting portals 7 are pivoted from the horizontal into the vertical position (Figure 1). They rest in this position on slanting supports 25. The roof element 6 is then hoisted by operating the handle 21 (Figure 2). Then vertical strips 26 are placed spaced apart between the base frame 1 and the roof element. These strips 26 have at their bottom side at 27 a hinged hook connection with a hinge 24 and are locked by a spring-loaded locking bolt 28 in a recess of the roof element 6 (Figure 8). The panels 8, 9 and 10 folded out vertically can then be connected to the strips 26, for example also with the locking bolt (not shown).

In an alternative embodiment, not shown, a side edge of panel 9 is hinged to a side edge of panel 10, panel 10 is hinged by a side wall to an upright of an end portal 3, and panel 8 is hinged to an upright of another portal 3. In this alternative embodiment the strips 26 may be omitted, and a detachable connection device must be provided, for example by means of locking bolts, between the panels 8 and 9.

In order to be able to fold out the portals 3 into the vertical position with very little effort, two springs 29, which exert a balancing counterforce when the portals are being folded out, are fitted between the bottom edge of the portals 3 and the base frame 1.

The main advantages of the construction described are:

- that the roof element 6 in the ready position of the container rests on the end portals 3, so that water which has collected on said roof element 6 cannot leak into the container;
- that the container can be folded out to the ready position with very little force;
- that the container has no loose parts;
- that the container in the collapsed state is of low height example 46 cm).

Claims

1. Collapsible container, in particular for combined rail and road transport, comprising a base frame (1), a bottom element (2), a roof element (6), two long side walls (8, 9, 10), and hinged end portals (3) on the two narrow sides of the container, in which end portals doors (4) or walls are fitted, while the roof element is suspended from at least four hoisting cables (11) running by way of pulleys (12, 13, 14, 15) to a control mechanism (16 to 23) for pulling in the cables for hoisting the roof element or for paying out the cables for lowering the roof element, characterised in that the container also has two or more hinged hoisting portals (7) which are higher than the end portals (3), and each of the hoisting cables (11) runs from the control mechanism in or along the uprights of a hoisting portal (7) to a pulley (12) at the top side of a hoisting portal.

2. Container according to Claim 1, characterised in that each of the long side walls is made up of a number of adjacent panels (8, 9, 10) which are hinged (24) to the base frame (1) and are or can be fixed between vertical strips (26) which are placed between the base frame (1) and the roof element (6) so that they are detachable and/or collapsible.

3. Container according to Claim 1, characterised in that each of the long side walls is made up of a number of adjacent panels, two of which are hinged to an end portal, while the remainder are hinged to a panel which is hinged to an end portal.

4. Container according to one of the preceding claims, characterised in that said control mechanism comprises an element (19) which can be moved hydraulically or mechanically, a number of sheaves (17) connected to said element, and a number of sheaves (18) connected to the base frame (1), and in that each of the hoisting cables (11) is passed a number of times back and forth over movable sheaves (17) and fixed sheaves (18).

5. Container according to one of the preceding claims, characterised in that one or more springs (29) acting as a counterforce are fixed at the bottom side of each end portal (3).

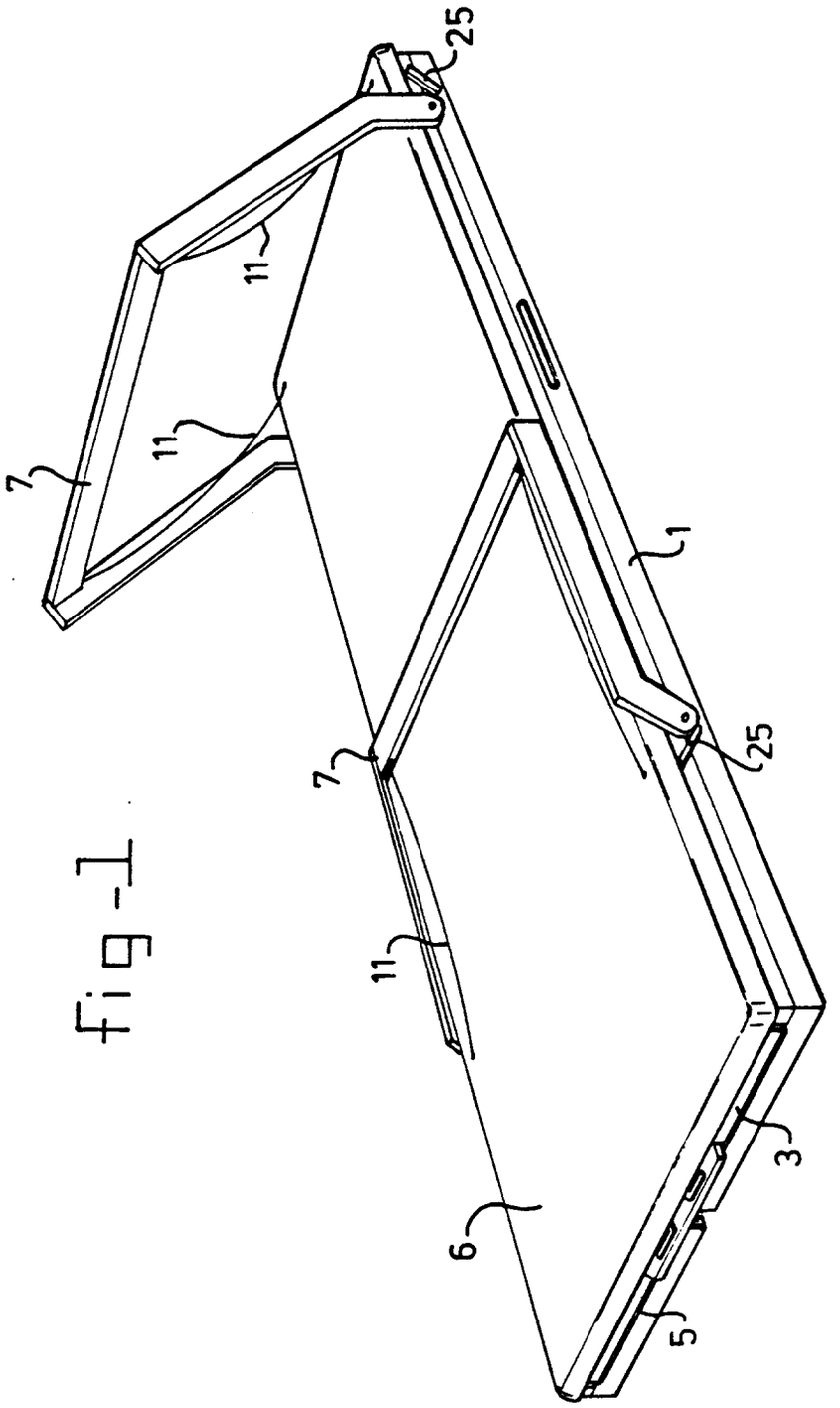

fig-1

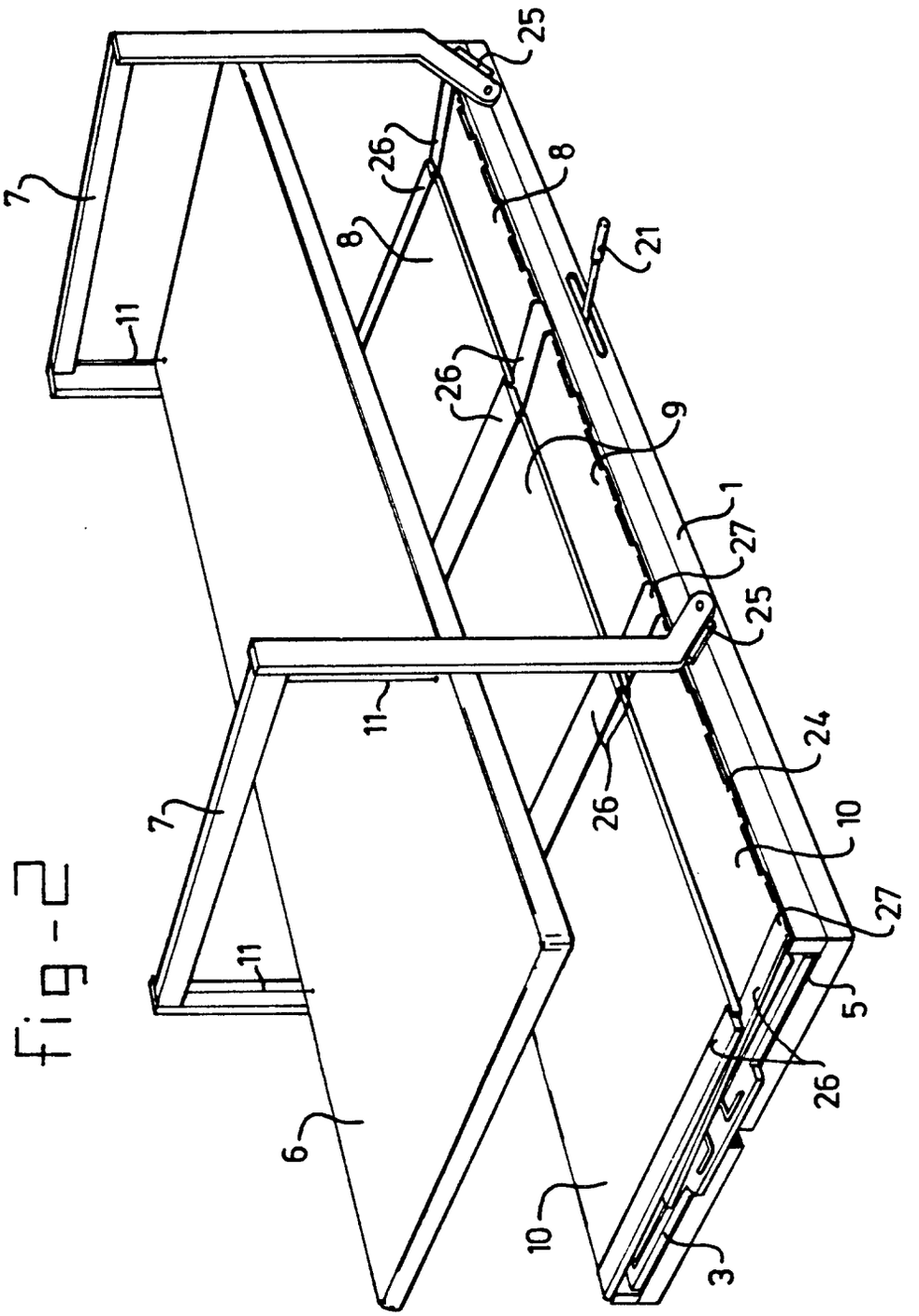

Fig-2

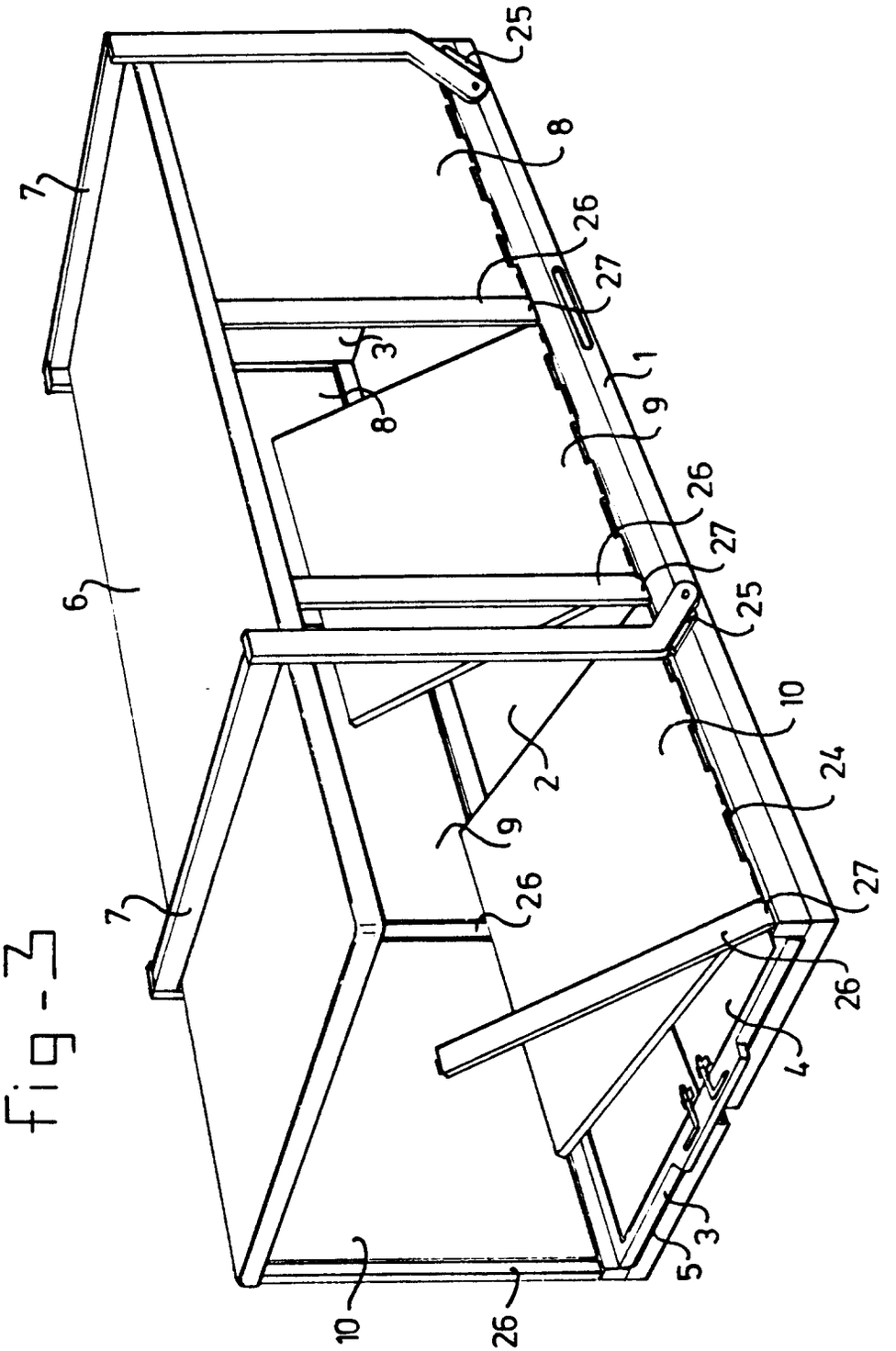

Fig-3

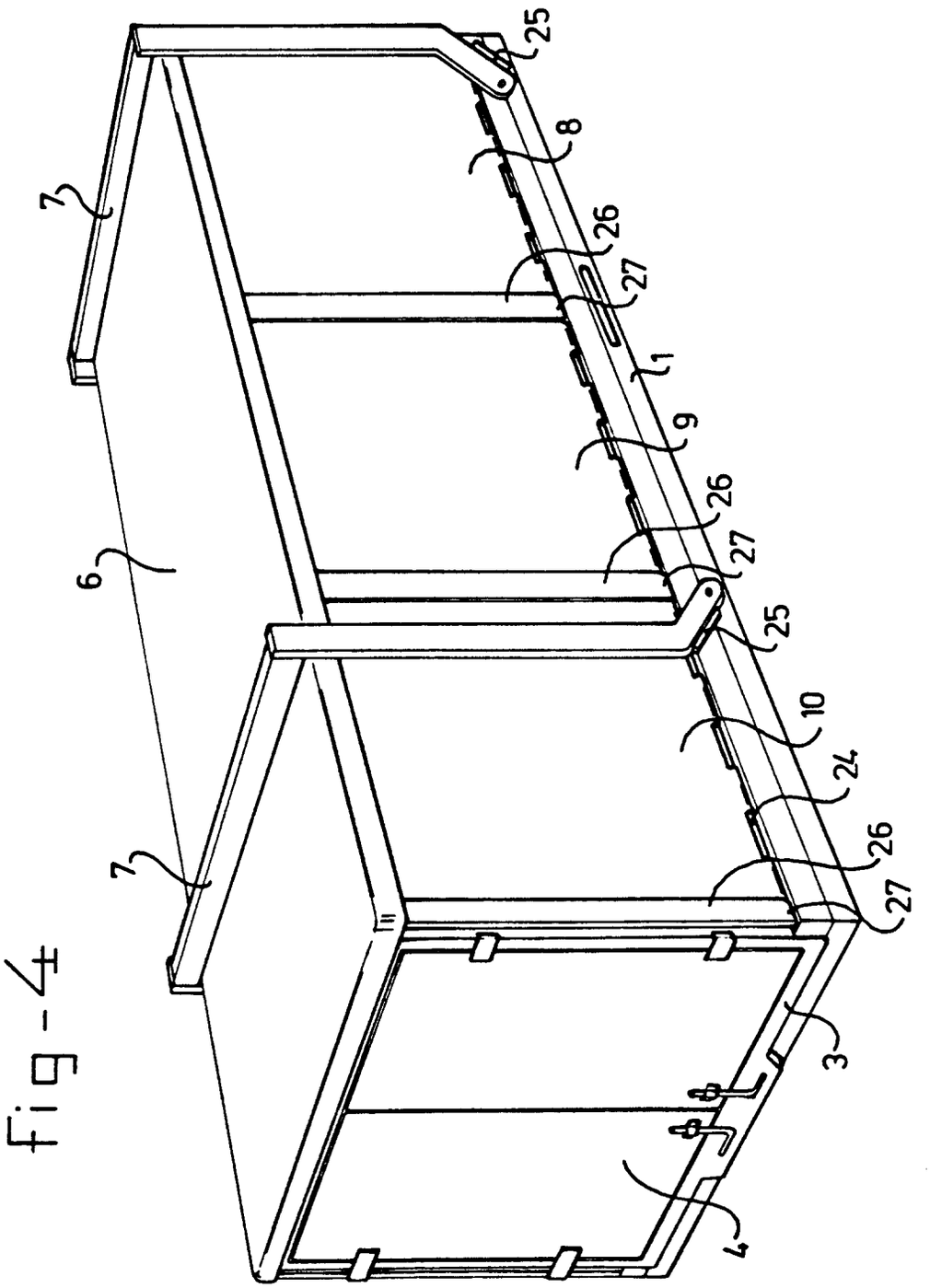

Fig-4

Fig-5

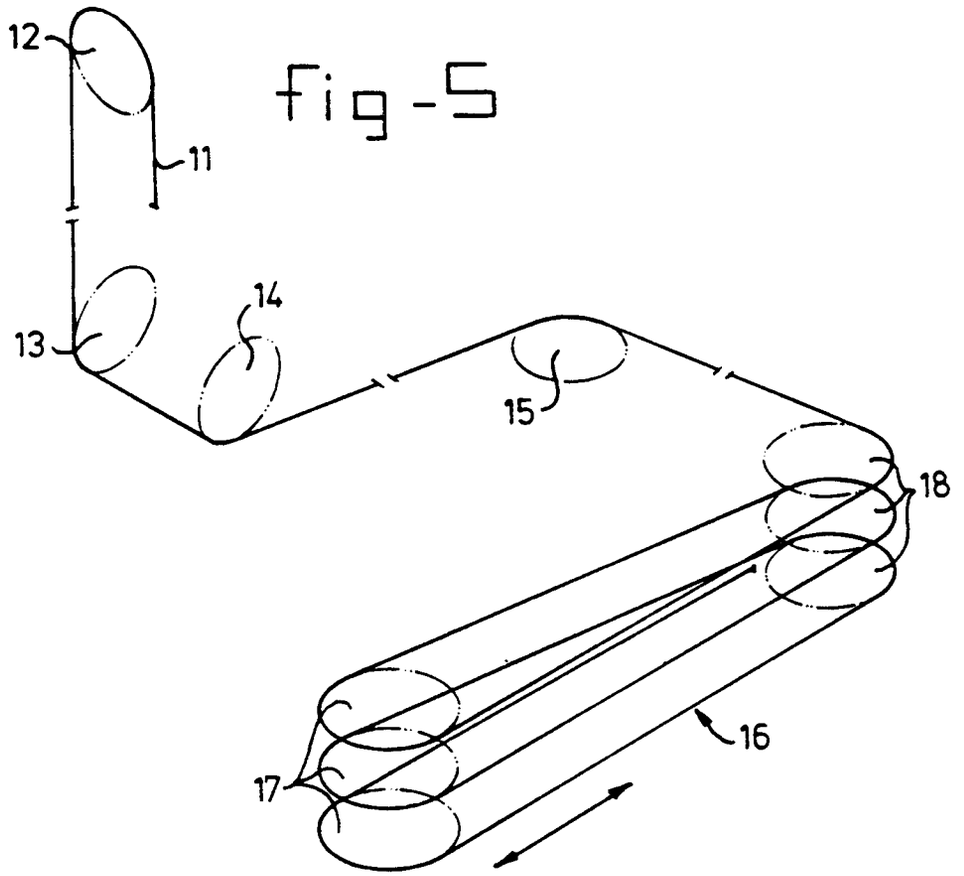

Fig-6

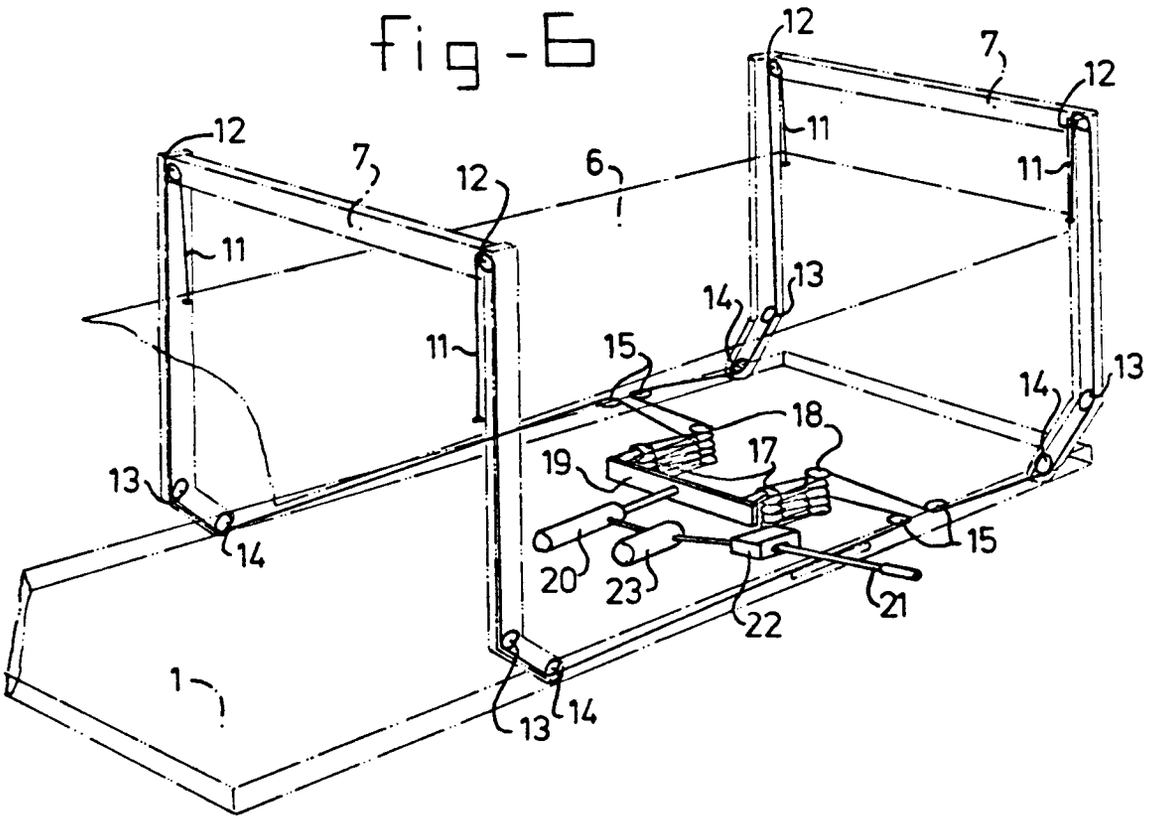

Fig-7

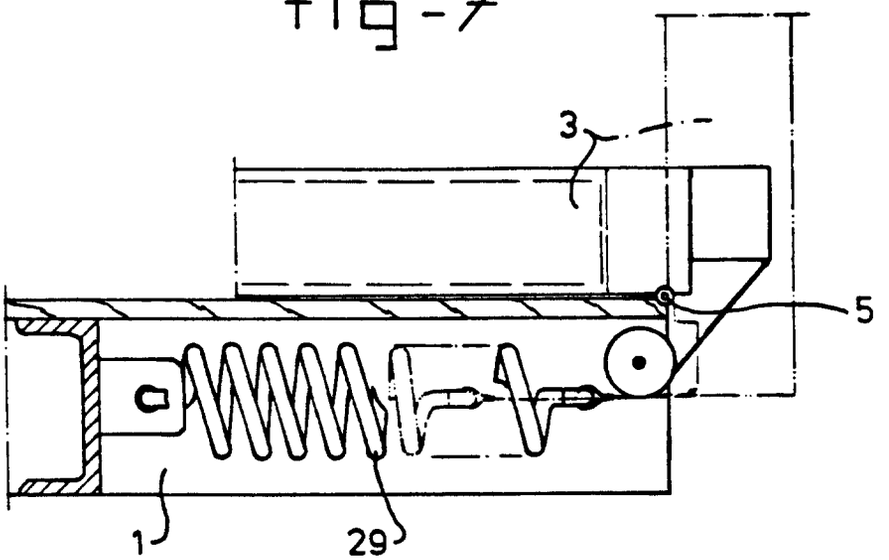

Fig-8