

fig-1

fig-2

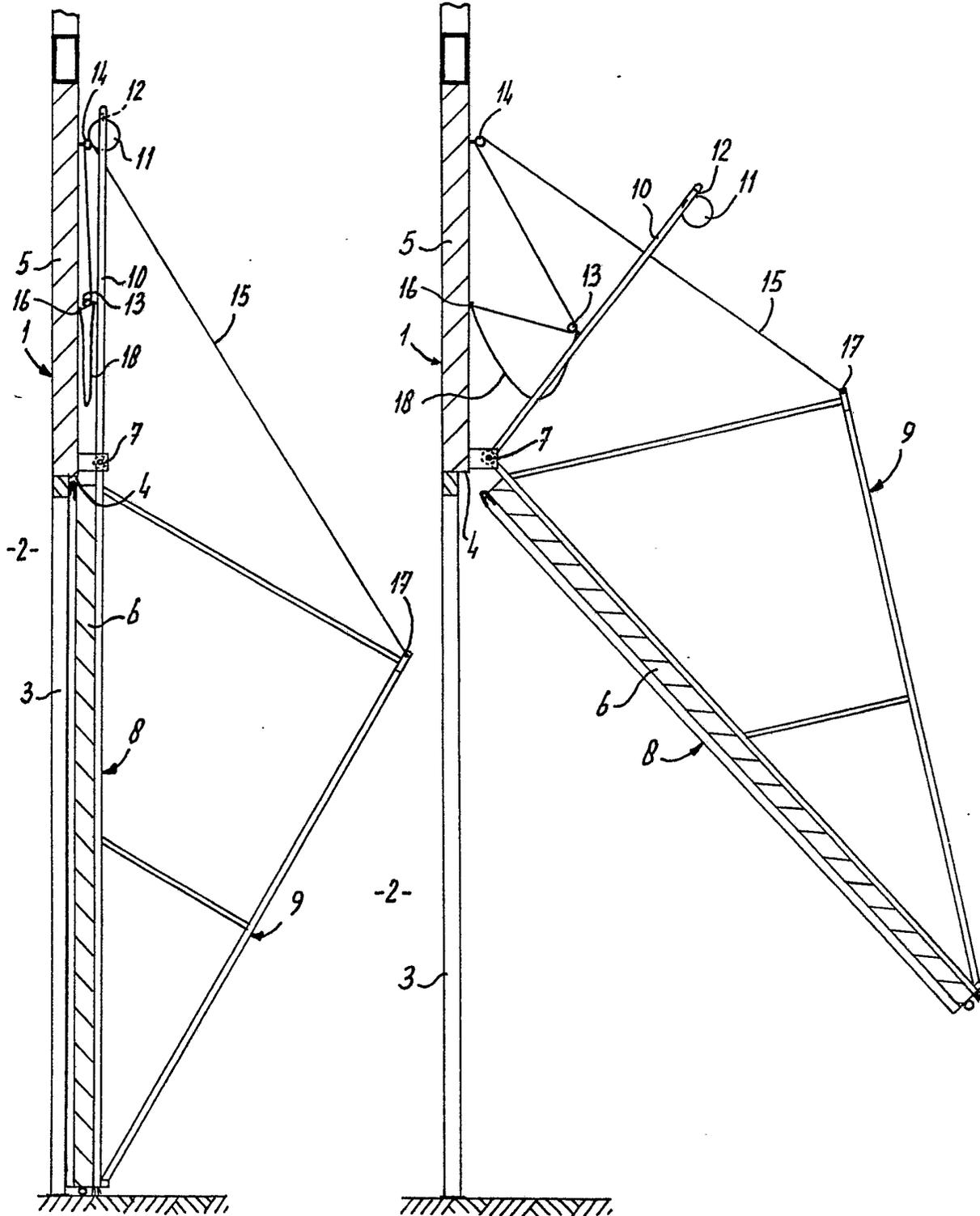


fig-3

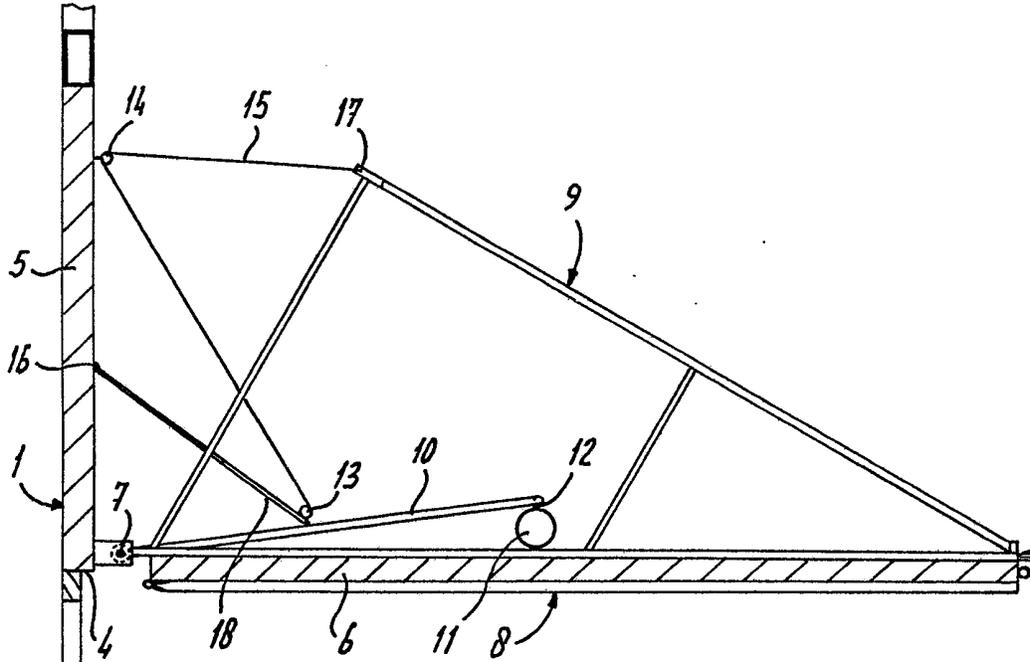
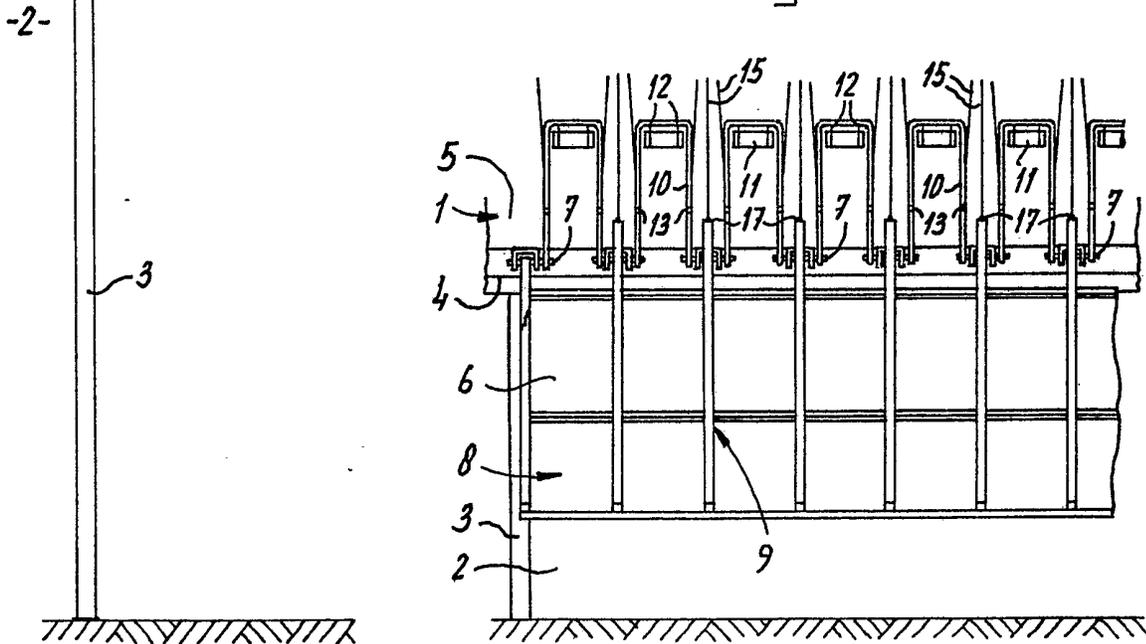


fig-4



SPECIFICATION

Panel with counterweight

The present invention relates to a panel comprising a counterweight for opening and closing and/or bridging an opening or a space.

Panels of this kind are known in various embodiments, such as floor or bottom panels, in which the panel closes or bridges an opening, or as wall panels for closing an opening in a wall. The counterweight may consist of one or more springs or of a body. The springs or the body exert a force on the panel such that said panel can easily be opened and/or closed by personnel.

When the counterweight is not connected directly to the panel, in most cases the connection between the panel and the counterweight is made with the aid of transmitting elements consisting of bars or levers which are pivoted or not pivoted and/or flexible elements, such as cables or chains. As an example is mentioned: bascule bridge roads, overhead doors, hatches in ceilings and in floors.

It can be required that the panel closing or bridging the opening from one side does not project into the space to be closed or bridged. In the case of an opening which has to be closed, the panel is with its top edge for instance pivoted to the downwardly directed upper edge of the fixed structure present around the opening to be closed or bridged; said structure here simply is simply called a frame. A panel of this kind is known e.g. from French Patent No. 560,071 and from U.S. Patent No. 1524956. Said known structures are highly complicated and they take up a good deal of space in the room to be closed. Thus, this room cannot be used completely. Both in open as in closed position the panel remains outside the space to be closed. It is the object of this invention to overcome the difficulties with known devices by providing a construction, in which the panel, the counterweight and the connection between the panel and the counterweight remains outside the space to be closed, i.e. in such a way that both in its open as in its closed position the panel and structural elements of the counterweight will not form an obstacle.

Accordingly the present invention provides a panel having a counterweight for opening and closing and/or bridging an opening or a space, in which the panel is pivoted to a part of the circumference of the opening and at the side facing away from the space to be closed or bridged is provided with a member which is rigidly connected thereto and which extends from the surface of the panel, in which one end of a flexible element is connected to said member and the other end of the flexible element is connected to a fixed point, and in which between its ends said flexible element passes around a guide means mounted on a part of the counterweight which is pivoted to or in the proximity of the pivot of the panel, and around a fixed guide means disposed on said circumferential part.

In order to make the construction of the panel not too heavy and, yet, rigid enough it is known

65 from the abovementioned Patents to reinforce the panel with one or more trussed reinforcing members positioned perpendicular to the plane of the panel; in accordance with said French Patent, said reinforcing members are provided on the outer side of the panel. Each one of the reinforcing members is preferably embodied as the above member that extends over a determined distance from the surface of the panel.

The construction is preferably embodied in such a way that when the panel is in its closed position, the counterweight lies mainly in the same plane as the panel and relative to the pivot said counterweight extends in opposite direction of the panel; when said panel is in the open position, the counterweight lies mainly in the same plane as the door section and relative to the pivot said counterweight extends in the same direction as the panel. As a result of this construction of panel and counterweight, the angle between the panel and the counterweight decreases from approximately 180° to approximately 0° when the panel is opened, the apex of the angle lies at or near the pivot joint of the panel and of the counterweight, and when said panel is closed said angle will increase from approximately 0° to approximately 180°. In closed position the panel and the counterweight lie approximately in one plane on either side of the pivot joint and in open position said panel and counterweight lie in the same plane on one side of the pivot joint; in the latter position they (panel and counterweight) are almost perpendicular to the plane of the opening to be closed. It is evident that in this construction not a single portion of the panel and of the counterweight lies inside the space to be closed and opened.

In accordance with a preferred embodiment the counterweight comprises a body that is mounted on the connection between the legs of a U-shaped element, the free leg ends of said element being pivoted to the same structure enclosing the opening as the panel.

In order to avoid that the counterweight is open position of the panel contacts said panel, it is preferred to provide a stop for the counterweight. In a simple manner said stop can be constituted by a flexible element with a fixed length, one end of said element being connected to the fixed structure enclosing the opening and the other end being secured to the counterweight.

The invention will now be described more in detail with reference to the accompanying drawing in which an exemplary embodiment of a panel for closing an opening in a wall is shown. In the drawing:

Figure 1 is a side view of a vertical section of the panel in closed position;

Figure 2 illustrates the panel according to Figure 1 in half-open position;

Figure 3 illustrates the panel according to Figure 1 in open position; and

Figure 4 is a front elevation of the panel according to Figure 2.

An opening 3 has been provided in wall 1

confining a space 2 (not illustrated). A panel 6 is pivoted at 7 to the lower edge 4 of the fixed structure 5 of the frame of the opening, said structure lying above the opening 3. The panel 6 may be similar to one described in our British Patent Application No. 7911818.

The panel 6 is constituted by a closing section 8 and a trussed reinforcement 9 provided on the side which faces away from the opening to be closed.

One end of a bar 10 is pivoted to the same pivot joint 7 as panel 6; the other end of the bar is provided with a body that forms a counterweight 11. As illustrated in the drawing, the bar 10 and the counterweight are also pivoted together. A guide means 13 is secured to the bar 10 at a point between both ends of said bar 10; a similar guide 14 is secured to the fixed structure 5 at a distance from the pivot joint 7. A flexible element, such as a cable 15, extends around guide means 13, 14 such as pulley blocks; one end of the cable being secured to the fixed structure 5, as at 16, between the pivot joint 7 and the guide 14. The other end of the cable is secured to the top 17 of the reinforcement 9. A cable 18 is secured at 16 and to the guide means 13; the length of this cable is chosen such that the counterweight 11 will not contact the panel 6.

It is evident that the right choice of the mass of the counterweight 11, of the positions of the point 16 where the cable 15 is secured and of the positions of the guide means 13 and 14, makes it possible to move the panel with ease from its closed position (shown in Figure 1) into its open position (shown in Figure 3) and back again into closed position.

As illustrated in Figure 4, the connection between pivot 7 and counterweight 11 is preferably U-shaped; each leg of the U-shaped connection constitutes a bar 10 and the counterweight 11 is provided on the connection between the legs of the U-shaped connection. In this way, a simple and reliable embodiment is obtained.

It is evident that the system according to the invention is applicable for many purposes, such as in bascule bridge roads, hatches in ceilings and in floors, etc.

CLAIMS

1. A panel having a counterweight for opening and closing and/or bridging an opening or a space,

in which the panel is pivoted to a part of the circumference of the opening and at the side facing away from the space to be closed or bridged is provided with a member which is rigidly connected thereto and which extends from the surface of the panel, in which one end of a flexible element is connected to said member and the other end of the flexible element is connected to a fixed point, and in which between its ends said flexible element passes around a guide means mounted on a part of the counterweight which is pivoted to or in the proximity of the pivot of the panel, and around a fixed guide means disposed on said circumferential part.

2. A panel according to Claim 1, provided with a reinforcement extending from the side facing away from the opening to be closed or bridged, in which said member being rigidly connected to the panel is constituted by a part of said reinforcement.

3. A panel according to Claim 1 or 2, in which when the panel is in its closed position, the counterweight lies substantially in the same plane as the panel and relative to the pivot said counterweight extends in opposite direction of the panel; and when said panel is in the open position, the counterweight lies mainly in the same plane as the panel and relative to the pivot said counterweight extends in the same direction as the panel.

4. A panel according to any one of Claims 1 to 3, in which the counterweight comprises a body provided on the connection between the legs of a U-shaped element, the free legs of said element being pivoted to or in the proximity of the panel pivot.

5. A panel according to any one of Claims 1 to 4, in which a stop for the counterweight is provided so that the panel and the counterweight will not contact each other when the panel is in the open position.

6. A panel as claimed in any preceding Claim in which the panel is pivoted about an upper edge thereof, said fixed guide means is disposed at a point on said circumferential part above the panel pivot, and said other end of the flexible member is attached to the circumferential part at a point between the fixed guide means and the panel pivot.

7. A panel having a counterweight substantially as herein described with reference to the accompanying drawings.