Aug. 5, 1952 G. W. LYONS, JR., ET AL 2,605,494

HINGED COVER FOR BULKHEADS

Filed July 22, 1950

Fig. 1.

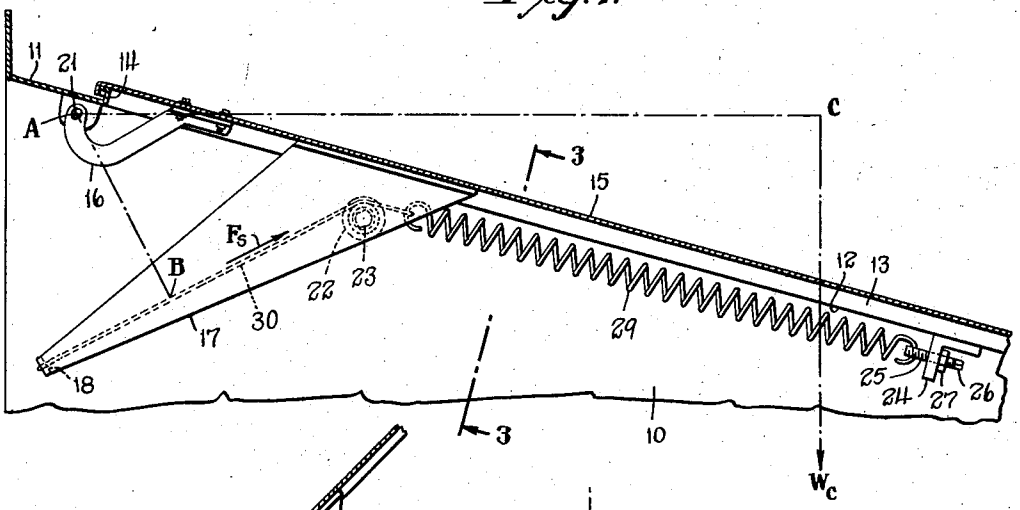


Fig. 2.

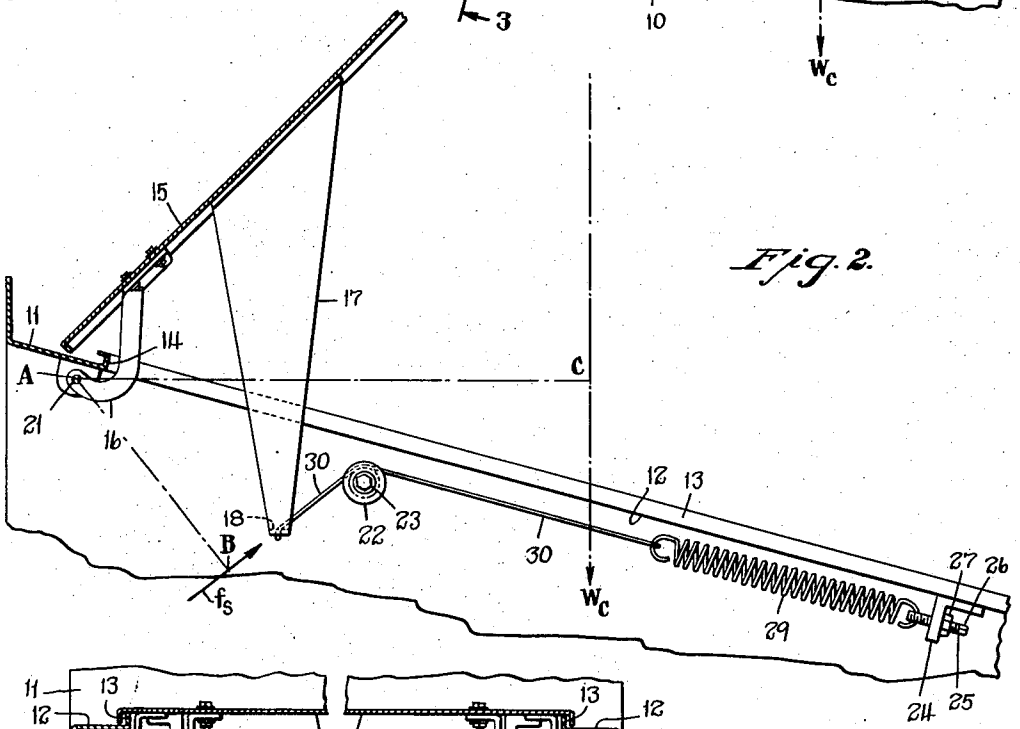
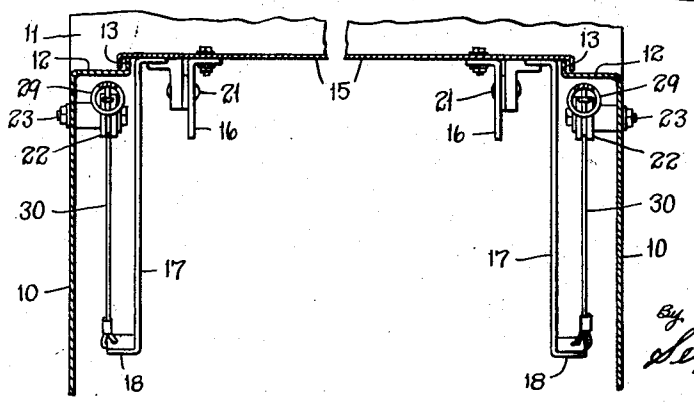


Fig. 3.



George W. Lyons, Jr.
Robert J. Lyons
Inventors
By
Seymour, Earle & Nichols
Attorneys

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HINGED COVER FOR BULKHEADS

George W. Lyons, Jr., West Haven, and Robert J. Lyons, North Guilford, Conn.

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1 Claim. (Cl. 16—1)

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The present invention relates in general to counterbalance mechanism for hinged members and more especially to superior counterbalance mechanism for a hinged cover such as, for example, a hatch cover, a bulkhead cover, box cover, and the like, whereby the cover may be more easily raised and, once raised, will be yieldingly held in an open position.

An object of the invention is to provide a hinged cover with superior counterbalance mechanism of simple, durable and economical construction.

A further object of the invention is to provide a hinged cover with counterbalance mechanism characterized by parts so made and arranged that they can be easily attached to the hinged cover, readily adjusted after attachment to the cover, and when in use will be protected from the weather when the cover is closed.

Other objects and advantages will appear to those skilled in the art from the following, considered in conjunction with the accompanying drawings.

In the accompanying drawings, in which certain modes of carrying out the present invention are shown for illustrative purposes:

Fig. 1 is a broken side elevation in section of a bulkhead having a cover hinged at its upper end thereto and provided with counterbalance mechanism, the cover being shown in its closed position on the bulkhead;

Fig. 2 is similar to Fig. 1, but showing the cover of the bulkhead in its raised position; and

Fig. 3 is a transverse section of the bulkhead on line 3—3 of Fig. 1.

The exemplary embodiment of the invention illustrated herein is used in conjunction with a frame structure or bulkhead which, in the main, comprises a pair of triangular-shaped side panels, each of which is indicated by the numeral 10, joined at their upper ends in substantially spaced, parallel relationship by means of a transverse head-plate 11. As shown in Fig. 3, each side panel is provided along its upper edge with a flange 12 which projects inwardly at substantially right angles to the vertical plane of its respective side panel and is provided along its inner edge with an upstanding lip 13. A similar upstanding lip 14 is provided along the forward edge of the head-plate 11, the upstanding lips of the side panels and the lip of the head-plate being adapted to form substantially watertight joints with downwardly bent flanges which extend along the edges and end respectively of the cover 15 of the bulkhead. As shown in Figs. 1 and 2, the cover 15 is hinged at its upper edge to the head plate 11 of the bulkhead by hinge means such as, for example, substantially V-shaped hinges 16—16, so that the cover is urged by gravity into a closed position.

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For a more detailed disclosure of the bulkhead per se, reference may be made to the co-pending application of George W. Lyons, Jr., and John M. Lyons, Ser. No. 169,312, filed June 21, 1950. It will be appreciated, however, that the counterbalance mechanism of this invention is not necessarily limited in its application to the bulkhead shown and described herein, but may be used with equal success on other devices having hinged lids or covers.

The hinged cover 15 of the bulkhead is adapted to be held in its open position and to be raised with the assistance of the counterbalance mechanism of this invention which, in the main, comprises the following associated elements. A pair of downwardly and forwardly projecting brackets 17 are provided on the underside of the cover, adjacent the upper end thereof, the upper end of each bracket being fixedly secured by a welded joint or equivalent fastening means to the underside of the cover adjacent one side thereof and in a substantially vertical plane perpendicular thereto. As shown in Fig. 3, the lower end of each bracket 17 is bent outwardly or otherwise provided with a tongue 18 which projects at substantially right angles thereto beneath the flange 12 of the corresponding side panel 10 of the bulkhead, each tongue being provided with a cable-anchoring eye. In the preferred construction, the length and angular inclination of each bracket 17 with respect to the inclined cover 15 are such that when the cover is closed on the bulkhead, the cable-anchoring eye of each bracket will be disposed substantially directly below the hinge-pintle 21 of the corresponding hinge 16 of the cover. As will be explained in greater detail presently, resiliently extensible means, indicated generally at 19, is connected to the tongue 18 so that the bracket acts as a leverage arm for effecting the extension of such means to counterbalance the weight of the cover and thus assist in swinging it to its open position.

Mounted on the inner face of each side panel 10 of the bulkhead immediately under its horizontal flange 12 and forwardly of the corresponding bracket 17 of the cover, is antifriction guide means comprising a grooved pulley 22 mounted on the inner end of a stud shaft 23, the opposite end of which is fastened securely to the corresponding side panel of the bulkhead.

Secured on the respective side panels of the bulkhead, forwardly of each grooved pulley **22**, is an anchoring bracket **24**, each of which extends inwardly substantially perpendicularly from the inner wall of the corresponding side panel of the bulkhead. Each anchoring bracket **24** has an unthreaded aperture therethrough, the longitudinal axis of which is substantially in alignment with the upper part of the groove of the corresponding pulley, and accommodates a screw-threaded stud **25**, one end of which is provided with a squared shank **26**. The same end of the screw-threaded stud is adapted to be provided with an adjusting nut **27** for holding the stud in any adjusted position in the bracket, against the pull of a spring, **29** the corresponding end of which is engaged in an aperture in the opposite end of the stud. The opposite end of each spring **29** is secured to the adjacent end of a flexible cord or cable **30** which is trained over the grooved pulley **22** on the corresponding side panel of the bulkhead, the opposite end of the cable being fixedly secured in the cable-anchoring eye of the corresponding bracket **17** of the bulkhead cover. By this construction, the longitudinal axes of the coil springs are substantially parallel to the flanges of the corresponding side panels and substantially in alignment with the hinge-pintles **21** of hinges at corresponding sides of the cover.

In the present embodiment of the invention, each of the coil springs is formed of ⅛-inch diameter wire and is substantially one foot long when in its closed or contracted condition. It will be understood, however, that the spring specifications may vary, depending upon the size and weight of the bulkhead door and upon the composition of the spring metal and similar factors in the design of the spring and bulkhead.

Pursuant to the objects of the invention, the coil springs for holding the cover in its open position have predetermined tension forces, so that when the bulkhead cover is in its closed position, the springs will be stretched to a considerable degree, as shown in Fig. 1, at which time each spring exerts a strong pull on its respective bracket **17** of the cover to swing the cover upwardly about its hinges. More particularly, the force of each spring, indicated at F_s, acts at the inner extremity or cable-anchoring eye of its respective bracket and is multiplied by its respective moment arm or perpendicular distances A—B to the hinge-pintle of the cover, to produce a force moment tending to raise the latter. However, the sum of the force moments of both springs is less than the moment of the force created by the weight W_c of the cover, times its effective distance A—C from the hinge-pintle, and hence the cover remains in its closed position. The difference between these two force moments is, however, small enough so that only relatively little effort is required to swing the cover upwardly from its closed position.

As the cover is swung upwardly manually about the hinges at its upper end, the brackets of the cover swing forwardly in an arc centered on the hinge-pintle **21** (see Fig. 2), thereby carrying the cable-anchoring eyes of their respective brackets forwardly and relieving the tension on the corresponding springs, whereupon the latter shorten in length. As a result, the force F_s exerted by each spring on its bracket **17** of the cover is greatly lessened, and, although the respective moment arms A—B of these forces are somewhat lengthened as the brackets swing upwardly, the force moments which act on the cover to raise the latter as it is swung into its open position, are less than the force moments which act on the cover to raise the latter from its closed position. However, since the force moment of the weight of the cover times its effective distance A—C to the hinge-pintle decreases as the cover is swung upwardly manually, a point intermediate the open and closed position of the cover will be reached at which the sum of the force moments of the shortened springs exceeds the force moment tending to close the cover, and hence the shortened springs will move the cover into its open position and yieldingly hold it in such position.

To close the cover, it is only necessary to grasp its forward edge and pull the cover down initially with sufficient force to overcome the force moments of the shortened springs, after which the weight of the cover times its moment arm, provides a force moment which exceeds the force moments of the tensioned springs, whereupon the cover is positively closed and held in its closed position.

The adjusting nut of the stud of each spring is adapted to be turned by a wrench or equivalent means so that variations in the tension of the springs may be made to compensate for small variations in spring structure and cover weights, whereby relatively close adjustment may be made between the forces holding the cover closed and the forces tending to raise the cover. In like manner, adjustments may be made in the tensioned springs whereby the forces of the latter which act to hold the cover open, may be controlled so as to preclude any likelihood of the cover inadvertently closing of itself.

Although the counterbalance mechanism of the cover comprises preferably coil springs having tension adjusting means, it will be understood that it is within the purview of the invention to utilize equivalent means for holding the cover in its open position.

The adjustable counterbalance mechanism of this invention is thus characterized by its simplicity, durability, and economy of construction, as well as by its adjustable feature for compensating for variations in spring structure and cover weights.

The invention may be carried out in other specific ways than those herein set forth without departing from the spirit and essential characteristics of the invention, and the present embodiments are, therefore, to be considered in all respects as illustrative and not restrictive, and all changes coming within the meaning and equivalency range of the appended claim are intended to be embraced therein.

We claim:

In a structure having an opening, a cover adapted to swing between closed and open positions with respect to said opening, hinge means by which said cover is supported for swinging movement between said positions, the axis of said hinge means being disposed horizontally adjacent an edge of the cover such that the cover is urged by gravity into its closed position, counterbalancing mechanism tending to swing said cover to and to hold it in its open position, comprising: a bracket secured to said cover and projecting therefrom so that its projecting end is disposed, in the closed position of said cover, beneath said hinge axis in spaced relation thereto; resiliently extendable means including a coil spring fixed to said structure at one of its ends

and having a cable interconnected between its other end and the projecting end of said bracket; and a pulley over which said cable passes, said pulley being positioned closely adjacent the projecting end of said bracket in the position assumed by the latter when said cover is in its open position; the positioning on said cover of said bracket with respect to said hinge being such that the moment arm at which the force exerted by said extensible means acts to open said cover is lengthened as said cover is swung upwardly, said force being insufficient in the closed position of said cover to overcome the downward moment of force exerted by the mass of said cover acting at its center of gravity but sufficient after said cover has been raised to a point intermediate said closed and open positions to overcome its gravitational moment and

to move and yieldingly hold it in its open position.

GEORGE W. LYONS, JR.
ROBERT J. LYONS.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
533,205	Bergman	Jan. 29, 1895
926,298	Simon	June 29, 1909
1,073,003	Troyer	Sept. 9, 1913
1,090,697	Eddelman	Mar. 17, 1914
1,606,621	Fischer	Nov. 9, 1926
1,721,308	Lormor	July 16, 1929
2,129,750	Schneider	Sept. 13, 1938