



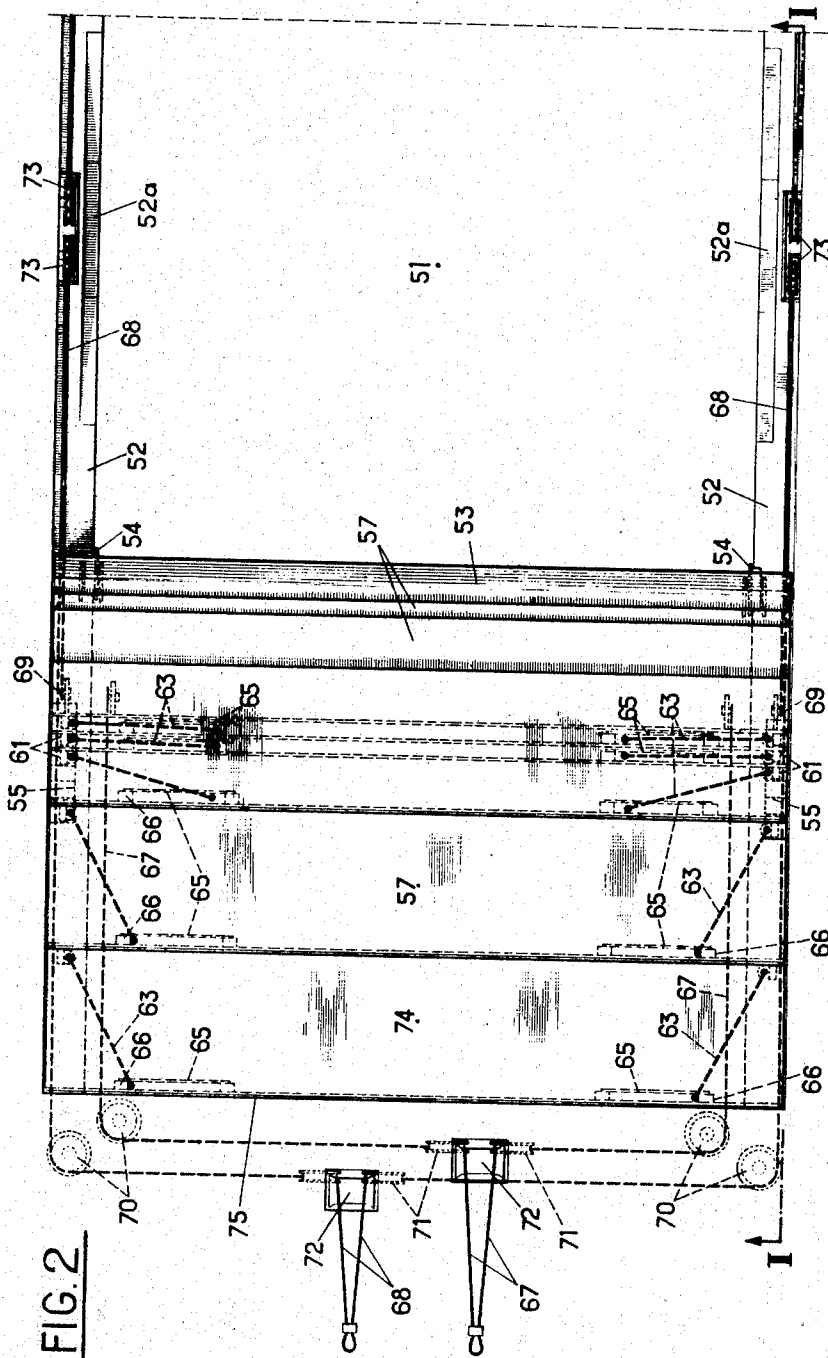
Sept. 19, 1967

R. C. CAILLET  
RETRACTABLE PANEL FOR CLOSING HORIZONTAL OR  
SUBSTANTIALLY HORIZONTAL OPENINGS

3,342,245

Filed Sept. 30, 1963

3 Sheets-Sheet 2



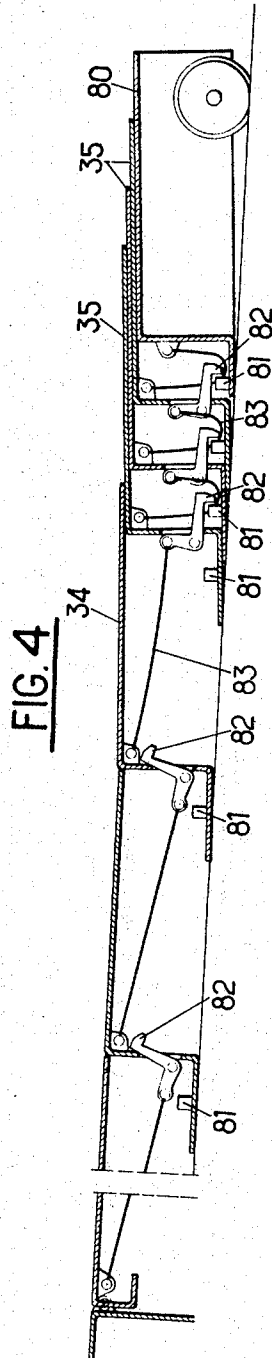
Sept. 19, 1967

R. C. CAILLET  
RETRACTABLE PANEL FOR CLOSING HORIZONTAL OR  
SUBSTANTIALLY HORIZONTAL OPENINGS

3,342,245

Filed Sept. 30, 1963

3 Sheets-Sheet 3



1

2

3,342,245

**RETRACTABLE PANEL FOR CLOSING HORIZONTAL OR SUBSTANTIALLY HORIZONTAL OPENINGS**

René Charles Caillet, 26 Rue de la Republique,  
Saint-Germain-en-Laye, France

Filed Sept. 30, 1963, Ser. No. 312,668

Claims priority, application Luxembourg, Oct. 2, 1962,  
42,461; May 9, 1963, 43,715

7 Claims. (Cl. 160—193)

The present invention has for its object a novel retractable cover intended to close horizontal or substantially horizontal openings, the cover being capable of supporting heavy loads, such cover being essentially characterized by the fact that it comprises a plurality of interconnected panels which can be stacked one on top of the other at the vicinity of the free end of the cover and comprises means imparting to the cover the following characteristics:

(a) When opening the cover, the resistance offered by a panel to its stacking over already stacked panels is less than the resistance offered by any one of the unstacked panels when subjected to the force necessary for opening the cover;

(b) When closing the cover, the resistance to unstacking offered by the topmost panel is less than the resistance to unstacking which is offered by any other one of already stacked panels when the cover is acted upon by its normal closing device.

The invention will now be illustrated by way of example and several illustrative embodiments thereof will be described with reference to the annexed drawings, upon which:

FIG. 1 is a longitudinal section taken by I—I of FIG. 2 of a ship's hatchway cover provided with still another embodiment of the cover according to the invention;

FIG. 2 is a top plan view of the cover represented on FIG. 1;

FIG. 3 is a perspective view, on an enlarged scale, of the embodiment represented on FIGS. 1 and 2, illustrating the manner into which the individual panels are collected by the carrier;

FIG. 4 shows another embodiment of this invention in which the various panels are directly locked, one upon the other, while being stacked.

FIGS. 1, 2, and 3 illustrate the invention, and show that the hatchway 51 comprises, at each side, a race 52 which supports the inventive cover. The end panel 53, whose cross-section is box-shaped, carries at both ends a wheel or roller 54 rolling upon the edge of race 52. The end panel 53 bears also on races 52 through two racks 55 pivotally mounted at 56 on panel 53, these racks sliding over race 52.

Thus, in a partly or totally open condition, panel 53 is located at the position illustrated in full lines, this position being at an angle relatively with the horizontal, as roller 54 bears upon race 52.

The lateral parts of races 52 comprise ramps 52a staggered down as seen in elevation on FIG. 2 and in cross section, in broken lines, on FIG. 1.

The depth of the variation of level so obtained is equal to the height of wheels 54, so that when the hatchway is completely closed (the end panel 53 being at the position 53a represented in broken lines on FIG. 1), the top face of that panel is perfectly horizontal, and in the same plane as the top surfaces of the other panels. The panels 57 of the cover have an S-shaped cross section, and a horizontal part 57a connected to a vertical web 57b which carries a horizontal part 57c extending in the opposite direction from part 57a.

As illustrated particularly on FIG. 3, the horizontal part 57c comprises two cut-out parts whose edges 58 and 59 have a function which will be described later. Panel 57 has also a flange 60 which forms a supporting surface for the end 57a of the top face of the next panel.

The web 57b of each panel 57 carries at its end a swinging locking member 61 pivoted on a horizontal axis 62.

Each panel 57 is connected to the next one by two rods 63 whose one end is fixed to a ring 64 affixed to lock 61 and whose other end is engaged in a slide 65 welded on web 57b of the next panel through supports 66.

FIG. 2 represents in a schematic way the position taken by the various rods 63 when the panels are unstacked or closed.

It can be seen on FIGS. 1 and 2 that the two left side panels are unstacked, that the third panel is being stacked and that the last two panels at the right side are in unstacked position.

It will be remarked that the bringing together of two successive panels can be effected because the end of rod 63 may slide along slide 65 and be accommodated in the remaining space between two successive panels after these have been folded.

The opening and closing of the hatchway cover is obtained through cables 67 and 68 whose ends are attached at 69 on the end panel 53 which is thus the only one to be positively operated by the cable.

The opening cable 67 acts through idle pulleys 70, 71 and 72, while cable 68 runs over similar pulleys as well as on idle pulleys 73 which may be located at the middle part of the hatchway if such hatchway is to be closed by two symmetrically located covers meeting at the middle of the hatch.

The operation of the inventive device is as follows: assuming that the hatchway cover is closed, when traction is applied on cable 67, the end panel 53 is drawn leftwards, that panel begins to swing because wheel 54 is ascending upon ramp 52a. Thereby, the end of the top face 57a of the next panel 57 slides over the top face of panel 53, which imparts to panel 57 a swinging movement.

During this swinging movement, the edge 58 of the lower face 57c bears upon race 52 so that the edge 59 of the same face is raised sufficiently to enable racks 55 to engage freely under such edge 59.

During this movement, rods 63 which connect the end panel 53 to the next panel 57 slide up on the webs of these panels to occupy the location represented on FIG. 2.

During that time, panel 57 does not move and just swings around edge 58 till edge 60 of panel 53 comes into abutment against panel 57.

From that time, panel 57 is also drawn leftwards by panel 53.

The tension which may exist upon rods 63 connecting panel 57 which has just been stacked upon end panel 53 and on the next panel is then released and the swinging locks 61 fall down under the action of their own weight, into the first notch 55a of each rack 55.

With a continued leftwards displacement of end panel 53 while pulling cable 67, the successive loading of panels upon the end panel is induced in the same manner, the swinging locks falling down in succession in the corresponding notches of the racks.

It should be noted that panel 74 which is attached to the edge of the hatchway is pivotally connected only at 75, so as to swing around said pivotal connection 75, and come into place in turn upon all the panels which have been previously stacked upon the end panel 53.

It will be easily understood that it is thus possible to open the hatchway in a progressive way and, that, at any time, the panel about to be stacked on the others is

always that one which is contiguous to the panels which have been previously stacked upon the end panel 53.

Assuming now that the hatchway is in completely opened position and that a traction is applied upon cable 68, it will be seen that the end panel 53 is being displaced towards the right.

The end panel draws, while being displaced, all the panels 57 which are fixed upon the racks 55 because their swinging locks 61 are engaged in the corresponding teeth of the rack.

Thus, it is panel 74 which first assumes again its horizontal position, followed by panel 57, which is next to it. The position successively assumed by each panel is determined by rods 63 as they assume the position represented on FIG. 2 for the panel under consideration.

At this time these rods 63 are put under tension, whose effect is to raise the swingable locks 61 (because rods 63 are rigidly connected to ring 64 which is connected with said locks) and to slide panel 57 off the other panels and off the end panel 53 which all continue their movement while continuing to close the hatchway.

It can be seen, in these conditions, that while the cover is being closed and whatever may be the state of completion of the closing operation, it is always the panel next to the panel which has just been pulled off the other panels which is next pulled off those panels which remain stacked.

As just explained, the invention makes it possible to effect the closure of a horizontal or substantially horizontal opening in particularly advantageous conditions.

In effect:

(a) In opened position, the various panels are stacked one over the other in a manner which occupy only a restricted volume, which considerably limits the overall bulk of the device.

(b) In closed position, the device is perfectly flat and is capable of supporting very substantial loads.

(c) It is possible to effect, as required, partial openings while leaving loaded, for instance with goods, the part of the panel which has not to be opened.

(d) Even at the condition of partial opening, the panels which have been slid away from the opened surface represent only a very small bulk.

(e) The device is simple and very sturdy.

FIG. 4 shows another way in which it is possible, in accordance with the invention, to connect the various panel elements to lockingly engage one upon the other in stacked position and to unlock them successively while the panel is being closed.

The unstacked panel 34, the stacked panel 35, and the box-like end panel 80 which is rolling upon a race, are shown on FIG. 4, just as in the embodiment illustrated on FIGS. 1, 2 and 3 hereinbefore described.

Each element comprises a fixed hook 81 on one of the faces of its vertical web and a pivotally secured hook 82 on the other face of said web.

The pivotally secured hook 82 has an inherent tendency to fall downwards because of its own weight.

The shapes and the relative locations of the fixed and mobile hooks 82 are such that when two adjoining panels are brought together into stacked position, these two hooks come into engagement one with the other, as can be seen, between any two of the panels 35 represented on FIG. 4.

In this connection, a chain or cable, or like member, 83 is connected, on the one hand, to the web of a panel, and, on the other hand, to the movable hook 82 of the next panel so that, when a panel 34 has reached its stacked position, it exerts on the mobile hook 82 of the next panel a traction through chain 83, which then unlocks the next panel and thus permits its unstacking.

Member 83 may be advantageously utilized to effect the connection of panels between themselves and to limit their distance while in unstacked position.

It is easy to understand that while opening the cover, the end panel pushes in succession the various panels whose hooks 81 and 82 interlock with each other, the opening of the cover being easily effected, because the various panels in opened position have sufficient friction relative to the hatchway edge where they are provided with locking means similar to those hereinbefore described.

It will readily be appreciated that, when closing the cover, it is always the panel next to the stacked panels which moves, as that panel is the only one which is unlocked.

It will be understood that the embodiments which have been described are purely illustrative and not restrictive and that various changes and modifications may be resorted to within the scope of the present invention.

It will be further understood that it is possible to utilize rolls to obtain a rolling action instead of the sliding action when it is desirable to do so.

What is claimed is:

1. A sectional sliding cover for a hatchway, said cover having a fixed end and a free end and comprising a plurality of panels mounted to slide in a common direction across said hatchway between a closed position in which said panels lie parallel to each other in a common plane to close the hatchway and an open position in which a plurality of said panels are stacked on the panel at said free end, thus leaving at least a portion of said hatchway uncovered, extensible connector means interconnecting each pair of adjacent panels which, when extended, prevents lateral separation of said adjacent panels when they lie side by side in said common plane but, when collapsed, permits stacking of said panels one upon the other, a pawl carried by each panel except the one at said free end, stop means positioned to be engaged by each pawl when the panel carrying said pawl is in stacked position, each pawl being mounted to normally engage said stop means, and thereby retain said last mentioned panel in stacked position, and said connector means being connected to release the pawl on a stacked panel to which said connector means is attached when, but only when, said connector means is in its extended position.

2. A sectional sliding cover as claimed in claim 1 in which said pawl and stop means consist of at least one hook and a cooperating catch on each pair of adjacent panels, said connector means being connected to selectively swing each hook on the unstacked panel nearest the free edge of said cover out of engagement with said catch.

3. A sectional sliding cover as claimed in claim 2 in which said connector means are pairs of extensible means connecting each panel to an adjacent panel, the points at which each pair of extensible means is connected to one of said panels lying closer to those edges of the hatchway parallel to said common direction than the points at which said pair is attached to the other panel.

4. A sectional sliding cover as claimed in claim 2 in which said connector means are pairs of rods connecting each panel to an adjacent panel, each rod being pivotally connected to the panel at one end thereof and slidably connected to the panel at the other for movement transverse to said common direction.

5. A sectional sliding cover for a hatchway, said cover having a fixed end and a free end and comprising a plurality of panels mounted to slide in a common direction across said hatchway between a closed position in which said panels lie parallel to each other in a common plane to close the hatchway and an open position in which a plurality of said panels are stacked one upon the other, thus leaving uncovered at least a portion of said hatchway, a rack connected to the panel at said free end and a pawl carried by each of the remaining panels, which pawl engages said rack when the panel on which said pawl is carried is in stacked position, means for selectively releasing the pawl of only the topmost stacked panel when said cover is being pulled toward its closed position, and

5

means causing the unstacked panel nearest the panel at said free end to offer the least resistance to sliding onto another panel when said cover is being moved toward its open position.

6. A sectional sliding cover for a hatchway, said cover having a fixed end and a free end and comprising a plurality of panels mounted to slide in a common direction across said hatchway between a closed position in which said panels lie parallel to each other in a common plane to close the hatchway and an open position in which a plurality of said panels are stacked one upon the other, thus leaving uncovered at least a portion of said hatchway, a rack mounted to slide with the panel nearest the free end of said cover, a pawl carried by each of the other panels and mounted in a position in which it normally engages said rack when the panel carrying it is stacked on said end panel, elongated means extending between each pair of panels, said elongated means being connected to swing said pawl away from said rack when said elongated means is tensioned, and means causing the unstacked panel nearest the panel at said free end to offer the least resistance to sliding onto another panel when said cover is being moved toward its open position.

7. A sectional sliding cover for a hatchway, said cover having a fixed end and a free end and comprising a plurality of panels mounted to slide in a common direction across said hatchway between a closed position in which said panels lie parallel to each other in a common plane to close the hatchway and an open position in which a plurality of said panels are stacked on the panel at said free end, thus leaving at least a portion of said hatchway uncovered, extensible connector means interconnecting each pair of adjacent panels which, when extended, prevents lateral separation of said adjacent panels when they

6

lie side by side in said common plane but which, when collapsed, permits stacking of said panels one upon the other, a rack connected to the panel at said free end, a pawl carried by each panel other than the panel at said fixed end, each pawl being mounted to engage said rack when the panel carrying said pawl is in said stacked position, thereby retaining said last mentioned panel in stacked position, and said connector means being connected to release the pawl on a panel to which it is attached when, but only when, said connector is in its extended position.

References Cited

UNITED STATES PATENTS

15	110,787	1/1871	Porter	160—167
	736,357	8/1903	Brousseau	160—118
	763,493	6/1904	Lacey	160—118
	790,992	5/1905	Williams	160—202
	974,327	11/1910	Woods	165—193
20	1,126,864	2/1915	Rankin	160—202
	1,342,612	6/1920	Wood	160—202
	1,692,782	11/1928	Mackin	160—193
	1,927,982	9/1933	Howard	160—193

FOREIGN PATENTS

25	133,014	4/1933	Australia.
	821,912	10/1959	Great Britain.
	48,080	3/1940	Netherlands.

DAVID J. WILLIAMOWSKY, *Primary Examiner.*

30 HARRISON R. MOSELEY, REINALDO P. MACHADO, *Examiners.*

D. L. TAYLOR, *Assistant Examiner.*