Dec. 17, 1946. T. C. CLARK, JR 2,412,872

WALL CLOSURE

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FIG. 1.

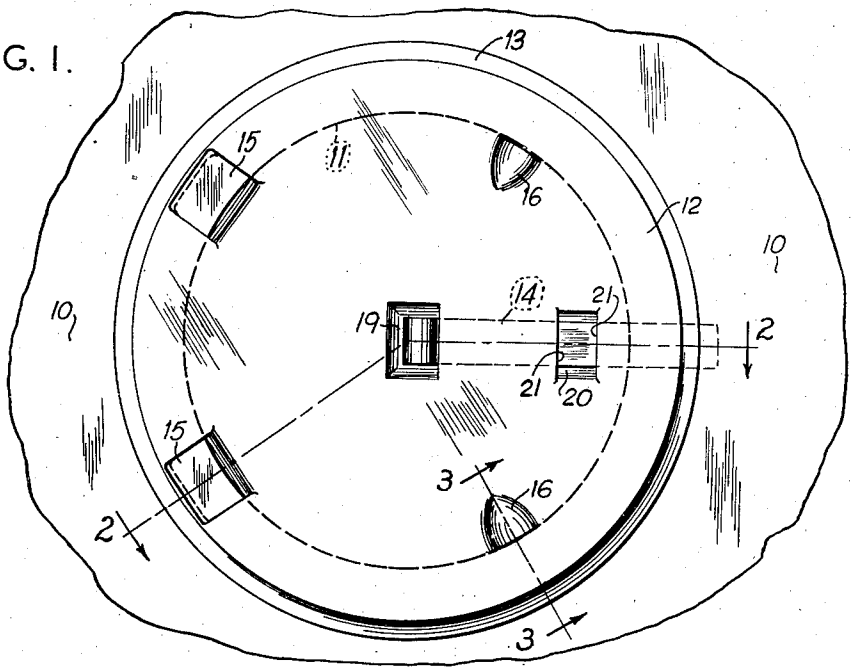


FIG. 2.

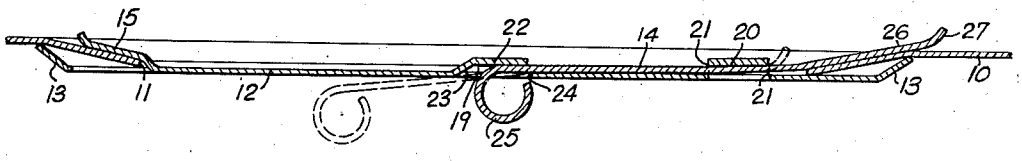
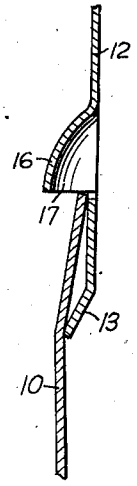


FIG. 3.



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WALL CLOSURE

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2 Claims. (Cl. 220—24.2)

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The present invention relates to closures of the type utilized in connection with an access or inspection opening in a wall or body and is particularly directed to improvements in the construction and arrangement thereof.

Although not limited thereto, the closure assembly of the present invention is especially applicable for use in connection with an access or inspection opening in the skin or frame covering in aircraft construction, many of which are customarily provided, for example, to give access to otherwise concealed joints and connections in the control system.

It is an important object of my invention to provide a simply constructed, easily assembled and low cost closure assembly which is constituted of two principal parts, each capable of being formed in the desired manner by simple operations.

It is also an important object of the present invention to provide in a closure of the above noted character, a cover plate member which may be quickly and easily placed in proper position over the wall or body opening from one side thereof, a latching element operatively carried by the plate member for securing the same when in position, and means on the cover plate member for supporting the latching element and for normally restraining the latter against movement out of latching position as might occur by accidentally striking the latch element or due to vibration in the wall or body.

A further object resides in the provision of a closure assembly which may be made in a variety of configurations to accommodate itself to the desired form of wall opening, thereby imparting to my invention greater utility than is possible in most prior closure assemblies.

Other objects and advantages will appear from the following description of a preferred embodiment of my invention, the same being illustrated in the accompanying drawing, in which:

Fig. 1 is a plan or face view of my improved closure plate as the same appears when in position over an opening in the wall of a body or housing;

Fig. 2 is an enlarged sectional view of the closure plate as the same appears in assembly and as seen along the line 2—2 of Fig. 1; and

Fig. 3 is a further sectional detail of a portion of the closure plate illustrating additional structural features thereof, this view being taken along line 3—3 of Fig. 1.

Referring now to the drawing it will appear that the body or housing wall 10 is provided with an opening 11 whereby access may be had to the interior thereof. Wall opening 11 is adapted to be closed by my improved closure means which includes a plate 12 shaped to conform to the wall opening and to lap the margins thereof, as by the pre-formed or beveled marginal lip portion 13, and a resilient latch element 14 which is slidably carried by the plate 12 for movement between locking and unlocking positions as will appear presently.

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The closure plate 12 is shown as of circular form to coincide with the character of the wall opening 11 but it should not be construed as limiting the scope of the invention for it is obvious that other shapes may be better suited for the purpose in mind or depending upon the requirements or limitations with respect to the shape or outline of the access opening. In the present example plate 12 is formed with a pair of radially directed and circumferentially spaced retaining elements 15, each of which is struck from the material of the plate and bent inwardly to lie below the plane of the plate. A further characteristic of the present construction resides in the fact that each element is desirably located in a zone inwardly of the plate lip portion 13, whereby the continuity of the plate lip portion remains unbroken and hence free of sharp edges. It will also appear that the circumferential lip 13 is inturned and that each of the retaining elements is suitably bent and angularly directed such that the portion of the wall adjacent the opening 11 will be slightly deformed or raised above the general plane of the wall as the same is engaged by and between the upper surface of the element and the adjacent edge of the plate lip. The upward deformation of the wall portion of these zones assures positive retention of the closure plate and also acts to urge the plate into a snug position over the opening 11.

It is also a feature of my improved plate construction to provide a plurality of spaced centering dimples or guides 16, two being shown, each of which is struck from the body of the plate 12 at zones inwardly of the margin and as determined by the location of the margin of opening 11, whereby the dimple (Figure 3) rides inwardly of the opening for abutment of its edge 17 against the margin thereof. Thus the dimples 16 serve as centering means and as such are, by preference, located at points spaced from retaining elements 15, as clearly appears in the drawing.

In combination with the above described closure plate, I provide a slidable latch element 14 which may be formed of strip stock having resilient or spring characteristics. This latch element is carried by the plate 12 between a centrally located recess 19 and a supporting bridge piece 20 spaced

from the recess a sufficient distance to provide adequate guidance and stability for the latch element during its sliding movement into or out of locking engagement with the wall 11. The bridge 20 is formed of a portion of the plate material which is struck inwardly or below its face plane a suitable distance and is severed along opposite sides to provide slot-like openings 21 for passage of the latch element therethrough. In forming the central recess 19, a portion of the plate 12 is suitably struck inwardly to form an element 22 having an inclined face or ramp 23 at one side and a slot-like opening 24 opposite thereto for insertion of the latch 14.

The latch element 14 is formed with a finger loop 25 at its inward end and a tongue portion 26 at its opposite end, the tongue portion being additionally formed, after assembly, to provide a more pronounced inturned lip 27 which acts as a cam for guiding the tongue into clamping engagement with the marginal surface of the wall opening 11, and at other times for limiting the retracting movement of the latch by engagement with the bridge 20.

With particular reference to Fig. 2, the latch element is shown, in full line, in its operative position to secure the plate 12 to the wall 10, and in such position it is seen to urge the adjacent lip portion 13 of the plate into wall engagement. The resilient nature of the latch will thus maintain the plate in closed position and at the same time will establish sufficient frictional restraint to unintended movement, as by its bearing on the bridge 20 and at the under surface of the wall, to prevent its accidental displacement due to vibration in the wall 10. However, after a period of use, should the latch element develop a tendency to creep toward its unlatched position under the influence of body vibration or should it be struck so as to cause movement in an unlatching direction, an additional safe guard is provided by the recessed element 22 and particularly by the ramp or inclined surface 23 which will normally effectively prevent unintended complete unlatching movement thereof. Movement of the latch element 14 into the broken line position can only be accomplished by forcibly elevating the inner end of the latch, as by the finger loop 25, so as to clear ramp 23. Accordingly, the inclination of the ramp should be chosen so that the latch element 14 cannot be moved to unlatched position except by intentional manipulation thereof in the manner described.

It will now be clear that the closure assembly comprises an extremely simple and efficient yet easily manufactured plate and latch element which are positive in effecting the closing of an opening or inspection and access port in the wall of a body or housing. The operation of the closure means is believed to be evident from the above description. Its particular features reside in the provision of spaced retaining elements which are set inwardly of the marginal lip of the closure plate to obviate objectionable projections or formation of sharp edges which may cut into or damage the body wall; in the provision of centering dimples for facilitating the positionment of the plate over the opening in a substantially correctly centered or aligned position; and in the provision of a resilient type latch element which is positively retained in its latched position through the cooperative effect of the bridge piece and the inclined face of the central recess.

The foregoing detailed description relates to a preferred embodiment of my invention which

may be found useful wherever it is desired to provide a detachable closure means for an access or inspection opening. I desire to point out that the closure means may have particular utility in connection with the provision of access and inspection openings in aircraft components such as wing panels, control surfaces, nacelles, fuselage and similar parts. In the case of fabric covered parts it may be desirable to reinforce the margin of the opening in any well known manner.

I also desire to emphasize the fact that the plate member may be formed in a simple metal stamping operation, or at least in a stamping operation requiring a minimum of forming steps; and the fact that the arrangement of retaining elements, centering dimples, latch bridge and recess may be selectively altered to meet a variety of conditions incident to the use of a closure of the present character.

Having now fully described my invention in connection with a preferred embodiment thereof, it will be understood that certain changes and modifications may be made or equivalent parts and elements be substituted for those disclosed and suggested herein without departing from the full and intended scope of the invention as the same is defined by the appended claims.

What is claimed is:

1. A closure assembly for an access opening in a body wall comprising in combination, a plate member positionable over the wall opening from one side and having a lip portion overlying the margins of the opening, said plate member being formed with a plurality of inwardly struck projections for guiding the plate into closing position, a plurality of retaining elements for engaging the margins of the opening at spaced zones to urge the lip portion of said plate member closely thereover, and an inwardly struck bridge piece which is severed from the plate member along opposite sides to provide aligned slots; a latch element carried by said bridge piece for movement through the aligned slots from a locking position in which one end thereof is in engagement with the margin of the wall opening underlying the lip portion of the plate member to an unlocking position in which said one end is free of such engagement for permitting removal or placement of the plate member over the wall opening; and said plate member having an inwardly struck element to provide a recess which is severed from the plate member along one side to provide a slot spaced from but aligned with the slots of said bridge piece and formed with an outwardly inclined surface opposite its slot, said latch element having its said opposite end extending through said recess slot to project outwardly of the recess when in unlocking position and to ride within said recess when in locking position whereby, when in said latter position the inclined surface of said recess is effective normally to restrain the latch element from movement outwardly of said recess toward unlocking positions.

2. A closure assembly for an access opening in a body wall comprising in combination, a plate member positionable over the wall opening from one side and having a beveled lip portion overlying the margins of the opening, said plate member being formed with a pair of retaining elements inwardly struck from the surface of the plate at spaced zones which are located inwardly of the beveled lip portion whereby to engage the margin of the wall opening and urge the lip portion closely thereover, a pair of inwardly

struck dimples arranged in spaced relation and located a predetermined distance from the lip portion of said plate member for passage inwardly of the wall opening and into guiding engagement with the edge thereof for determining the position of said plate member over the wall opening, and an inwardly struck bridge piece which is severed from the plate member along opposite sides to provide aligned slots; a latch element carried by said bridge piece for movement through the aligned slots from a locking position in which one end thereof is in engagement with the margin of the wall opening to an unlocking position in which said one end is free of such engagement for permitting removal or placement of said plate member over the wall

opening; and said plate member having an inwardly struck element to provide a recess which is severed from the plate member along one side to provide a slot spaced from but aligned with the slots of said bridge piece and formed with an outwardly inclined surface, said latch element having its opposite end extending through said recess slot to project outwardly thereof when in unlocked position and to ride within said recess when in locked position whereby, when in said latter position, the inclined surface of said recess is effective normally to prevent outward movement of the latch element toward unlocking position.

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