

July 6, 1948.

J. J. XENAKIS
CLOSURE FASTENER

2,444,716

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2 Sheets-Sheet 1

Fig. 1

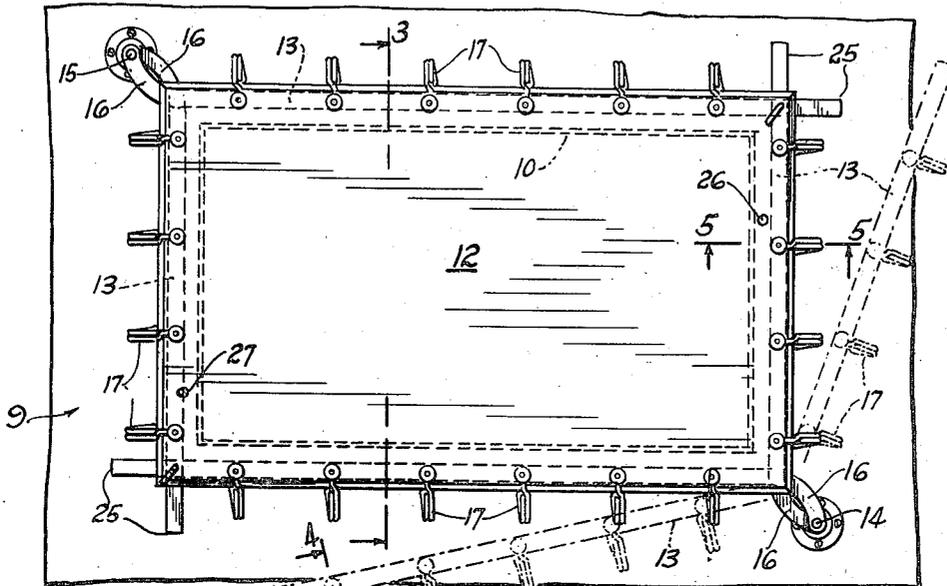


Fig. 2

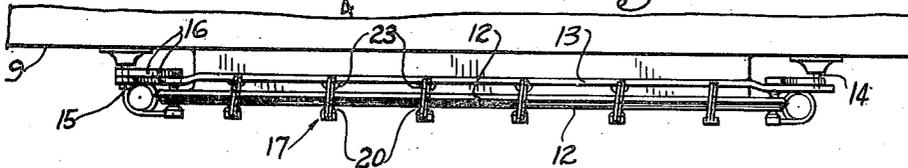


Fig. 3

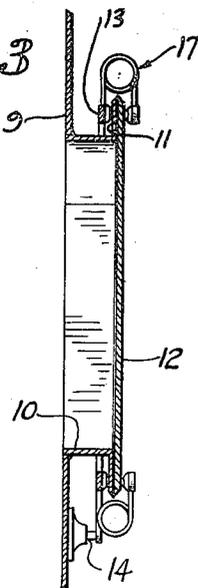
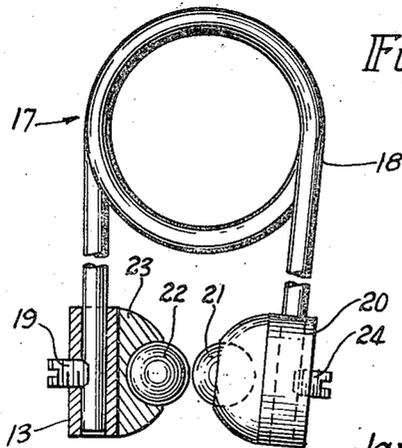


Fig. 4



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Fig. 5

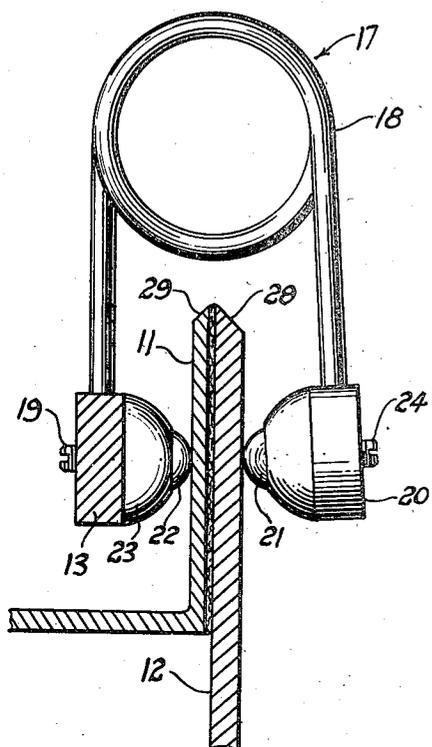


Fig. 6

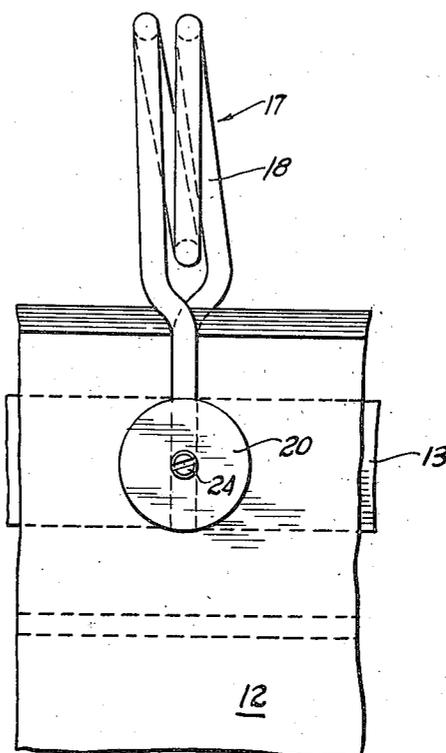
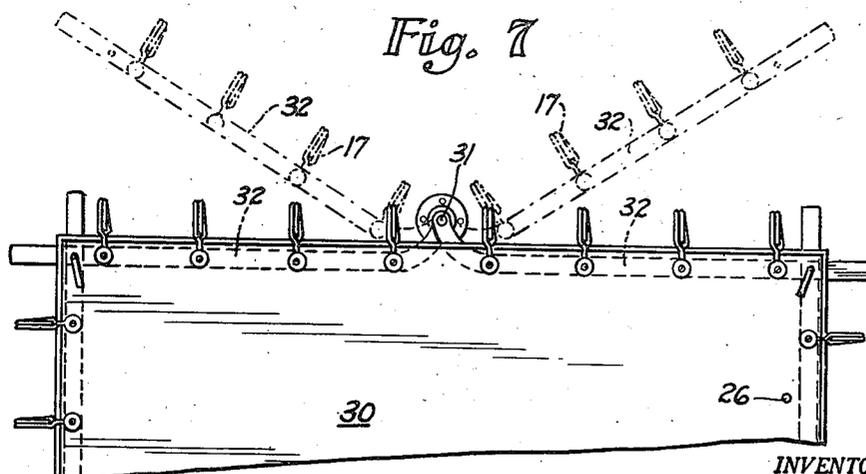


Fig. 7



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CLOSURE FASTENER

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9 Claims. (Cl. 292-17)

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This invention relates to improvements in closure fasteners.

In certain industrial and other apparatus, such as tanks, bulkheads of ships and in other wall or like structures, openings or passages frequently are provided to afford access by workmen or for other purposes when necessity therefor arises. Such openings are provided with closures frequently in the form of steel or other metal plates that normally are secured by bolts or screws in liquid or air tight engagement over the opening, such as to a perimetrical flange surrounding the opening. The removal of such a closure plate to provide access into the structure or through the wall, bulkhead, or the like, as well as the subsequent replacement of the plate, requires considerable time and it is the object of the present invention to provide fastening or retaining means for such closure members which will enable the same to be removed quickly and, likewise, to be again secured in normal position in a minimum of time. The quick removal of such closure members is of particular importance in emergencies and the saving of time and labor effected by use of the improvements where the removal of the closure is for routine inspection or other purposes, is substantial.

Another object of the invention is to provide closure holding or fastening means which are operable to release or lock up a closure member rapidly by a workman or other individual, without the use of wrenches or other such conventional tools.

An additional object of the invention is to provide a closure fastening means which is provided with a plurality of clamping devices which when in operative position exert the total holding force required under the particular conditions of use and which devices are movable successively from a released or inoperative position to operative holding positions whereby the manual effort required in locking up a closure member is within the physical capacity of an average individual.

Another object of the invention is to provide a closure member provided with individually operable marginally positioned latching members which together constitute a perimetrical lock-up means for the closure member. Other objects of the invention relate to various features of construction and arrangement of parts which will be apparent from a consideration of the following specification and accompanying drawings herein.

Figure 1 is a plan view illustrating a closure

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plate in position upon a flanged support surrounding an opening in a wall, or the like, the plate being retained in position by means of latching members which are illustrative of the present improvements;

Fig. 2 is a broken top plan view of the structure shown in Fig. 1;

Fig. 3 is a vertical sectional view taken on line 3-3 of Fig. 2;

Fig. 4 is an enlarged sectional view taken, for example, on line 4-4 of Fig. 1;

Fig. 5 is an enlarged sectional view through one of the locking devices shown in operative position, as along line 5-5 of Fig. 1;

Fig. 6 is an elevational view of the structure shown in Fig. 5, looking to the left in the latter figure; and

Fig. 7 is an elevational view of a closure plate, one side of which is shown as being provided with two locking levers.

In the drawings 9 indicates generally a wall which may be the side of a tank, bulkhead, or the like, having an opening or passage 10 therein of rectangular form. Surrounding the opening is a frame which may be welded to the wall 9 and which terminates in a flange 11. It is upon such a flange that closure plates heretofore generally have been secured by means of bolts or screws. As shown in the drawings, a closure plate 12 is adapted to be positioned upon the flange for closing the opening 10 and to be secured in closing position by means of the improved latching devices. Where the plate is of rectangular form, four operating latching or clamping units preferably are employed, but as will be apparent, should the opening be circular, two or three arcuate latching units may be employed for securing a circular closure plate in position to a circular flange.

Each of the latching units illustrated in the drawing comprises a bar 13 which, as shown in Fig. 1, is adapted to be disposed adjacent one of the edges of the closure plate and preferably is slightly longer than the respective edge of the plate. In the structure shown in Fig. 1, the opposed bars 13 are of similar length, although the bars extending along the top and bottom edges of the plate are longer than those along the end edges. In the embodiment of the invention shown in the drawings there is provided, adjacent diagonally opposed corners of the opening, pivot members or studs 14, 15 which may be welded to the wall 9. Each of the bars 13 is provided with a laterally directed end portion 16 having an aperture therein which enables the end of the bar

to be slipped over the respective stud to provide a pivotable mounting for the bar. Thus, in Fig. 1 the right-hand end bar 13 and the bottom bar 13 are shown in pivotable engagement with the stud 14, while the left-hand end bar and the uppermost bar in the figure are shown in pivotable engagement with the stud 15. The laterally directed end portions 16 of each pair of bars that is mounted upon one of the studs are complementarily offset, as indicated in Fig. 2, so that the major length of the bars can occupy the same plane without interference.

Spaced along each of the bars 13 is a plurality of fastening or clamping devices 17 which, as indicated in Figs. 4, 5 and 6, comprise springs 18, each having one end extending into an aperture in the bar 13 and anchored therein by any suitable means, such as by set screws 19. The opposite end of each spring is provided with a contact member 20 preferably provided with an anti-friction member 21 which provides rolling contact with the surface with which it contacts during use. Opposed to each contact 21 is a similar contact 22 which may be retained in place by a socket forming member 23 welded or otherwise secured to the bar 13. The members 20 may be secured to the ends of the respective springs 18 by set screws 24 or by other approved means.

The springs 18 are shown as being of helical formation, although other types of springs may be employed. It will be observed that with the bars 13 provided with the longitudinally spaced locking devices above described, and with the bars in pivotable engagement with their respective studs 14 or 15 either bar may be seized at the free end 25 thereof, which projects beyond the adjacent portion of the plate 12, and be swung from the full line position away from the engaged edge of the plate to a position suggested by the dotted line positions shown in said figure. When all four of the bars 13 have thus been swung to the inoperative positions suggested, the plate 12 will be free for removal from the flange 11.

Preferably, the plate is retained in proper registering position on the flange by a pair of dowels 26 and 27 which make it convenient to position the plate properly in registration with the flange and which retain the plate against coplanar sliding movement out of the proper position while being clamped in place. The dowels are non-symmetrically arranged, as shown, to insure replacement on the flange in the same position. The dowels may be metal pins welded to the flange 11 and arranged to project through corresponding openings provided in the plate 12. When a plate, after removal, has been restored to proper position upon the flange 11 the bars can be grasped one at a time and swung by a workman into latching relation with the plate and flange, such movement causing the clamping devices 17 to move in succession into the operative positions shown in full lines in Fig. 1 and in greater detail in Fig. 5.

For the purpose of facilitating the deflection of the free arms of the several springs 18 as the individual latching members 17 are moved against the respective edges of the plate and flange, the latter members preferably are beveled, as indicated in 28 and 29 in Fig. 5. These beveled edges, when contacted by the contact members 21 and 22 while in the unsprung position shown in Fig. 4, cam said contact members apart to enable the clamping devices to be moved readily to the latching position shown in Fig. 5.

By means of the present improvements, a single workman in a matter of seconds can grasp the free ends or handle portions 25 of the bars 13 and swing them to inoperative positions, thus freeing the plate for removal from the opening. It will also be apparent that upon replacing the plate upon the flange, each of the bars 13 can be grasped in succession by an individual and swung to the lock-up position shown in full lines in Fig. 1.

While the total clamping force exerted by the members 17 of the bars is sufficient under the circumstances of use, the effort required by a workman in swinging each bar to its clamping position is not excessive in view of the pivotable movement of the levers which causes the members 17 to be moved in succession into engagement with the camming surfaces 28 and 29 of the plate and flange respectively. Thus, a single workman can quickly latch the plate to its flange without the use of conventional tools. The number of latching devices 17 provided on each bar 13 is determined by the conditions of use, more such devices, or devices formed of stiffer springs, being used under some conditions than where the plate is subjected to less pressure.

In Fig. 7 the structure illustrated is essentially the same as that above described, except that the plate 30 shown in Fig. 7 is assumed to be of greater length than the plate shown in Fig. 1. For the purpose of avoiding the use of a single bar of a length sufficient to extend from edge to edge of the plate 30, a pivot 31 may be positioned midway of the edges of the plate, upon which a pair of cooperating bars 32 is mounted and each being provided with latching members 17 of the type above described. Where each edge of the plate 30 is secured in position by a pair of latching members corresponding to members 32 shown in Fig. 7, pivots corresponding to pivot 31 will be located centrally of the respective edges of the plate for accommodating the cooperative bars, as will be understood. The use of shorter bars arranged in tandem along an edge of a closure may be required also in instances where there is insufficient clearance to accommodate the swinging movement of a longer bar.

While I have shown and described a structure which is illustrative of the invention, it will be apparent that variations in the details shown may be utilized in employing the principles and gaining the advantages of the present invention.

I claim:

1. Latching means for a closure plate positioned on a flanged support comprising a plurality of levers arranged adjacent marginal portions of the plate when in latching positions and together framing the plate perimeter, pivotal means for one end of each lever whereby the levers can be swung individually away from and toward the respective portions of the margin of the plate, and a plurality of spring clamping members on each lever movable successively into clamping relation with the respective portions of the plate margin and corresponding adjacent portions of the flanged support as the levers are moved to the respective latching positions.

2. Latching means for a closure plate adapted to be positioned over a flanged support comprising a plurality of levers arranged adjacent marginal portions of the plate when in latching positions and together framing the plate perimeter, pivotal means at one end of each lever whereby the levers can be swung individually away from and toward the respective margins of the plate,

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and a plurality of spring clamping members on each lever and each provided with cooperating contact elements for engaging opposed portions of the plate and flange when the respective lever is in latching position, the clamping members on each lever being spaced apart longitudinally of the lever whereby upon swinging movement of the lever to said latching positions the respective clamping members are moved in succession into clamping position upon the plate and flange.

3. Latching means for securing a plate to a flanged support comprising a plurality of bars each pivotally mounted adjacent the plate margin for swinging movement toward and away from a latching position adjacent a portion of the plate margin, and a plurality of spring latching members carried by each bar and arranged to be sprung successively into clamping contact with a respective marginal portion of the plate and support as the bar is swung into said latching position.

4. Means for releasably clamping a plate closure member to a flanged support comprising a plurality of bars each pivotally mounted adjacent the support and adapted to be swung to and from a latching position adjacent a marginal portion of the plate, and a plurality of spring clamping members carried by each bar in longitudinally spaced relation therein and adapted to be moved successively into clamping relation with respect to the plate and support as the bar is swung into said latching position.

5. Clamping means for securing the margin of a plate closure member to a parallel supporting flange surrounding a wall opening comprising a plurality of clamping members, each comprising a lever disposed adjacent an edge portion of the flange when in latching position and each provided with a pivotal mounting adjacent an end thereof whereby the lever can be swung out of the respective latching position to an unlatching position, and a plurality of clamping members mounted in longitudinally spaced relation on each of said levers and comprising spring urged contact members adapted to be cammed apart by the respective edges of said plate and flange into clamping engagement with opposed marginal portions of the plate and flange as the respective lever is moved from the unlatching position to said latching position thereof.

6. A clamping device comprising a bar adapted for pivotal mounting at one end thereof for swinging movement in a given plane, and a plurality of clamping units secured in spaced relation along the bar, said units comprising spring arms provided with contact members disposed

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in spaced relation at one side of the bar and adapted to exert clamping action on elements to be clamped together disposed between said contact members and the adjacent portion of the bar.

7. Clamping means for securing the perimetrical portion of a cover to a flanged support on which the cover is placed, comprising a plurality of levers arranged adjacent successive portions of the cover perimeter, spring clamping units on each lever for clampingly engaging corresponding portions of the cover and flange for clamping the cover to the flange, and pivotal mountings for one end of each lever whereby the levers can be swung manually away from the respective portions of the cover perimeter for moving said clamping units out of clamping engagement with the cover and support for releasing the cover from the support.

8. A clamping device for clamping a portion of a cover perimeter to a flanged support comprising a lever adapted to be pivotally mounted at one end for movement into contact with the side of the support remote from the cover, and a plurality of clamping members secured to the lever in longitudinally spaced relation with respect thereto and provided with spring urged contact members adapted to be moved successively into contact with the cover for pressing the same against said support as the lever is swung into contact with the support.

9. Clamping means for latching a plate-like cover to a flanged support comprising a plurality of levers arranged to extend generally in end-to-end relation about the support when in latching positions, a plurality of individually operable clamping devices secured to each lever in longitudinally spaced relation along the same for clamping the margin of the cover to the support when the levers are in said latching positions, and pivotal mounting means for one end of each lever enabling the lever to be swung arcuately away from the support for removing the respective clamping devices from engagement with the cover and support.

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