June 9, 1942. A. P. LEINEN 2,285,728

COMBINED LATCH AND CLAMP CONSTRUCTION

Filed March 7, 1940

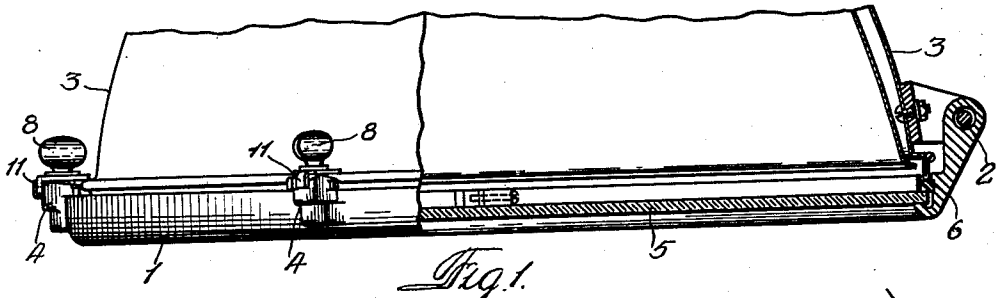


Fig. 1.

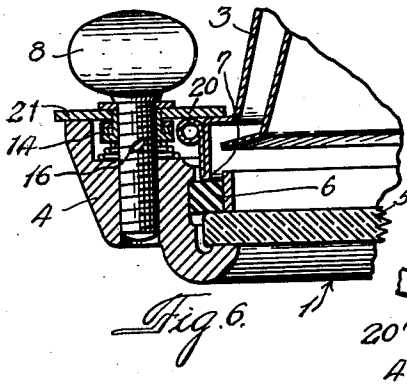


Fig. 6.

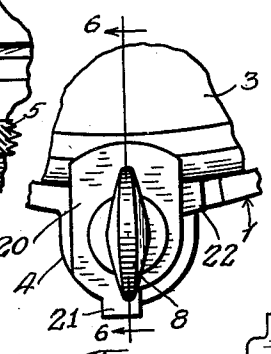


Fig. 5.

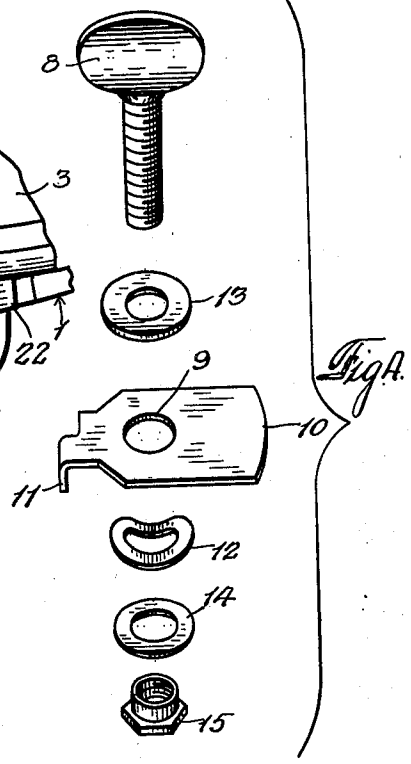


Fig. 4.

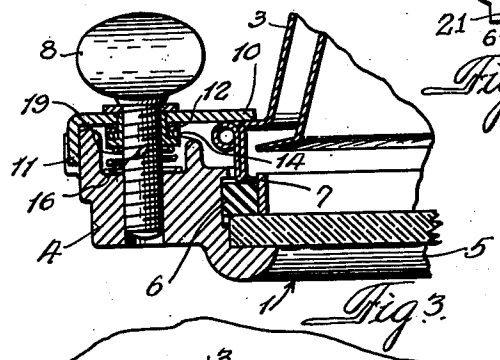


Fig. 3.

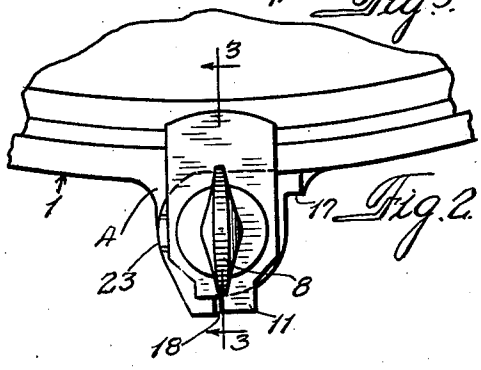


Fig. 2.

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Patented June 9, 1942

2,285,728

UNITED STATES PATENT OFFICE

2,285,728

COMBINED LATCH AND CLAMP CONSTRUCTION

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Application March 7, 1940, Serial No. 322,749

7 Claims. (Cl. 292—212)

This invention relates to latching and clamping constructions and more particularly to manually operable closure securing means which may be quickly operated by simple manipulation of a thumb screw to latch and tightly clamp a closure.

Latching mechanisms and clamping mechanisms have heretofore been proposed; however, such prior constructions lack a number of important features both as to the method of operation and the type of closure obtained.

The present invention is directed to a combined latch and clamp construction whereby the quick operation is combined with secure fastening to provide adequate clamping pressure in a quickly operable closure locking device. The construction is simple and may be easily manufactured by standard manufacturing processes; it employs a minimum number of parts and when assembled may be dealt with as a unit whereby replacements may be easily made without the use of tools or the necessity for difficult replacement operations.

The invention is shown applied to a light reflector but of course may be applied to any suitable closure or to any device which may, or may not, require a sealing engagement, such for example as electrical outlet boxes, cooking devices, hatches, water proof doors, machinery, and any other situation where a readily releasable tight seal is desired. In the servicing of electric light reflectors and particularly those installed in factories and the like, it is frequently necessary for the maintenance man to stand atop a tall ladder and, ordinarily, he has but one hand free to remove the reflector cover, perform the servicing operation, and replace the cover. It is therefore of material importance that a reflector closure be provided which is adapted to manipulation by the single free hand of such operator without sacrificing any of the tight sealing characteristics of the closure.

The present invention is particularly adapted to such use and employs a number of individually operable combined latch and clamp devices disposed about the periphery of the reflector rim and which may independently be operated to latch and to tightly clamp the reflector cover in place.

The present construction also is particularly adapted to inconspicuous installation upon a reflector cover so that the manually manipulated portions of the clamp project away from the face of the reflector cover, leaving the face of the cover free and clear from protruding objectionable irregularities.

It is a further object of the present invention to provide a simple, inexpensive combined latch and clamp construction, initial movement of which automatically latches the closure being sealed, while continued movement applies clamping pressure thereto.

Other objects and advantages will be hereinafter more fully described and for a complete understanding of the nature, scope and characteristics of this invention, reference may now be had to the following description and accompanying drawing in which:

Fig. 1 is a side elevation partly in section showing the present invention applied to the cover of a light reflector.

Fig. 2 is a top view of one of the latch and clamp devices illustrated in Fig. 1.

Fig. 3 is a vertical axial section taken on a line corresponding to line 3—3 of Fig. 2.

Fig. 4 is an exploded view of the embodiment illustrated in Figs. 1, 2, and 3, and shows the order of assembly of the parts.

Fig. 5 is a top view of another embodiment of the present invention and which employs a different type of stop for limiting the movements of the parts.

Fig. 6 is a vertical axial section taken on a line corresponding to line 6—6 of Fig. 5.

Referring to the drawing in detail, the embodiment shown in Fig. 1 illustrates the invention applied to light reflectors wherein it releasably secures the usual glass covers to the face of the reflector. In this use a number of latch and clamp units are preferably disposed about the periphery of the usual cast lens cover member 1, which may be hinged as at 2 to the reflector hood 3 so as to be suspended therefrom when in the open position. The cover member 1 may be provided with cast lugs 4, one for each of the clamp and latch devices.

The cover member 1 is internally recessed to accommodate a light transmitting lens 5. This lens may be sealed to the face of the reflector hood 3 by a gasket 6 disposed between the periphery of the lens and the lower rim 7 of the reflector.

The latch and clamp members illustrated in Fig. 1 are disclosed in detail in Figs. 2, 3 and 4. As there shown they comprise a shouldered thumb screw 8, the shank of which is threaded and may be secured in a suitable threaded opening in one of the lugs 4 of the cover 1. The shank of the thumb screw 8 passes through an opening

9 in a clamp plate 10 which in this embodiment is provided with a downwardly formed tail or stop engaging portion 11.

To provide the previously mentioned frictional engagement between the thumb screw 8 and the clamp plate 10, a friction washer 12 is provided. As illustrated in Fig. 4 the washer is deformed in shape and constructed of spring-like or resilient material whereby when compressed its sides will frictionally engage the adjacent surfaces. As shown in Fig. 4, washers 13 and 14 are located between the shouldered portion of the thumb nut and clamp plate 10 and between the friction washer and a threaded bushing 15 respectively. The threaded bushing 15 has an outstanding collar at one end.

When the device is assembled in the order shown in Fig. 4, the tubular portion of bushing 15 extends through the washer 14, the friction washer, and hole 9 in the plate 10. It will be apparent that when assembled as shown in Fig. 3, the friction washer 12 will be compressed to frictionally engage the plate 10. Rotary movement of the thumb screw 8 will then be transmitted to the plate 10. After the parts have been assembled in the order illustrated in Fig. 4, and the bushing 15 screwed tightly into place, the threads on the shank of the screw 8 are upset just below the bushing as shown at 16 (Fig. 3). This permanently locks the bushing into position and causes it to function as an integral part of the thumb screw 8.

The entire assembly may thereafter be handled as a unit and damaged or worn units may be bodily replaced without tools simply by unscrewing the old unit from the lug 4 and inserting a new one.

The lugs 4 in the cast cover member 1 may be given the external contour illustrated in the top view of Fig. 2, whereby a recessed area is provided terminating at each end in stops 17 and 18. When the clamp plate 10 is in place the downturned tail 11 is positioned in this recess and the plate 10 is limited in its rotary movement with the thumb screw by the stops 17 and 18. When in its unlatched position the latch and clamp device is retained in place and kept from free movement due to vibrations or the like by means of a coiled spring 19 which is preferably tapered as indicated in Fig. 3, so as to permit a greater range of movement of the thumb screw 8. When in unlatched position plates 10 of each of the latches are positioned parallel to the rim 7 of the reflector hood so as to be out of the path of the rim during the opening and closing of the cover. In order to latch the cover to the reflector the operator merely turns the thumb screw 8 to the right, and, by reason of its frictional engagement with the screw, the plate 10 is rotated to the latched position indicated in Figs. 2 and 3. In this position the cast cover 1 is latched in place and the latch plate is kept from accidentally working around to an unlatched position by the coil spring 19. When it is desired to clamp and securely fasten the cover 1 to the reflector hood, the thumb screw 8 is further rotated so as to draw the plate more firmly into contact with the upper edge of the rim 7. The plate 10 does not rotate with the thumb screw, however, as the down turned tail 11 engages the stop 18 to prevent further movement of the plate.

To release the closure it is only necessary to reverse this procedure so that the cover will first be unclamped and then, when the plate 10 is free, it is rotated by the frictional engagement with the screw to swing it out away from the rim 7 of the reflector hood and permit removal of the cover. The movement of the plate 10 in the opening direction is limited by the engagement of tail 11 with stop 17.

Of course, the present construction is shown employing a thumb screw on which right hand threads are employed, and the stops and plate portions are formed accordingly. However, should it be desired to use left hand threads it would obviously only be necessary to transpose the parts so that proper latching and unlatching operations will result from operation of the thumb screw.

In Figs. 5 and 6 a second embodiment is illustrated which operates upon the same principle as the previously discussed embodiment, but wherein a modified clamp plate and different plate stops are employed.

The clamp plate 20 employed in this embodiment has the general shape illustrated in Fig. 5, but has what is not provided with the downwardly formed tail of the previously described embodiment. Instead the plate has a protruding portion 21 which engages a raised abutment 22 on the reflector cover member 1 to limit its opening movement. This same abutment 22 also limits the closing movement of the clamp plate as the edge of the clamp plate 20 engages the abutment 22 and the plate is stopped despite continued rotation of the clamp screw 8.

A suitable drain trough 23 may be provided in each of the lugs 4 if desired where the parts are exposed to the elements. This prevents an accumulation of moisture around the threaded parts.

From the foregoing description it will be apparent to those skilled in the art that various modifications thereof may be made without departing from the spirit and scope of this invention and it is desired, therefore, that the same be limited only by the scope of the prior art and the appended claims.

Having thus described the invention, what is claimed and desired to be secured by Letters Patent is:

1. In a combined latch and clamp construction the combination with a rotatable pressure applying traction screw of a latch and clamp plate, a bushing having a collar portion and threaded on said pressure applying screw and a friction washer positioned between the collar portion of said bushing and said plate to provide a frictional connection therebetween, and a clamp member engaged by the threads of said screw and positioned to clamp a gasketed connection between itself and said plate.

2. A latching and clamping construction comprising a clamping member, a screw having a threaded engagement with respect to said clamping member, a combination latching and clamping member having a frictional swivel thrust connection with respect to said screw and a rotational movement with respect to said clamping member whereby, when said screw is threaded into the clamping member, the latching and clamping member turns with the screw to latching position and thereafter is forced by the endwise movement of the screw to effect a clamping action, and abutment means threaded on said screw and secured against unscrewing for preventing the latching and clamping member from slipping off the end of the screw when the screw is removed from said clamping member.

3. A latching and clamping construction comprising a clamping member, a screw having a threaded engagement with respect to said clamping member, a combination latching and clamping member having a frictional swivel thrust connection with respect to said screw and a rotational movement with respect to said clamping member whereby, when said screw is threaded into the clamping member, the latching and clamping member turns with the screw to latching position and thereafter is forced by the endwise movement of the screw to effect a clamping action, stop means for limiting the turning movement of the clamping and latching member and for stopping it in latching position, and abutment means threaded on said screw and secured against unscrewing for preventing the latching and clamping member from slipping off the end of the screw when the screw is removed from said clamping member.

4. A combination latch and clamp construction comprising a latch and clamp plate having an opening therein, a bushing mounted to rotate in said opening, a thumb screw extending through said bushing and secured thereto, and a spring washer engaging both said plate and said bushing and exerting frictional pressure therebetween whereby initial operation of the thumb screw induces latching movement of said plate and continued operation of said thumb screw applies clamping pressure between said plate and a clamp member into which the screw is threaded.

5. A clamp construction comprising a clamping member, a screw having a threaded engagement with respect to said clamping member, a sleeve into which said screw is threaded secured against axial movement thereon, a combination latching and clamping member swiveled on said sleeve, and a coil spring surrounding said screw and acting between said sleeve and the clamping member to urge said sleeve and screw away from the clamping member.

6. A locking and clamping construction comprising a screw for threaded engagement with a cooperating clamping member, said screw having a torsion head for screwing it into the clamping member and being provided with an annular shoulder, a clamping and latching member having an opening through which said screw extends and having a swivel thrust connection with respect to said screw and held against axial movement in one direction by said shoulder and having a rotational movement with respect to said cooperating clamping member, and a nut threaded onto said screw on the opposite side of said latching and clamping member from said shoulder for holding said latching and clamping member against axial movement in the opposite direction.

7. A locking and clamping construction comprising a screw for threaded engagement with a cooperating clamping member, said screw having a torsion head for screwing it into the clamping member and being provided with an annular shoulder, a clamping and latching member having an opening through which said screw extends and having a swivel thrust connection with respect to said screw and held against axial movement in one direction by said shoulder and having a rotational movement with respect to said cooperating clamping member, and a nut threaded onto said screw on the opposite side of said latching and clamping member from said shoulder for holding said latching and clamping member against axial movement in the opposite direction, said screw having provisions for holding said nut against helical movement thereon.

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