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SWITCH BOX LATCH WITH VARIABLE BIAS

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SWITCH BOX LATCH WITH VARIABLE BIAS

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This invention relates to duplex latches for box covers and more particularly to electric switch box covers or doors in that larger sizes. The invention is not limited however to any particular box size or to electric switch boxes. The invention is particularly useful in connection with any box and cover in which there is need for a person to use one hand for holding the switch lever or anything else in a certain position so that the door can be opened while he is at the same time trying to unlatch dual cover latches with his remaining hand.

Many electric switches of various sorts are housed in metallic boxes in order to comply with Underwriters' rules and for other reasons. In many instances, there must be provision of an interlock so that the box cover will remain shut when the switch handle is in the closed circuit position. The interlocking arrangement referred to is dependent upon the position of the handle and switch; and it is ordinarily inside the box or unavailable for manual manipulation from the outside except by the use of a special tool or screwdriver. It is thus impossible for anyone to open the cover while the switch is in closed circuit position. Beside the provision of mechanism for accomplishing the aforementioned functions, there is sometimes provided a third position of the handle different from both the "on" and "off" positions into which the handle must be moved and held before the handle-controlled latching means is disabled and opening of the cover is permitted. Obviously when there is a provision for this third momentary position, one hand of the operator must be occupied in holding the handle in said position.

In addition to the foregoing, it is desired and often required that the box cover have additional latching means, independent of the switch, to operate automatically when the cover closes. To that end, latching means is provided on the exterior of the box body to cooperate with means on the cover to snap into operative latching position when the cover closes.

In the larger size of switch boxes, the provision of one such exterior latch is insufficient for various reasons and to obtain unauthorized or improper access to the interior. To avoid that possibility, many latches are provided. It is obvious however that if such latches are spring biased so as to automatically move to closed position when the cover closes, difficulty will be encountered in trying to hold the handle of the switch in the box opening position and at the same time to overcome the spring bias of the exterior latches. Indeed it is quite impossible to do so without at first moving one of the latches into open position and prying it there and then holding the other latch with one hand while the switch handle is held in the proper box opening position with the other hand. The invention is not limited to use of two latches together. In some instances, only one latch may be used and many of the advantages of the invention will be put to use.

With these problems in mind, it is an object of the present invention to provide a spring biased exterior latch-

ING means for switch box covers and the like in which the latch may be easily adjusted to be retained in position permitting opening of the box without the need to use special means or tools.

Another object of the invention is to provide such a latching means that is economical to manufacture and assemble and may be easily fabricated mainly from sheet metal stampings.

Another object of the invention is to provide latching means of the aforementioned type in which the exterior latch may be biased to automatically engage its keeper or not to engage its keeper, by movement of the position of the biasing spring manually without the need for use of tools or other special means.

A related object is to provide such a latching means which will permit securing together of the box and cover by a screw with the latching means biased in either of its two positions.

Other objects and advantages of the invention will become apparent as the invention is described in connection with the accompanying drawings.

In the drawing:

Fig. 1 is a side elevation view of a box to which the invention is applied wherein the top latch is biased open and the bottom latch is biased closed. Fig. 2 is a front elevation view of the box and top latch of Fig. 1. Fig. 3 is a view looking up at the structure of the bottom latch assembly of Fig. 1. Fig. 4 is a detail side view of one of the moveable latch members.

Referring to the drawings, a rectangular sheet metal switch box 10 has a stamped sheet metal door or cover 12 hingedly mounted thereon with a peripheral flange on the door overlapping the sides of the box. On the door 12 is pivotally mounted a switch operating handle or lever 14 of any suitable or conventional form. For the purpose of description and better understanding of the invention, it will be assumed that the handle is capable of occupying at least an "on" and "off" position and an "open" position, into which "open" position the handle must be moved before the cover can be opened. Since many possible means for interlocking the cover and the box when the handle is in any position except the "open" position may be incorporated, no specific means need be described and illustrated. It need only be mentioned that the interlocking arrangement between the handle, cover and box is entirely enclosed within the box and can only be rendered ineffective by movement of the handle into said "open" position.

Other means independent of the position of the handle are provided so that the cover may be latched to the box when the cover is closed. These additional means consist of identical latching devices, one being located preferably near the top of the box at the side thereof while the other is located near the bottom. Mounted on the side flange of the door 12 of the box at spaced points near the top and bottom are welded stamped sheet metal angle brackets. One arm 16 of the angle is welded to the cover so that the other arm 17 will extend perpendicularly thereto paralleling the cover of the box. The extending arm 17 thus constitutes the keeper of the latch device.

Mounted upon the box at the side thereof adjacent the location of the keeper lugs is a two-part latching assembly. This assembly on the box comprises a mounting bracket, designated generally by the numeral 20, stamped from sheet metal and welded to the side of the box 10. The bracket has an L-shaped mid-portion with one arm 22 forming a mounting portion welded to the box and the other arm 21 offset by an amount slightly greater than the thickness of the metal. At the end of arm 21 a wing 26 is bent outwardly at right angles to the plane of the side of the box and parallel to the plane of
the cover, the wing is pierced and threaded to receive a screw bolt 19. It may also have a second circular piercing 27 in a depending extension of the wing, to receive the loop of a padlock P. The top end of arm 22 is bent outwardly at right angles to the plane of the side of the box and at right angles to the plane of the cover and has a narrow rectangular slot 24 cut in the edge farthest from the cover providing a bearing recess for the movable latch member 20. The movable latch, designated generally by numeral 30, is stamped from sheet metal preferably but not necessarily of the same gauge as the bracket 20. The movable latch 30 has formed at one end of its body a hook-like formation 31 providing a bearing to engage in the bearing recess 24 of the bracket 20. On the other end of the latch body is formed a latch nose 32 adapted to engage the keeper 17 on the door or cover.

The latch body is extended down at its central portion and offset toward the box as at 33, then continuing along the surface of the side of the box parallel thereto and to the plane of the upper portion of said body. Bent out at right angles to the lower portion 34 perpendicular to the side wall of the box and adapted to parallel the bracket wing 26 is a latch wing 35 into which is stamped a keyhole-shaped aperture 37. Freely through the keyhole slot extends further the securing screw bolt 19. On tightening up the bolt, the latch 30 pivots into latching position and the latch wing 35 is screwed tight against the bracket wing 26, thus securing the cover closed permanently without regard to the condition of the apparatus in the box.

In order to enable opening of the box while one hand of the operator is occupied, as by holding the switch handle in “open” position, a spring, which is shiftable between different anchoring points, is provided between the latch 30 and bracket 20. In the embodiment illustrated, one end of a coiled compression spring seats on a curved stub extending from one edge of the top 23 of the bracket. The other end of the spring is manually adjustable to seat on either of two seats on the latch 30 which are at an obtuse angle to one another. When the spring is on the upper seat as in the top of Fig. 1, the latch is biased open and the door keeper 17 will clear the nose 32 when the door is swung to open it. When the spring is on the lower seat as in the bottom of Fig. 1, the latch is biased toward closed position. With that bias, the latch will automatically snap closed when the door is swung to closed position. On either seat the spring force acts to hold the bearing 31 of the latch 30 against the bearing slot 24 of bracket 20.

If both latches have their springs seated on their upper seats, the latches will be biased open and the door can be swung open when the handle is in the proper position.

If one latch has its spring on its upper seat, the door can be swung open when the handle is in the proper position provided the other latch is held open by the free hand of the operator.

If both latches are on their lower seats, the door will automatically latch itself shut when swung into closed position. For one person to open the door, it will then become necessary to shift one or both springs to their upper seats, the door will then be open, the latch whose spring is shifted will be biased toward open position. If the screw bolts were tightened, unscrewing them will permit any latch whose spring is on the bottom seat to move to open position.

Most of said boxes are provided with a rubber or flexible gasket 13 on their peripheral edge between the box and the cover. When the cover is shut, it is possible to press the cover against the gasket compressing it, to make a tighter seal. For that purpose, I preferably provide for a small clearance C between the wings 26 and 35 of the bracket and latch, when the door is just closed. By tightening up on the screw bolt 19, the clearance can be reduced, causing compression of gasket as the cover moves slightly closer to the box. During such movement, the resilience of the gasket, transmitted through the cover, maintains the keeper 17 and latch nose 32 pressed tightly together. In order for such tightening of the screw bolt to be accomplished to compress the gasket, there must be provision for lost motion in the pivotal mounting of the latch 30, as is possible in the pivot described and shown.

When a padlock is applied, the door will stay locked despite the removal of the screw bolts 19, because the loop of the padlock just fits in the hole 27 in the bracket and it cannot move out of the larger part of the keyhole slot 37 in the latch 30. Hence the latch cannot pivot from the latching position (lower part of Fig. 1) to the unlatched position (shown in upper part Fig. 1) while the padlock loop is in said holes.

From the foregoing, it will be apparent that the new latch is particularly useful when applied in pairs to a door which cannot be satisfactorily latched and secured with one latch and when one hand of the operator is otherwise occupied and not available to release one of the two latches. The latch is also useful individually or in pairs in any case where there is need to disable the latch temporarily but in which the latch will be made latching position when a screw bolt is inserted, or a padlock is applied, or other means is provided to secure the door or cover permanently closed.

Modifications within the scope of my invention will occur to those skilled in the art. Therefore it is not limited to the specific form illustrated and described.

What I claim is:

1. A box having a hinged cover, dual latching means positioned in spaced relation on the box and cover a distance preventing their simultaneous operation by one hand, each latching means comprising a bracket member, a pivoted latching member mounted on said bracket member, spring biasing means engaging said bracket and latching means, spaced seats for said spring means between which said spring means may be manually shifted to change the position into which said latch member in non-latching position the other latch may be manipulated to release the door with one hand.

2. A box having a hinged cover, dual latching means positioned in spaced relation on the box and cover a distance preventing their simultaneous operation by one hand, at least one of said latching means comprising a bracket member, a pivoted latching member mounted on said bracket member, spring biasing means engaging said bracket and latching means, spaced seats for said spring means between which said spring means may be manually shifted to change the position into which said latch member is biased, means engaged by said latching member when the cover is shut to hold it shut when said spring is on one seat but not engaged when said spring is on the other seat, whereby on location of the spring of one latching means on said one seat for biasing that latching member into non-latching position the other latch may be manipulated to release the door with one hand.

3. A box having a hinged cover, spaced latching means for holding said cover and box closed at spaced points, said latching means being spaced a distance preventing simultaneous manipulation by one hand, biasing means for at least one of said latching means comprising biasing means in either of two positions enabling said latching means to be biased in either latching or non-latching position, said biasing means being shiftable by hand without tools between said positions whereby on location of the biasing means in the position which biases the latching means in non-latching position the other latching means may be manipulated to release the door with one hand.
4. The combination for latching a cover to a box comprising a bracket member having a mounting portion, a bearing portion bent at right angles to said mounting portion and provided with a bearing recess and also having a securing wing at right angles to the plane of said mounting portion and said bearing portion, a latching member having a bearing portion engaging said bracket member in its bearing recess, a latch nose adapted to engage means on said bracket member when in latching position to hold the cover and box closed, and a securing wing bent at right angles to the plane of said bearing and nose portions, and adapted to be parallel to cooperate with said bracket wing, a bolt threaded into said bracket and engageable with said latch wing to hold said latch member in latching position and connected to said bracket, a biasing spring between said bracket and latching members shiftable manually between two seats to vary the direction of bias for biasing the latching member toward a latching or a non-latching position.

5. The combination for latching a cover to a box consisting of a stamped sheet metal latch member adapted to engage a keeper to hold the box and cover shut, a stamped sheet metal bracket member on which said latch is mounted, a spring between said latch and bracket members, a plurality of anchoring points on said members for said spring between which said spring is manually shiftable to vary the direction of bias of said latch member between a latching and a non-latching position.

6. The combination of claim 5 wherein the latching member and bracket member are each provided with wings adapted to lie parallel, one of said members being apertured and the other being tapped to receive a screw bolt, whereby the latch may be secured in latching position.

7. The combination of claim 5 wherein the latching member and bracket are each provided with wings, one being apertured and the other being tapped, and a screw bolt entering said tap through said aperture and acting on said latch to move it into latching position when desired and to secure it there.

8. The combination for latching a cover to a box comprising a stamped sheet metal latch member having a bearing portion, a latch portion adapted to engage a keeper, and a wing portion, a bracket having a portion interengaged by said bearing portion and pivotally supporting said latch member, said bracket also having a mounting portion for attachment to a box and a wing portion to cooperate with the latch wing portion, said wing portions extending laterally from said mounting and latch portions, and a spring between said latch and bracket members, a plurality of anchoring points on said members for said spring between which said spring is manually shiftable to vary the direction of bias of said latch member between a latching and a non-latching position.

9. A device for latching a cover to a box in which the device is mountable on the one and a keeper is mountable on the other, comprising a stamped sheet metal latch member having a bearing portion, a latch portion adapted to engage a keeper, and a wing portion perpendicular to said bearing and latch portions, a bracket having a portion interengaged by said bearing portion and pivotally supporting said latch member, said bracket also having a mounting portion for attachment to a box and a wing portion to cooperate with the latch wing portion, said wing portions being perpendicular to said mounting and latch portions, one wing portion being apertured and the other being tapped, and a screw bolt entering said tap through said aperture and acting on said latch to move it into latching position when desired and to secure it there, a spring between said latch and bracket members, a plurality of anchoring points on said members for said spring between which said spring is manually shiftable to vary the direction of bias of said latch member between a latching and a non-latching position.

10. The combination as claimed in claim 5 in which the bracket member has an open bearing, and the latch member has an open bore engaging the bearing recess of the bracket member, said spring urging said latch and bracket members into engagement regardless which seat said spring is on.

11. The combination as claimed in claim 5 wherein said latch and bracket members have a loose pivotal connection, and said spring urges said latch and bracket members into engagement regardless which seat said spring is upon.

12. The combination as claimed in claim 8 wherein the wing portions are pierced to receive a padlock, the loop of said padlock preventing the latch from moving relative to said bracket from latching position, thereby maintaining said cover and box locked.

13. The combination for latching two parts together comprising a keeper adapted to be mounted on one member and a latching device adapted to be mounted on the other, said latching device comprising a stamped sheet metal latch member having a bearing portion, a latch portion and a laterally extending wing portion, a bracket having a portion interengaged by said bearing portion and pivotally supporting said latch member, said bracket also having a mounting portion attached to one of said two parts and a laterally extending wing portion to cooperate with the latch wing portion, a spring between said latch and bracket members, a plurality of seats on said members for said spring between which said spring is manually shiftable to vary the direction of bias of said latch member between a latching and a non-latching position.

References Cited in the file of this patent

UNITED STATES PATENTS

1,002,259 Goedeke ---------------- Sept. 5, 1911
1,885,713 Hamerly ---------------- Nov. 1, 1932
2,121,620 Workman --------------- June 21, 1938
2,551,913 Toby ------------------ May 8, 1951