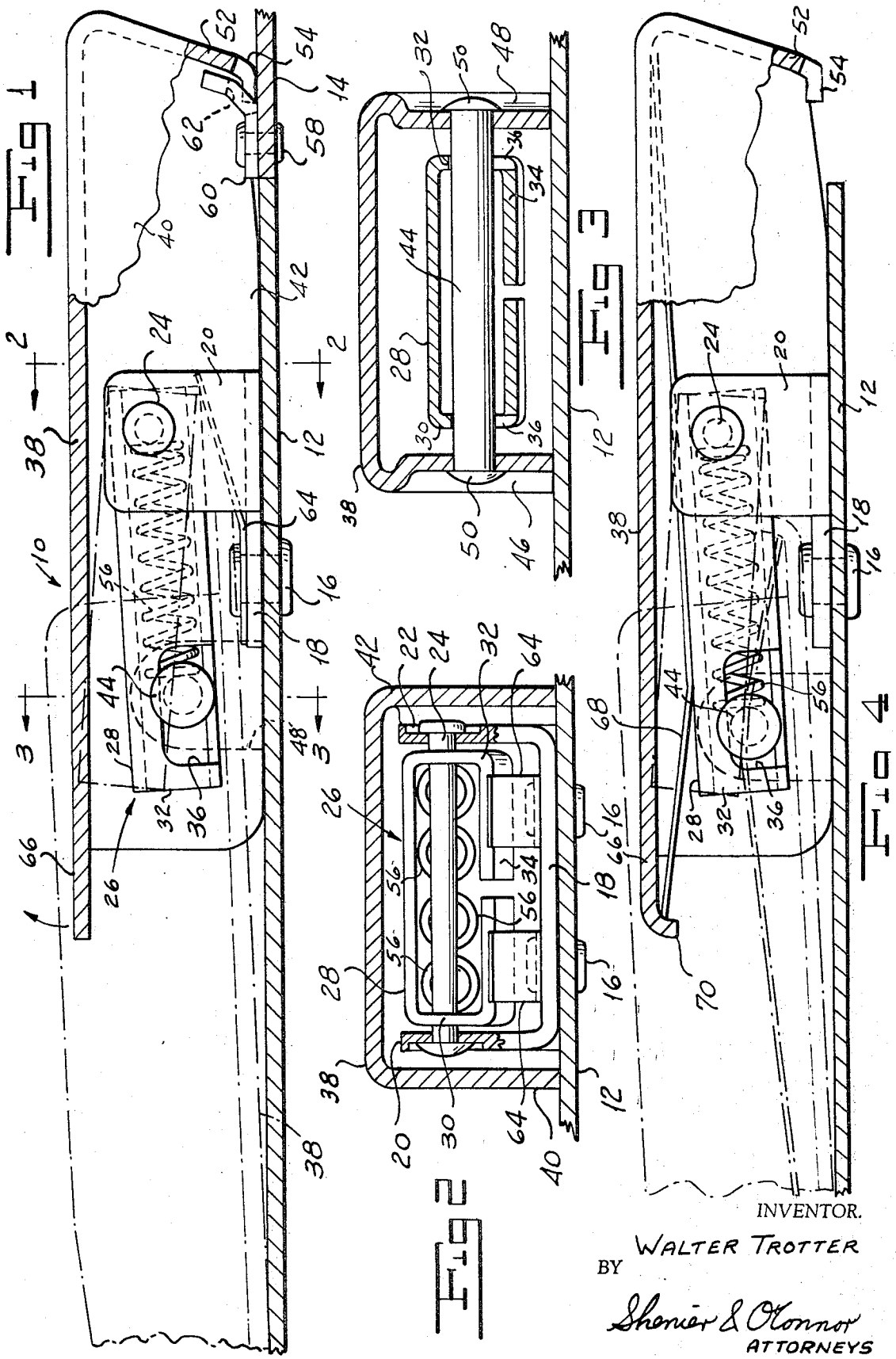
Sept. 1, 1970 W. TROTTER 3,526,422

BOX LATCH

Filed July 26, 1967 2 Sheets-Sheet 1



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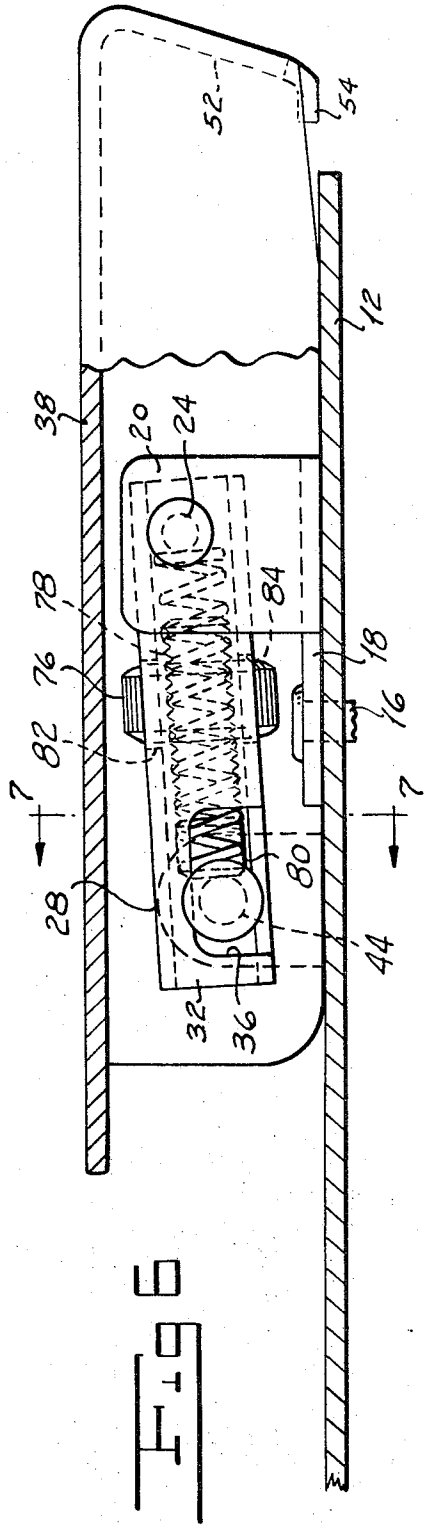


FIG 6

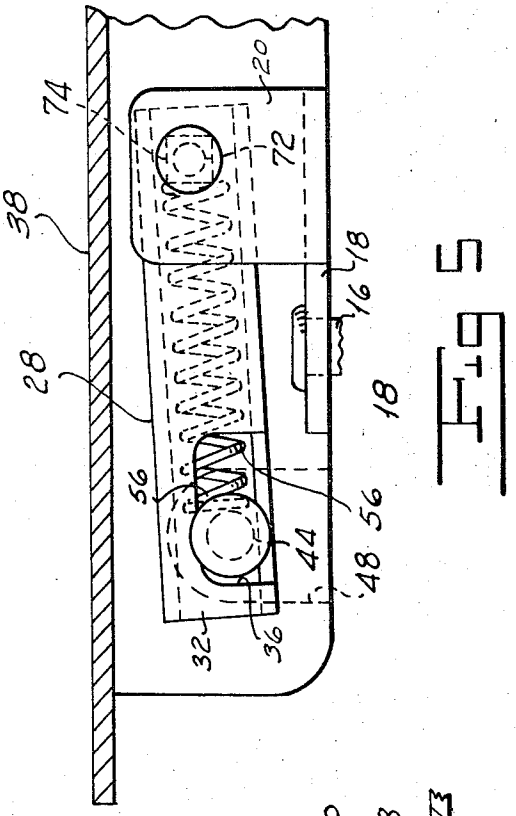


FIG 5

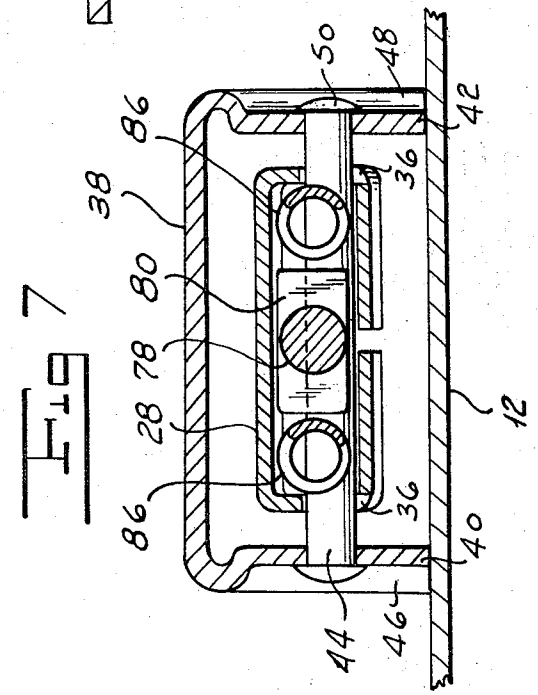


FIG 7

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BOX LATCH

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U.S. Cl. 292—113 1 Claim

ABSTRACT OF THE DISCLOSURE

An improved box latch in which a limited lost motion toggle linkage mounts a handle on one of two members to be joined for movement between a closed position at which it houses the toggle mechanism and an open position. One form of the toggle linkage incorporates resilient means for urging the parts toward one limit of the lost motion. Another form of the toggle linkage incorporates means for adjusting the amount of lost motion provided. The assembly may be provided with auxiliary releasable means for holding the latch in either of its open or closed positions.

BACKGROUND OF THE INVENTION

There are known in the prior art latches for securing a box lid to the box bottom, for example. One type of latch includes a handle on one of the members which pivotally supports a drawbar for movement between a position at which it is out of engagement with a strike on the other of the members and a position at which the drawbar engages the strike. This type of latch may incorporate a beyond dead center or toggle action for holding the parts together.

Latches of the type described above incorporate a number of disadvantages. First, a relatively high degree of care must be exercised in mounting the latch assembly and the strike on the respective members to be joined in order that the latch will operate effectively.

Very often boxes or the like on which the latch assemblies are mounted are to be painted after the assembly has been placed on the box. In constructions of the prior art when this operation is performed, care must be taken to avoid painting the operating parts of the latch assembly.

Another disadvantage of latches of the type described above known in the prior art is that the latch assembly falls open when not engaged with the strike so that if mounted vertically, it may flop across the parting line of the structure to which it is attached and thus interfere with closing of the structure and, possibly, be damaged.

I have invented an improved box latch assembly which overcomes the defects of latches of the prior art such as are adapted to secure a box lid on a box bottom, for example. My latch is so constructed that it is releasably held in the closed position even when the latch element is out of engagement with the strike. My assembly thus facilitates painting of a container or the like after the latch assembly has been mounted thereon. My latch assembly is releasably held in the open position thereof so that it cannot fall or flop out of that position. My latch assembly is easily installed in that minor inaccuracies in installation will not affect its operation.

SUMMARY OF THE INVENTION

One object of my invention is to provide an improved box latch, the operation of which is not seriously affected by inaccuracies in installation.

Another object of my invention is to provide an improved box latch which facilitates painting of the handle without affecting the operating parts.

A further object of my invention is to provide an improved box latch which will not fall or flop from its open position even if vertically mounted.

Another object of my invention is to provide an improved box latch which is relatively inexpensive to construct.

Other and further objects of my invention will appear from the following description.

In general my invention contemplates the provision of an improved box latch in which a limited lost motion toggle linkage connects a latch handle to a bracket on one of the members to be joined for movement between a closed position in which the handle houses the linkage and in which the handle is adapted to engage a strike on the other member and an open position of the handle. I so construct my latch that the handle is releasably held in its open position and is releasably held in its closed position though out of engagement with the strike. I may provide my latch with resilient means for urging the lost motion linkage to one limit of its movement and I may provide my latch with means for adjusting the extent of the lost motion.

BRIEF DESCRIPTION OF THE DRAWINGS

In the accompanying drawings which form part of the instant specification and which are to be read in conjunction therewith and in which like reference numerals are used to indicate like parts in the various views:

FIG. 1 is a side elevation of one form of my improved box latch with a part broken away.

FIG. 2 is a sectional view of the form of my improved box latch shown in FIG. 1, taken along the line 2—2 of FIG. 1.

FIG. 3 is a sectional view of the form of my improved box latch shown in FIG. 1, taken along the line 3—3 of FIG. 1.

FIG. 4 is a side elevation of a further form of my improved box latch with a part broken away.

FIG. 5 is a fragmentary side elevation of another form of my improved box latch with a part broken away.

FIG. 6 is a fragmentary side elevation of yet another form of my improved box latch with a part broken away.

FIG. 7 is a sectional view of the form of my improved box latch shown in FIG. 6 taken along the line 7—7 thereof.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to FIGS. 1 to 3 of the drawings, my improved box latch indicated generally by the reference character **10** is adapted to join a first member **12** which may, for example, be a box bottom and a second member **14** which may be a box lid. I employ any suitable means such, for example, as rivets **16** or the like to secure a mounting bracket **18** having sides **20** and **22** to the member **12**. A pivot pin **24** supported in the sides **20** and **22** pivotally supports a spring cartridge indicated generally by the reference character **26**. The cartridge **26** includes a casing **28** readily formed from sheet metal so as to have sides **30** and **32**, through which the pin **24** extends, and a bottom **34**. I form slots **36** in each of the sides **30** and **32** adjacent the end of the cartridge casing **28** remote the pivot pin **24**.

The assembly **10** includes a handle **38** having sides **40** and **42** which receive a handle pivot pin **44**. The handle **38**, like the cartridge casing and the supporting bracket, may readily be formed from any suitable sheet metal such, for example, as sheet steel. I form the handle with side recesses **46** and **48** for receiving heads **50** on the ends of the handle pivot pin **44**. Handle **38** has a forward end

wall 52 carrying a latch element 54 adapted to engage a strike to be described hereinafter. The handle pivot 44 extends through the openings 36 in the cartridge sides 30 and 32. A plurality of coil springs 56 extending along the length of the cartridge case bear between the pivot pin 24 and the pivot pin 44 normally to urge handle 38 to the left as viewed in FIG. 1.

Any suitable means such, for example, as rivets 58 secure a strike 60 to the other member 14 of the two members to be joined. I provide the strike 60 with a recess 62 for receiving the latch nose 54 of the handle 38.

One or more leaf springs 64 carried by the rivets 16 engage the underside of the cartridge 26. From the structure thus far described, it will be seen that in the positions of the parts illustrated in FIG. 1, springs 56 normally urge pivot pin 44 and the handle 38 to the left to draw the front end wall 52 of the handle into engagement with the strike 60. Moreover, in the position of the parts shown, pin 44 is in a beyond dead center position with respect to pin 24. To move the handle latch 38 out of engagement with the strike 60, an extension 66 on the handle is grasped and the handle is moved in the direction of the arrow in FIG. 1. When that occurs, the handle pivots about a point to the right of pin 24 as viewed in FIG. 1 to move pin 44 upwardly. As the pin moves upwardly, it moves slightly to the right along the slots 36 against the action of the springs 56. Ultimately, the pin 44 moves upwardly past a dead center position with respect to pin 24 and wall 52 can be moved out of engagement with the strike 60 to permit handle 38 to be moved in a counterclockwise direction around its pivot 44 to the dot-dash line position shown in FIG. 1. In that position of the parts, springs 64 engage the lower righthand corner of the cartridge casing 28 to hold the handle latch 38 in its fully open position.

If now with part 14 remote part 12 the handle latch 38 is moved from its open position back to a position close to that illustrated in full lines in FIG. 1, and with the handle 38 housing the operating parts, the handle will releasably be held in that position by the action of the springs 64 on the cartridge casing 28. It will further be appreciated that in this relative position of the parts, handle latch 38 completely houses the operating mechanism so that paint or another suitable finish can be applied to the member 12 and to the handle or to the outer surface of the handle without contaminating the operating parts. It will be appreciated that the pin 24 and the pin 44 riding in the slots 36 forms a lost motion toggle linkage between the handle latch 38 and the bracket 18. I so construct the slots 36 as to provide a positive metal-to-metal stop when pin 44 moves far enough to the right to engage the righthand edges of openings 36 before the springs 56 are excessively compressed.

Referring now to FIG. 4, I have shown an alternate form of my improved box latch in which an elongated leaf spring 68 replaces the leaf springs 64. In that form of my latch I provide a retaining flange 70 on the end of extension 66 so that the spring 68, which extends from the flange 70 to the end wall 52 of the handle latch 38, is retained within the latch. Spring 68 is so shaped that a portion thereof bears on the top of the cartridge casing 28 to hold the casing in the position it occupies in both the closed and the open positions of the handle latch 38. Thus, it achieves the same functions as those which are performed by the springs 64 in the form of the invention shown in FIG. 1.

Referring now to FIG. 5, in a still further form of my improved box latch, I provide the cartridge casing with a pin 72 having a square shank 74 against which the springs 56 bear. In this form of the device, the sides of the square shank tend to hold the handle latch 38 in the positions to which it has been moved in a manner similar to that in which the springs 68 or 64 function. It will be appreciated that pin 72 is fixed in the sides 20 and 22 of bracket 18 and that the casing 28 rotates on the pin 72.

Referring now to FIGS. 6 and 7, I have shown yet another form of my invention in which I provide means for effectively adjusting the lengths of the slots 36, thus to limit the lost motion provided. In this form of my invention a knurled nut 76 is carried by the shank 78 of a T-bolt having a T-head 80 adjacent the handle pin 44. Nut 76 extends through openings 82 and 84 in the top and in the bottom of the casing 28 so as to be accessible to permit it to be turned manually to position the T-head 80 at the desired location along the length of the casing 28. When this form of my latch is moved to its closed or latching position, the pin 44 engages head 80. I provide this form of my latch with two springs 86 within the cartridge casing 28 at the sides of the T-bolt. The latching action in this form of my latch is provided by the engagement of the head 80 with the pin 44 rather than by the resilient forces exerted by the springs. The springs eliminate any sloppiness from the action of this form of my latch.

In operation of the forms of my latch shown in FIGS. 1 to 5, to join the two members 12 and 14 with the handle latch 38 in the open position, it is rotated around its pivot 44 to a position at which the wall 52 is over the strike 60. The handle latch 38 is then moved in a counterclockwise direction, as viewed in the figures, until pin 44 is moved beyond dead center with respect to the pin 24. In that position of the parts, the springs 56 provide a force which draws wall 52 into engagement with strike 60 to cause the nose 52 to enter slot 62. When the latch is to be released, handle latch 38 is first rotated in a clockwise direction until it has moved sufficiently far beyond dead center in that direction of movement to permit wall 52 to be moved away from the strike 60 so that it can be moved to fully open position.

Each of the forms of my latch shown in FIGS. 1 to 5 has means for releasably holding it in its open position to prevent it from flopping back toward closed position and over the parting line between members 12 and 14 if it is, for example, vertically mounted. In FIG. 1 springs 64 engage the lower righthand corner of the cartridge 28 to achieve this purpose. The same function is performed by the spring 68 in the form of my latch shown in FIG. 4 and by the square shank 74 in the form of my latch shown in FIG. 5. Moreover, each of these elements also serves the purpose of holding the handle latch 38 in its closed position over all of the operating parts, although it is out of engagement with the strike 60.

In operation of the form of my latch shown in FIGS. 6 and 7, nut 76 is turned to position the head 80 to provide the desired latching force. As the wall 52 is brought into engagement with the strike 60, engagement of the pin 44 with the head 80 provides the latching action. I may, of course, if desired, provide the form of my latch shown in FIGS. 6 and 7 with any of the various means shown in FIGS. 1 to 5 for releasably holding the latch in its open position and in its closed position.

It will be seen that I have accomplished the objects of my invention. I have provided an improved box latch, the operation of which is not affected by minor inaccuracies in mounting. My box latch can readily be painted or otherwise finished in its installed condition without contaminating the operating parts thereof. I so construct my latch that it will not readily flop or fall over the parting line even when vertically mounted. My improved box latch is relatively inexpensive to construct. It is especially adapted for use in installations wherein the available space is limited. Its handle is flat when the latch is fully open.

It will be understood that certain features and subcombinations are of utility and may be employed without reference to other features and subcombinations. This is contemplated by and is within the scope of my claim. It is further obvious that various changes may be made in details within the scope of my claim without departing from the spirit of my invention. It is, therefore, to be

understood that my invention is not to be limited to the specific details shown and described.

Having thus described my invention, what I claim is:

1. A latch assembly including in combination a unitary latch and handle member comprising sides and a top made up of a web of material extending between said sides substantially from end to end thereof, said sides extending downwardly from said web, said member having a latch portion at one end of said top and having a manually engageable handle portion at the other end of said top, a bracket, a link, respective pivot pins carried by said link, one of said pins pivotally supporting said link on said bracket, the other of said pins pivotally connecting said handle to said link, said link being provided with a longitudinally extending slot for receiving one of said pins for limited movement along the length of the link, a compression spring located between said pins to urge the pin in said slot to one limit of its movement with respect to said link said handle being movable from an open position at which said bracket and said link are exposed to a closed position at which said latch and handle member sides and top house said link and said bracket to conceal the same, and an auxiliary spring biased between said link and said bracket for releasably restraining said member against movement from its open position and against movement from its closed position.

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