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 [21] Appl. No. **839,329**
 [22] Filed **July 7, 1969**
 [45] Patented **Aug. 31, 1971**

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[54] **CATCH WITH ANTIRELEASE LATCH**
 24 Claims, 10 Drawing Figs.

[52] U.S. Cl. 292/113,
 292/108, 292/247, 292/DIG. 49
 [51] Int. Cl. E05c 5/00,
 E05c 19/14
 [50] Field of Search..... 292/113,
 114, 106, 108, 6, 247, 5, 150, 153, 207, 210, DIG.
 31, DIG. 66

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ABSTRACT: A catch for releasably securing together two separable parts and having a connecting member, an operating member for moving the connecting member into and out of engagement with an associated strike, and a latch element carried by and extending through the operating member and latchingly engageable with another part of the catch. The latch element releasably retains the catch in a closed or active condition and is longitudinally and pivotally movable relative to the operating member to permit the catch to be moved to an open or inactive condition out of engagement with the strike.

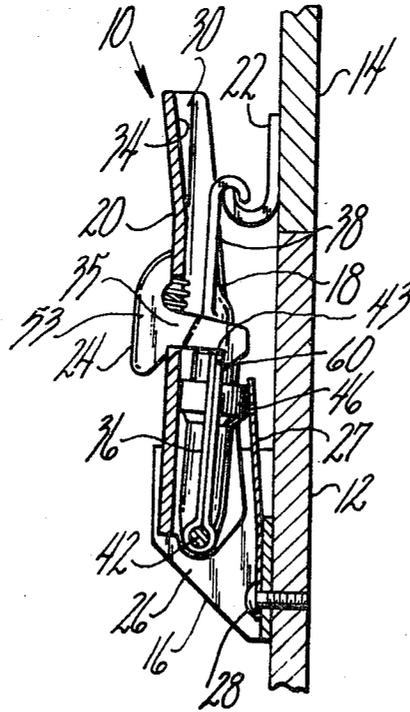


FIG. 1

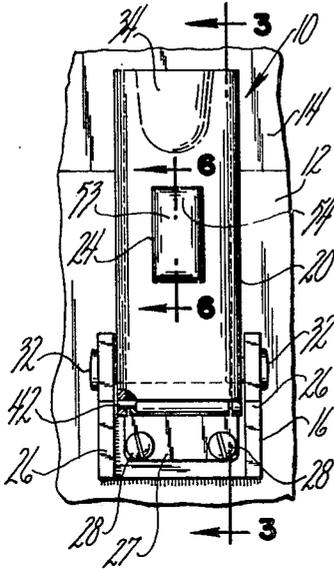


FIG. 2

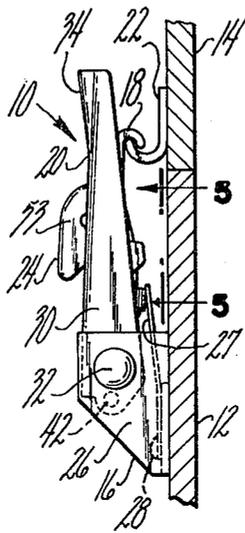


FIG. 3

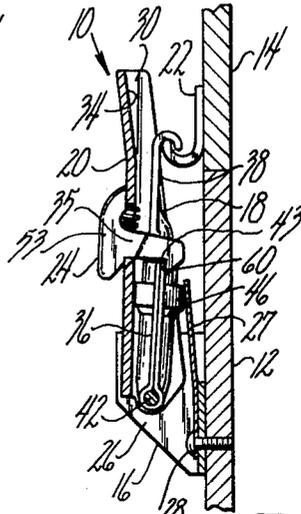


FIG. 4

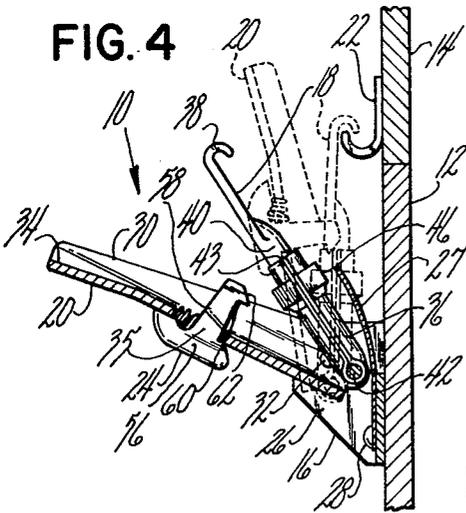


FIG. 5

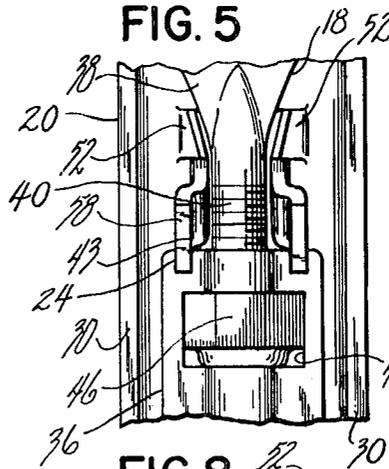


FIG. 9

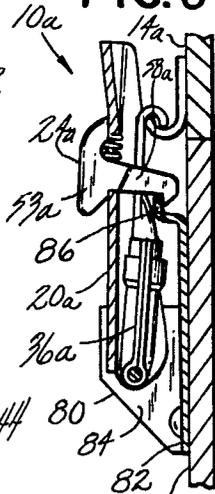


FIG. 8



FIG. 7

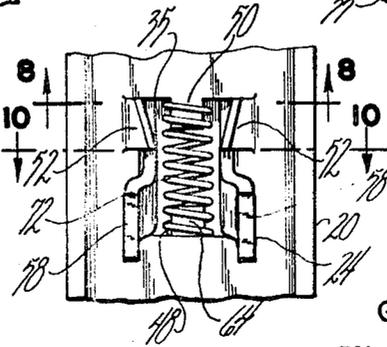


FIG. 6

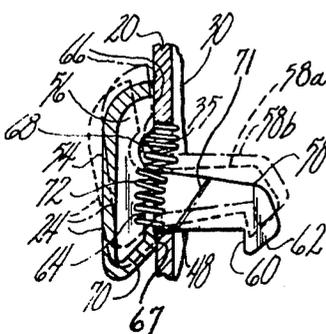
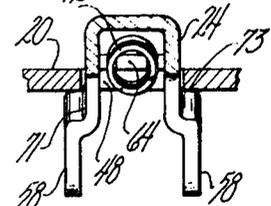


FIG. 10



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CATCH WITH ANTIRELEASE LATCH

BACKGROUND OF THE INVENTION

This invention relates in general to a catch operative to secure together two separable parts for quick release, such as the body and cover of a packing case or box, and deals more particularly with an improved catch of toggle-action type which includes a manually releasable latch for retaining the catch in a closed or operative condition.

SUMMARY OF THE INVENTION

In accordance with the present invention, an improved catch of the aforescribed general type is provided which comprises a plurality of connected members including a base member, a connecting member and an operating member for moving the connecting member into and out of engagement with a strike. A latch element carried by one of the members and extending therethrough is engageable with another of the members to releasably retain the catch in its operative or strike-engaging condition. The latch element is longitudinally and pivotally movable relative to the one member to release the other member so that the catch may be moved to its open or inactive condition out of engagement with the strike.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a front elevational view of a catch embodying the invention, the catch being shown in a closed condition.

FIG. 2 is a side elevational view of the catch of FIG. 1.

FIG. 3 is a sectional view taken along the line 3—3 of FIG. 1.

FIG. 4 is generally similar to FIG. 3 but shows the catch in an open condition and in a partially closed condition indicated by broken lines.

FIG. 5 is a somewhat enlarged fragmentary rear elevational view taken along the line 5—5 of FIG. 2.

FIG. 6 is a somewhat enlarged fragmentary sectional view taken along the line 6—6 of FIG. 1.

FIG. 7 is a fragmentary rear elevational view of the operating lever and latch member.

FIG. 8 is a fragmentary sectional view taken along the line 8—8 of FIG. 7.

FIG. 9 is generally similar to FIG. 3 but shows another catch embodying the invention.

FIG. 10 is a fragmentary sectional view taken along the line 10—10 of FIG. 7.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The present invention may be practiced with any type of catch which includes an operating member movable relative to another part of the catch and between open and closed positions for releasably holding two parts together in connected relation. In the drawing, the invention is shown embodied in a toggle catch designated generally by the reference numeral 10 and adapted to releasably secure together two separable panels 12 and 14 for quick release. The panels may, for example, comprise parts of the body and cover respectively of a packing case or the like. The catch 10 includes a base 16, a connecting member or drawbar 18, and an operating member or lever 20 pivotally connected to the drawbar and the base for moving the drawbar into and out of engagement with a strike 22 mounted on the panel 14 in alignment with catch 10. A latch element or member 24 carried by the operating lever 20 includes at least one latch hook for engaging a part of the drawbar 18 to releasably retain the catch 10 in its closed or active condition as it appears in FIGS. 1-3.

The base 16 is adapted to rest flatly against the surface of the panel 12 and includes two transversely spaced and forwardly extending flanges 26, 26. A flat cantilever spring 27 is preferably received between the flanges 26, 26 and secured at its lower end by fasteners 28, 28 which also secure the base 16

to the panel 12. The upper or free end portion of the spring 27 is arranged to exert a biasing force on the drawbar 18. The operating lever 20 is received between the flanges 26, 26 and includes two transversely spaced and longitudinally extending side flanges 30, 30. Pivotal connection between the lever 20 and the base 16 is provided by a pair of coaxially aligned pivot pins or trunnions 32, 32. Each pivot pin 32 passes transversely through an opening in an associated base flange 26 and is riveted or otherwise suitably secured at its inner end to an associated lever flange 30. The upper or free end portion of the lever 20 is provided with an arcuately contoured finger grip 34. An opening 35 through the central portion of the lever 20 receives the latch member 24 and will be further described with reference to the latter member.

The invention may be practiced with drawbars of various kinds, however, the drawbar 18 is an adjustable type and has an inner part 36, an outer part or strike engageable claw 38 and an intermediate part or shank 40 which connects the inner and outer parts, as best shown in FIG. 5. In the illustrated case, the shank 40 forms an integral portion of the outer part 38 and is formed from sheet metal. The inner part 36 may also be made from sheet metal, as shown, and has a transversely extending opening at its lower end for receiving a pivot pin 42. Each end of the pin 42 is received in an associated one of the lever flanges 30, 30. The lower part 36 also defines a longitudinally extending centrally arranged opening for loosely receiving the shank 40 and has a transversely extending upper edge 43 which cooperates with the latch 24 in a manner hereinafter described. Another opening 44 through the part 36 communicates with the longitudinally extending opening and receives a nut 46 therein which threadably engages the shank 40 as shown in FIG. 5. When the nut 46 is secured against rotation the claw 38 can easily be rotated by hand to change the length of the drawbar.

Considering now the latch member in further detail, the manner in which it is assembled with the operating lever and referring particularly to FIGS. 5-7, the latch member 24 is assembled with the operating lever 20 through the opening 35. The lower portion of the latter opening is generally rectangular and has a transversely extending lower edge 48 which provides a fulcrum for the latch member 24. The upper portion of the opening is defined by a centrally depending tab 50 and a pair of tabs 52, 52 bent rearwardly at opposite sides of the opening. The latch member 24 is preferably formed from sheet metal and includes an operating button 53 positioned adjacent the forward face of the operating lever 20 and defined by a central portion 54 and an integral pair of transversely spaced longitudinally extending side flanges 56, 56. A latch hook 58 projects rearwardly from each flange 56 and through the opening 35. Each latch hook has a forwardly facing abutment surface 60 near its free end and a cam surface 62 inclined rearwardly and upwardly from the abutment surface 60 as the latch member 24 appears oriented in FIG. 6. The lower part of the central portion 54 is bent rearwardly and upwardly between the flanges 56, 56 and includes an elongated generally upwardly extending tab 64 which is somewhat longer than the tab 50. Rearwardly facing bearing surfaces 66 and 67 at the upper and lower ends of each flange 56 respectively engage the forward face of the lever 20 above and below the opening 35 when the latch member 24 is in its latching position, as it appears in full lines in FIG. 6. An arcuate recess or relief space 68 is formed in each flange 56 below each bearing surface. At its lower end, each flange 56 has a rearwardly and upwardly inclined cam surface 70 generally aligned with the inclined part of the central portion 54 for camming engagement with the lower edge 48. It will be noted that the latch hooks 58, 58 are transversely spread apart rearwardly of the opening 35 to receive the shank 40 therebetween as best shown in FIGS. 5, 7 and 10. More specifically each latch hook 58 has a leg portion bent transversely outwardly along a line 71 inclined rearwardly and upwardly from the rear surface of the operating lever as best shown in FIG. 6. The free end portion of each latch hook 58 is bent rearwardly along a line

generally parallel to the line 71 so that an angular shoulder 73 is formed across the leg portion of each latch hook as best shown in FIG. 10. Thus, the spread latch hooks 58, 58 coact with the button 53 to aid in retaining the latch member in assembly with the operating lever 20 and to permit pivotal action of the latch member relative to the operating lever as will be hereinafter further discussed.

To assemble the latch member 24 with the lever 20, each tab 52 is bent rearwardly to a position generally indicated by broken lines in FIG. 8. The latch member is inserted through the opening 35 from the rear side of the lever after which the tabs 52, 52 are bent inwardly or toward each other to their respective full line positions as shown in FIG. 8 so that each tab 52 is positioned generally above an associated latch hook 58 to retain the latch member 24 in functional assembly with the lever 20 for movement relative thereto. A helically coiled compression spring 72 made from relative heavy spring wire is positioned between and retained by the tabs 50 and 64. The spring 72 is preloaded to retain the latch member 24 for longitudinal sliding and pivotal movement relative to the operating lever and urges the latch member toward its latching or full line position as it appears in FIG. 6. It will be noted that when the latch member is in the latter position the bearing surfaces 66 and 67 engage the front surface of the lever 20. It should be further noted that the lower end of the spring 72 closely surrounds the relatively long tab 64 which extends upwardly for some distance into the spring coils. It will be noted that the lower end of the spring 72 engages the tab 64 forwardly of the opening 35 whereas the upper end of the spring engages the somewhat shorter tab 50 within the latter opening. Due to the laterally offset arrangement of the tabs 50 and 64 the straight spring 72 becomes arcuately bent or deformed along its axis when positioned in assembly. The compressed condition of the spring 72 causes it to exert a downwardly directed biasing force on the lower end portion of the button 53 as previously discussed. However, the axial deformation of the spring and the manner in which it is arranged with respect to the tabs 50 and 64 also causes it to exert another biasing force on the latch member which tends to urge the latch hooks 58, 58 in a clockwise direction about the fulcrum 48 or toward the latching position, as the latch member appears in FIG. 6.

When the catch 10 is in its closed condition as it appears in FIGS. 1—3, the operating lever 20 extends upwardly from the base 16 and overlies the drawbar 18 and the strike 22. The axis of the pivot pin 42 is so located that when the catch 10 is closed it is located further from the strike 22 than the axis of the trunnions 32, 32 and is also preferably located on the opposite side from the panel 12 of a plane passing through the axis of the trunnions 32, 32 and the point of contact between the drawbar and the strike, as shown. The pivot pin 42 is thus moved from a position on the panel 21 side of a fixed axis defined by the trunnions 32, 32 to a position on the opposite side of the latter axis as the operating lever 20 is moved between its opened and closed positions. This arrangement provides a preferred over-the-center action which, under toggling force retains the operating lever in its closed position.

Referring now particularly to FIG. 4, in closing the latch 10, the lever 20 is pivoted in a clockwise direction from its solid line position while pressure is simultaneously manually applied to the drawbar 18 to pivot it to its broken line position in generally engaging alignment with the strike 22 against the biasing force of the spring 27 and the latch 24. These pivotal movements can be effected with a simple one-hand motion. The latch 24 is positioned with respect to the drawbar lower part 36 so that the latch hooks 58, 58 are biased upwardly when the cam surfaces 62, 62 engage the lower part upper edge 43 on opposite sides of the shank 40 as the lever 20 is pivoted toward its closed position and as shown by the broken line positions of the lever and drawbar in FIG. 4. Coengagement of the cam surfaces 62, 62 and the upper edge 43 causes the latch 24 to pivot generally about the lower edge 48 to a position indicated at 58a in FIG. 6.

When the catch 10 attains its fully closed position, the cam surfaces 62, 62 are disposed rearwardly of the upper edge 43 and the biasing spring 72 urges the latch 24 to its latching or full line position of FIG. 6. In the latter position, the latch hook abutment surfaces 60, 60 bear against the rear surface of the lower member 36 to releasably retain the catch 10 in its closed condition.

To release the latch 24 and open the catch 10, pressure is initially applied to the button 53 in a longitudinally upwardly direction relative to the lever. When the lower bearing surface 67 moves into alignment with the opening 35 the inclined cam surface 70 engages and travels upwardly along the edge 48 while the bearing surfaces 66 slide upwardly in engagement with the face of the lever 20 for some distance so that the latch 24 simultaneously pivots and moves upwardly to its broken line or releasing position indicated at 58b in FIG. 6. The spring 72 which is arcuately bent under force along its axis in the latching position moves toward a straightened condition and is further compressed as the latch 24 moves toward its releasing position, indicated by broken lines at 58b in FIG. 6, thereby exerting a biasing force on the latch which aids in releasing it. When the latch member 24 reaches the position 58b the latch hooks 58, 58 are disposed above the upper edge 43 so that the lever 20 may be pivoted outwardly or away from the strike and toward its open position and disengagement.

The latch 10 may be opened with a simple one-hand motion by applying pressure to the lower end of the latch member 24 while simultaneously applying force to the finger grip 34 to pivot the lever away from the strike 22. This movement of the lever 20 causes the drawbar 18 to move upwardly until the upper part 38 moves out of engagement with the strike. If the catch 10 is provided with a spring 27, as shown, the biasing action of the latter spring will cause the drawbar 18 to pivot about the pin 42 so that it is displaced a substantial angular distance from the strike as shown in FIG. 4.

Considering now FIG. 9, another catch embodying the invention is indicated generally at 10a and shown in a closed condition releasably securing together two separable panels 12a and 14a. Parts of the catch 10a which are similar to parts of the catch 10 bear the same reference numerals as parts previously described but include a letter "a" suffix and will not be hereinafter further described. The catch 10a is similar in most respects to the catch 10, but differs therefrom in the manner in which the latch member releasably retains the catch in its closed condition.

The catch 10a includes a base 80 which has a central part 82 and two transversely spaced and forwardly extending flanges 84, 84. The central part 82 extends upwardly for some distance above the flanges 84, 84 and has an upper end portion bent forwardly and upwardly to form a lip 86 spaced forwardly of the panel 12a. The latch member 24a includes a pair of latch hooks 58a, 58a, which are transversely spaced a sufficient distance to receive an associated portion of the drawbar 38 therebetween when the catch 10a is in its closed position. The latch member 24a is positioned with respect to the operating lever 20a to coact with the lip 86 for releasably retaining the catch 10a in its closed position in the manner previously described.

The invention has been illustrated and described with reference to the manner in which the latch member is used to retain a catch in a closed condition. It will now be evident that the latch member may also be used to retain the operating lever and the drawbar in releasably connected condition for movement in unison relative to the base when the drawbar is out of engagement with the strike. When the latch member is arranged for latching engagement with the base it may also be employed to retain the operating lever and the drawbar in fixed position relative to the base when the drawbar is disengaged from the strike.

I claim:

1. A catch for releasably connecting two separable panels one of which carries a strike, said catch comprising a plurality of connected members including a base member adapted for

attachment to the other of said panels in alignment with said strike, an operating member supported for movement relative to said base member between open and closed positions, and a connecting member supported for movement into and out of engagement with said strike in response to movement of said operating member between its open and closed positions, respectively, one of said members having an opening therethrough intermediate the ends thereof, a latch element carried by said one member and extending through said opening, said latch element having one portion disposed on one side of said one member and another portion projecting beyond the opposite side thereof, and means supporting said latch element on said one member for both longitudinal and pivotal movement relative thereto between latching and releasing positions in response to application of pressure to said one portion, said other portion in said latching position being engageable with another of said members to releasably retain said one member against movement relative to said other member.

2. A catch for releasably connecting two separable panels as set forth in claim 1 wherein said supporting means includes biasing means for urging said latch element toward said latching position.

3. A catch for releasably connecting two separable panels as set forth in claim 2 wherein said supporting means includes a pair of generally opposed spaced-apart tabs extending each toward the other, one of said tabs associated with said one member and the other of said tabs associated with said latch element, and wherein said biasing means comprises a helically coiled compression spring extending between said tabs and having each end thereof closely surrounding an associated one of said tabs.

4. A catch for releasably connecting two separable panels as set forth in claim 3 wherein said one tab is laterally offset from said other tab, at least one of said tabs extends for a substantial distance into said spring, and said spring exerts a biasing force on said latch element in both said longitudinal and said pivotal direction toward said latching position.

5. A catch for releasably connecting two separable panels as set forth in claim 3 wherein said one tab is disposed generally within said opening and said other tab is laterally offset from said one tab.

6. A catch for releasably connecting two separable panels as set forth in claim 2 wherein said biasing means exerts biasing force in both said pivotal and said longitudinal direction.

7. A catch for releasably connecting two separable panels as set forth in claim 1 wherein said supporting means comprises at least one bearing surface on said latch element for engaging one portion of said one member for longitudinal sliding and pivotal movement relative thereto and a cam surface on said latch member spaced from said bearing surface for engaging another portion of said one member.

8. A catch for releasably connecting two separable panels as set forth in claim 7 wherein said other portion of said one member is defined by an edge of said opening.

9. A catch for releasably connecting two separable panels as set forth in claim 1 wherein said one portion comprises an operating button positioned generally adjacent the forward face of said one member and said other portion includes a pair of latch hooks extending from said one portion and projecting rearwardly through said opening, said latch hooks being spread apart rearwardly of said opening a distance greater than the width of said opening and coacting with said one portion to retain said latch element in functional assembly with said one member.

10. A catch for releasably connecting two separable panels as set forth in claim 1 wherein said connecting member comprises a drawbar and said one member is said operating member and comprises an operating lever providing pivotal connection between said drawbar and said base member.

11. A catch for releasably connecting two separable panels as set forth in claim 10 wherein said drawbar comprises a plurality of connected parts including an inner part connected

with said operating lever, a strike engageable outer part and an intermediate part providing connection between said inner and outer parts and said latch element includes a pair of spaced-apart latching hooks arranged to receive said intermediate part therebetween and latchingly engage one of the other said parts on opposite sides of said intermediate part in said latching position.

12. A catch for releasably connecting two separable panels as set forth in claim 1 including means for deflecting said latch element from said latching position when said connecting member is in a strike engageable position and said operating member is moved toward its closed position to permit said operating member to be moved to its closed position.

13. A catch for releasably connecting two separable panels as set forth in claim 12 wherein said latch element includes at least one latch hook for latching engagement with said other member in said latching position and said deflecting means comprises a cam surface on said one latch hook for coengagement with an associated edge of said other member when said connecting member is in said strike engageable position and said operating member is moved toward its closed position.

14. A catch for releasably connecting two separable panels as set forth in claim 1 wherein said opening is partially defined by at least one tab bent from said one member, said tab comprising said supporting means.

15. A catch for releasably connecting two separable panels as set forth in claim 1 wherein said other member is said connecting member.

16. A catch for releasably connecting two separable panels as set forth in claim 24 wherein said other member is said base member.

17. A catch for releasably connecting two separable panels as set forth in claim 1 wherein said one portion is hollow and including a spring for biasing said latch element toward said latching position, at least a part of said spring being disposed within said one portion.

18. In a catch for releasably connecting two separable panels the combination comprising an operating member having an opening therethrough, a latch element carried by said operating member and extending through said opening, said latch element including one portion disposed on one side of said operating member and another portion extending beyond the opposite side of said operating member, said latch element supported for both longitudinal and pivotal movement relative to said operating member, a pair of opposing spaced apart and generally parallel tabs each extending in the general direction of and laterally offset relative to the other, one of said tabs associated with said operating member and the other of said tabs associated with said latch element, and a helically coiled spring extending between said tabs and having each end thereof closely surrounding an associated one of said tabs, at least one of said tabs extending for a substantial distance into said spring to cause said spring to exert a biasing force in a direction transversely of said spring axis.

19. The combination as set forth in claim 18 wherein said spring exerts biasing force in both said longitudinal and said pivotal directions.

20. The combination as set forth in claim 18 wherein said one tab is disposed within said opening.

21. The combination as set forth in claim 18 wherein said one portion comprises a hollow button and at least a portion of said spring is disposed within said button.

22. In a catch for releasably connecting two separable panels the combination comprising an operating member, a latch member carried by said operating member for movement relative thereto between latching and releasing positions and including a hollow operating button portion protruding beyond one face of said operating member, said latch member and said operating member including a pair of opposing spaced-apart tabs one of which is carried by said operating member and the other of which is carried by said latch member, and a compression spring located at least partially within said hollow operating button portion of said latch

member for biasing said latch member relative to said operating member toward said latching position, said spring extending between said tabs and having each end thereof retained by an associated one of said tabs.

23. A catch for releasably connecting two separable panels as set forth in claim 1 wherein said one member is said operating member.

24. A catch for releasably connecting two separable panels one of which carries a strike, said catch comprising a plurality of connected members including a base member adapted for attachment to the other of said panels in alignment with said strike, an operating member supported for movement relative to said base member between open and closed positions, and a connecting member supported for movement into and out of engagement with said strike in response to movement of said operating members between its open and closed positions, a

latch element supported on one of said members for movement relative thereto between latching and releasing positions, said latch element including a hollow operating button portion protruding beyond one side of said one member and another portion adapted for latching engagement with another of said members to releasably retain said one member against movement relative to said other member, said latch element and said one member including a pair of opposing spaced-apart tabs, one of which is carried by said one member and the other of which is carried by said latch element, and a compression spring located at least partially within said hollow operating button portion of said latch element for biasing said latch element relative to said one member toward said latching position, said spring extending between said tabs and having each end thereof retained by an associated one of said tabs.

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