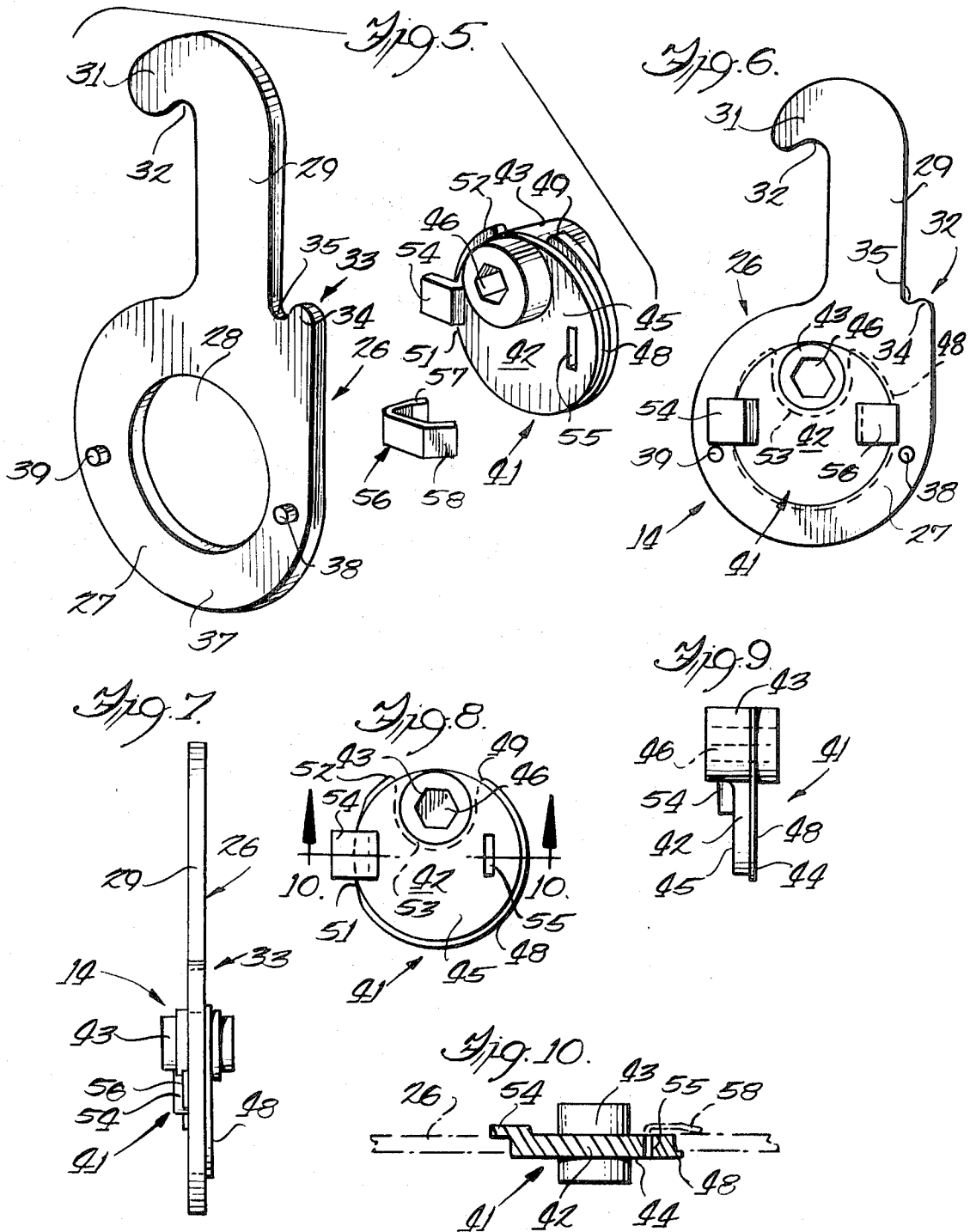
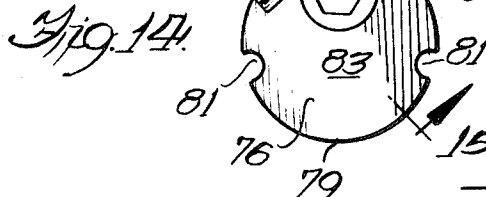
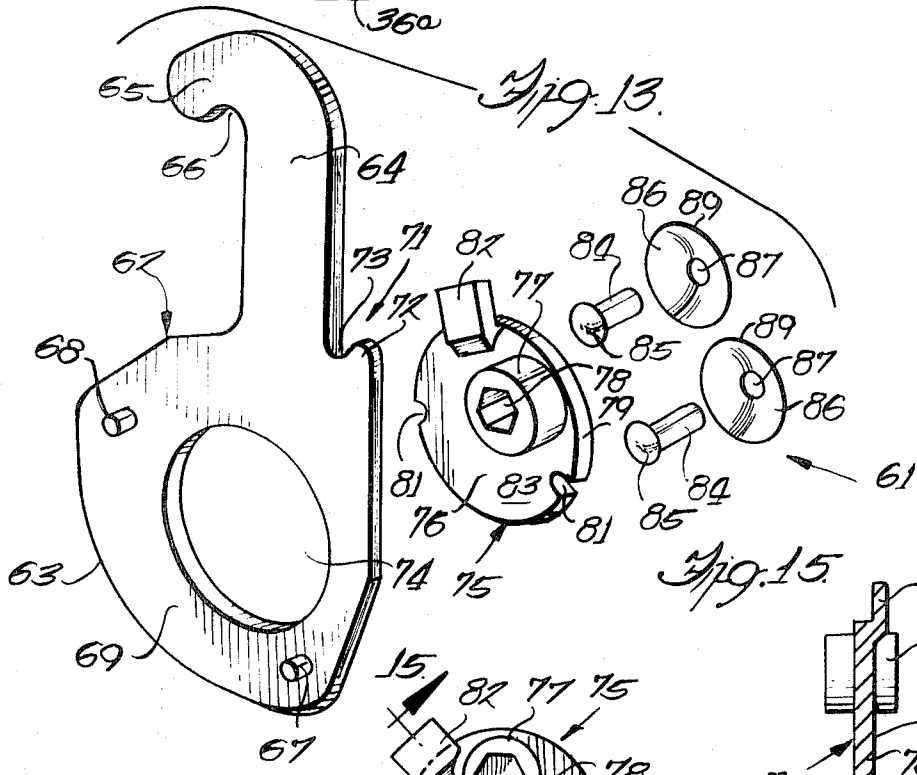
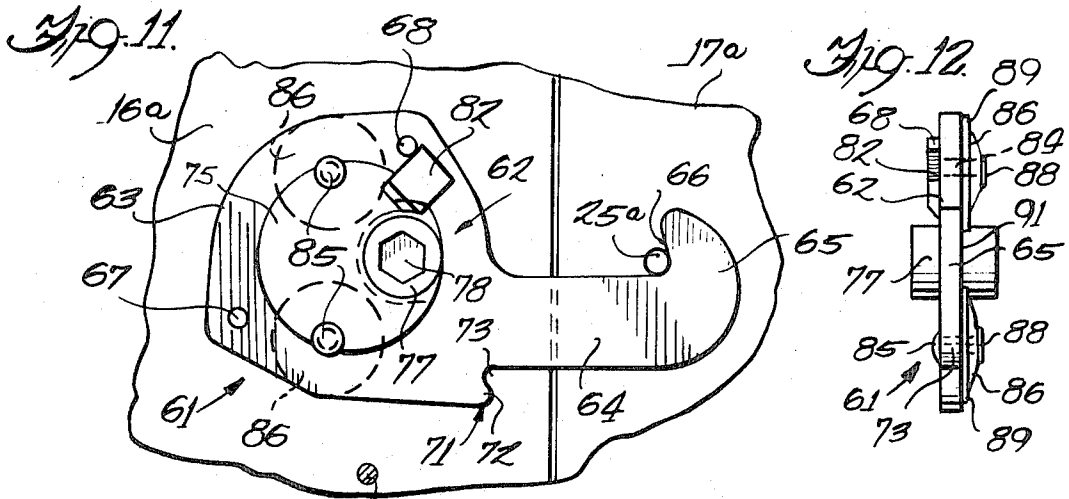


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### PANEL LATCHING MECHANISM

The present invention relates to a panel latching mechanism and more particularly to a sectional cooler latch for joining the separate panels used to form the cooler or other enclosure.

Among the objects of the present invention is the provision of a panel latch mechanism to be inserted in the abutting edges of two adjacent panels to join these panels and actuated from either the interior or the exterior surface. This latch mechanism includes a pair of latch housings adapted to be mounted within the edges of the panels with open sides facing each other at the panel edge surfaces. One housing contains a transverse latching pin, rivet or strike and the opposite housing contains a latch bolt mechanism.

Another object of the present invention is the provision of a novel panel latch mechanism for latching a pair of adjacent panels in abutting relation where the latch bolt mechanism includes a rotatable and reciprocable latch bolt adapted to cooperate with the latch pin or strike in the adjacent panel. The latching mechanism is simplified both in structure and in operation over previous latching mechanisms for similar applications, and provides a positive latching cooperation with the latching pin, and a positive holding position for the latch bolt when retracted into its housing.

A further object of the present invention is the provision of a novel panel latching mechanism having a rotatable and reciprocable bolt with a generally circular body portion having a central circular opening and an offset outwardly extending arm terminating in a hook end, and a circular cam having a partial peripheral flange on one flat surface and a tab or projection extending radially outwardly from the opposite flat surface. A generally flat spring extends from the cam opposite the tab to retain the cam in the opening in the bolt body, and the cam is provided with an offset transverse shank or hub extending from both surfaces of the cam and received in aligned bearings in the latch housing.

The present invention also comprehends the provision of a novel panel latch mechanism having a latch bolt with a central opening receiving a circular cam and an offset hook arm, and a secondary projection adjacent the hook arm forming a shallow hook which cooperates with a retaining pin in the latch housing to retain the bolt in the housing in retracted position. The latch bolt includes limiting pins thereon cooperating with a tab on the cam to limit rotary movement of the cam relative to the latch bolt.

The present invention further comprehends the provision of a novel panel latch mechanism having a latch bolt with a hook arm and a central opening, and a cam member received in the opening and having an offset actuating hub. The cam has a radial tab or projection cooperating with a pair of limiting pins on the latch bolt, and a pair of rivets extend through peripheral notches in the cam with the rivet heads overlapping the latch bolt on one side and spring washers secured to the free ends of the rivets and overlapping the bolt on the opposite side.

Further objects are to provide a construction of maximum simplicity, efficiency, economy and ease of assembly and operation, and such further objects, advantages and capabilities as will later more fully appear and are inherently possessed thereby.

In the drawings:

FIG. 1 is a partial front elevational view of a pair of adjacent panels, partly broken away, having the panel latch mechanism mounted therein with the latch bolt retracted.

FIG. 2 is a generally vertical cross sectional view taken on the irregular line 2—2 of FIG. 1.

FIG. 3 is a front elevational view of the latching mechanism with the housings broken away and the latch bolt in an intermediate position of actuation.

FIG. 4 is a view similar to FIG. 3 but showing the latch bolt in latched position.

FIG. 5 is an exploded perspective view of the latching mechanism.

FIG. 6 is a front elevational view of the assembled latch mechanism without the housing.

FIG. 7 is an edge elevational view of the latch mechanism taken from the right hand side of FIG. 6.

FIG. 8 is a front elevational view of the rotary cam.

FIG. 9 is an edge elevational view of the cam of FIG. 8.

FIG. 10 is a horizontal cross sectional view of the cam on the line 10—10 of FIG. 8.

FIG. 11 is a front elevational view of an alternate embodiment of panel latch mechanism with the housings partially broken away and the bolt in latched position.

FIG. 12 is an edge elevational view of the latch mechanism taken from the right hand side of FIG. 11.

FIG. 13 is an exploded perspective view of the latch mechanism of FIG. 11.

FIG. 14 is a front elevational view of the cam of this alternate construction.

FIG. 15 is a cross sectional view of the cam taken on the line 15—15 of FIG. 14.

Referring more particularly to the disclosure in the drawings wherein are disclosed two illustrative embodiments of the present invention, FIG. 1 discloses a pair of adjacent panels 10 and 11 adapted for abutting engagement at their edges 12 and 13 and clamped and held together by a latch mechanism 14 compressing a suitable sealing strip 15 between the panels. The latch mechanism 14 is housed within a latch housing 16 and a strike housing 17 suitably embedded or secured within the panels 10 and 11, respectively.

Each housing is formed from a pair of mirror image sheet metal members which are suitably riveted or welded together to form a hollow housing encompassed on three sides by a peripheral flange 18. The latch housing members 19, 19 are each formed with an inwardly extruded or bent annular flange forming a bearing 21 and an opening 22 spaced from the bearing. Both the bearings 21, 21 and the openings 22, 22 are aligned in the two members 19, 19. The strike housing members 23 each have an opening 24 with the openings aligned to receive a latch rivet, pin, or strike 25 generally horizontally aligned with the bearings 21 of the latch housing 16.

The latch mechanism 14 includes a rotatable and reciprocable hook bolt 26 and a rotatable cam 41. The hook bolt 26 includes a generally circular bolt body 27 having a central circular opening 28 therethrough, and an offset hook arm 29 extending from the body to terminate in a curved hook 31 having an undercut portion 32 adapted to cooperate with the strike or pin 25. Formed on the bolt body adjacent the arm 29 and on the opposite edge to the curve of the hook 31 is an outwardly opening hook 33 defined by a projection 34 and a curved surface 35; the hook 33 being adapted to cooperate with a retaining pin 36 extending across the housing 16. Also formed on one surface or face 37 of the bolt body 27 are a pair of spaced pins or projections 38 and 39 for a purpose to be later described.

The rotatable cam 41 has a circular body 42 conformably received within the opening 28 in the bolt 26 with a shaft or hub 43 extending from each face 44 and 45 of and offset from the center of the cam 41. The hub has a polygonal opening or passage 46 extending therethrough to conformably receive the polygonal end (FIG. 2) of a suitable tool 47 to rotate the cam. As seen in FIGS. 5 through 10, a peripheral flange 48 is formed on the edge of and as an extension of the face 44 of the cam 41 and extends from a point 49 adjacent the hub 43 around the cam, and merges into the cam at 51 and then reemerges to terminate at 52 adjacent the other side of the hub. The edge of the flange 48 is continuous in a generally U-shape at 53 between the points 49 and 52 around the hub 43, as shown in dotted outline in FIGS. 6 and 8.

On the opposite face 45 of the cam 41, an outwardly projecting tab or ear 54 is formed integral with the cam and extending outwardly beyond the periphery of the cam at the point 51 where the flange 48 merges into the edge of the cam. As seen in FIG. 10 the tab 54 is above the surface 45 of the cam. Generally opposite the tab 54 is located a slot 55 extending through the cam to receive the hooked end 57 of a generally J-shaped flat leaf spring 56. At the opposite end, the

spring is provided with an inwardly bent end portion 58 for a purpose to be later described.

To assemble the latch mechanism as seen in FIG. 5, the cam 41 is inserted into the opening 28 with the tab 54 entering the opening ahead of the cam body 42 so that the tab engages the surface 37 of the bolt body 27 and then the flange 48 engages the opposite surface of the bolt body 27 in sliding contact therewith. The end 57 of the spring 56 is inserted through the slot 55 in the cam 41 from the surface 45 with the end 57 bent against the surface 44 and the inwardly bent portion 58 extending beyond the cam to slidably and yieldably engage the bolt body surface 37. The hub 43 is positioned in the bearings 21,21 of the housing members 19,19 and the members 19,19 are riveted or otherwise suitably secured together.

With the latch housing 16 suitably secured in the edge of the panel 10 and the strike housing 17 suitably secured in the panel 11, the latch mechanism 14 is ready for operation. With the latch mechanism in the position shown in FIG. 1, the hook 33 engages the retaining pin 36 and the tab 54 on the cam 41 abuts the projection 38 on the bolt body 27. The tool 47 is adapted to be inserted through an aligned opening 59 in the panel 10 into the polygonal opening 46 in the hub 43 of the cam 41 to rotate the cam.

Rotation of the tool 47 in a counterclockwise direction as seen in FIGS. 1, 3 and 4 causes initial rotation of the cam 41 relative to the hook bolt 26; the bolt not rotating because of the engagement of the hook 33 with the pin 36. This initial cam rotation about the off-center hub 43 causes substantially upward camming movement of the bolt 26 as the tab 54 moves away from the projection 38. Rotation of the cam continues until the hook 33 is released from the pin 36 to allow the cam and bolt 26 to rotate simultaneously (see arrow A in FIG. 3) due to the frictional engagement between the flange 48, the tab 54 and the spring 56 of the cam 41 with the bolt body 27.

In view of the frictional interengagement, the bolt 26 and the cam 41 rotate simultaneously, as shown in FIG. 3, until the hook arm 29 engages the latch pin or strike 25 to stop rotation of the bolt. The cam 41 continues to rotate relative to the bolt 26 to cam and draw the bolt to the left as seen in FIG. 4 until the undercut portion 32 of the curved hook 31 engages the latch pin 25 to draw the panels 10 and 11 together and compress the gasket 15. At the termination of movement of the bolt 26, the tab 54 abuts the projection 39. Thus, the panels 10 and 11 are securely latched together and additional panels can be added in the same manner to form a wall of desired dimensions. Although only one latch mechanism 14 is shown, additional latching units can be utilized along the edge of the wall panels depending on their height.

To unlatch the panels, the procedure is reversed. Rotation of the tool 47 clockwise initially rotates the cam 41 relative to the bolt 26, due to the engagement of the hook 31 with the pin 25, until the bolt is cammed to the right a sufficient distance to release the hook; the tab 54 moving away from the projection 39. When the hook 31 is released from the pin or strike 25, the cam and the bolt 26 rotate simultaneous in a clockwise direction until the hook arm 29 abuts the retaining pin 36. Then the cam 41 again rotates relative to the bolt 26 to cam the bolt body 28 downward so that the hook 33 engages the pin 36 and the tab 54 abuts the projection 38. It should be noted that the end 58 of the leaf spring 56 does not extend outwardly a sufficient distance to engage or interfere with the projections 38 and 39 on the bolt body 27.

FIGS. 11 through 15 disclose an alternate embodiment of latching mechanism 61 where parts identical to those of the latch mechanism 14 are identified by the same reference numeral with a superscript *a*. This latching mechanism 61 can be substituted for the mechanism 14 in a latch housing 16<sup>a</sup> and cooperates with a strike or latch pin 25<sup>a</sup> in a strike housing 17<sup>a</sup>. The mechanism includes a hook bolt 62 having an irregularly shaped bolt body 63 and an offset outwardly extending hook arm 64 terminating in a curved hook 65 with an undercut recess 66 adapted to cooperate with the latch pin or strike 25<sup>a</sup>.

The bolt body 63 has a pair of spaced projections 67 and 68 on one surface 69 thereof, and a retaining hook 71 is formed on the periphery of the bolt body to engage a retaining pin 36<sup>a</sup> in the latch housing 16<sup>a</sup>. The hook 71 is formed by a projection 72 spaced slightly from the hook arm 64 to provide an undercut recess 73 adapted to engage the pin 36<sup>a</sup>. The bolt body 63 also has a generally central circular opening 74 therethrough to receive a cam 75 with a circular body 76 received in the opening 74. The cam has an offset hub 77 extending from both flat surfaces of the cam body 76 with a polygonal opening or passage 78 therethrough to conformably receive the end of a tool 47 as seen in FIG. 2.

The cam body 76 is provided with a circular periphery 79 interrupted by a pair of spaced U-shaped notches 81,81. Also, closely adjacent the hub 77, the cam has an outwardly extending tab or ear 82 integral with the cam and above the flat surface 83 of the cam as seen in FIG. 15; the tab 82 acting to cooperate with the spaced projections 67 and 68 on the bolt body. To assemble the latch mechanism 61, the cam 75 is conformably received in the opening 74 in the bolt body 63 with the tab 82 frictionally engaging the surface 69 of the bolt body.

To secure the cam 75 in the bolt body 63, a pair of rivets 84,84 extend through the spaced notches 81,81 in the periphery 79 of the cam 75 with the head 85 of each rivet 84 overlapping and frictionally engaging the surface 69 of the bolt body 63 adjacent the opening 74. At the opposite side of the cam and bolt 62, a pair of outwardly dished spring washers 86,86 are positioned with the central opening 87 in each washer 86 receiving the free end of a rivet 84, which end is headed or clinched at 88 (see FIG. 12) to secure the rivet and washer together. The outer periphery 89 of each washer 86 is slightly curled, and the spring washer edges overlap and frictionally engage the opposite surface 91 of the bolt body 63.

In operation, the latching mechanism 61 is initially positioned in unlatched position with the hook 71 engaging the retaining pin 36<sup>a</sup> and the tab 82 engaging the projection 67. Initial rotation of the cam 75 by the tool in a counterclockwise direction causes the tab 82 to move away from the projection 67 as the cam rotates relative to the bolt 62 to draw the bolt upwards and draw the hook 71 away from the pin 36<sup>a</sup>. Once the hook 71 is released, the cam 75 and bolt 62 rotate simultaneously until the hook arm 64 abuts the strike or pin 25<sup>a</sup>. Then the cam rotates relative to the bolt to draw the curved hook 65 into engagement with the pin 25<sup>a</sup> as the tab 82 abuts the projection 68. Reverse rotation causes the cam to rotate relative to the bolt until the hook 65 is disengaged from the pin 25<sup>a</sup>, the bolt and cam rotate simultaneously until the arm 64 abuts the pin 36<sup>a</sup>, and then the cam rotates relative to the bolt to lower the bolt until the hook 71 engages the pin 36<sup>a</sup> and the tab 82 abuts the projection 67.

While the improved and simplified latching mechanisms have been shown and described as being advantageously applicable to joining wall panels together, it is not our desire or intent to unnecessarily limit the scope or the utility of the improved features by virtue of these illustrative embodiments.

Having thus disclosed our invention, we claim:

1. A latch assembly mounted in one of a pair of adjoining panels for latching engagement with a strike in the other adjoining panel for retaining the panels in abutting relation, comprising a housing secured in the edge of the panel having spaced sides with aligned bushings therein, and a latch bolt assembly rotatably mounted within said housing and including a latch bolt having a body with a central circular opening therein, an offset arm extending from said body and terminating in a hooked end to engage the strike for latching adjoining panels together, a circular cam conformably received in said opening having a hub with a polygonal passage therethrough integral with but offset from the center of the cam and projecting from the opposite sides thereof, the opposite ends of said hub being conformably received within said bushings to rotatably mount the cam within said housing, an integral outwardly projecting tab on one surface of said cam projecting

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beyond the cam to overlap the surface of the body, a substantially continuous peripheral flange formed on the cam as an extension of the surface opposite the cam surface provided with said tab, said flange overlapping and engaging the surface of the bolt body adjacent the opening, said cam having a slot therethrough generally opposite said tab, resilient retaining means secured to the cam and frictionally engaging said bolt body comprising a generally J-shaped flat leaf spring with the curled end of the J extending through said slot and crimped onto said cam, the opposite end of the spring being inwardly bent to overlap and resiliently engage the surface of said bolt opposite said peripheral flange, said flange, said tab and said spring positioning and retaining said cam in the opening in said bolt, and a pair of spaced projections formed on said bolt body and cooperating with said tab to limit the arc of movement of said cam relative to said latch bolt.

2. A latch assembly as set forth in claim 1, including a retaining pin extending through and secured in said housing spaced from said aligned bearings, and a projection on the periphery of the bolt body adjacent said offset arm forming an outwardly opening hook cammed into engagement with and receiving said retaining pin when the bolt is in unlatched position.

3. A latch assembly as set forth in claim 1, in which said leaf spring does not sufficiently overlap said bolt to interfere with said projections.

4. A latch assembly mounted in one of a pair of adjoining panels for latching engagement with a strike in the other adjoining panel for retaining the panels in abutting relation, comprising a housing secured in the edge of the panel having spaced sides with aligned bushings therein, and a latch bolt assembly rotatably mounted within said housing and including a latch bolt having a body with a central circular opening therein, an offset arm extending from said body and terminating in a hooked end to engage the strike for latching adjoining panels together, a circular cam conformably received in said opening having a hub with a polygonal passage therethrough integral with but offset from the center of the cam and projecting from the opposite sides thereof, the opposite ends of said hub being conformably received within said bushings to rotatably mount the cam within said housing, an integral outwardly projecting tab on one surface of said cam projecting beyond the cam to overlap the surface of the body, resilient retaining means secured to said cam and frictionally engaging said bolt body, said cam having a substantially continuous peripheral flange formed as an extension of the surface opposite the cam surface provided with said tab, said peripheral flange terminating adjacent each side of said hub, extending

around said cam and merging into the edge of the cam adjacent said tab and overlapping and engaging the surface of the bolt body adjacent the opening, said flange, said tab and said resilient retaining means, positioning and retaining said cam in the opening in said bolt, and a pair of spaced projections formed on said bolt body and cooperating with said tab to limit the arc of movement of said cam relative to said latch bolt.

5. A latch assembly mounted in one of a pair of adjoining panels for latching engagement with a strike in the other adjoining panel for retaining the panels in abutting relation, comprising a housing secured in the edge of the panel having spaced sides with aligned bushings therein, and a latch bolt assembly rotatably mounted within said housing and including a latch bolt having a body with a central circular opening therein, an offset arm extending from said body and terminating in a hooked end to engage the strike for latching adjoining panels together, a circular cam conformably received in said opening having a hub with a polygonal passage therethrough integral with but offset from the center of the cam and projecting from the opposite sides thereof, the opposite ends of said hub being conformably received within said bushings to rotatably mount the cam within said housing, an integral outwardly projecting tab on one surface of said cam projecting beyond the cam to overlap the surface of the body, resilient retaining means secured to said cam and cooperating with said bolt body to retain the cam within said opening and frictionally engage said bolt body, said cam having a circular peripheral edge interrupted by a pair of spaced notches and said tab is positioned closely adjacent said hub, said notches being generally equally spaced from and on the opposite sides of said hub, said resilient retaining means being secured to said cam through said notches, and a pair of spaced projections formed on said bolt body and cooperating with said tab to limit the arc of movement of said cam relative to said latch bolt.

6. A latch assembly as set forth in claim 5, in which said resilient retaining means includes a pair of rivets extending through said notches, said rivets each having a head on one end and a free end, and a spring washer secured to the free end of each rivet.

7. A latch assembly as set forth in claim 6, in which said spring washers are dished outwardly away from the surface of the cam opposite the cam surface containing said tab, said spring washers resiliently and frictionally engaging said bolt.

8. A latch assembly as set forth in claim 7, in which both said rivet heads and said spring washers overlap and engage the opposite surfaces of both the cam and the bolt.

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