Oct. 14, 1969 I. L. BERKOWITZ 3,472,545

PANEL FASTENERS

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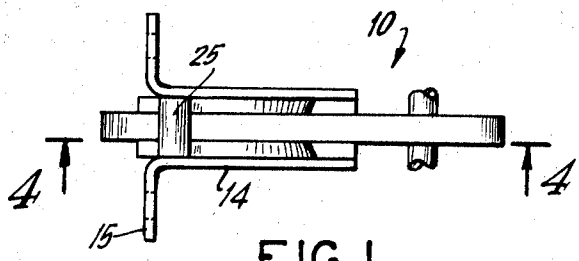



FIG. 1

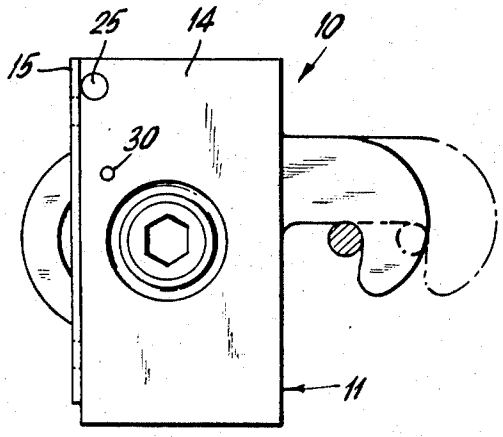



FIG. 2

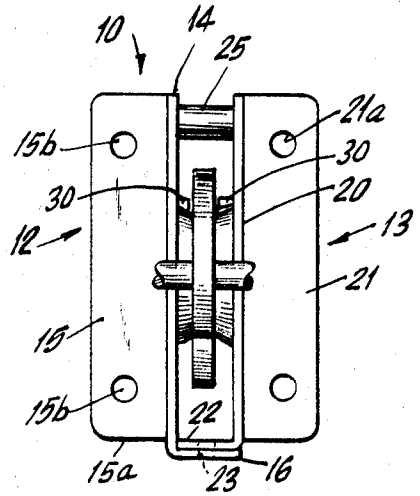



FIG. 3

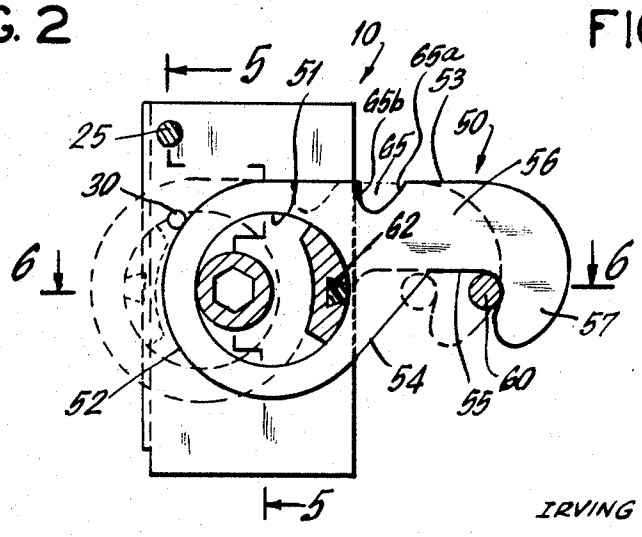



FIG. 4

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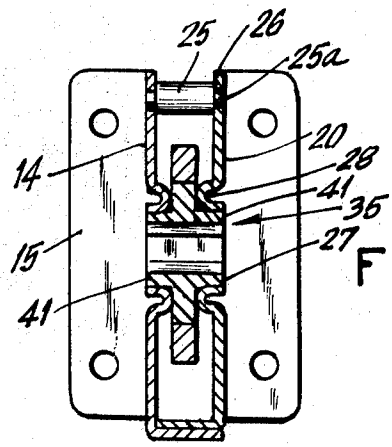



FIG. 5

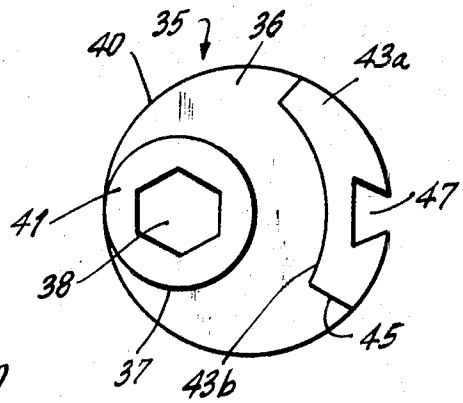



FIG. 7

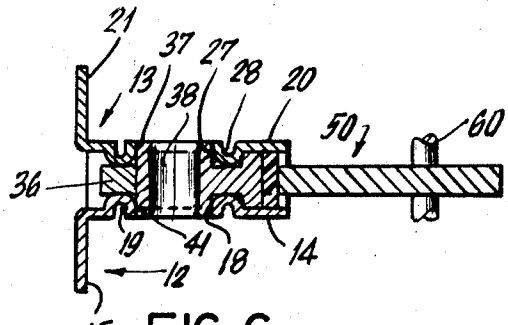



FIG. 6

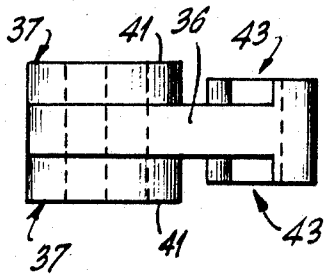



FIG. 8

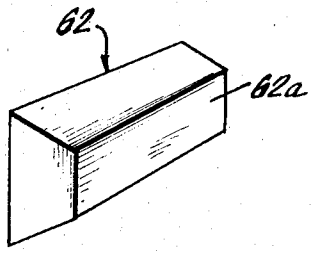



FIG. 9

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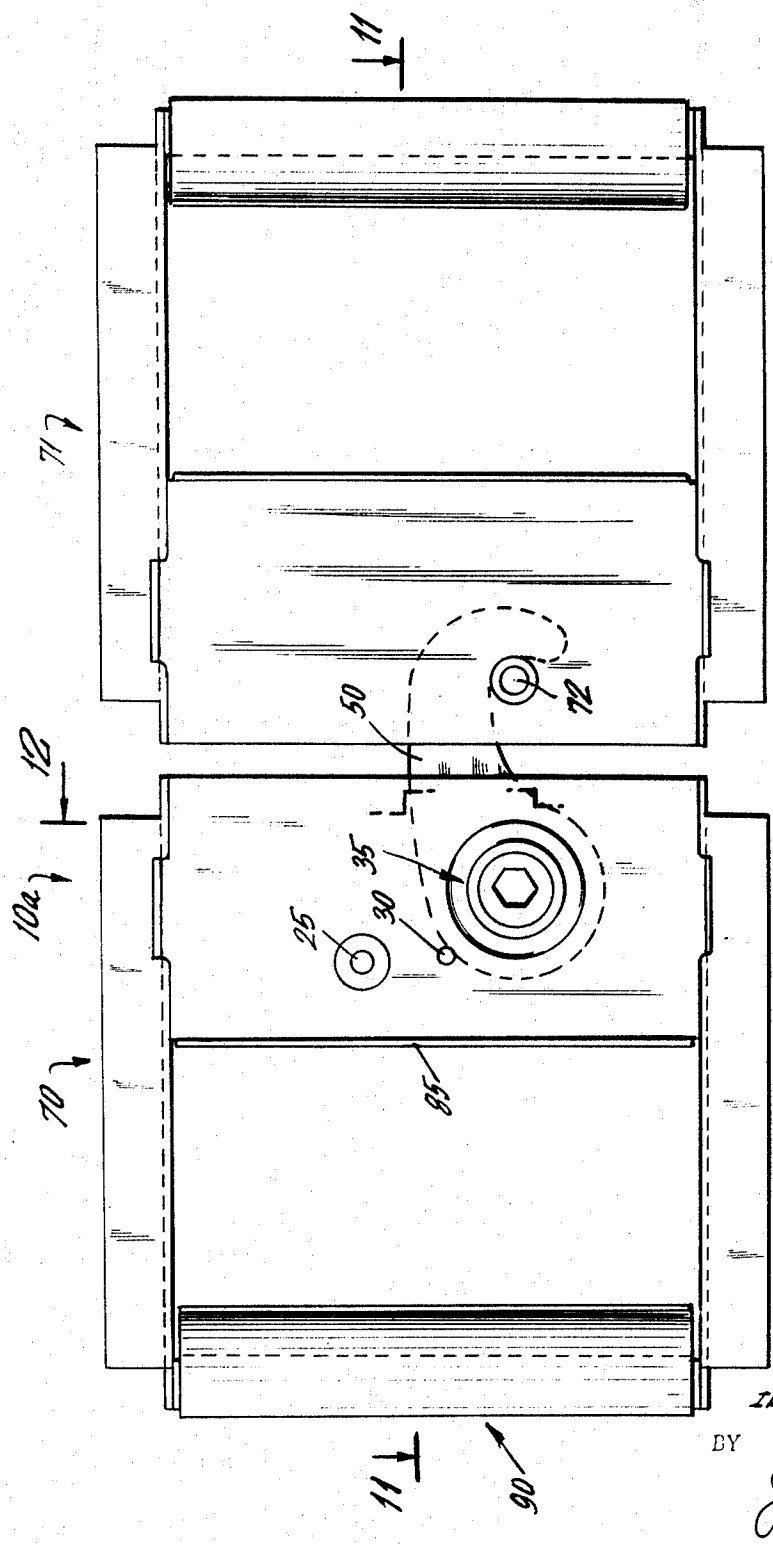



FIG. 10

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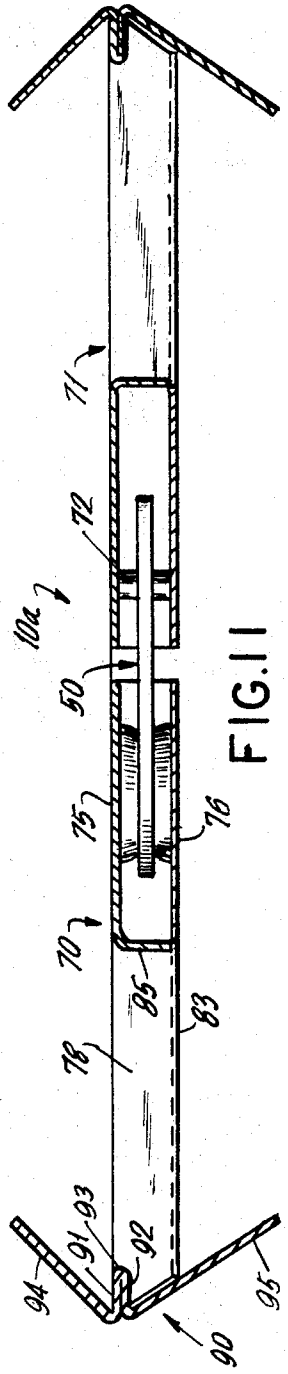



FIG. 11

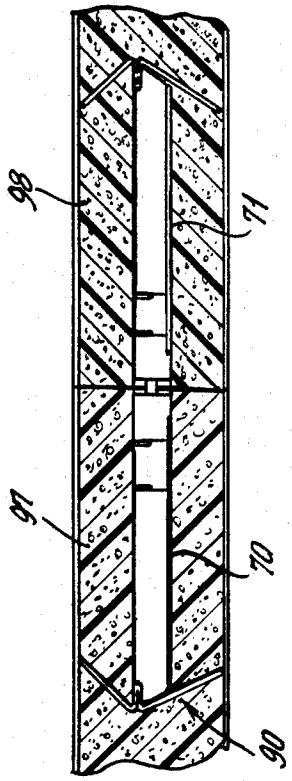



FIG. 13

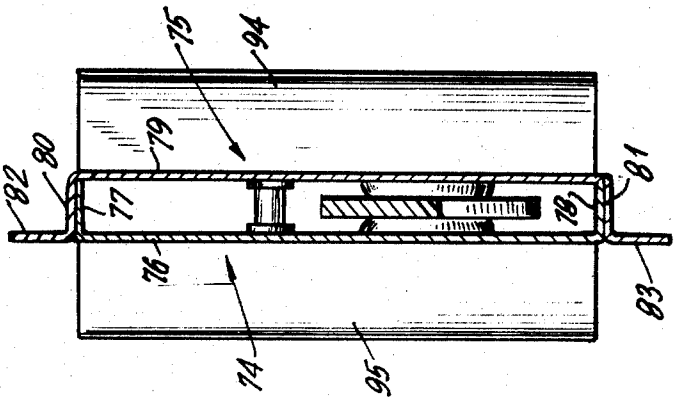



FIG. 12

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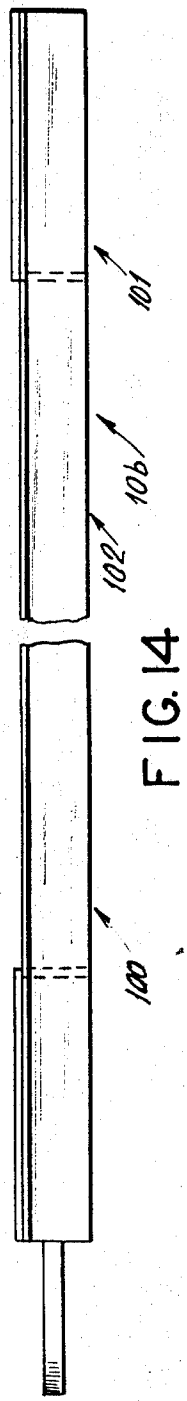



FIG. 14

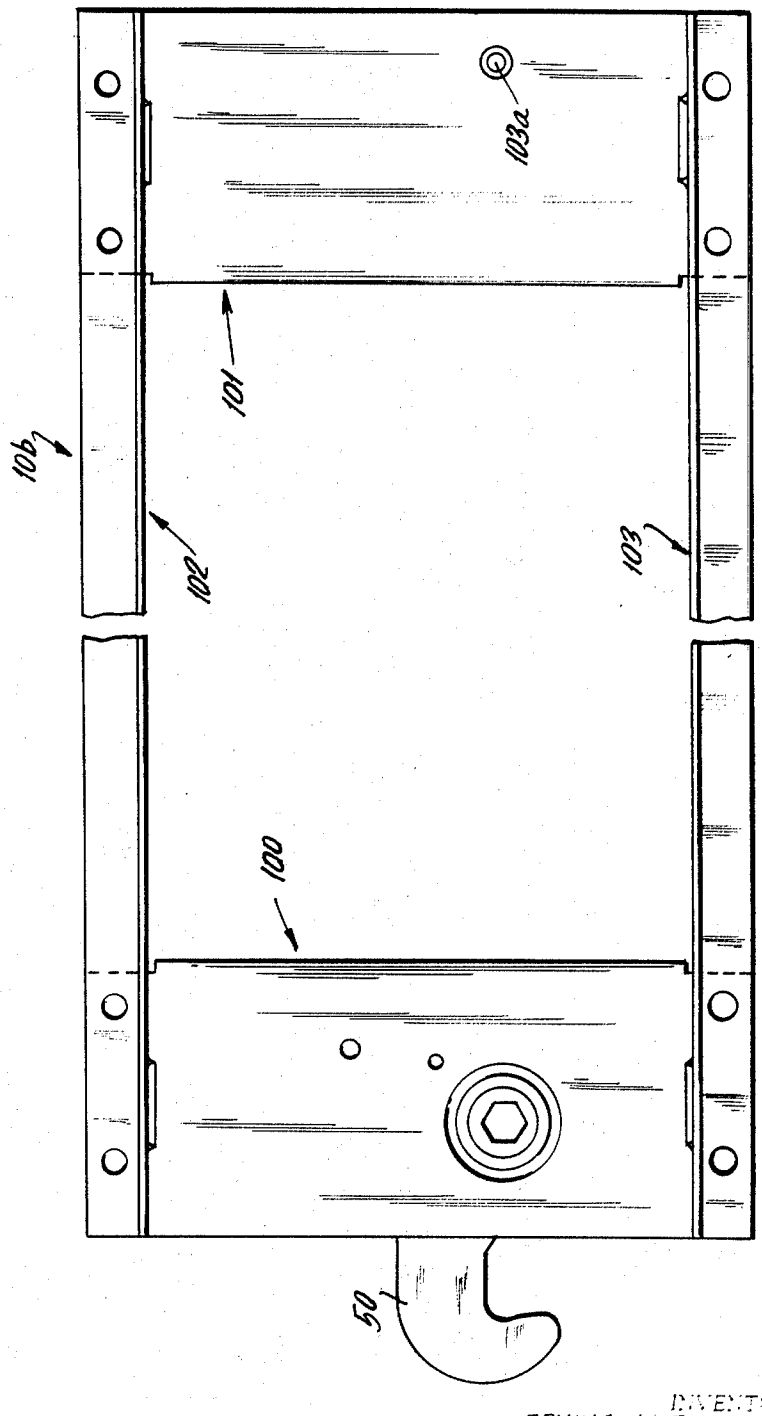



FIG. 15

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United States Patent Office 3,472,545 Patented Oct. 14, 1969



3,472,545

# PANEL FASTENERS

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Int. Cl. E05c 5/00, 19/12
U.S. Cl. 292—111 9 Claims

## ABSTRACT OF THE DISCLOSURE

The panel fastener comprises a casing provided with a bearing in which a circular cam is eccentrically mounted, with a latch rotatably mounted on the cam, said latch having a hook to engage a pin, said cam having a socket to be engaged by a tool for turning the cam, to thereby draw the latch sideways, and said cam having stop means engeable with a stop pin on the casing to limit rotation of the cam, and hence limit side movement of the latch. An insert is provided for the cam to frictionally engage the latch to prevent free rotation of the latch relative to the cam. Means is also provided to hold the latch partly within the casing during shipment.

## Brief summary of the invention

This invention relates to panel fasteners.

In one form of the invention, the panel fastener comprises a single casing which may be attached to a panel and from which the latch hook extends for engagement with a pin. In another form of the invention two casings are provided, one carrying the latch and attachable to one panel and the other attachable to another panel and carrying a pin to be engaged by the latch. In still another form of the invention, the fastener has a latch at one end and a pin at the other, whereby a plurality of such fasteners may be connected in series by engaging the latches of said fasteners with the pins of adjacent fasteners.

One object of the invention is to provide a fastener of the character described comprising a casing having a bearing, a cam having a circular portion, and an eccentric hub, the latter being journalled in the bearing and provided with a socket to receive a wrench or tool to turn the cam, a latch having a round opening rotatably receiving said circular portion of the cam, and the cam having a groove at its periphery receiving an insert of plastic material which frictionally engages the inner edge of the latch at its circular opening to prevent free relative rotation between the latch and said cam.

Another object of this invention is to provide a fastener of the character described in which the casing has a stop pin to engage a stop on the latch to limit its rotary movement relative to the casing.

Yet another object of this invention is to provide, a strong, rugged and durable panel fastener of the character described which shall be relatively inexpensive to manufacture, easy to assemble, and which shall yet be smooth and positive in action, easy to manipulate and practical and efficient to a high degree in use.

Other objects of this invention will in part be obvious and in part hereinafter pointed out.

The invention accordingly consists in the features of construction, combinations of elements, and arrangement of parts which will be exemplified in the construction hereinafter described, and of which the scope of invention will be indicated in the following claims.

## Brief description of several views of the drawing

In the accompanying drawing, in which are shown various illustrative embodiments of this invention,

FIG. 1 is a top plan view of a panel fastener embodying the invention;



FIG. 2 is a side elevational view thereof;

FIG. 3 is a front elevational view thereof;

FIG. 4 is a cross-sectional view taken on line 4—4 of FIG. 1;

FIG. 5 is a cross-sectional view taken on line 5—5 of FIG. 4;

FIG. 6 is a cross-sectional view taken on line 6—6 of FIG. 4;

FIG. 7 is a side view of the cam;

FIG. 8 is a top plan view of said cam;

FIG. 9 is a perspective view of the insert for said cam;

FIG. 10 is a side elevational view of panel fasteners, illustrating another form of the invention;

FIG. 11 is a cross-sectional view taken on line 11—11 of FIG. 10;

FIG. 12 is a cross-sectional view taken on line 12—12 of FIG. 10;

FIG. 13 is a partial horizontal cross-sectional view illustrating the embedding of the fastener of FIGS. 10–13 in polyeurethane panels;

FIG. 14 is a side elevational view illustrating a panel fastener embodying a further modified form of the invention; and

FIG. 15 is a top view of the structure shown in FIG. 14.

## Detailed rescription of the invention

Referring now in detail to FIGS. 1–9 of the drawing, **10** designates a panel fastener embodying the invention. The fastener **10** comprises a casing **11**. Said casing comprises parts **12** and **13**. Part **12** comprises a vertical wall **14** from the rear vertical end of which there extends outwardly, a vertical flange **15** at right angles to said wall; and from the lower end of which there extends inwardly, a horizontal flange **16** spaced below the lower edge **15***a* of flange **15**. Flange **15** is formed with openings **15***b* to receive fasteners for attachment to a panel. Fall **14** is provided with a circular bearing **18** formed by an annular hub **19** of outwardly opening U shaped cross-section.

Part **13** is disposed symmetrically to part **12** and comprises a wall **20** parallel to wall **14** in opposed coextensive relation thereto. Extending outwardly from wall **20** is a flange **21** in the plane of flange **15** and coextensive therewith. Extending inwardly from the lower end of wall **20** is a horizontal flange **22** contacting the upper surface of flange **16** and welded thereto as at **23** to connect parts **12, 13**. Said parts are also interconnected by a transverse pin **25** having reduced diameter studs **25***a* passing through openings **26** located near the upper ends of walls **14, 20** and near flanges **15, 21**. Studs **25***a* may be riveted over if desired.

Wall **20** is provided with a bearing **27** aligned with bearing **18**. Bearing **27** is formed by an annular outwardly opening bead, rim or hub **28** of U-shaped cross-section. Pin **25** is located above the bearings **18, 27** and adjacent flanges **15**. Flange **21** has openings **21***a* for receiving fasteners for attachment to a panel.

A pair of short transverse stop pins **30** project from walls **14, 20** into the space between said walls, adjacent flanges **15, 21** and below the pin **25**.

Rotatably mounted in bearings **18, 27** is a cam member **35** located between parts **12, 13**. Cam **35** comprises a central wall **36** located between the hubs or beads **19, 28**. Integrally formed with wall **36** are eccentric hub extensions **37** provided with a hexagonal through opening **38**. The hub **37** extends to opposite sides of wall **36** as at **38** and said extensions have circular outer surfaces **39**. The extensions **37** are rotatably received in bearings **18, 27**. Wall **36** has a circular outer edge **40**. Surfaces **39** have inner tangency to edge **40**.

The outer end edges **41** of hub extensions **37** are in the planes of the rim edges of hubs **19, 28**, which in turn

are in the planes of the outer surfaces of walls **14, 20,** respectively.

Also integrally formed with wall **36** and extending to opposite sides thereof are similar symmetrically disposed wings, or extensions **43** the outer surfaces of which are extensions of surface **40**. The wings **43** have aligned lower edge ends **45** radial with respect to the axis of hub **37**. Said cam **35** is also formed at its outer periphery with a transverse groove **47** of dove-tail cross-section. The groove **47** is in the wings **43**. A diametric plane passing through the axis of hub **37** bisects groove **47**.

It will now be noted that a key, wrench or tool may be inserted into hexagonal opening **38** and cam **35** rotated in a clockwise direction until stop edges **45** contact the pins **30**.

Mounted on the central wall **36** of the cam is a latch **50**. Latch **50** has a central opening **51** rotatably receiving said wall **36**. Latch **50** has a rear part-circular outer edge **52**. Pins **30** are located radially beyond said edge **52** as shown in FIG. 4. Latch **50** is in a plane disposed between pins **30** so that said latch may move between said pins.

The outer end edges **43***a* of wings **43** loosely contact the inner surfaces of walls **14, 20**.

The latch is loosely mounted between the hubs **19, 28**.

Said latch **50** has a top horizontal edge **53** which extends forwardly from the upper end of part-circular edge **52**. Extending upwardly and forwardly from the opposite end of part-circular edge **52** is an inclined edge **54** extending to the horizontal level of a horizontal plane passing through the axis of hub **37**, when said latch is in operative position, as shown in FIG. 4. Extending forwardly from the upper end of edge **54** is a horizontal edge **55**. Between edges **53, 55** is an arm or extension **56** provided at its forward end with a downwardly extending hook or tongue **57**.

The latch is adapted to engage a pin or keeper **60** which may be located on any part or mechanism to be drawn relatively toward casing **11**. Pin **60** is located to engage the latch, with edge **55** in horizontal position, in the plane of the axis of hub extensions **37**, when the latch is fully extended.

An insert **62** is fitted into groove **47**. Insert **62** is made of nylon or any other plastic or other material which will provide friction with the inner edge **51** of latch **50**. The insert **62** is of dove-tail cross-section and has a part cylindrical outer surface **62***a* engaging edge **51**. The length of the insert is equal to the length of the groove **47**. The insert prevents free rotation of the latch on the cam.

It will now be understood that as the cam **35** is rotated in a clockwise direction, the latch, and hence the pin **60**, will be drawn to the left relative to casing **11** until stop edge **45** contacts stop pins **30**. The total movement of the pin is equal to twice the distance from the axis of the cam hub to the axis of the central wall of the cam. The cam acts as a crank for the latch during the rotation of the cam through an angle of 180°. Stop pins **30** are located to limit rotation of the cam through 180° from start to finish. As the cam is rotated its central axis moves in a circle having a center at the center of hub extensions **37**.

At the upper edge **53** of the latch **50** is an inclined notch **65** so located that when the latch is rotated in a counterclockwise direction, arm **56** will move up between walls **14, 20** and pin **25** can be engaged in said notch to retain the latch in vertical position, for shipment or storage. Notch **65** has an inclined edge **65***a* and a part-circular edge **65***b*, as shown in FIG. 4, for this purpose.

The cam **35** may be manipulated to engage the notch edge with said pin **25**. To engage the latch with pin **25**, the latch may first be rotated on the cam in a counterclockwise direction until pin **25** is contacted. Then the cam is rotated counter-clockwise until the pin engages in the notch.

The inner surfaces **43***b* of wings **43** are concave, being part-circular and rotatably engaging the outer circular surfaces of hubs **19, 28**.

Thus, the radial axis of arcuate surfaces **43***b* of wings **43** is the axis of hub **37** and the beads or hubs **19, 28** are located between hubs **37** and surfaces **43***b*.

Casing **11** may be attached to one panel and pin **60** may be located on another panel, and the panels may be drawn together by means of the mechanism disclosed herein.

Referring now to FIGS. 10–13 of the drawings, **10***a* designates a panel fastener embodying a modified construction which may be used for unframed polyeurethane foamed panels. The fastener **10***a* comprises a part **70** carrying a latch **50** and a part **71** carrying a pin **72** engagable by said latch.

Part **70** comprises a casing **73**. Casing **73** comprises casing parts **74, 75**.

Part **74** has a vertical wall **76** from which extend top and bottom flanges **77, 78**, respectively. Part **75** has a wall **79** parallel to wall **76**. Extending from wall **79** are top and bottom flanges **80, 81** contacting the top of flange **77** and bottom of flange **78**, respectively. Flanges **77, 78** may be welded to flanges **80, 81**, respectively.

Extending up from flange **80** is a vertical flange **82**. Extending down from flange **81** is a flange **83**. Flanges **82, 83** are coplanar. Flanges **80, 82** and **81, 83** extend beyond wall **75**. Extending from wall **75** is a vertical flange **85** contacting wall **76**.

Interconnecting the outer ends of flanges **80, 82** and **81, 83** is a winged vertical member **90**. Member **90** has contacting portions **91, 92** connected by a fold **93**. Extending from portions **91, 92** are forwardly and outwardly inclined wings **94, 95**, respectively. The upper and lower ends of member **90** may be welded to the flanges **80, 82** and **81, 83**.

Walls **75, 76** are constructed like walls **14, 20** and rotatably carry a cam **35** on which the latch **60** is mounted in the same manner as in fastener **10** and has stop pins like stop pins **30** and a pin like pin **25**.

Part **71** comprises a casing with extensions connected by a winged member symmetrical to corresponding elements of part **70**. However, the casing of part **71** carries the pin **72** to be engaged by the latch **60**.

The two casings may be embedded in polyeurethane foam panels **97, 98**, respectively. These panels may be drawn together by turning the cam on part **70**, with the latch engaging the pin **72** on part **71**.

In FIGS. 14 and 15 there is shown a panel fastener **10***b* comprising casings **100, 101** interconnected by bars **102, 103**. Casing **100** carries the latch **50** and its related structure as in FIGS. 1–9 whereas casing **101** carries the pin **103***a* to be engaged by a latch of a similar fastener **10***b*. The latch of fastener **10***b* engages a pin **103***a* on a next adjacent fastener **10***b*.

Thus a plurality of such fasteners may be attached together in tandem. Each fastener may carry a panel, so that a plurality of such panels may be attached together. The fasteners **10***b* may be encased in polyeurethane foam panels if desired.

It will thus be seen that there is provided an article in which the several objects of this invention are achieved, and which is well adapted to meet the conditions of practical use.

As possible embodiments might be made of the above invention, and as various changes might be made in the embodiments above set forth, it is to be understood that all matter herein set forth or shown in the accompanying drawing, is to be interpreted as illustrative and not in a limiting sense.

I claim:

**1.** In a panel fastener, support means, a cam, means for mounting said cam on said support means for rotation about a first axis, a latch mounted for rotation on said cam about a second axis offset with respect to the first axis and parallel thereto, a stop fixed on said cam, and

stop means fixed on said support means to be engaged by said stop on said cam, upon rotating said cam in one direction of rotation, said support means comprising a casing, said means for mounting said cam for rotation on said support means comprising a bearing on the casing and said cam comprising a wall provided with a hub extending to one side of said wall and journalled in said bearing said means for mounting said latch on said cam comprising a circular outer edge on said wall of said cam rotatably received in a circular opening in said latch, said stop on said cam comprising a wing on said wall having an outer surface which is an extension of said circular edge, and said wing having an end edge to engage said stop means on said support means.

**2.** The combination of claim **1**, said wing having an inner, concave, arcuate surface, said bearing on said casing having a portion received between said hub and said concave surface, the radial center of said concave surface being the axis of rotation of said cam on said support means.

**3.** In a panel fastener, support means, a cam, means for mounting said cam on said support means for rotation about a first axis, a latch mounted for rotation on said cam about a second axis offset with respect to the first axis and parallel thereto, a stop fixed on said cam, and stop means fixed on said support means to be engaged by said stop on said cam, upon rotating said cam in one direction of rotation, said cam having a central wall, formed with a circular outer edge, said latch having a circular opening receiving said circular edge, said stop on said cam comprising wings projecting to opposite sides of said central wall and formed with end edges, said stop means on said support means comprising stop pins on said casing walls to engage said end edges.

**4.** The combination of claim **3**, and means to frictionally prevent free rotation of said latch on said cam, comprising an insert of non-metallic material, received in a notch in the periphery of said central wall and in said wings and engaging the inner edge of said latch at the opening of said latch.



**5.** The combination of claim **4**, said insert and said groove being of dove-tail transverse cross-section, and said insert having a part-cylindrical outer surface.

**6.** In a panel fastener, support means, a cam, means for mounting said cam on said support means for rotation about a first axis, a latch mounted for rotation on said cam about a second axis offset with respect to the first axis and parallel thereto, a stop fixed on said cam, and stop means fixed on said support means to be engaged by said stop on said cam, upon rotating said cam in one direction of rotation, said stop on said cam comprising a wing on said cam, having an end edge to engage said stop means on said support means, said cam having a circular outer edge.

**7.** The combination of claim **6**, said wing having an outer surface which is an extension of said circular edge.

**8.** In a panel fastener, support means, a cam, means for mounting said cam on said support means for rotation about a first axis, a latch mounted for rotation on said cam about a second axis offset with respect to the first axis and parallel thereto, a stop fixed on said cam, and stop means fixed on said support means to be engaged by said stop on said cam, upon rotating said cam in one direction of rotation, said means for mounting said latch on said cam, comprising a circular edge on said cam, and said latch having a circular opening rotatably receiving said circular edge, said stop on said cam comprising a wing on said cam, and said wing having an end edge to engage said stop means on said support means.

**9.** The combination of claim **8**, said wing having an outer surface which is an extension of said circular edge.

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