

Sept. 23, 1969

KIYOSHI YAMADA ET AL

3,469,051

DEVICE FOR CLAMPING INSTRUMENTS TO PANELS

Filed Nov. 20, 1967

2 Sheets-Sheet 1

Fig. 1

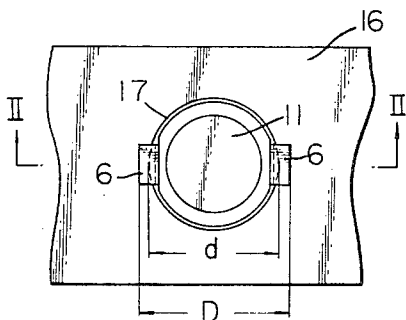


Fig. 4

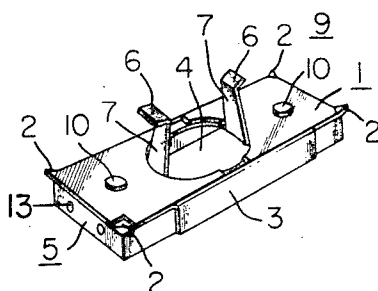


Fig. 2

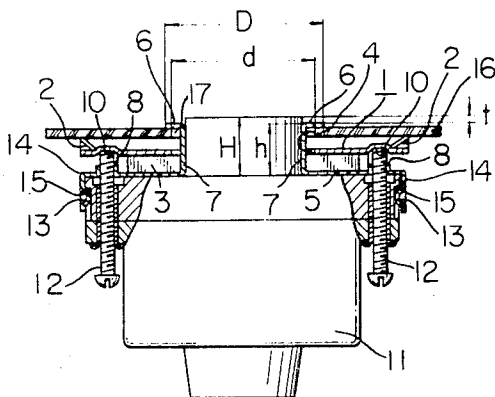


Fig. 5

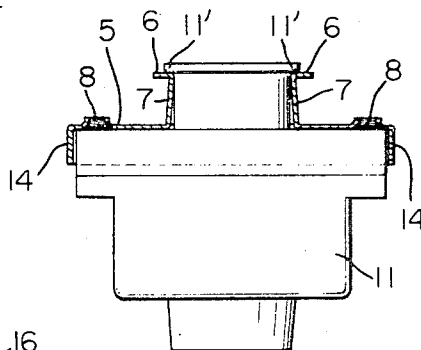
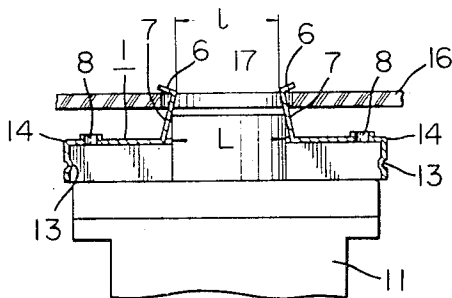


Fig. 3



INVENTORS
KIYOSHI YAMADA
RIKIO TAKEUCHI
IKUHISA MORIMOTO
TATSURO ASANO
By: Wolfe, Hubbard, Voit & Osann
ATTYS.

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Fig. 6

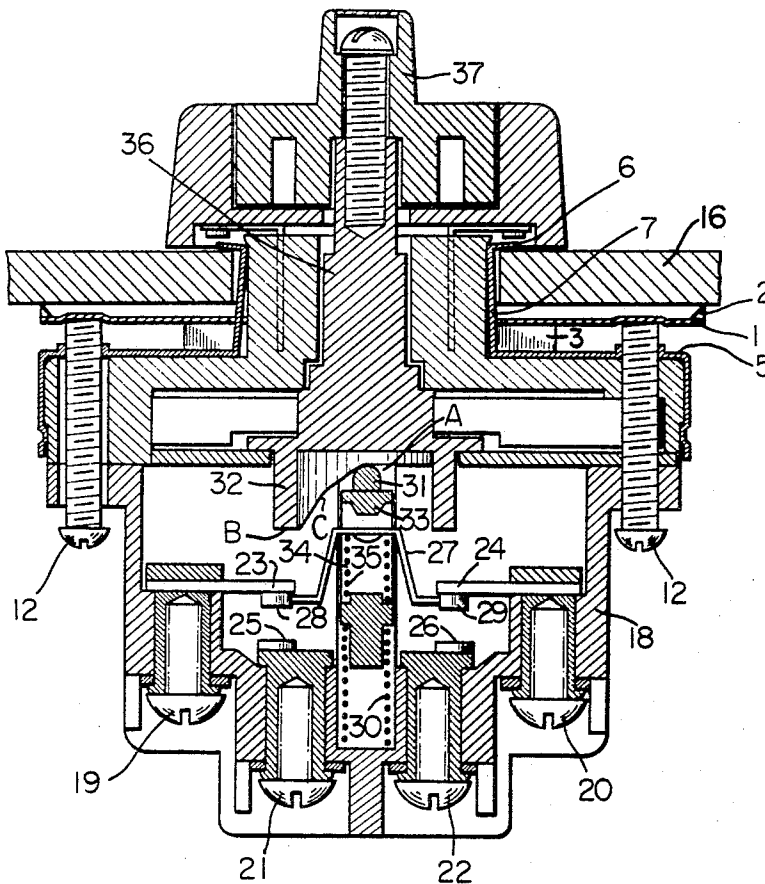


Fig. 7

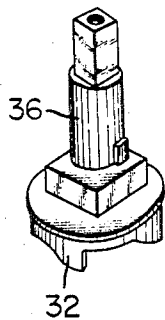
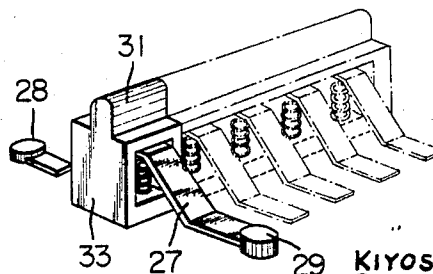


Fig. 8



INVENTORS
KIYOSHI YAMADA
RIKIO TAKEUCHI
IKUHISA MORIMOTO
TATSURO ASANO

by: Wolfe, Hubbard, Voit & Osann
ATTYS.

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DEVICE FOR CLAMPING INSTRUMENTS TO PANELS

Kiyoshi Yamada, Rikio Takeuchi, Ikuhisa Morimoto, and Tatsuro Asano, Kadoma, Osaka, Japan, assignors to Matsushita Denko Kabushiki Kaisha, Osaka, Japan, a corporation of Japan

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3 Claims

ABSTRACT OF THE DISCLOSURE

A device for clamping instruments to panels comprising a subsidiary clamp having a central round hole and provided with a plurality of pallet pieces on the periphery; a clamp for receiving the instruments, said clamp being provided with at least a pair of opposed resilient pieces each having an outwardly bent hooked piece at the tip, and with a pair of fixing screw holes made outside said resilient pieces; and fixing screws to be screwed respectively into said screw holes to fix the instruments.

This invention relates to devices for clamping instruments to panels.

A conventional panel instrument clamping device of this kind consists of a clamping ring and a rubber packing so as to clamp an instrument by rotating the clamping ring. With such conventional clamping device, there are such disadvantages that two men are required to clamp an instrument to a large control panel or operating panel and that, whenever the thickness of the panel is adjusted with a bushing made of rubber or the like, the height of the instrument above the panel surface must be adjusted.

The present invention has been suggested to eliminate the above mentioned disadvantages.

An object of the present invention is to provide a clamping device with which an instrument can be simply clamped to a panel from the back surface of the panel.

Another object of the present invention is to provide a clamping device with which the height of the head part of the instrument exposed out of the panel can be made always constant irrespective of the thickness of the panel.

Other objects and advantages of the present invention will become clear with the perusal of the following detailed explanation with reference to the drawings.

FIGURE 1 is a plan view of a panel showing an instrument as clamped to the panel by using a device of the present invention.

FIGURE 2 is a side view showing only the clamping device of the present invention in section on line II—II in FIGURE 1.

FIGURE 3 is a sectioned view showing the order of fitting the instrument to the panel by using the clamping device of the present invention.

FIGURE 4 is a perspective view showing the clamping device of the present invention.

FIGURE 5 is a sectioned side view of another embodiment of the clamping device of the present invention.

FIGURE 6 is a control switch using a clamping device of the present invention.

FIGURE 7 is a perspective view of an essential part of an operating rotor.

FIGURE 8 is a perspective view of an operating shaft.

A preferable embodiment of the present invention shall be explained. But, it should be understood that the invention is not limited to the specific embodiment shown here but should rather include various alterations and equal

arrangements to be included in the scope and spirit of the claims.

In the drawings, 1 is a subsidiary clamp provided with upwardly bent pallet pieces 2 respectively in four corners, two embracing side pieces 3 opposed to each other respectively on the right and left sides and a central round hole 4 in the center.

5 is a clamp having resilient pieces 7 formed as bent substantially vertically to the surface of the clamp near the center and provided with inverted L-shaped hooked pieces 6 made by outwardly bending the upper parts of said respective resilient pieces 7. The distance between each of the above mentioned resilient pieces 7 is made a little smaller than the diameter of the central round hole 4 of the subsidiary clamp 1. Thus, in case the resilient pieces 7 are erected upright, it will be possible for the hooked pieces 6 to engage with the periphery of the central round hole 4 of the subsidiary clamp 1. 8 is a fixing screw hole made on each side of the hooked pieces 6. 14 is a side part formed on each side of the clamp 5 so as to be at right angles to the main surface of the clamp and having at least a projection 13 provided as projected inside of the respective side part 14.

11 is an electric instrument provided on each side with a side stepped part 15 which will engage with the projection 13 provided on each side of the clamp 5 when the electric instrument is fitted to the clamp 5. 12 is a fixing screw. 10 is a recess formed on the lower surface of the clamp 5 at each side. When the instrument 11 is fitted to the clamp 5, the respective tip of the fixing screws 12 will engage with each of said recesses 10.

16 is a panel provided with a round hole 17 of a diameter d for clamping the instrument.

The manner of clamping the instrument to the panel by using the clamping device of the present invention shall be described in the following.

The clamping device 9 as assembled as in FIGURE 4 is fitted so that its resilient pieces 7 may fit into the round hole 17 in the panel 16 and then the instrument 11 is fixed to the clamping device 9 with the fixing screws 12.

In such case, the distance l between the resilient pieces 7 of the clamping device 9 in the free state is made a little smaller than the distance L of the head part of the instrument 11, that is, $l < L$.

Then, if the instrument 11 is pushed in from the rear side of the panel 16, the distance l will tend to approach the distance L and the hooked pieces 6 of both resilient pieces 7 will expand on both sides. But, when the instrument 11 has been completely pushed in from the rear side of the panel 16, as the distance D between the tips of the hooked pieces 6 is larger than the diameter d of the round hole 17 in the panel 16, that is, $D > d$, said hooked pieces 6 will be fastened to the upper inner edge of the hole 17 in the panel 16. Then, if the fixing screws 12 are fastened in this state, the tips of said fixing screws 12 will respectively press the recesses 10 in the subsidiary clamp 1, therefore the pallet pieces 2 respectively in the four corners on said subsidiary clamp 1 will bite into the back surface of the panel and the instrument 11 will be positively clamped and fixed to the panel.

When the instrument 11 has been clamped and fixed to the panel 16, if the height of each resilient piece 7 of the clamping device 9 is made h , the head part of a height of $H - h = t$ of the instrument 11 will be exposed on the surface of the panel 16.

The effects of the above mentioned device and the manner shown in FIGURE 5 will be clear from the following facts. The structure in FIGURE 5 is used to keep always constant the height of the instrument exposed on the surface of the panel irrespective of the thickness of the clamping panel. A stepped part 11' projected toward each side

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is made in the head part of the instrument 11. By engaging the hooked pieces 6 of the clamp 5 respectively with the stepped parts 11', the height of the instrument exposed on the surface of the panel can be kept constant. In this structure, the projections 13 in the side parts 14 of the clamp 5 can be omitted.

Now, FIGURES 6 to 8 shall be explained. In the drawings, 1 is a subsidiary clamp, 2 is a pallet piece, 5 is a clamp, 6 is a hooked piece, 7 is a resilient piece and 12 is a fixing screw.

18 is a switch body provided on different levels with two sets of opposed terminals 19, 20 and 21, 22 having fixed contacts 23, 24, 25 and 26, respectively. 27 is a movable contact piece having contacts 28 and 29 at the respective ends. Said movable contact piece 27 is normally kept pushed up by a spring 30, is passed through a through hole 34 in an operating shaft 33 pressed in a sliding part 31 at the upper end against an operating cam 32 and is pressed up by a spring 35 provided in said through hole 34. Said operating cam 32 is provided on the lower surface of an operating rotor 36 to which a knob 37 is secured. By the rotation of the knob 37, the operating cam 32 provided on the operating rotor 36 will be rotated so that the sliding part 31 at the upper end of the operating shaft 33 pressed against said cam 32 may be made to slide from a cam surface A to a cam surface B through an inclined surface C, their rotary motion may be converted to a vertical motion, both contacts 28 and 29 of the movable contact piece 27 set in the operating shaft 33 displaced by said vertical motion may be separated from the fixed contacts 23 and 24 of the terminals 19 and 20 and may be brought into contact with the fixed contacts 25 and 26 of the terminals 21 and 22, respectively, and the contacts 25 and 26 may be thus short-circuited. Further, as shown in FIGURE 8, if the movable contact pieces 27 set in the operating shafts 33 are arranged laterally as shown by the chain lines and the fixed contacts corresponding to them are also arranged in the switch housing, this switch will be able to be simply made multipolar and then the operating rotors 36 for the single-pole switch will be able to be utilized as they are.

What is claimed is:

1. A clamping device for clamping instruments and the like to a first side of a panel having an aperture formed therein, said clamping device comprising the combination of a first clamping member having one side adapted to receive the instrument to be clamped in the panel, said first clamping member including a pair of opposed resilient tabs projecting from the other side thereof and spaced to fit through the aperture in said panel, the end portion of said tabs being bent away from each other to overlap the edges of said aperture on the second side of said panel, said first clamping member also forming a pair of opposed fastener holes disposed radially and outwardly away from said tabs, and a subsidiary clamping member adapted to fit around the tabs between said other side of said first clamping member and the first side of said panel, one side

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of said subsidiary clamping member forming recesses aligned with said fastener holes for receiving the ends of fasteners passed through said holes, the other side of said subsidiary clamping member forming projecting pallet pieces to bite into the first side of said panel, whereby the advancement of fasteners through said holes into said recesses forces said first clamping member away from said subsidiary clamping member so as to draw the bent end portions of said tabs into firm engagement with the second side of said panel while at the same time pressing said pallet pieces into the first side of said panel.

2. A clamping device as set forth in claim 1 wherein said first clamping member includes opposed flanges projecting from said one side thereof to receive the instrument to be clamped, with said flanges forming inward projections to engage the side walls of the instrument inserted within said flanges.

3. A device for clamping instruments to a panel having an aperture therein, said device comprising the combination of a switch body forming stepped side walls and provided with two sets of terminals opposed to each other on different levels, said terminals having respective fixed contacts, a movable contact piece having a contact at each end and set in an operating shaft to be moved vertically by an operating cam provided on an operating rotor, a switch in which said two sets of fixed contacts opposed to each other are to be brought into contact and short circuited by said movable contact piece, a first clamping member forming projections for latching and engaging the stepped side walls of said switch body on one side of said clamping member, said first clamping member also forming a pair of opposed resilient tabs projecting from the other side thereof and dimensioned to fit through the aperture in said panel, the end portion of said tabs being bent outwardly away from each other to overlap the edges of said aperture on the other side of said panel, said first clamping member also forming a pair of opposed fastener holes disposed outwardly away from said tabs, and a subsidiary clamping member adapted to fit around said tabs between said other side of said first clamping member and the first side of said panel, said subsidiary clamping member forming projecting pallet pieces to bite into the first side of said panel whereby the advancement of fasteners through said holes in said first clamping member into engagement with said subsidiary clamping member forces the two clamping members apart so as to draw the bent end portions of said tabs into firm engagement with the second side of said panel while at the same time pressing said pallet pieces into the first side of said panel.

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H. O. JONES, Primary Examiner