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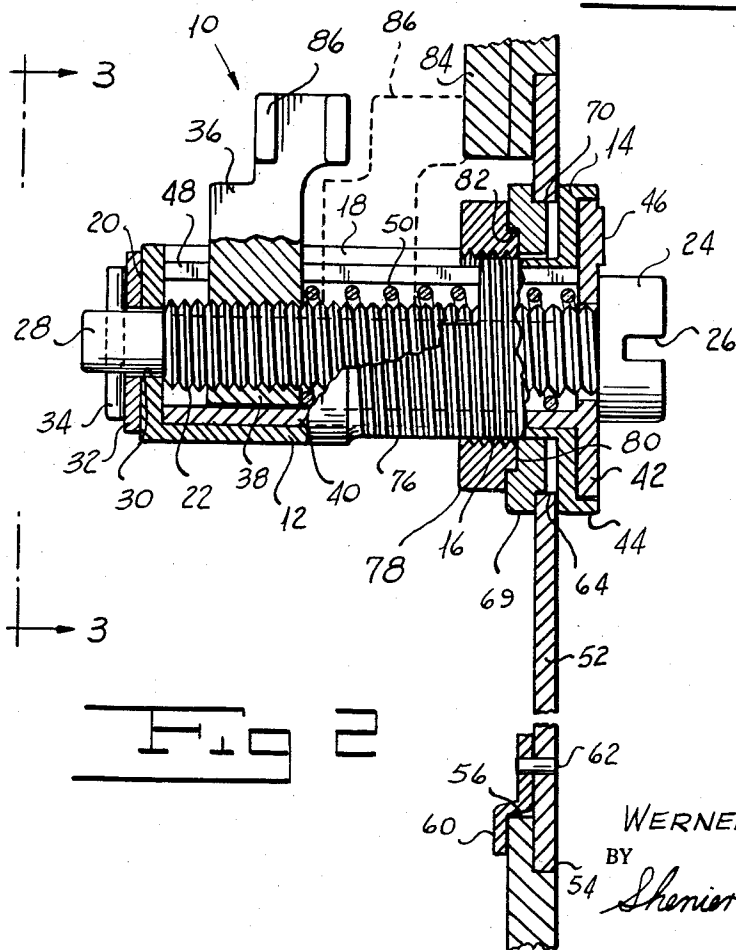
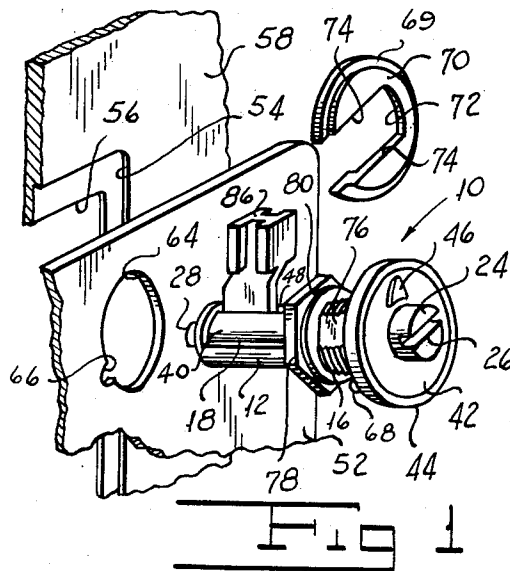
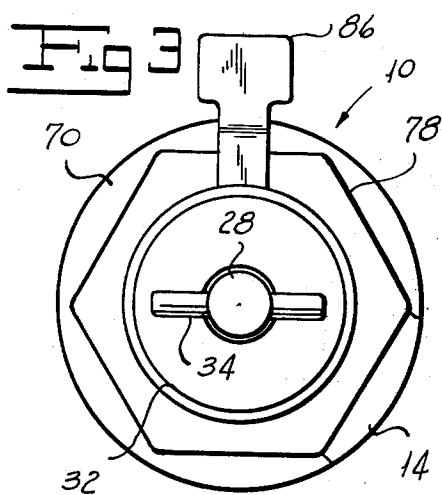
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3,146,010

READILY DEMOUNTABLE PAWL LATCH

Filed Jan. 4, 1963

3 Sheets-Sheet 1



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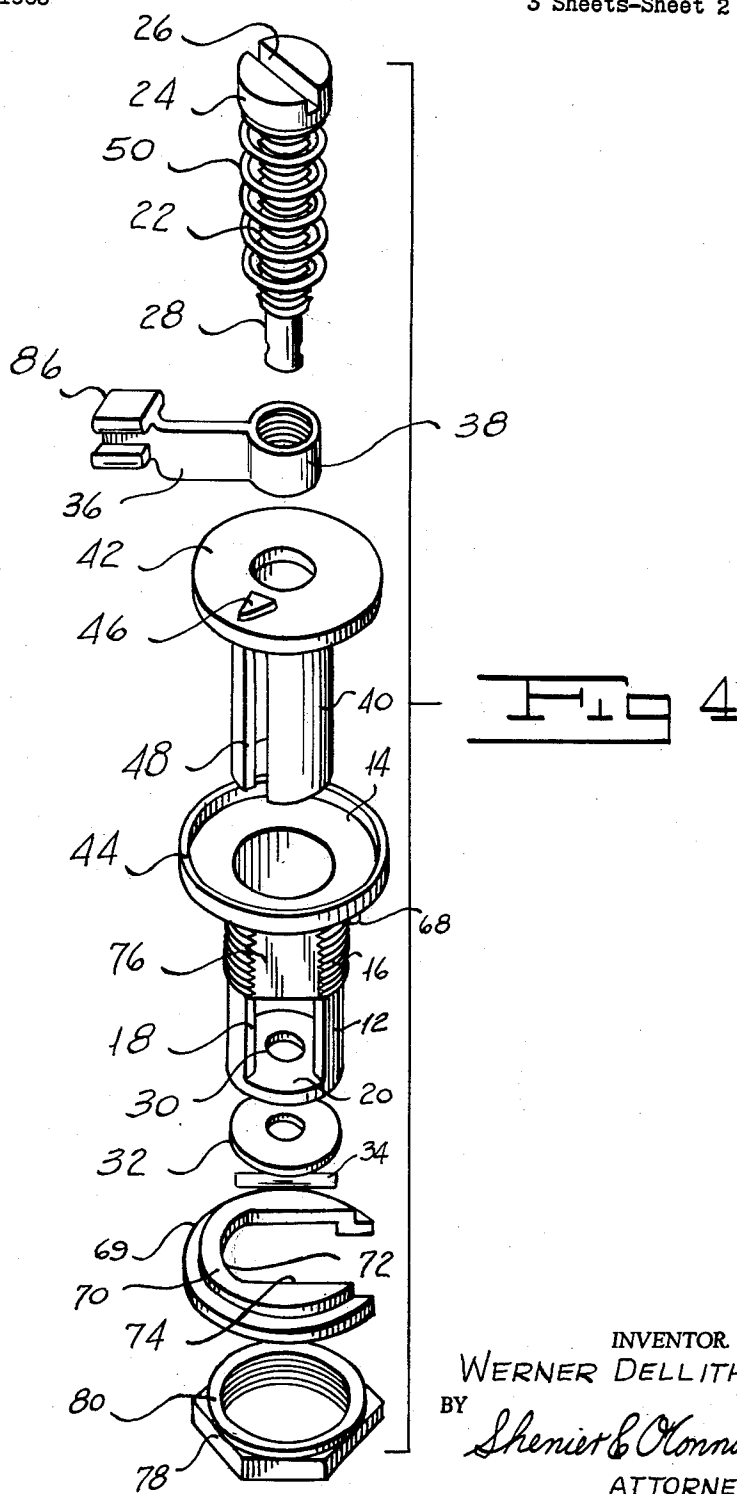
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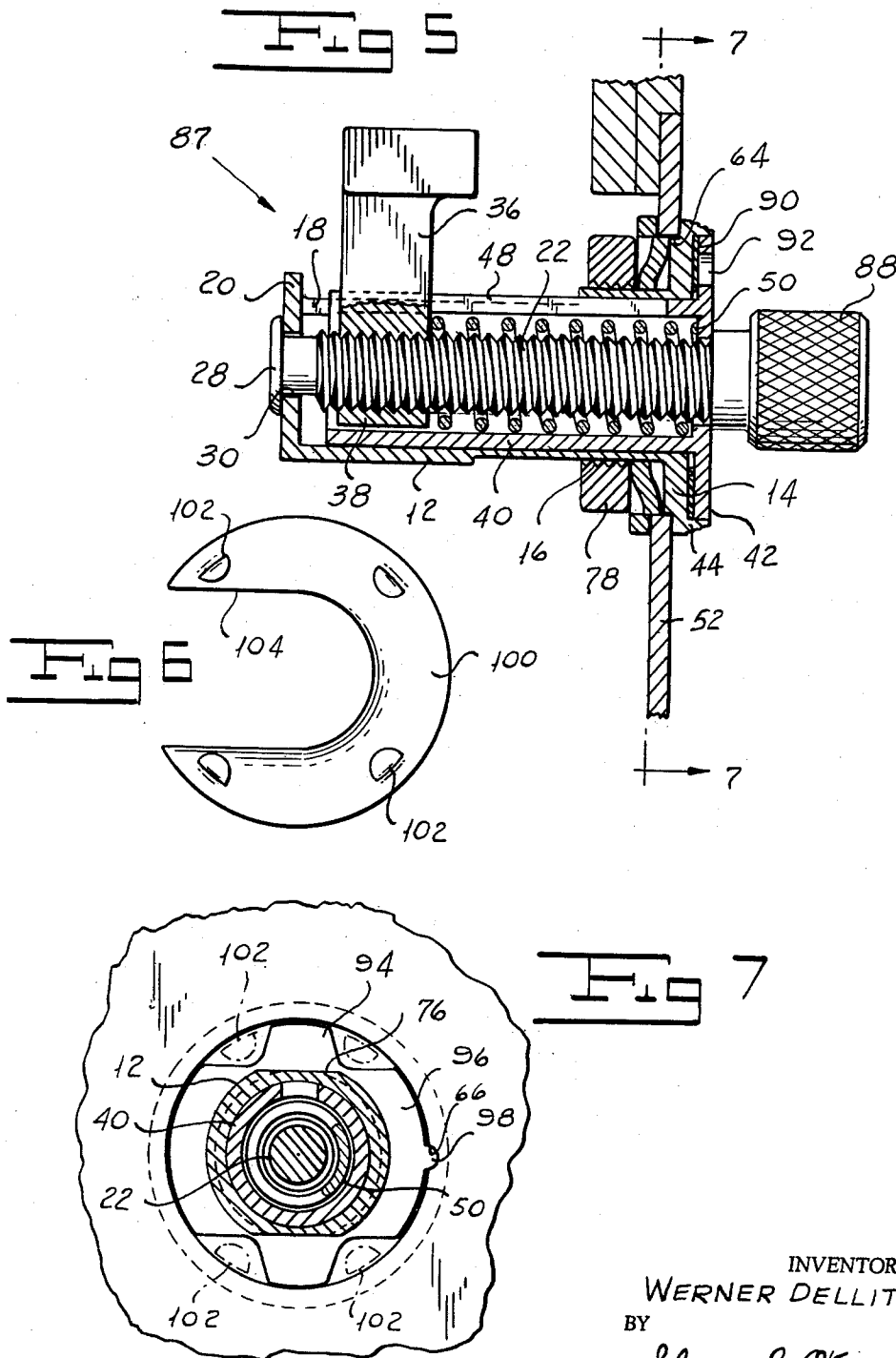
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3 Sheets-Sheet 3



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3,146,010

READILY DEMOUNTABLE PAWL LATCH

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3 Claims. (Cl. 292—212)

My invention relates to a readily demountable pawl latch and more particularly to an improved mounting for permitting blind latch fasteners to be engaged with the proper orientation in a rapid and expeditious manner and to be readily opened.

There are known in the prior art latch assemblies for securing members against relative movement. In many instances the latching assembly is hidden from view as it is actuated to move the latch from a released position to a locked position. That is the latches engage the inside of the frame of one of the members and are operated from outside the member providing the frame. Typical examples of such uses are on electronic cabinets, for office machines and to secure removable panels over openings in an aircraft. In such installations it cannot readily be determined from outside whether or not the latch is in its latched position. If for any reason the latch is tightened when it is not in its latched position then the parts may accidentally be disengaged. To avoid this result most latches of the prior art are provided with an externally visible indicator which informs the operator of the position of the latch. Thus if he tightens the latch down thinking that it is in its latching position in engagement with the inside of the frame when such is not the case, he can observe the indicator and be informed that the latch has not been properly fastened. Alternatively the latch assembly may be so constructed that the latch cannot be moved into and tightened in an inoperative position.

It is customary in the prior art to employ rivets for securing latch assemblies in panel openings. In order that the external indicator perform its intended function care must be taken to locate the assembly properly with respect to the opening. Even if the type of latch which does not require an indicator is used it must be installed with such an orientation that it will perform its intended function. If this is not done it could happen that the assembly would be installed in such a condition that a false indication of the position of the latch would be given or the latch would be inoperative. The use of rivets to secure the latch assembly to the panel is a relatively difficult and time-consuming operation. Moreover, an installation of this type is permanent so that the latch assembly cannot be removed without damage to its parts if it is or if it becomes defective.

I have invented a readily demountable pawl latch which permits a blind fastener to be rapidly and expeditiously secured in a panel opening with the proper orientation. My pawl latch does not require the use of rivets or the like for securing it in the panel opening. My pawl latch is readily demountable in the event it becomes necessary or desirable to replace the assembly.

One object of my invention is to provide a readily demountable pawl latch which can be assembled in a panel opening in a rapid and expeditious manner.

Another object of my invention is to provide a readily demountable pawl latch which can easily be installed in a mounting opening with the correct orientation.

A further object of my invention is to provide a readily demountable pawl latch which can be removed from its mounting and replaced without damage to any of its parts.

Still another object of my invention is to provide a readily demountable pawl latch which can be removed

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from its mounting and replaced in a rapid and expeditious manner.

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

In general my invention contemplates the provision of a readily demountable pawl latch for securing a movable member to a frame in which a cylindrical latch housing carrying the latch for limited rotary movement has a head adapted to fit over a mounting opening through which the housing extends. I provide the head with a locating boss which fits into a cavity in the side of the mounting opening accurately to locate the latch assembly with reference to the axis of rotation of the latch. A centering washer cooperates with the housing to center it in the opening with the locating boss in the cavity. When a nut is tightened to hold the parts in this position the latch indicator is properly oriented.

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:

FIGURE 1 is a fragmentary partially exploded view of my readily demountable pawl latch and its mounting panel.

FIGURE 2 is a sectional view of my readily demountable pawl latch with parts broken away.

FIGURE 3 is an end view of my readily demountable latch taken along the line 3—3 of FIGURE 2.

FIGURE 4 is an exploded perspective view of my readily demountable pawl latch.

FIGURE 5 is a sectional view of a modified form of my readily demountable pawl latch.

FIGURE 6 is a plan view of an alternate form of centering washer of my readily demountable pawl latch.

FIGURE 7 is a fragmentary sectional view of the modified form of my readily demountable pawl latch taken along the line 7—7 of FIGURE 5.

Referring now to the drawings the latch assembly indicated generally by the reference character 10 of my readily demountable pawl latch includes a cylindrical housing 12 having a head 14 which, as will be described hereinafter, fits over a panel opening. I form a portion of the housing 12 adjacent the head 14 with external threads 16 for receiving a nut to be described hereinafter. I provide the housing 12 with an opening 18 extending from the threads 16 towards the lower end 20 of the housing 12. Housing 12 receives a screw or bolt 22 having a head 24 provided with a notch or slot 26 for the reception of a suitable tool such as a screwdriver or the like. The reduced end 28 of the screw 22 extends through an opening 30 in the base 20 of the housing and through a spring washer 32. A crosspin 34 bears against the washer 32 to hold the screw in position within the housing.

The pawl 36 of the assembly 10 extends through the opening 18 and as a hub 38 provided with internal threads which engage the threads of the screw 22. The arrangement is such that in response to a turn of the screw 22 pawl 36 moves with the screw until the pawl engages an edge of the opening 18. Upon continued movement of the screw the latch 36 travels along the screw axis in one direction or the other depending upon the direction of rotation of the screw. I so arrange the opening 18 that only about 90° of movement of the pawl 36 around the axis of the screw is permitted so that the pawl can move from a latching position to a released position.

In one form of latch assembly with which my fastener assembly 10 is used an indicator operator made up of a barrel 40 disposed within the housing 12 has a head 42 disposed within a peripheral flange 44 formed on a head 14 of the housing. Any suitable indicator such, for example, as an arrowhead 46 embossed on the head 42 may be provided to indicate the position of the pawl 36.

The pawl 36 extends through a slot 48 in the barrel 40. A spring 50 bears between the pawl hub 38 and the underside of head 42. Slot 48 is slightly wider than the pawl 36 is thick. Owing to this arrangement the barrel 40 and its head 42 will rotate with the latch within the limits of opening 18. The arrowhead 46 or the like is aligned with the slot 48 so that the arrowhead always indicates the position of the pawl 36.

One application of the fastener assembly 10 is to secure a panel 52 in a recess 54 surrounding an opening 56 in an aircraft or the like. In such an installation the plate or panel 52 may be provided with a retainer flange 60 secured to the plate by any suitable means such as by rivets 62 and adapted to slip over the lower edge of the opening 56 when the panel 52 is positioned in the recess 54.

The panel 52 is provided with an opening 64 of such a size as will permit the pawl 36 and the housing 12 to be inserted through the opening while permitting the head 14 to cover the opening. I form the opening 64 with a recess or notch 66 at the edge thereof. The underside of the head 14 carries a boss or projection 68 which engages in the recess 66 when the fastener assembly is properly oriented with reference to the axis of rotation of the screw 22.

Owing to the fact that the opening 64 is made large enough to permit the passage therethrough of the latch and housing, after this has been done and the projection 68 is located in recess 66 the housing 12 is relatively loose in the opening. I provide my assembly with a centering washer 69 having a boss 70 of the same diameter as that of the opening 64. Washer 69 has a slot or opening 72 with straight sides 74 adapted to engage flat portions 76 formed on diametrically opposite sides of the threaded portion 16 of the housing 12. Once the pawl 36 and the housing 12 have been inserted through the opening the washer 69 is slid over the housing with the straight sides 74 in engagement with the flat portions 76, the parts are manipulated until the housing 12 is centered in the opening 64 as the boss 70 rides into the opening 64 and until the projection 68 comes to rest in the recess 66.

The threaded portion 16 of the housing 12 carries a nut 78 provided with a boss 80 adapted to engage a seat 82 formed in washer 69 to hold the parts in their assembled position on the panel 52. The interior surface of the skin 58 carries a block 84 adapted to be engaged by a head 86 on the pawl 36 when the pawl is in its latching position.

In mounting my assembly 10 on the panel 52 I first pass the pawl 36 and the housing 12 through the opening 64 and then slide the washer 69 on to the housing 12 with the straight sides 74 of the slot 72 engaging the flat portions 78 of housing 12. I so orient the washer 69 that its locating boss 70 finds the opening 64. I now move the parts until the boss 70 engages in the opening 64 and until the boss or projection 68 comes to rest within the recess 66. Next the nut 78 is turned down toward the washer 69 until its boss 80 is firmly engaged in the seat 82 to hold the assembly 10 securely on the panel.

Referring now to FIGURES 5 to 7 I have shown a modified form of my readily demountable pawl latch in which I have indicated like parts to those shown in FIGURES 1 to 4 by the same reference characters. This form of my invention indicated generally by the reference character 87 includes the cylindrical housing 12 having the recessed head 14 and external threads 16 for receiving the nut 78. The screw 22 has a knurled head 88 for turning the screw. The reduced end 28 of the screw 22 extends through the opening 30 in the end 20 of housing 12 and is upset to retain the screw within the housing while permitting the screw to be rotated. The barrel 40 disposed within the housing 12 has a slot 48 through which the pawl 36 extends from the hub 38, threadably received by the screw 22. The spring 50 bears between the head 42 on the barrel 40 and the hub 38.

Rather than employing an embossed arrowhead 46 as the indicator in the form of my invention shown in FIGURE 5, I dispose a colored plastic washer 90 in the recess of the head 14 underneath the head 42. Head 42 has an opening through which the plastic washer 90 can be viewed so that the position of the pawl 36 can readily be determined by observing the hole 92, which is made apparent by the colored washer 90.

In the form of my invention shown in FIGURES 5 to 7 I form the underside of the head 14 with pairs of bosses 94 and 96 adapted to engage in the opening 64 in the frame when the latch 86 is assembled on the frame. These bosses assist in centering the assembly in the hole. One of the bosses 96 carries a projection 98 which engages in the notch 66 to orient the assembly with respect to the axis of rotation of the screw 22. Rather than employing a locating washer such as the washer 69 having a boss 70 shown in FIGURES 1 to 4, I employ a washer 100 stamped out of suitable material and provided with a plurality of locating lugs 102 punched out of the material in the course of formation of the washer 100. The washer 100 is provided with a flat-sided slot 104 adapted to engage the flat portions 76 of the housing 12. It will readily be apparent that the lugs 102 are disposed on the locus of a circle having a diameter which is substantially equal to the diameter of the hole 64. Further with the washer properly positioned and with the assembly correctly oriented in the hole, the washer lugs 102 are disposed in the spaces between adjacent bosses 94 and 96 as indicated by the broken lines in FIGURE 7.

In use of the form of my fastener shown in FIGURES 1 to 4 to secure the panel 52 in the recess 54, for example, head 24 is first turned in a counterclockwise direction as viewed in FIGURE 1 until the arrowhead 46 points to the left. The panel 52 next is inserted in the recess 54. In the course of this operation if the panel is provided with a flange 60 this flange is slipped over the lower edge of the opening 56. It will readily be appreciated that if desired the flange 60 could be eliminated and another assembly 10 could be used at the lower edge of the panel.

With the parts in this position I turn the head 24 in a clockwise direction as viewed in FIGURE 1 until the arrowhead 46 points up. With the arrowhead in this position I know that the head 86 is in position behind the frame 84. Upon continued rotation of the screw 22 in this direction the pawl 36 is drawn toward the frame 84 until the panel 52 has been tightened to the desired degree in the recess 54. It will readily be apparent that no further movement of the pawl 36 with the screw 22 is permitted owing to the engagement of the pawl 36 with the edge of the opening 18.

If for any reason it becomes necessary or desirable to remove the assembly 10 from its installed position on the panel 52 I first remove the panel by loosening the latch and then move it to its released position. Next the nut 78 can be backed off to free the locating washer 69 which is then removed. When this has been done the assembly 10 can be moved bodily out of the opening 64. The use of the form of my invention shown in FIGURES 5 to 7 will readily be understood from the description given hereinabove.

It will be seen that I have accomplished the objects of my invention. I have provided a readily demountable pawl latch which permits a latch assembly to be installed in a mounting opening with the correct orientation of the latch and an external indicator in a rapid and expeditious manner. My assembly accomplishes this result while ensuring that the latch assembly is properly oriented. My readily demountable pawl latch permits the latch assembly to be readily removed and replaced as necessary or desirable.

It will be understood that certain features and sub-combinations are of utility and may be employed without reference to other features and subcombinations. This is

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contemplated by and is within the scope of my claims. 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. Apparatus for mounting an assembly on a support, said assembly comprising a housing provided with a head and a member mounted for limited rotary movement with respect to said housing around an axis passing through said support including in combination means forming an opening in said support, said opening having a size sufficient to permit the passage of said member and said housing through said support while preventing the passage of said head through said support, interengageable means on said head and on said support for providing a predetermined orientation of said housing around the axis of said support, a centering washer having a boss substantially equal to the dimension of said opening and adapted to fit in said opening and interengageable means on said housing and said washer whereby said washer centers said assembly in said opening.

2. Apparatus for mounting an assembly on a support, said assembly comprising a housing provided with a head and a member mounted for limited rotary movement with respect to said housing around an axis passing through said support including in combination means forming an opening in said support, said opening having a size sufficient to permit the passage of said member and said housing through said support while preventing the passage of said head through said support, interengageable means on said head and on said support for providing a predeter-

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mined orientation of said housing around the axis of said support, a centering washer having a boss substantially equal to the dimension of said opening and adapted to fit in said opening, interengageable means on said housing and said washer for preventing relative movement of said assembly and said washer and a nut carried by said housing for securing said washer and said assembly in said opening.

3. Apparatus for mounting an assembly on a support, said assembly comprising a housing provided with a head and a pawl mounted for limited rotary movement with respect to said housing around an axis passing through said support, said head carrying an indicator for indicating the position of said pawl including in combination means forming an opening in said support, said opening having a size sufficient to permit the passage of said pawl and said housing through said support while preventing the passage of said head through said support, interengageable means on said head and on said support for providing a predetermined orientation of said housing around the axis of said support and means for centering said assembly in said opening.

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