United States Patent [19]

Sopko, Jr. et al.

[11] **3,727,110**

[45] **Apr. 10, 1973**

[54] **MOUNTING ASSEMBLY FOR PLUG IN TIMING DEVICES**

[75] Inventors: **Bernard J. Sopko, Jr.**, Fairfield; **Frank J. Papa, Jr.**, Montville, both of N.J.

[73] Assignee: **Industrial Timer Corporation**, Parsippany, N.J.

[22] Filed: **Feb. 28, 1972**

[21] Appl. No.: **229,925**

[52] **U.S. Cl.** **317/120**, 214/99

[51] **Int. Cl.** **H02b 1/08**

[58] **Field of Search** ..... 317/99, 101 C, 101 B, 317/104, 107, 109, 110, 111, 119, 120, 104, 101 R, 118, 105; 339/123, 125 R, 126 R; 174/52, 58, 50; 248/27; 338/197

[56] **References Cited**

UNITED STATES PATENTS

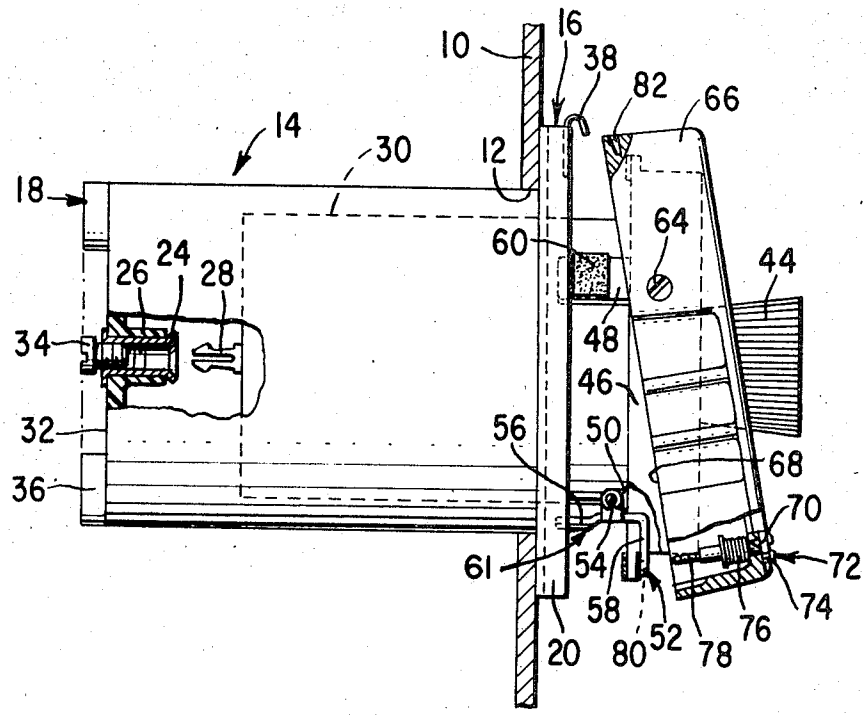
3,054,023	9/1962	Blecker et al.	317/99
3,093,773	6/1963	Cole	317/99 X
3,434,013	3/1969	Kadah	317/99
2,585,887	2/1952	Woodward	248/27 X
3,201,786	8/1965	Andersen et al.	317/118 X
3,277,234	10/1966	Dekko et al.	339/126 R X
3,408,617	10/1968	Broyles	339/126
3,446,467	5/1969	Bailey et al.	248/27
3,620,404	11/1971	Grasso	174/58 X

Primary Examiner—Richard B. Wilkinson
Assistant Examiner—U. Weldon
Attorney—Marshall J. Breen et al.

[57] **ABSTRACT**

A mounting assembly for an electrical timing device including a cylindrical receptacle having a plurality of sockets adapted to receive a plurality of electrical terminal pins mounted on the rear of the timing device. The receptacle includes a panel mounting flange disposed about the open end thereof and having a latch member thereon. The electrical timing device includes a dial housing on which is pivotably mounted a bezel. The bezel is provided with a recess so that when the timing device is inserted within the receptacle the recess is gripped by the latch and the bezel then acts as an engaging lever for forcing the timing device into the receptacle so that the pins are properly inserted into the socket. The dial housing has a plurality of gripping members which engage the inner wall of the receptacle when the device is properly inserted. A clamping screw held captive in the bottom of the bezel engages a pivotable one of the gripping members and as the screw is threaded into the member it provides an outward locking force between the inside of the receptacle and the gripping members.

10 Claims, 4 Drawing Figures



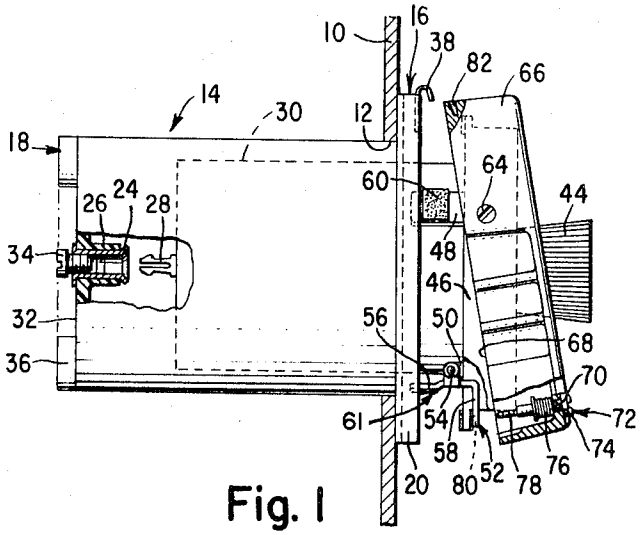


Fig. 1

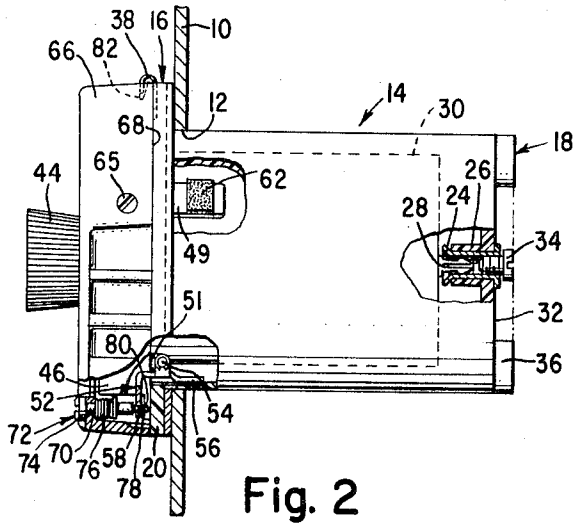


Fig. 2

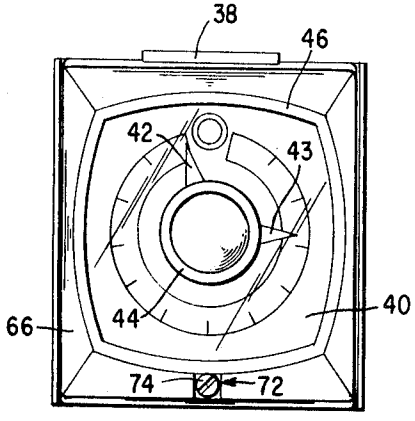


Fig. 3

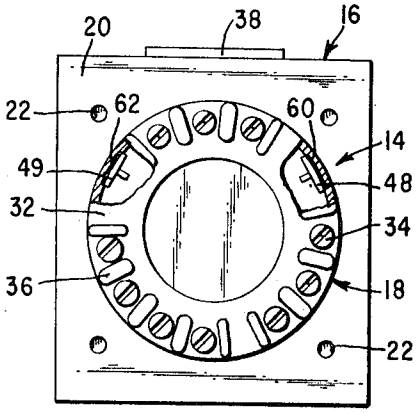


Fig. 4

MOUNTING ASSEMBLY FOR PLUG IN TIMING DEVICES

BACKGROUND OF THE INVENTION

This invention relates to electrical instruments which can be installed and removed rapidly and easily from an instrument panel without rewiring the electrical circuits controlled by the device.

More particularly the invention relates to a mounting arrangement by which electrical instruments may be positively mounted in an instrumental control panel quickly and properly and can quickly and simply be removed for replacement and servicing.

Prior art devices such as those disclosed in U.S. Pat. Nos. 3,054,023 and 3,434,013 disclose panel mounted electrical instruments of the plug-in type which are adapted to fit within a mounting case permanently installed in a control panel. However, these prior art mounting arrangements require that the mounting case be specifically designed and fitted for the particular electrical instrument design. The present invention however provides an assembly by which the electrical instrument may be fitted within a plurality of and various designs of previously installed mounting cases. This is accomplished by the provision of a plurality of pressure or gripping members on the instrument which act against the inner periphery of the mounting case, and means to provide a locking force between the inside of the case and the gripping members.

A further aspect of the invention lies in the provision of a bezel member which is pivotably mounted on the dial housing and which can act as an engaging and disengaging lever for inserting or removing the timing device into or out of a case provided with a mounting flange including a latching member to complement a latching member on the bezel. The complemental latches first act as a fulcrum so that the remainder of the bezel acts as a lever as it is pressed against the flange to pivot about the dial housing. This drives the electrical contacts on the rear of the timer into engagement with sockets in the rear of the case to make proper electrical connection.

Therefore it is an object of the invention to provide an electrical instrument assembly which may be rapidly inserted into a mounting case and properly locked into position.

It is another object of the invention to provide a mounting assembly for plug-in electrical instruments in which a pivotable bezel acts in conjunction with a plurality of mounting case clamping elements to provide for rapid insertion or withdrawal of the instrument from a control panel.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other features and objects of the invention will appear more fully from the following detailed description taken in conjunction with the accompanying drawings in which:

FIG. 1 is an elevational view partially broken away and cross sectioned illustrating an electrical instrument assembly partially inserted within a panel mounted mounting case;

FIG. 2 is an elevational view of the assembly of FIG. 1 taken from the opposite side and illustrating the assembly in the installed position in the mounting case;

FIG. 3 is a front view of a mounted assembly; and

FIG. 4 is a rear view of a mounting case.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings, wherein like numerals designate similar parts, there is shown an instrument control panel **10** within which is cut a circular opening **12** for receiving a cylindrical mounting case **14**. The mounting case has a forward open end **16** and a rear closed end **18** and includes a flange mounting or backing plate **20** rigidly disposed about the front end. The flange is secured to the instrument panel by conventional means such as screws (not shown) received in holes **22** formed in the flange. The closed end of the mounting case includes a plurality of female plug-in inserts or sockets **24** permanently fixed in bosses **26** formed in the rear wall of the case. The sockets receive a similar number of male terminal prong-type plugs or pins **28** extending from the rear of an electrical instrument **30** which is adapted to be mounted within the case. The rear of the closed end of the case includes a terminal block **32** for mounting a plurality of terminal screws **34** separated by insulating barriers **36**. The screws **34** are threaded into the rear of the sockets **24** for providing electrical connections to external circuits controlled by the instrument **30**. Fixed on the top of the forward facing surface of the mounting flange **20** is a latching member **38** having a protruding curved lip, for purposes which will hereinafter be understood.

The electrical instrument **30**, which for illustration purposes is shown as a timing mechanism, includes an indexed dial **40** and a pair of timing pointers **42** and **43**. A time setting knob **44** is located in the center of the dial for setting the time delay interval of the instrument. The dial pointers and knob are mounted within a dial housing or chassis **46** which encases the dial and pointers and is rigidly secured to the remainder of the instrument **30** and to the terminal pins **28**. Projecting rearwardly from the dial chassis **46** is at least a pair of arcuately shaped ears **48** and **49**. Also formed on the rear of the dial chassis is a pair of smaller spaced ears **50** and **51** within which a bell crank lever **52** is pivotably mounted by means of a pivot pin **54** extending between the ears **50** and **51**. The bell crank lever **52** includes a first leg **56** extending rearwardly in the longitudinally direction of the timing device, and a second leg **58** which is substantially perpendicular to the first leg **56** extending downwardly substantially parallel to the rear of a dial housing when the instrument is in the installed position within the mounting case. Each of the ears **48** and **49**, and the leg **56** of the bell crank lever may include on its outwardly extending surface a piece of abrasive material **60**, **61** and **62** respectively which is adapted to frictionally grip and hold the inner surface of the mounting case when the instrument is properly installed as hereinafter described. The bell crank lever **52**, which acts as a pivot latch, and the ears **48** and **49** are substantially equally spaced about the rear of the dial chassis **46** and define three points of a circle whose diameter is substantially that of the interior wall of the mounting case. It is of course understood that since the bell crank can pivoted about the pin **54** the circle defined by the ears **48** and **49** and the leg **56** of the bell crank is variable to a certain extent, as will be understood.

Pivotably mounted by means of pivot studs **64** and **65** is a substantially rectangular bezel member or dial frame **66** which includes on its rear facing peripheral

edge a substantially planar surface **68**. When the instrument is properly mounted within the case, the mounting surface **68** abuts the flange **20** so that the spacing from the pins **28** to the mounting surface **68** is substantially equal to the spacing from the sockets **24** to the flange **20**. Thus, when the mounting surface **68** abuts the flange **20** the pins **28** are properly inserted and make proper electrical contact with the sockets **24**. Captively held within a slightly oversized hole **70** in the bottom portion of the front of the bezel is a clamping screw **72** having the head thereof **74** projecting from the outer surface of the bezel. A spring **76** surrounds the screw and abuts the rear of the front bezel surface. The spring is secured to the screw and thereby locks the screw in the hole **70** while allowing limited movement thereof. The rear end of the screw is threaded as shown at **78** and is adapted to be received within a threaded hole **80** tapped in the leg **58** of the bell crank **52**. Formed adjacent the rear edge of the top surface of the bezel is a recess **82** which is adapted to receive the latch **38** and complement the same when the bezel is in the installed position.

Upon insertion of the timing device **30** into the mounting case receptacle, the bezel **66** is rotated about the pivot studs **64** and **65** to the position shown in FIG. **1**. The timing device **30** is then pushed into the case until the recess **82** of the bezel engages the latch **38**. The bezel is then depressed at the bottom thereof, which acts as a lever about the pivot studs, to force the timer into the mounting case and to positively insert the pins **28** into the sockets **24** as the mounting surface **68** of the bezel fully engages the flange **20**. As the bezel rotates into a vertical position, the clamping screw **72** engages the threaded hole **80** of the bell crank arm **56**. The clamping screw is then tightened which causes the bell crank to rotate counterclockwise as seen in FIG. **1** (clockwise in FIG. **2**). The arm **56** engages the interior wall of the mounting case and exerts a force on the inside of the case. This causes a clamping pressure to be exerted between the inside case and the three gripping surfaces **60**, **61** and **62**, thereby to force these elements into a frictional clamping relationship with the interior of the mounting case. The screw **72** is turned until the reaction forces prevent further movement of the bell crank and the device is firmly locked into the case.

The timing device may also be locked into any suitable cylindrical container without the use of the engaging recess **82** and the latch **38** by solely employing the clamping screw **72**. Threading the screw into the hole **80** of the pivot latch bell crank **52** exerts a clamping force on the gripping tabs **60**, **61** and **62** as outlined above.

To remove the timing device, the above procedure is reversed and the bezel is lifted upwardly from the bottom, pivoting about the pivot studs **64** and **65**. The bezel thereby acts as a lever and disengages the pins **28** from the sockets **24** as the timing device is removed from the case assembly.

Numerous alterations of the structure herein disclosed will suggest themselves to those skilled in the art. However, it is to be understood that the present disclosure relates to a preferred embodiment of our invention which is for purposes of illustration only and not to be construed as a limitation of the invention. All such modifications which do not depart from the spirit of the invention are intended to be included within the scope of the appended claims.

Having thus described the nature of the invention, what We claim herein is:

1. An electrical instrument assembly adapted to be mounted in a receptacle having a plurality of electrical sockets in a closed end thereof and a mounting flange at the receptive end, said assembly comprising a dial chassis, a bezel attached to said chassis and supported thereby, said bezel including a mounting surface facing said receptacle, a plurality of electrical terminal pins, means secured to said chassis for rigidly supporting said pins spaced from said mounting surface, said pins being supported on said chassis for alignment and mating engagement with said sockets when the assembly is inserted into said receptacle with said surface abutting said flange, a plurality of pressure elements circumferentially spaced about said chassis and facing opposite adjacent inner peripheral surface portions of said receptacle, and means on chassis for forcing each of said elements into frictional clamping engagement with the respective peripheral portion thereby to lock the assembly in said receptacle.

2. An assembly as recited in claim **1** wherein said means for forcing each of said elements into frictional clamping engagement includes means pivotably mounting at least one of said pressure elements on said chassis for pivotal movement relative to the adjacent peripheral portion of said receptacle, and means mounted in said bezel for pivoting said one element into abutment with said adjacent peripheral portion and for locking said element against further movement when the peripheral portion prevents further movement of said one element.

3. An assembly as recited in claim **2** wherein said pressure element comprises a first leg of a bell crank lever, said means for pivoting and locking said pressure element includes a screw captively held in said bezel, a second leg of said bell crank lever having means defining a threaded hole for receiving said screw and positioned relative to said first leg to turn the first leg toward the peripheral portion when said screw is advanced into said hole.

4. An electrical instrument mounting assembly comprising a receptacle having an open end for receiving an electrical instrument and a closed end, a panel mounting flange disposed about the open end, electrical sockets in said closed end for receiving electrical terminal pins, an electrical instrument adaptable for insertion into said receptacle, said instrument having electrical terminal pins on its rearward end disposed for alignment and mating engagement with said sockets when said instrument is inserted into said receptacle and a dial housing at its forward end, a bezel having a rearwardly facing mounting surface attached to said housing, a plurality of pressure elements circumferentially spaced about said instrument and disposed to face adjacent inner peripheral portions of said receptacle when the instrument is within said receptacle, and means on said housing for forcing each of said elements into frictional clamping engagement with its respective peripheral portion when the bezel mounting surface abuts said mounting flange thereby to lock the instrument in the receptacle.

5. An instrument mounting assembly as recited in claim 4 wherein said element forcing means includes a member mounted in the bezel and actively engageable with at least one of said pressure elements when said mounting surface abuts said mounting flange, means for pivotably mounting said one element for movement into engagement with the peripheral portion of the receptacle when acted upon by said member.

6. An instrument mounting assembly as recited in claim 4 including means for pivotably mounting said bezel on said housing for permitting one edge of said mounting surface to abut with said panel mounting flange prior to abutment by the remainder of said mounting surface, said bezel and panel mounting flange having complementary latching means actively engageable prior to abutment of the entire mounting surface with said flange, whereby the remainder of said mounting surface may be positioned in abutting relationship with said flange by application of a turning force to said bezel thereby to positively insert said pins in said sockets.

7. An instrument mounting assembly as recited in claim 6 wherein said element forcing means includes means pivotably mounting at least one of said pressure elements on said housing for pivotal movement relative to the adjacent peripheral portion of said receptacle, and means mounted in said bezel for pivoting said one element into abutting relationship with said adjacent peripheral portion and for locking said element against further movement when the peripheral portion prevents further movement of said one element.

8. An instrument mounting assembly as recited in claim 7 wherein said one pressure element comprises a first leg of a bell crank lever, said means for pivoting and locking said pressure element includes a screw captively held in said bezel, a second leg of said bell crank lever having means defining a threaded hole for receiving said screw and positioned relative to said first leg to turn the first leg toward the peripheral portion when said screw is advanced into said hole.

9. An instrument mounting assembly as recited in claim 8 wherein said complementary latching means comprises a protruding lip adjacent the top of said flange, and a recess formed in the top of said bezel.

10. An instrument mounting assembly as recited in claim 9 wherein said receptacle is a cylinder and said pressure elements are arcuate.

* * * * *