Feb. 8, 1966 S. GODEL 3,233,299

PANEL MOUNTED DEVICES

Filed March 6, 1964

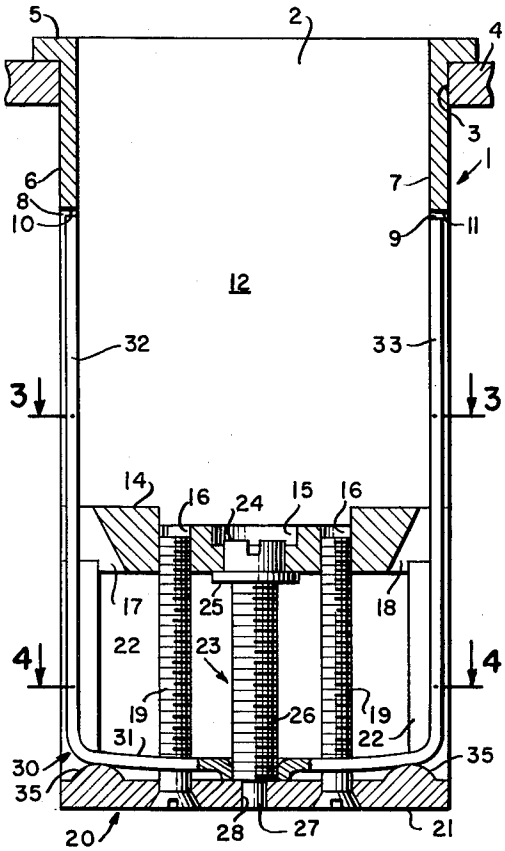

FIG. 1.

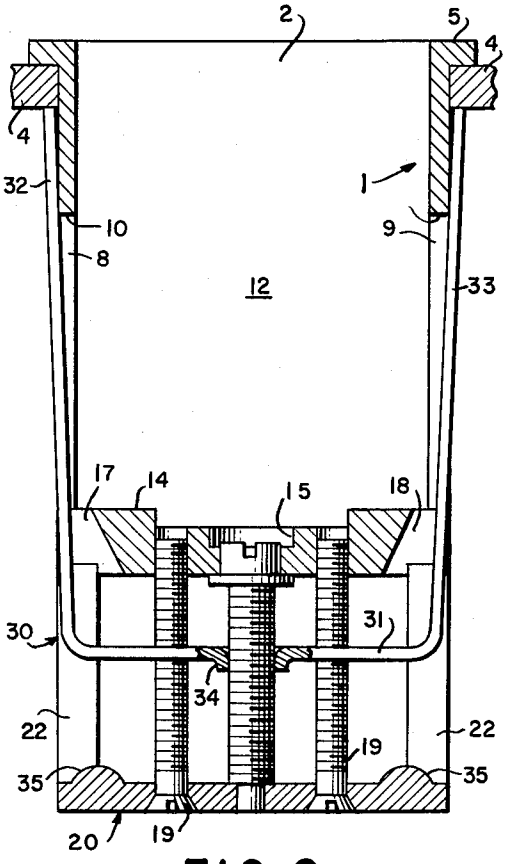

FIG. 2.

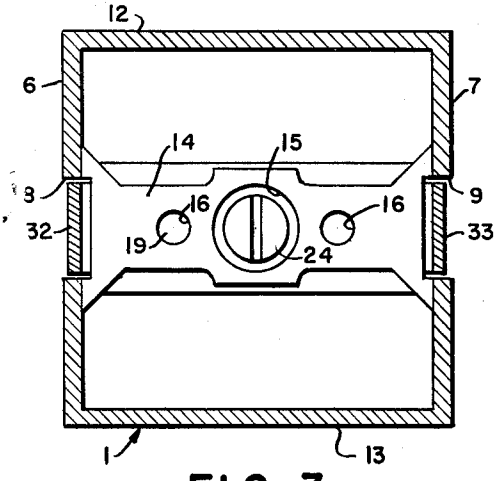

FIG. 3.

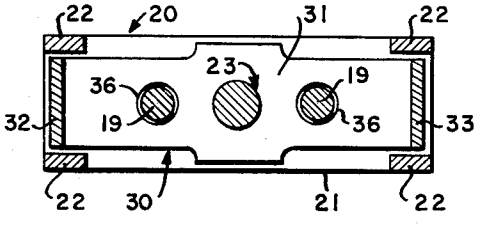

FIG. 4.

INVENTOR

Siegfried Godel

BY Arnold, Loyland & Harris

ATTORNEYS

United States Patent Office 3,233,299 Patented Feb. 8, 1966

3,233,299

PANEL MOUNTED DEVICES

Siegfried Godel, Norwalk, Conn., assignor to American Machine & Foundry Company, a corporation of New Jersey

Filed Mar. 6, 1964, Ser. No. 350,033
4 Claims. (Cl. 24—211)

This invention relates to panel mounted devices, and more particularly to devices of the type adapted for mounting in an opening of a supporting panel without requiring manual holding or manipulation of portions of the device not readily accessible from in front of the panel.

Numerous modern fields of application require small devices to be mounted in the opening of a supporting panel, with the device being rigidly secured to the panel by mounting means which is easily operated and which at most occupies a minimum of the frontal area of the panel. Typical of devices of this general type are the illuminated indicators disclosed and claimed in copending application Serial Number 349,982, filed concurrently herewith by Lester Miller, Jr.

Though it is highly desirable to design devices of this type with mounting means which can be manipulated entirely from in front of the supporting panel, numerous difficulties have been encountered in attempts to devise satisfactory mounting means of this type. Such difficulties arise from the fact that the devices are frequently quite small, with a concurrent requirement that the cost of manufacture be kept reasonably low while still achieving high reliability. Further, the devices to which such mounting means must be applied are usually quite complicated, even though small in size, so that it has been difficult to incorporate satisfactory mounting means without either requiring an increase in size of the device or imposing some limitation on the design of the device itself in order to accommodate the mounting means. Finally, there has been a general requirement that the mounting means be easily releasable, still from in front of the panel, so that the mounted device can be removed through the opening in the panel within which the device was accommodated.

A general object of this invention is to provide improved mounting means for securing indicators, switches, and like devices to a supporting panel, the mounting means being easily operated wholly from in front of the panel to accomplish secure mounting or quick release.

A further object is to provide mounting means of the type described wherein operation of the mounting means, both for securing the mounted device and for releasing the same, is accomplished simply by rotation of a single actuating screw.

Another object is to provide such mounting means characterized by more positive actuation to release condition than has heretofore been achieved.

Stated generally, devices in accordance with the invention employ an elongated hollow housing having an open front end portion to be accommodated by an opening in the supporting panel. Accessible through the open front of the housing is a clamp actuating screw which is mounted for free rotation but restrained against rearward movement relative to the housing. A clamp member having a transverse base and forwardly extending legs is employed, the base portion being provided with thread means engaged with the screw in such manner that rotation of the screw in one direction drives the clamp member forwardly relative to the housing while rotation of the screw in the opposite direction drives the clamp member rearwardly relative to the housing. This clamp member is of resilient material

and has a normal or relaxed configuration such that the forwardly extending legs thereof project outside of the housing so that, when the clamp member is driven forwardly, the tips of the legs can be brought into engagement with the rear face of the supporting panel, the panel then being clamped between the legs of the clamp member and suitable flange or shoulder means provided at the front of the housing and engaged with the front of the panel. Disposed behind the base of the clamp member is a stop having transversely spaced portions arranged to be engaged by the ends of the base of the clamp member when the clamp member is driven to its limit of rearward movement. When the actuating screw is rotated in a direction to drive clamp member rearwardly, the base portion of the clamp member is forced against the stop and the clamp member is resiliently deformed to cause the legs to move inwardly into retracted positions which allow free withdrawal of the device through the opening in the panel via which the device was originally installed.

In order that the manner in which the foregoing and other objects are achieved in accordance with the invention can be understood in detail, particularly advantageous embodiments of the invention will be described with reference to the accompanying drawings, which form a part of this specification, and wherein:

FIG. 1 is a longitudinal sectional view of portions of a device equipped with clamp means constructed in accordance with one embodiment of the invention, the clamp means being illustrated in a position such that the clamping legs thereof occupy a nested, inactive position;

FIG. 2 is a longitudinal sectional view, similar to FIG. 1, but showing the clamp means in a position such that the clamping legs thereof are projected forwardly into engagement with the supporting panel;

FIG. 3 is a transverse sectional view taken on line 3—3 of FIG. 1; and

FIG. 4 is a transverse sectional view taken on line 4—4, FIG. 1.

Referring to the drawings in detail, a rigid hollow housing is indicated generally at **1**, this housing being suitable, for example, for supporting an illuminated indicator of the type disclosed and claimed in the aforementioned copending application Serial Number 349,982. Housing **1** is an integral structure of rectangular transverse cross-section, the front end portion **2** thereof being adapted to be accommodated in an opening **3** in the supporting panel **4**. The panel is of uniform transverse cross-section through its length and is provided at its front end with an outwardly projecting flange **5** which engages the front face of the supporting panel when the device is fully inserted through opening **3** from in front of the panel, it being noted that the transverse cross-sectional dimensions of the housing and opening **3** are such that the housing substantially completely fills opening **3**.

Opposed side walls **6** and **7** of the housing are provided with longitudinally extending slots **8** and **9**, respectively, which have closed front ends defined respectively by straight edges **10** and **11** lying in a common transverse plane spaced rearwardly from flange **5** by a distance materially greater than the largest thickness contemplated for panel **4**. Slots **8** and **9** are of plain rectangular form and have open rear ends. The remaining side walls **12** and **13** of housing **1** are continuous and uninterrupted. A transversely extending support member **14**, located at the rear of the housing, has its ends integrally connected to side walls **6** and **7**.

Support member **14** has a cylindrical central opening **15** the axis of which is coincident with the longitudinal

axis of the housing. On each side of opening 15, member 14 is provided with a pair of threaded openings 16. The ends of member 14 are notched, as indicated at 17 and 18 in FIGS. 1 and 2, these notches opening respectively into slots 8 and 9.

Mounted on support member 14, as by screws 19, is a combined support and stop structure indicated generally at 20. Structure 20 includes a transversely extending member 21 and four forwardly extending side projections 22, the tips of projections 22 being engaged in suitable notches provided at the rear of member 14. Structure 20 is clamped rigidly in place, screws 19 being engaged in threaded openings 16 so that structure 20 is forced forwardly and the tips of projections 22 are firmly held in the accommodating notches in member 14.

A clamp operating screw 23 is employed and, as seen in FIGS. 1 and 3, has a plain cylindrical head portion 24 rotatably engaged in opening 15 in member 14. Immediately adjacent to head portion 24, the screw has a transverse annular flange 25 engaged behind member 14. The screw further comprises an elongated threaded body 26 and a plain cylindrical unthreaded tip 27 which is of smaller diameter than body 26 and is journalled in a cylindrical opening 28 located at the center of member 21. Tip 27 joins the body of the screw at a transverse rearwardly facing shoulder which engages the front face of member 21 so that the screw is restrained against rearward movement relative to the housing. Forward movement of the screw relative to the housing is prevented by engagement of flange 25 with member 14.

Clamp member 30 is generally U-shaped and formed as an integral unit from stiff spring metal. Member 30 includes a base portion 31, which extends transversely of the housing and is disposed between members 14 and 21, and two forwardly projecting leg portions 32 and 33. Member 30 has a normal, relaxed configuration, seen in FIG. 2, such that base 31 is straight and legs 32 and 33 diverge forwardly and outwardly, with the spacing between the free tips of the legs being greater than the space between the outer surfaces of side walls 6 and 7 of the housing. At its center, base portion 31 of clamp member 30 has a circular opening and the initially flat material from which the clamp member is made is deformed cylindrically, providing a rearwardly extending projection 34, FIG. 2, which is threaded internally and engaged with the threads of screw 23. Accordingly, rotation of screw 23 in one direction will be effective to drive clamp member 30 forwardly relative to housing 1, while rotation of the screw in the opposite direction is effective to drive the clamp member rearwardly.

Near each of its ends, member 21 is provided with an integrally formed, forwardly extending abutment 35. Abutments 35 each present a forwardly exposed surface in the form of a part of a cylinder. The spacing between the two abutments 35 is such that, when the parts of the device are assembled as illustrated, each abutment 35 will be disposed behind a different end portion of base 31 of clamp member 30. Thus, the abutments 35 are remote from the central axis of the housing and are in close proximity to the respective junctures between the legs of clamp member 30 and the base 31 of the clamp member.

Base 31 of the clamp member is provided with a pair of circular openings 36, FIG. 4, each of which freely accommodates a different one of the mounting screws 19. Thus, the screws 19 serve to restrain clamp member 30 against rotational movement and keep the clamp member in a position such that legs 32 and 33 are aligned generally with slots 8 and 9, respectively.

Preparatory to installation of the device, the operator employs a screw driver to turn screw 23 in a direction driving clamp member 30 rearwardly, actuation of the screw being continued until base 31 of the clamp member is forced against abutments 35. A slight further rotation of screw 23 then serves to deform base 31 of the clamp member to cause the clamp member to assume

the shape seen in FIG. 1. Thus, legs 32 and 33 are tilted inwardly until the legs are parallel and each fully accommodated within the corresponding one of slots 8 and 9. The housing 1 can then be inserted through opening 3 in panel 4 until flange 5 engages the front of the panel. While holding the housing in this position from in front of the panel, the operator then rotates screw 23 in the opposite direction, so that clamp member 30 is driven forwardly and moves away from abutments 35. As soon as base 31 of the clamp member is disengaged from abutments 35, the clamp member springs back to its normal, relaxed configuration, seen in FIG. 2. Hence, legs 32 and 33 slant forwardly and outwardly through slots 8 and 9, respectively, so that the tips of legs 32 and 33 are now disposed outside of the housing. Further rotation of screw 23 then drives the clamp member forwardly, with the legs now moving outside of the housing, until the free tips of legs 32 and 33 engage the rear face of panel 4 and the panel is clamped firmly between the ends of legs 32 and 33 and the rear face of flange 5.

When it is desired to remove the device from the panel, it is only necessary to operate screw 23 to drive clamp member 30 rearwardly again, causing the base 31 thereof to come into engagement again with the abutments 35, so that the clamp member is deformed to bring legs 32 and 33 into their retracted positions within slots 8 and 9, respectively.

While one particularly advantageous embodiment of the invention has been chosen for illustration, it will be understood that various changes and modifications can be made therein without departing from the scope of the invention, as defined in the appended claims.

What is claimed is:

1. In a device of the type described adapted for mounting in an opening in a supporting panel, the combination of

a housing structure having

an open front end portion,

rigid shoulder means projecting laterally from said front end portion for engagement with the front of a supporting panel, and

side wall portions extending rearwardly from said front end portion;

a spring metal clamp member having

a base portion extending transversely of said housing, and

at least two leg portions each extending forwardly from a different point on said base portion, said points being spaced outwardly from the longitudinal axis of said housing and spaced angularly from each other,

said clamp member having a normal, relaxed configuration such that the forward ends of said leg portions are free to move forwardly outside of said housing structure;

an operating screw rotatably carried by said housing structure and extending at least generally along the longitudinal axis thereof,

said base portion of said clamp member being connected to said screw and said screw being operative to drive said clamp member forwardly relative to said housing structure when the screw is turned in one direction and rearwardly when the screw is turned in the other direction; and

spaced, rigid stop means carried by said housing structure and disposed behind said base portion of said clamp member to engage said base portion at points adjacent said leg portions,

turning of said screw in said one direction being effective to drive said clamp member forwardly into engagement with the panel on which said housing structure is to be supported, and turning of said screw in said other direction driving said clamp member rearwardly against said stop means and distorting said clamp member to

move the leg portions thereof inwardly into retracted position to allow the device to be removed forwardly through the opening in the supporting panel.

2. A device in accordance with claim 1 and wherein said housing structure is provided with a plurality of rearwardly opening, longitudinally extending slots each disposed to accommodate a different one of said leg portions,

distortion of said clamp member as a result of engagement with said stop means being effective to move said leg portions into the respective ones of said slots.

3. In a device of the type described adapted for mounting in a rectangular opening in a supporting panel, the combination of

a support structure including

two spaced side wall members each provided with an elongated rearwardly opening slot,

rigid shoulder means projecting laterally from the front end portions of said side wall members and adapted to engage the front of the supporting panel, and

a first support member and a second support member extending transversely of said support structure and fixed rigidly thereto, said second support member being disposed behind said first support member and spaced therefrom, said first and second support members having openings concentric with the longitudinal central axis of said support structure;

an operating screw journaled in said openings and including

a head portion which is forwardly exposed for engagement by a tool manipulated from in front of the supporting panel, and

a threaded body extending between said first and second support members;

said first and second support members and said screw having cooperating shoulder means operative to restrain said screw against longitudinal movement relative to said support members;

a spring metal clamp member including

a base portion extending transversely of said screw between said first and second support members, said base portion having a threaded opening through which said body of said screw extends in operative screw-thread engagement, and

two leg portions projecting forwardly from said base portion each on a different side of said screw,

said clamp member having a normal relaxed configuration such that said leg portions slant forwardly and outwardly, the space between the junctures of said leg portions with said base portion being such that, when said clamp member is allowed to assume its normal relaxed position, the free ends of said leg portions are spaced apart by a distance greater than the space between the outer surfaces of said side wall members, whereby turning of said screw in one direction will drive said clamp member forwardly and cause the free end portions of said leg portions to travel forwardly outside of said support structure and into engagement with the rear face of the supporting panel to cause the panel to be clamped between said rigid shoulder means of said support structure and the free ends of said leg portions;

said clamp member being disposed with said leg portions aligned respectively with said slots, said leg portions being dimensioned to be accommodated each by a different one of said slots; and

two spaced abutments each fixed to said second support member generally behind a different one of said junctures, said abutments being forwardly exposed for engagement by said base portion of said clamp member,

turning of said screw in the other direction driving said clamp member rearwardly into engagement with said abutments, such engagement and further turning of said screw in said other direction distorting said clamp member to move said leg portions toward each other into retracted positions within said slots.

4. A device in accordance with claim 3 and wherein said support structure further comprises means engageable by said clamp member and effective to restrain the same against rotation about the axis of said screw.

References Cited by the Examiner

UNITED STATES PATENTS

543,432	7/1895	Thompson et al.	
1,212,123	1/1917	Anderson.	
1,541,362	6/1925	Locke	85—3
1,779,681	10/1930	Smith et al.	220—3.6
2,399,491	4/1946	Lindstrom	220—3.6
2,573,713	11/1951	Ki Ku.	

FOREIGN PATENTS

38,137	1/1915	Sweden.

WILLIAM FELDMAN, *Primary Examiner.*

DONLEY J. STOCKING, *Examiner.*