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2,331,759

PLASTIC INSTRUMENT CASE

Filed Dec. 16, 1939

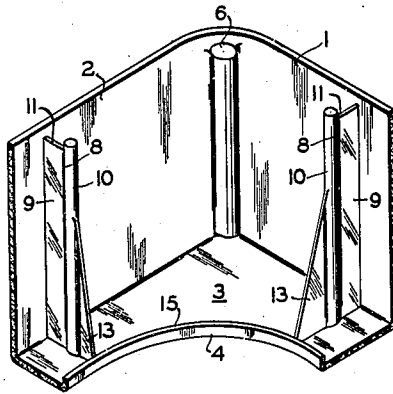


Fig. 1

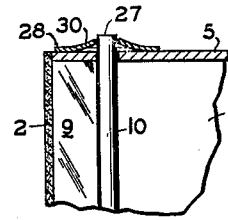


Fig. 3

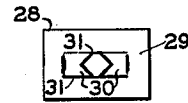


Fig. 4

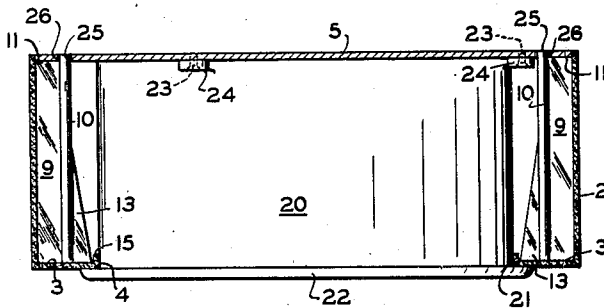


Fig. 2

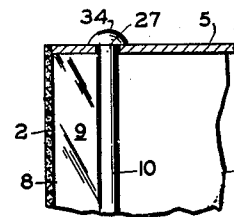


Fig. 5

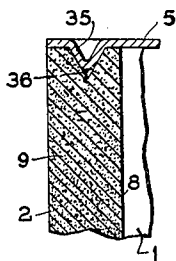


Fig. 6

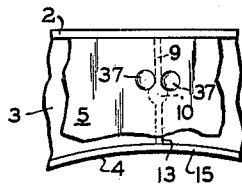


Fig. 7

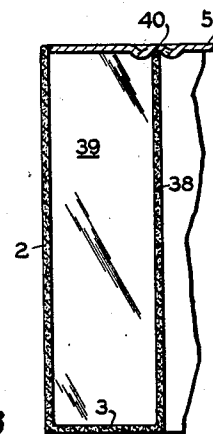


Fig. 8

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PLASTIC INSTRUMENT CASE

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3 Claims. (Cl. 73—151)

This invention relates to an improved means for securing relatively rigid closure plates to hollow articles made from molded plastic material and with relatively thin and therefore inherently non-rigid walls.

Characteristic problems solved by the present invention are presented by the attachment of metal backs and other closure plates to shell-like moldings adapted to house the operating mechanisms of instruments such as clocks, barometers, thermometers, etc. Such back plates of clocks, for example, usually are secured rigidly to the metal frame of the mechanism; and the dial rim, also rigid with the frame, extends through a suitable opening in the plastic molding so that such rim can be secured to the front face of the molding by a bezel ring surrounding the dial rim and secured thereto as by screw threads or a bayonet lock. Thus the bezel ring can, if desired, be seated tightly against the front face of the molding to tighten the whole assembly into a rigid unit. Now if the molding is of fairly thin walled section (as frequently desired in order to reduce the amount of plastic material required for the molding), the back plate, in being drawn tightly against the rear portion of the case, sometimes distorts the peripheral walls of the case as by springing them outwardly, thus destroying the desired appearance of solidity of the case. If the back plate slips off such narrow shoulders as are commonly provided on the molding for engagement with marginal portions of the plate, this usually renders ineffective the tight engagement of the bezel ring with the front face of the shell as a means for holding the assembly tight and the case sealed against entrance of dust and other foreign matter into its interior. An object of the present invention is to overcome difficulties such as outlined above, in the making of instrument cases and the like principally from molded plastic material.

A further object of the present invention is to provide an interlock between a hollow molded case and a relatively rigid closure plate therefor, such as will prevent displacement of marginal portions of the molding with respect to adjacent edge surfaces of the closure plate.

A further object is to provide an interlock between such plate and a molded plastic casing as will, if desired, enable discarding of the bezel ring connection with the instrument frame, such as described above, in order to hold the parts securely together.

A further object is to provide an improved instrument case adapted to be made principally

from molded plastic material with relatively thin wall sections throughout.

A specific object is to provide a connection between a clock case of molded plastic material and a back plate thereof which will insure a tight joint between the plate and casing and prevent entrance of foreign matter into the interior of the case, and at the same time contribute to the reinforcement of the entire assemblage.

While the invention is illustrated in connection with a case designed or intended to serve as a clock mechanism housing, applicability of the principles thereof to other articles of manufacture will be obvious from the illustrative embodiments.

Other objects and features of the invention will become apparent from the following description relating to the accompanying drawing, in which:

Fig. 1 is a fragmentary perspective view of a corner portion of a clock case adapted to be made from plastic material;

Fig. 2 is a central sectional vertical view of a clock shell-like casing, including a metal or other relatively stiff back plate for closing the rear portion of the shell;

Fig. 3 is a fragmentary sectional view showing adjacent portions of the case secured as by a nut type of fastener, the nut device of this specific illustration (known as "speed nut"; trade name) being characterized in that it does not require turning as on screw threads in order to effect the fastening function;

Fig. 4 is a detailed plan view of such speed-nut as shown in Fig. 3;

Fig. 5 is a view similar to Fig. 3 in which a portion of the plastic molding is formed into a rivet head to hold the back plate and plastic molding together;

Fig. 6 is a view similar to Fig. 3 in which the interlock between the back plate and plastic molding does not require the formation of any opening in the back plate;

Fig. 7 is a fragmentary view showing rear portions of the case and back plate, with a further modified connection between the parts; and

Fig. 8 is a view similar to Fig. 2 showing a modified form of case and interlock between the back plate and molded portion of the case.

Referring to Fig. 1, the portion of the molding there shown comprises walls 1 and 2, illustrative of the type of walls usually arranged to extend entirely around the case, and a front wall 3 which extends in surrounding relation to an opening 4, shown as circular and adapted to expose the dial of the instrument. The rear opening of the

molding (necessary in order to form the same between separable dies) is adapted to be closed as shown in Fig. 2 with a back plate 5. The marginal edges of the plate 5 preferably extend into abutting relation with the perimetral walls of the case in order fully to close the back thereof. Instead of the usual slight perimetral shoulders, to form supporting surfaces for the back plate, I provide corner members, such as 6, integral with the molding and terminating a slight distance forwardly from the rear marginal edges of the case walls 1 and 2 and inwardly extending flanges such as shown at 8, the rear end or edge portions of which corner members and flanges form lands or abutment surfaces for the back plate. In order further to reduce the amount of plastic material required, the flanges are made with fairly thin webs 9, and integral post-like reinforcing portions 10 are provided, which, as shown in Figs. 1 to 3 and 5, extend along the flange webs from the front wall 3 (optionally) to points slightly beyond the rear edges 11 of the webs 9 which abut the back plate 5. Additional flange elements or buttresses may be provided as shown at 13 inwardly beyond the thickened post portions 10 and connected to the front wall 3. A strengthening rib 15 may extend around the circular opening 4 which exposes the dial of the instrument.

Referring now to the mechanism to be supported by or contained in the case, this may comprise a suitable framework 20, housing for example, the works of a clock, having a forwardly extending rib 21 lying in close relationship to the periphery of the opening 4. The rib may extend slightly beyond the front wall 3 in order that it may carry the bezel ring 22. The bezel ring may be screw threaded to the rib 21 in the usual fashion, or may be applied to the rim as by a bayonet lock, not shown. Assuming that 20 represents a fairly rigid framework either open or closed at its sides, this can be securely fastened to the back plate 5 as by a series of screws 23 adapted to be inserted through ears 24 on the framework 20 into threaded engagement with the back plate 5. With such an arrangement as above described, were it not for the abutment between the corner members 6, and/or webs 9, and the inner face of the back plate, the attachment of the bezel as by threads could cause the plate to be moved an undesirable distance forwardly between the peripheral case walls, for example, 1 and 2. Thus, if the edges of the plate abutted slight shoulders on the molding, the forward pressure of the plate could spring the side walls outwardly and cause gaps to occur between the back plate and adjacent rear edge portions of the molding. With the flange reinforcing portions 10 extended as at 25 into registering openings 26 in the back plate, the walls, for example 1 and 2, are rigidly fixed to the plate at each flange in a manner to prevent movement of the side walls both inwardly and outwardly. Thus, a reasonable amount of forward pressure by the back plate against the molding will not distort the peripheral walls. When the instrument is picked up by hand, it "feels solid" and is, in fact, capable of withstanding considerable lateral pressure without distortion although comprising a fairly thin shell.

In some instances, it is desirable to secure the back plate in position on the case without requiring any rearward pressure of a bezel ring against the face. There are several ways of doing this. One is illustrated in Figs. 3 and 4.

Fig. 3 shows the reinforcing enlargement or post 10 extending a short distance beyond the back plate 5 as at 27. These extensions 27 of the reinforcing portions 10 of the flanges 8 are adapted to receive appropriate attachment devices, for instance threaded nuts, not shown. To obviate the necessity for threading the extensions 27 speed-nuts, one of which is shown at 28, can be used. In Fig. 4 a speed-nut is shown as comprising a body portion 29 and a pair of spring tongues 30 bent outwardly in a single direction away from the body 29 as by partially severing the metal of the body along parallel lines 31, the free ends of the tongues so formed being appropriately shaped so as to receive between them the projecting end 27 of the flange portion 10. Such speed-nuts need only to be pressed toward the back plate with the notched free ends of the tongues in sliding engagement with the projection 27, and when the body portion 29 is seated firmly against the back plate 5, the tongues act as friction pawls normally to prevent removal of the speed-nut.

Fig. 5 shows an alternative arrangement for accomplishing the same purpose as effected by the arrangement of Fig. 3. This comprises enlarging the extensions such as 27 of Fig. 3, beyond the receiving openings of the plate, to form, in effect, rivet heads 34. If the molded material is thermoplastic, this enlarging can be accomplished by a hot die having a cavity substantially the desired shape for the head 24. After formation of the head, the latter solidifies and attains substantially the strength of the remaining portions of the molding.

Fig. 6 shows an arrangement on the order of Fig. 2, except that the back plate 5 is not perforated in any way, but instead has a series of projections or a continuous rib such as 35 formed therein, and each of the web portions 9 of the flanges 8 are provided with V or other suitably shaped notches 36 adapted to receive the projections or ribs 35 on the back plate. The V-shaped notches in the flanges may be made deeper than the height of the ribs or projections 35 so that, upon securing of the bezel ring to the framework 20, the plate is locked against displacement radially both inwardly and outwardly of the case.

Paired projections such as shown at 37, Fig. 7, struck inwardly from the back plate can embrace the flange webs 9 and radially abut the enlargements 10 for a more complete interlock between the back plate and shell if desired.

For more elaborate or expensive instruments, an inner wall may extend around the dial-exposing opening and to the rear of the case as at 38, Fig. 8, and the flanges 8 may be replaced by webs 39 which bridge entirely across the normally unoccupied portion of the case from the outer perimetral walls to the extended portion 38 of the case. In this event, the interlock between the back plate 5 and the molded portions of the case may be effected in any of the various ways above suggested, but because of the reinforcing effects of a continuous inner wall, such as 38, it would be adequate to provide the interlock between such inner wall and the back plate. As shown, the back plate is rearwardly indented as at 40, as by a rib or series of separate indentations to receive the rear edge of the inner wall 38 or spaced extensions thereof as desired.

The term "perimetral" as applied to the wall portions 1 and 2 of the plastic molding is used for convenience only, and is not intended to mean

that the outer wall of the case is endless. The case may be wholly open at the bottom or may be closed by means separate from the molding.

I claim:

1. A plastic instrument case, comprising a front wall and rearwardly extending side walls integral therewith, said front wall being provided with a dial-exposing opening spaced from the periphery of such front wall, webs integral with said side walls and extending inwardly toward said opening, post-like parts integral with said webs and projecting rearwardly therebeyond, buttress portions integral with said webs and said front wall and extending inwardly from said webs and along said front wall substantially to the opening of said front wall, and a back plate resting upon said webs and provided with openings for receiving the projecting post-like parts thereof.

2. A plastic instrument case, comprising a front wall and rearwardly extending side walls integral therewith, said front wall being provided with a dial-exposing opening spaced from the periphery of such front wall, webs integral with said front and side walls and extending inwardly from said side walls toward said opening, post-like parts integral with said webs and said front wall and extending along the inner longitudinal edges of

said webs and rearwardly therebeyond, buttress portions of generally triangular shape integral with said post-like parts and said front wall and extending inwardly from said post-like parts substantially in the planes of the webs and along said front wall to the opening of said front wall, and a back plate resting upon said webs and provided with openings for receiving the projecting post-like parts thereof.

3. A plastic instrument case, comprising a front wall and rearwardly extending side walls integral therewith, said front wall being provided with a dial-exposing opening spaced from the periphery of such front wall, a flange integral with said front wall and extending rearwardly peripherally of said opening, webs integral with said side walls and extending inwardly toward said opening, post-like parts integral with said webs and projecting rearwardly therebeyond, buttress portions integral with said webs and said front wall and extending inwardly from said webs and along said front wall to the rearwardly extending peripheral flange of said front wall, and a back plate resting upon said webs and provided with openings for receiving the projecting post-like parts thereof.

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