This invention relates to housings for instruments of various types or forms, also for controlling apparatus and various forms of mechanisms. It is applicable to house small or large size instruments, or other devices, requiring protection from dust, moisture, water spray, or water, or tampering by unauthorized users.

One important object is to provide a housing which avoids the usual screws or bolts for securing the parts together. Another object is to avoid the use of moulded-in inserts in the moulded parts and the machining of threads in any part of the housing. A further object is to provide a structure which may be conveniently and quickly assembled and dismantled. Another object is to form the moulded parts of such shape that they can be withdrawn directly and simply from the moulds without the necessity of using back-offs in the moulds. A further advantage is the reduction of the hazard of insulation failure and by the elimination of housing screws the possible discharge thereto from live instrument parts is avoided. A further object is to provide means for shielding the instrument electrostatically and from stray magnetic fields. A further important object is to reduce the cost of manufacture and of assembling the parts. Other objects and advantages will be understood from the following description and accompanying drawings which illustrate a preferred embodiment of the invention.

Fig. 1 is a vertical sectional view of the separated parts arranged in the order of their assembly; Fig. 2 is a vertical section of the parts assembled; and Fig. 3 is a rear view.

The housing is shown as formed of four parts. The part A is the front portion and forms the case, the part B is the base and forms the support for the instrument or other mechanism parts, the part C is an auxiliary base plate or interlocking member and the part D is the clamping or holding member and may also serve as the shield.

The part A is the case formed of molded Bakelite or other plastic material and is in the form of a cylindrical main portion having a circular opening at the rear end. The front portion is provided with an outwardly extending rim having openings for mounting against a supporting panel. The front portion is also provided with an opening for the reading or observation of the instrument, the opening being closed by a glass plate retained in place by any suitable means, such as the metal ring. A small opening is provided when desired at the lower front portion of the case for receiving means for adjusting the zero reading of the instrument, a similar opening being provided in the lower upwardly extending portion of the ring. A groove is formed in the rear of the flange or rim for receiving the front edge of the holding or clamping means. In the rear portion of the part A are formed three circumferentially spaced inclined elongated depressions or slots which are open at the rear of the casing. These slots are inclined in the same direction as each other from the openings at the rear and are adapted to receive corresponding spaced lugs on the clamping or holding member. At the inside of the rear portion of the cylindrical casing three wedge-shaped circumferentially spaced depressions or slots are formed for receiving correspondingly shaped lugs or projections on the base.

The part B or main base of the housing is of moulded Bakelite and of circular form adapted to fit within and over the outer edge of the case A. It is shaped to suitably support the instrument parts or other form of mechanism and is shown as provided with a projection at each side of the lower portion of the base for supporting the instrument indicated as 12. It is secured in place by clamping bolts and nuts which seat within openings formed in the moulded base. The upper portion of the instrument which might be a permanent magnet of a voltmeter or ammeter, is shown supported by a clamp secured to the base by a bolt located within an opening formed in the base. The base is shown formed with another opening for receiving a square-headed bolt which is threaded within its inner end for receiving a screw which secures another part to the base. At opposite sides of the center of the base depressions are formed to receive the heads of a pair of bolts which pass through openings in the base outwardly for providing terminal connections thereto by the nuts and washers, as shown in Fig. 2, to lead wires from the instrument. This form of base for supporting the instrument, or other form of device avoids the necessity of forming threads in the base; the use of moulded-in inserts and provides a form conveniently withdrawn from the mould. The openings which receive the heads of the bolts may be formed to fit around the heads or nuts to prevent them from turning. However, it should be understood that this mounting of parts and the provision of formed openings in the base are shown merely as an illustrative example and that suitable projecting parts and similar openings may be provided in the base for reception of the particular character of instru-
ment or mechanism to be mounted thereon and may be varied widely for adaptation to the particular use.

The base is provided with an inwardly extending circular flange 21 which fits within the inner end of the case A and the base is also provided with an outwardly extending circular flange 22 which fits over the inner edge of the case. The outer face of the ring 21 is provided with three circumferentially spaced projections 23 adapted to fit within the correspondingly spaced recesses 16 of the casing for preventing movement of the base relatively to the case. On the rear face of the base is formed a circular groove 24 near its outer circumference.

The auxiliary base plate C is moulded of Bakelite or other suitable material and is shown in the form of a circular flat plate 25 with an outwardly extending rim 26 and covers and fits the main base. It is provided with an inwardly extending circular rib 27 which seats within the groove 24 of the main base. On the rear side of the base 25 near its rim are formed two diagonally opposite projections 28, as more particularly shown in Fig. 3. On opposite sides of the center of the base plate are formed two elongated openings 29 for reception of the terminal bolts 15 in this particular instance.

The part D which forms the clamping or holding member is in the form of a metal cylinder 30 having an inturnd outer edge 31. It is adapted to fit over and cover all the parts previously described and the front edge is adapted to enter the groove 8 formed in the flange of the casing. The holding member D is provided with three inwardly formed projecting lugs 32 which are equally spaced in a circumferential direction and correspond with the location of the inclined slots 9 or the case. The projections 32 are elongated and inclined in correspondence with the inclination of the slots. On the inner edge of the inturnd rear portion 31 of the clamping member are formed two diametrically opposite indentations or slots 33 which correspond with the position of the projections 28 on the auxiliary base. By reason of this clamping or holding member D being made of metal, it protects the instrument electrically and may be made of brass or other suitable material but when it is desired to shield the instrument from stray magnetic fields, or from shunting effects of nearby magnetic material, this member will be made of sheet-iron or steel. It thus not only serves the purpose of a clamping member but also as a shield for the instrument.

In assembling the parts, the base B with its mounted instrument or other devices is inserted within the case, the flange 22 of the base covering the inner edge of the case; and the projections 23 serve to immovably position the base with reference to the case. The auxiliary base plate or interlocking member C is placed over the rear of the base, the projecting rib 27 entering the groove 24 of the base. The clamping or holding member is then slipped over the other three parts and the projecting portions 32 are caused to pass in the grooves 8 of the case. The shield or holding member is then turned slightly to cause the projections 32 to travel along the slots 9 which brings the inturnd rim 31 of the clamping member close to the auxiliary base plate. The further turning of this member causes the projections 28 of the base plate to snap within the openings or notches 33 of the clamping member to interlock therewith, after which a further turning of the clamping member turns the auxiliary base plate or interlocking member with it a small amount to thereby cause all parts to seat firmly against adjoining parts in the final tightening of the clamping member. In cases where it is desired to make the housing proof against moisture, water, water spray, or where it is to be submerged in a liquid, intervening washers 35 are provided between the meeting rims of the housing.

In the final turning of the clamping member after its notches 33 are engaged by the projections 28 of the base plate, the rib 27 may not fully be seated within the groove 24 of the base but the final turning will force the rib fully within the groove so as to cause the flange 25 to seat against the outer portion of the base. When the terminal connecting parts are used, they pass through the enlarged openings 29 in the base plate and these openings are of a size to permit a certain amount of movement of the auxiliary base plate in the final clamping action without interfering with the location of the terminal connections.

After the parts are clamped in their final position, the nuts 34 on the terminal bolts 15 are tightened against the intervening washers 35, as shown in Fig. 2. This locks the parts in place. The washers 35 are preferably made large enough to cover the elongated openings 29. Also, the locking of the parts may be done by forming an elongated slot 38 in the base plate 25 through which a bolt 37 passes. This bolt also passes through the main base and has its head fitted into a cavity on the inner side of the base. The washers 35 on the bolt preferably are made large enough to cover the slot 38. The usual seals for preventing unauthorized access to the interior of the housing may be applied to the locking means.

In instances where no exterior means are required for adjustment of the instrument, the opening 6 in the front of the case will not be provided; and when needed it will be sealed to be dust, moisture and water proof. In some cases where it is not necessary to fully cover the main base, the auxiliary base or interlocking member may be in the form of a ring, or a cross piece, or otherwise to interlock the parts. Also, in some cases where it is not important that the rings and parts supported by it have a fixed position relatively to the case and when sealing against moisture is not required, one of the two bases may be omitted; and in that event the cylindrical clamping member would have interlocking engagement with the remaining base in the latter part of its turning movement.

Although a preferred form of the invention has been described, it will be understood that various modifications may be made for adaptation to particular requirements without departing from the scope of the invention.

I claim:

1. A housing for an instrument and the like comprising a case having an open end, a base at the open end of the case, and a cylindrical member engaging the case and holding said base in place, said member and case having engaging portions for forcing the base toward the case by turning said member, and said base and said member having portions which interlock in the latter part of the turning movement of said member.

2. A housing for an instrument and the like comprising a case having an open end, a main base at the open end of the case, an auxiliary member outside of the main base, and a cylindri-
3. A housing for an instrument and the like comprising a case having an open end, a main base at the open end of the case, an auxiliary member outside of the main base, a cylindrical member, said member and case having engaging portions for clamping the two bases against the end of the case by turning said member, said auxiliary base and member having portions which interlock in the latter part of the turning movement of said cylindrical member, and locking means engaging the main base and passing through the auxiliary member for holding the parts from turning relatively to each other.

4. A housing for an instrument and the like comprising a case having an open end, a main base at the open end of the case, said main base and case having engaging portions for holding the base from turning relatively to the case, an auxiliary base over the outside of the main base, and a cylindrical member, said member and case having engaging portions for clamping the two bases against the end of the case by turning said member, and said auxiliary base and member having portions which interlock in the latter part of the turning movement of said member.

5. A housing for an instrument and the like comprising a case having an open end, a main base at the open end of the case for supporting the interior parts, said main base and case having engaging portions for holding the base from turning relatively to the case, an auxiliary base covering the outside of the main base and turnable relatively thereto, a cylindrical member, said member and case having engaging portions for clamping the two bases against the end of the case by turning said member, said auxiliary base and member having portions which interlock to turn together in the latter part of the turning movement of said member, and means for connecting the two bases for holding them from relative movement after said turning movement has been completed.

6. A housing for an instrument and the like comprising a cylindrical case having an open end, a main base of moulded material at the open end of the case for supporting the instrument parts, said base being formed with openings for the free passage therethrough of means for securing said parts to the base, an auxiliary base covering the outside of the main base, and a cylindrical member extending over the case and engaging the auxiliary base, said member and case having engaging portions for clamping the two bases against the end of the case by turning said member, and said auxiliary base and member having portions which interlock to turn together in the latter part of the turning movement of said member.

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