July 16, 1940. L. G. MAECHTLEN ET AL 2,208,007

PANEL CABINET

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Fig. 1.

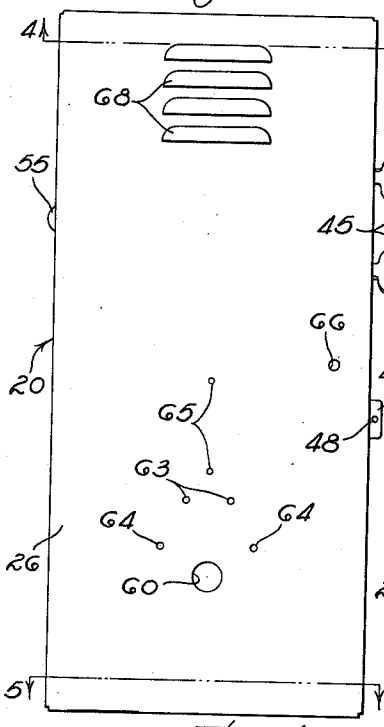


Fig. 2.

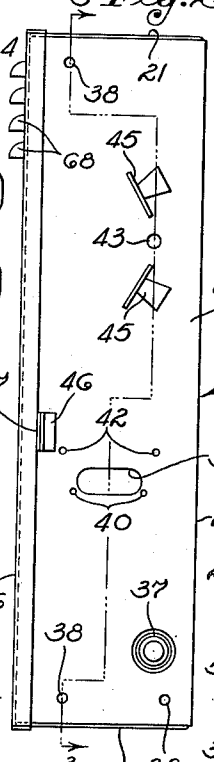


Fig. 3.

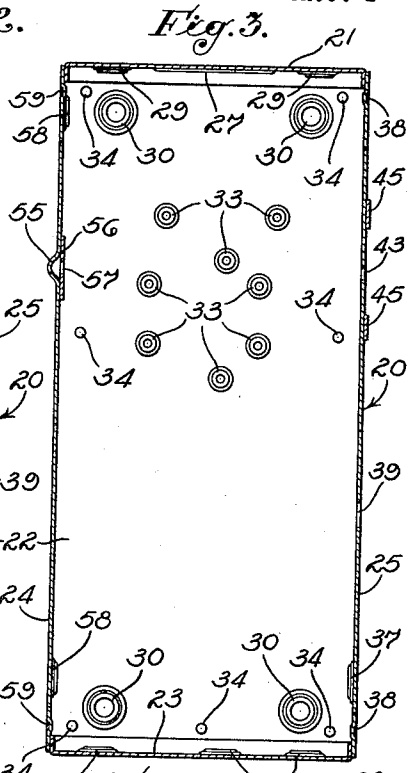


Fig. 4.

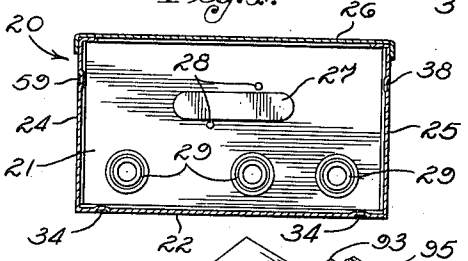


Fig. 5.

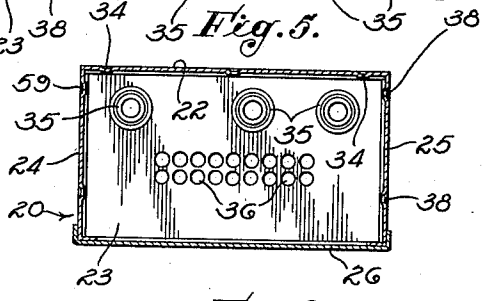


Fig. 6.

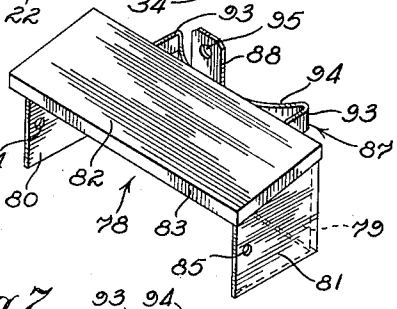


Fig. 8.

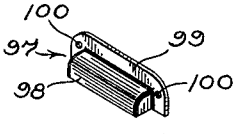
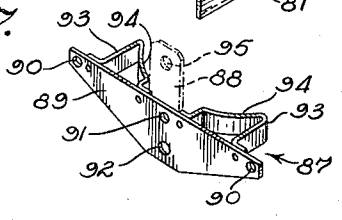


Fig. 7.



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Fig. 10.

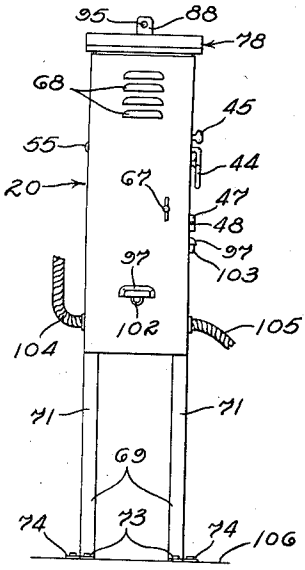


Fig. 11.

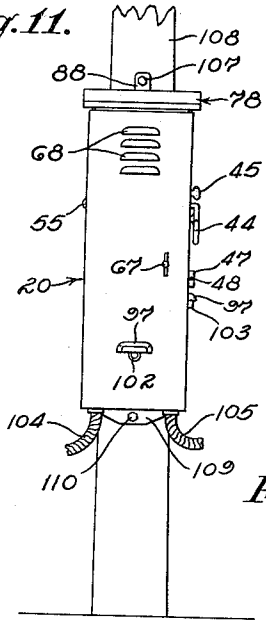


Fig. 9.

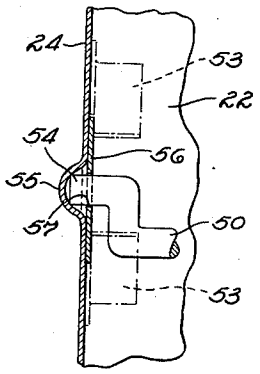


Fig. 15.

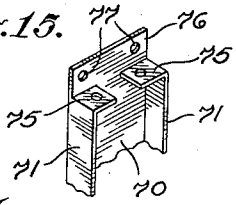


Fig. 12.

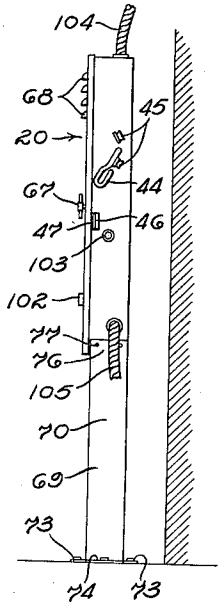


Fig. 13.

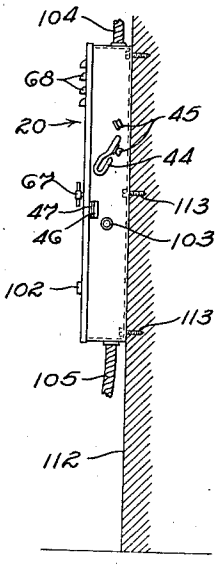
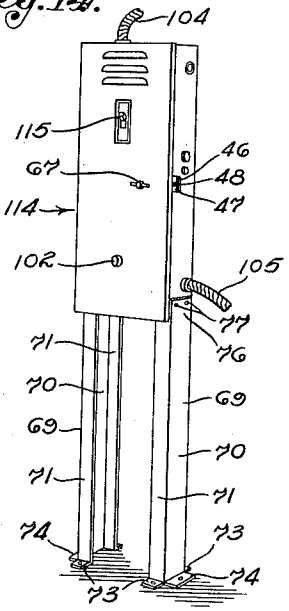


Fig. 14.



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Patented July 16, 1940

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UNITED STATES PATENT OFFICE

2,208,007

PANEL CABINET

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Application February 23, 1938, Serial No. 191,946

1 Claim. (Cl. 220—3.9)

Our invention relates to electrical control devices, particularly means for housing such control devices, and is directed specifically to an improved form of cabinet panel for controlling circuits for motors and the like.

The present invention is concerned primarily with problems arising in the installation of such panels. These problems are of three kinds: The first relating to the adapting of panels to various electrical mechanisms and circuit requirements, the second relating to arrangements for supporting the panel as required for different installations, and the third relating to weather-proofing required for outdoor service.

The general object of our invention is to provide a panel construction that is flexible in the sense that it is adapted to meet these various problems, whereby a single model may accommodate any of a variety of mechanisms and may be adapted to various locations and diverse operating requirements. More specifically, it is our object to provide a single basic box structure adaptable to various mechanisms and various circuit hookups, in combination with accessory fittings to adapt the box to various types of support and to outdoor use when required.

The advantages of such a construction are numerous. The undifferentiated basic structures may be manufactured in relatively large lots, and later differentiated for particular installation requirements as they are drawn from stock. It will be apparent, then, that manufacturing costs will be relatively low, and that only a limited number of models need be stocked to meet a variety of demands. It will also be apparent that a basic structure once converted to a particular type to meet the requirements of a particular installation may be subsequently reconverted to another type to meet the requirements of another and different installation.

The above and other objects and advantages of our invention will be apparent from the following detailed description considered with the accompanying drawings.

In the drawings:

Fig. 1 is a front elevation of a basic cabinet structure;

Fig. 2 is a side elevation of the structure shown in Fig. 1;

Fig. 3 is a section taken as indicated by the broken line 3—3 of Fig. 2;

Fig. 4 is a transverse section taken as indicated by the line 4—4 of Fig. 1;

Fig. 5 is a similar section taken as indicated by the line 5—5 of Fig. 1;

Fig. 6 is a perspective view of a hood that is attachable to the top of the basic structure for outdoor installations;

Fig. 7 is a perspective view of a bracket or saddle that may be mounted on the hood;

Fig. 8 is a hood for weather-proofing apertures in the vertical walls of the basic structure;

Fig. 9 is an enlarged sectional detail showing a bearing incorporated in the basic structure;

Fig. 10 is a front elevation of a basic structure converted into a model required for a particular outdoor installation;

Fig. 11 is a similar view showing the basic structure converted into a model for another outdoor installation;

Fig. 12 is a side elevation of the basic structure converted into a model suitable for an indoor installation;

Fig. 13 is a side elevation of another model for indoor service derived from the basic structure;

Fig. 14 is a perspective view of a second type of basic structure converted into a model for indoor use;

Fig. 15 is a fragmentary perspective view of a leg that may be employed with the basic structure.

As best shown in Figs. 1 to 5, the basic structure 20 is a box or cabinet having a top 21, a back 22, a bottom 23, left and right sides 24 and 25 respectively, and a door 26 providing the front wall of the cabinet.

The top wall 21 of the basic structure has formed therein an elongated meter-loop knockout 27, the metal being heavily scored or offset by dies whereby the portion indicated may be readily dislodged by hand-tools to receive a well known type of meter-loop bushing (not shown), screw holes 28 being provided for anchoring the bushing to the wall 21. The top wall 21 also has circular knockouts 29 at various locations, three being shown in the drawing, for the purpose of receiving fittings for running conduit to and from the panel. Each of these conduit knock-outs comprises a concentric series of circular scores of various diameters, as indicated, whereby metal may be removed to provide holes of various diameters as required for conduit of various sizes.

The back wall 22 of the basic structure is provided with knock-outs of three sizes for a variety of purposes. The larger knock-outs 30 are similar to knock-outs 29 previously described and serve the same purpose, namely, to receive conduit fixtures, there being, by preference, one such knock-out near each corner of the box, as shown. Somewhat smaller knock-outs 33 are distributed

over the back wall 22 in a pattern or combination of patterns conforming to the base blocks and hangers of the various circuit breakers, knife switches, fuses, and similar devices that may conceivably be required in various installations, the knock-outs 33 being positioned to register with the bolt-holes of said devices.

A feature of our invention is that the smallest knock-outs in the back wall 22 indicated in the drawings by the numeral 34 may be positioned to serve a variety of purposes in different types of installations. The lowermost knock-outs 34 near the bottom of the cabinet may be employed to mount the box on legs or other base structures; the uppermost knock-outs 34 near the top of the cabinet may be employed for attaching a weather-proofing hood to the cabinet or a hanger for mounting the cabinet; and any of the knock-outs 34 at the top, bottom, or intermediate positions may be employed for attaching the cabinet directly to a wall or other vertical supporting means.

The bottom wall 23 of the cabinet, as best shown in Fig. 5, is provided with a number of concentric conduit knock-outs 35, similar to the previously described knock-outs 30 and 33, and serving the same purpose, there being, by preference, three such knock-outs. The bottom may also be provided with a plurality of holes 36 for ventilating the interior of the cabinet.

The wall 25 at the right side of the basic structure, shown in Fig. 2, may have a conduit knock-out 37 near the lower end of the box, and has smaller single knock-outs 38 similar to the small knock-outs 34 of the back wall and serving similar purposes.

The small knock-outs 38 near the bottom of the box may be employed to mount the box on legs or other supporting base structures, and the top knock-out 38 may be employed either for supporting the box or for attachment of a weather-proofing hood thereto. In the particular base structure chosen for illustration, the side wall 25 has an aperture 39 to receive a push-button fitting, small screw holes 40 being provided near the aperture for attachment of the push-button fitting to the wall. Above the aperture 39 are small knock-outs 42 for attachment of a weather-proofing accessory to shelter the push-button where required for outdoor service.

Since the particular cabinet illustrated is designed to house a switch that is manually controlled from the exterior of the cabinet, the side wall 25 has an aperture 43 to receive the switch handle 44 shown in Figs. 10, 11, 12, and 13, and a pair of suitable stops 45, to limit the movement of the handle, are attached to the wall 25 by spot-welding or other means. Since it may be desirable to lock the door 26 of the cabinet, a bent plate or angle 46 may be riveted or spot-welded to the side wall 25 to cooperate with a similar member 47 carried by the door, each of the members having a hole 48 for a padlock.

One type of switch mechanism, for which this particular cabinet is designed, includes a crank 50 (Fig. 9) rotatable within the cabinet to operate switch blades in a well known manner that need not be described, the crank being controlled by the external switch handle 44. Bent plates 53 or angle-iron clips, or other suitable stop members are mounted on one or both of the side walls of the cabinet to limit the rotation of the crank 50, the positions of these plates being indicated in Fig. 9.

One of the features of our invention in the form here under consideration is a bearing construction that may be incorporated in the left side wall 24 to journal the left end 54 of the crank 50, the bearing construction being best shown in Fig. 9. This bearing is provided by swaging the side wall outward to provide a cup-portion 55 to embrace the end 54 of the crank, and by attaching to the side wall 24, from the inside, a plate 56 spanning the cup-portion 55, the plate having an aperture 57 to embrace the crank end.

The left wall 24 of the cabinet may also be provided with conduit knock-outs 58, two such knock-outs being shown, and is additionally provided with small knock-outs 59 corresponding to the knock-outs 38 of the opposite side wall and serving the same purposes.

The door of the particular basic structure being described has a circular aperture 60 to receive a button controlling a relay reset device (not shown), this device being mounted on the inner side of the door by means engaging small screw holes 63. Small knock-outs 64 in the door grouped above the aperture 60 are provided for attachment of a weather-proofing hood to shelter the recessed button when the cabinet is installed outdoors. In the central area of the door, additional screw holes 65 may be provided for the purpose of mounting on the outer surface of the door a plate displaying printed matter relating to the operation of the control mechanism housed in the cabinet. Near one edge of the door is an aperture 66 to receive a latch handle 67 shown in Figs. 10 to 13, and near the top of the door may be formed a series of louvres 68 to serve the purpose of ventilating the interior of the box in cooperation with the vent holes 36 in the bottom of the cabinet.

For the purpose of supporting the cabinet from a floor, attachable legs 69 are provided by our invention, which legs may be of channel configuration formed as indicated in Figs. 10, 12, 14, and 15. Each leg has a web 70 and two flanges 71. At the bottom of each leg are tongues 73 integral with the flanges and a tongue 74 integral with the web 70, the three tongues being provided with suitable bolt holes, as shown, for anchoring the bottom of the legs to the floor. At the top of each leg are inwardly bent tongues 75 (Fig. 15), having suitable screw holes by means of which the tongues may be anchored to the box, and the web of each leg extends upward above these tongues 75 to provide a flange 76 to lie against the side of the box, the flange having bolt holes 77 positioned to register with the knock-outs 38 or with the knock-outs 59 in the opposite sides of the cabinet.

A pair of legs, such as described, provide a rigid support for a cabinet, since the legs are anchored to the floor with the bent-over tongues 75 pressed against the bottom of the cabinet and with the flanges 76 at the sides of the cabinet under tension, the rigidity of the construction being attributable to the fact that the two legs are stressed in opposition to each other.

The construction of a weather-proofing hood as one of the accessory fittings for converting the basic structure into a panel suitable for outdoor installation is shown in Fig. 6. The weather-proof hood 78 has a back wall 79, a left side wall 80, a right side wall 81, and an inclined top 82 having a flange 83 extending downward on all four sides and overhanging the back and side walls of the hood. To equip a basic structure for outdoor service, this hood is fitted to the top of the cabinet, as shown in Figs. 10 and 11, the sides

and back of the hood lying against the outside surfaces of the corresponding sides and back of the cabinet. The hood may be readily bolted or riveted to the basic structure, the hole 84 in the left side wall 80 of the hood registering with the upper hole 59 in the left side wall of the cabinet, the hole 85 in the right side wall of the hood registering with the corresponding hole 38 on the right side wall of the cabinet and other holes (not shown) registering with corresponding holes 34 in the back wall 22 of the cabinet.

An important feature of one form of our invention is the combination with the weather-proofing hood of a pole-bracket for supporting the cabinet. This bracket may comprise a saddle member 87 shown in Fig. 7 and a hanger member 88. In the construction shown, the saddle comprises a plate 89 having holes 90 to register with holes 34 in the back of the cabinet and having holes 91 and 92 to receive rivets for attachment of the hanger 88. Mounted on the plate 89 by rivets or other means is a pair of straps 93 shaped to provide arcuate rear faces 94 for contact with circumferentially spaced points on the periphery of a pole. The spacing between the bracket plate 89 and the pole upon which a given cabinet is to be mounted will vary with the diameter of the pole. The hanger member 88 is, however, of readily flexible or deformable material, such as soft iron, and may be bent or offset as required to have the cabinet hang vertically when a bolt or other attachment means extending through an aperture 95 in the bracket holds the bracket against the pole.

A construction shown in Fig. 8 is suggested for a weather-proofing accessory to shelter either the relay reset button that extends through the aperture 60 in the door of the cabinet or the push-button control that is fitted in the aperture 39 in the right wall of the cabinet. This means 97 comprises a hood 98 having a flange 99, in which are holes 100 positioned to register either with holes 64 in the front door of the cabinet or holes 42 in the side wall of the cabinet.

Fig. 10 shows a basic structure converted into a model for outdoor use where the cabinet is to be supported from a floor. The basic structure 20 is provided with a hood 78 at the top, a hood 97 to protect the relay reset push-button 102 on the door of the cabinet, and a second hood 97 to protect the control push-button 103 on the side of the cabinet. In the particular installation shown, a conduit 104 from a meter box (not shown) is connected with one side of the panel cabinet and a second conduit 105 leading to the motor, or other device to be controlled, is connected with the opposite side of the panel, corresponding knock-outs being removed from the walls of the basic structure to provide the required apertures. The cabinet is rigidly supported by legs 69 anchored to the floor 106.

Fig. 11 shows the same type of box with the legs omitted, the box being supported from above by means such as a bolt or lag-screw 107 in the pole 108 engaging the hanger 88. For further anchorage a saddle 109 constructed as shown in Fig. 7 may be provided at the bottom of the cabinet, the saddle being riveted or bolted to the cabinet through holes (not shown) registering with the lower holes 34 in the back wall of the cabinet. The plate of the saddle extends below the bottom of the cabinet and is apertured to receive a suitable bolt or lag-screw 110. In this particular installation, conduits 104 and 105 are both connected with the bottom of the cabinet.

Fig. 12 shows an indoor installation in which the cabinet is mounted on a pair of legs 69. All weather-proofing hoods are omitted. The conduit 104 from the meter is connected with the top wall of the cabinet and the other conduit 105 is connected with the side wall.

Fig. 13 shows another indoor installation, the cabinet being mounted on a wall 112 by screws 113 passing through apertures provided by knock-outs 34 in the back wall of the cabinet. The conduits 104 and 105 are connected with the top and bottom walls respectively of the cabinet.

The forms of our invention described to this point are all built up from the particular basic structure shown in Figs. 1 to 5, which basic structure is designed for installations in which a fuse-protected knife-switch is employed. For an installation, such as indicated in Fig. 14, requiring circuit breaker instead of fused disconnect circuit protection, a somewhat different basic structure is desirable, but it will be apparent, at a glance, that the basic structure from which the model shown in Fig. 14 is derived is so similar to the basic structure heretofore described that, up to an advanced stage, the manufacturing operations for the two basic structures will be identical.

Fig. 14 shows the cabinet 114 mounted on the usual legs 69 for indoor use, a cabinet having the usual conduits 104 and 105 connected to its top and side walls respectively. This particular model differs from the previously described models principally in having an aperture in the door through which extends a circuit breaker handle 115, instead of having a switch handle at the side.

For the purpose of complete disclosure and to illustrate the principles involved, we have described certain forms of our invention in specific detail. It will be apparent to those skilled in the art, however, that our inventive concept is not restricted to the particular constructions set forth, and we therefore reserve the right to all changes and modifications that come within the scope of our appended claim.

We claim as our invention:

The combination with a box-like cabinet of the character described having a front wall, a rear wall, side walls, a top wall, and a bottom wall, of means for adapting the cabinet to an outdoor installation on a pole of cylindrical configuration, said means comprising: a weather-proofing hood adapted for attachment to said cabinet, said hood having a top wall to overlie said top wall of the cabinet and having a rear wall to lie against said rear wall of the cabinet; a pair of fixed horizontally spaced bracket legs extending rearward from said rear wall of the hood to abut said pole with the spacing of the rear wall of the hood from the pole varying with the curvature of the pole periphery; and a hanger strap extending upward from said rear wall of the hood normally parallel with said rear wall of the hood, said strap being deformable to compensate for variation in said spacing of the hood from the pole to permit the cabinet to hang in substantial alignment with the pole.

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