Dec. 30, 1930. R. E. MARBURY 1,786,765

TERMINAL STRUCTURE

Filed June 22, 1927

Fig. 1.

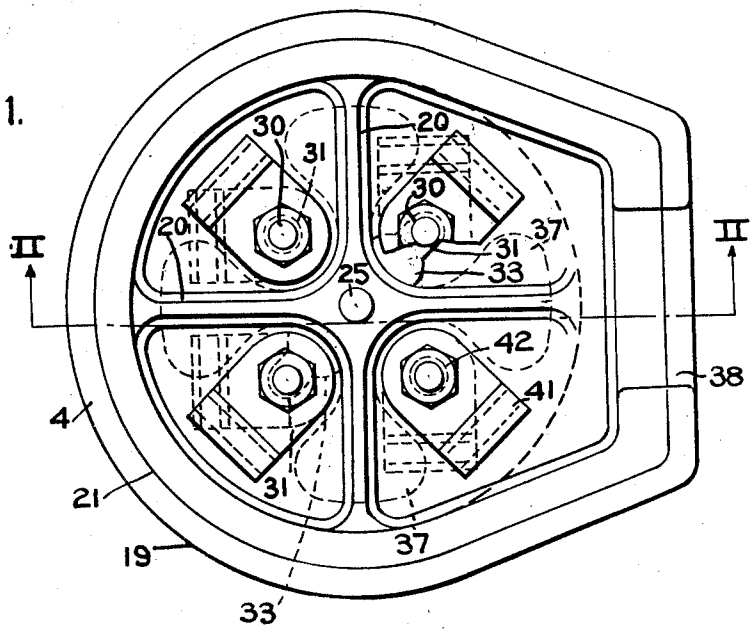
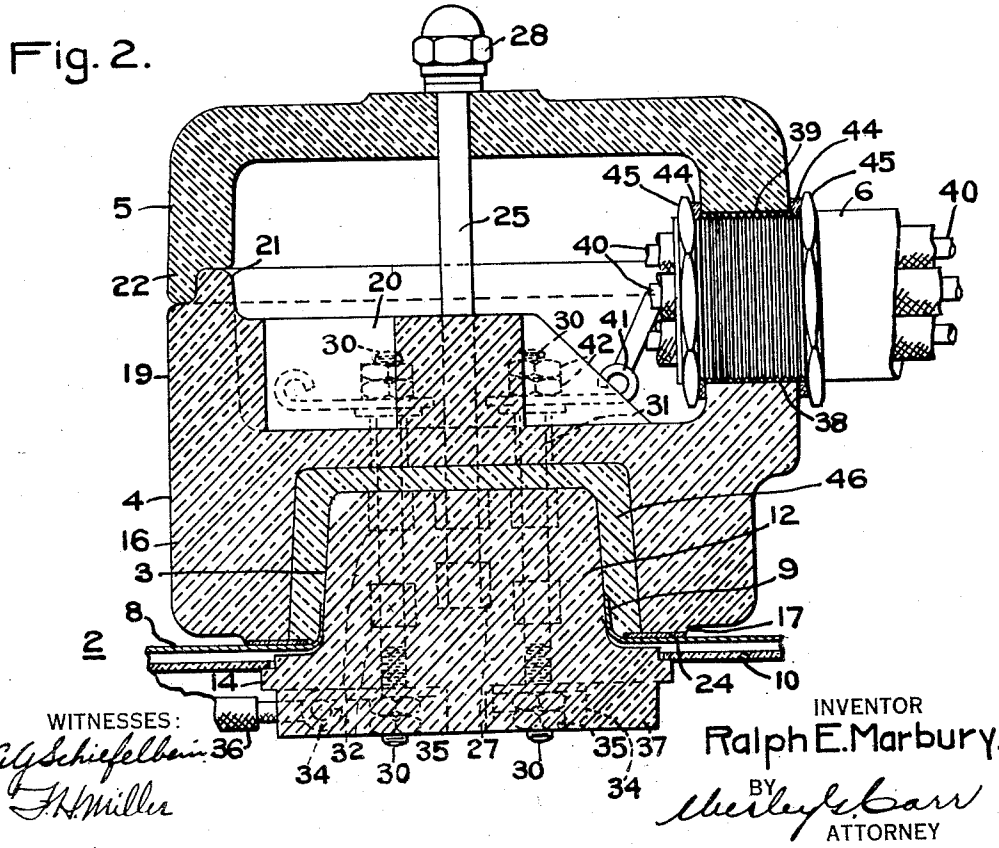


Fig. 2.



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UNITED STATES PATENT OFFICE

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TERMINAL STRUCTURE

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My invention relates to terminal structures and particularly to terminal structures of the fluid-tight bushing type for cooperation with oil-containing condenser casings.

One object of my invention is to provide a terminal structure of the above-indicated character that shall effectively prevent the escape of oil or other fluid through, and along the outer surface thereof.

Another object of my invention is to provide a novel single bushing structure for permitting a plurality of conductors to extend through one opening in a wall.

Another object of my invention is to provide a terminal device that shall constitute a combined bushing and terminal-compartment structure.

Another object of my invention is to provide a novel terminal structure that shall embody a plurality of terminal compartments and a single leading-in conduit for a plurality of conductors cooperating with the compartments.

Another object of my invention is to provide a bushing structure that shall so combine organic and refractory insulating members in sealed relation to each other and to a wall structure as to provide a more substantial structure and more effective fluid sealing than has been obtained in similar structures heretofore employed.

A further object of my invention is to provide a terminal structure that shall be simple and durable in construction, economical to manufacture and effective in its operation.

In terminal devices for oil-containing condenser casings heretofore employed, adequate sealing against the escape of oil has been almost impossible of attainment and has only been attained with a reasonable degree of success by means of relatively complicated and expensive structures.

The excessive expense and difficulty involved in providing such sealed terminal structures where a separate opening and a separate bushing have been provided for each conductor extending through the casing, are proportionately more objectionable where more than one or two conductors as in a polyphase condenser, are extended through the casing and a sealed terminal structure provided for each conductor.

It is my aim to overcome the above-mentioned difficulties by providing a structure that shall be more economical, rugged and effective than any device of a similar nature heretofore employed, of which I am aware, and that shall constitute means whereby a plurality of conductors may be extended through a single opening in the condenser casing to reduce the leakage hazards to a minimum.

Accordingly, in practicing my invention, I provide a single homogeneous bushing member of organic insulating material, a refractory insulating sealing and compartment member, a cover member, a single leading-in conduit for a plurality of conductor leads, and other features which are so combined and which so cooperate as to reduce the casing-terminal openings to a minimum, to provide a compact and easily manipulated structure and to effect other improvements over structures heretofore employed.

Figure 1 of the accompanying drawing is a top plan view of a terminal structure embodying my invention, the cover and conduit members therefor being omitted, and

Fig. 2 is a view taken along the line II—II of Fig. 1, but with the above-mentioned cover and conduit members in position.

The device comprises, in general, a wall structure 2, constituting a portion of an oil-containing condenser casing, an inner bushing member 3, an outer terminal housing or bushing member 4, a cover member 5 opposite the outer end of the member 4, and a conduit 6.

The wall structure 2 preferably comprises a portion 8 of relatively thin sheet metal having an opening around which a flange 9 is pressed out of the plane of the sheet to provide an inner surface of substantially frusto-conical shape. The wall structure 2 further comprises an inner sheet insulating lining member 10.

The inner bushing member 3, preferably constructed as a single homogeneous body of organic, fibrous or composition insulating

material, such as bakelite having a fibrous or other filler, comprises a main body portion 12 disposed in, and projecting from, the opening in the sheet-metal member 8, at one side of the wall structure 2, and a lateral flange 14, at the inner side of the wall structure 2, to prevent outward withdrawal of the bushing 3. The body portion 12 is preferably frusto-conically tapered, similar to the flange 9, in order that it may be forced into relatively tight engagement with the flange 9.

The insulating member 4, preferably constructed of refractory insulating material, such as porcelain or glass, has an inner portion 16 of inverted substantially cup shape disposed over the body portion 12 in spaced relation thereto, an annular bottom portion 17, an outer side wall portion 19, laterally extending outer-end web portions 20, and a stepped or rabbeted outer perimetral flange 21 for cooperation with a similar flange 22 on the cover member 5. A gasket 24 is disposed between the portion 17 of the member 4 and the sheet-metal member 8 of the wall structure 2.

Holding means, such as a bolt 25, extends in substantial alinement with, or parallel to, the longitudinal axis of the bushing between the members 4 and 5 and is provided, adjacent to one end, with anchoring portions 27 embedded in the member 3 and, at its other end, with a nut 28 for holding the cover member 5 in position.

The lateral web portions 20 provide four substantially equal compartments in which the ends of through circuit conductors 30 are disposed. These conductors, in the form of bolts having screw-threaded portions at each end, extend through openings 31 in the member 4 and have laterally extending portions 32 in the bushing member 3 in which the conductors are molded. The portions 32 laterally interlock with the material of the member 3 to perform the combined functions of providing mechanical anchoring and preventing direct seepage of oil along the conductors. One or more of the openings 31 may be provided with a parallel enlargement or chamber 33, as indicated in Fig. 1, for a purpose to be hereinafter set forth.

Terminal clips 34 and nuts 35 provide means on the inner ends of the conductors 30 for connecting the same to conducting leads 36 extending to the condenser parts (not shown). Webs or raised portions 37, on the bottom of the member 3 and similar to the webs 20 on the member 4, provide separated compartments for the clips 34 and the nuts 35.

The members 4 and 5 are provided with complementary openings 38 and 39, respectively, fitting the tubular conduit 6 to hold the latter in position.

The conduit 6 encloses conductors 40 which are connected to the conductors 30 by means of clips 41 and nuts 42. Yieldable gaskets 44, or lock washers, and nuts 45 may be provided on the conduit 6 to assist in holding the latter in position.

In assembling the structure, the organic insulating bushing member 3, with the conductors 30 and the bolt 25 molded in position therein, is forced into position against the flange 9 and the gasket 24 and the member 4 placed in position over the outer end thereof. A body of hardening insulating material 46 is then poured through the enlarged portion 33 of the opening or openings 31 to seal the member 4 to the member 3 and to the wall member 8.

The member 3, being of organic insulating material, thereby effects better forced sealing contact with the flange 9, constitutes more permanent anchoring for the portions 27 and 32 and provides a better cantilever base for the bushing, as a unit on the wall structure 2. The member 4, being of refractory insulating material, provides better exposed insulating surfaces and is economical to manufacture, the combining of organic and refractory materials, in the manner described, effecting, in general, an improvement over prior devices.

By my invention, wherein a plurality of conductors are extended through only one opening in the casing, the terminals of the conductors are grouped together in one multipart insulated compartment, the conductors 40 are extended through a single outlet conduit, the single nut 28 holds the single cover member for all the compartments and other features are provided, an effective, durable, compact and economical terminal structure is obtained that is oil-proof, compact, rugged and durable, effective in operation, easy to manipulate and has other features of advantage over similar devices heretofore employed.

While I have shown and described a particular form of my invention, changes may be effected therein without departing from the spirit and scope thereof as set forth in the appended claims.

I claim as my invention:

1. A terminal comprising a wall structure having an opening therethrough, a single homogeneous insulating bushing member disposed in the opening, a plurality of conductors extending through said member, and an insulating structure having a portion of substantially cup-shape sealed to the wall structure in position over the outer end of said bushing member and providing terminal-supporting means for the conductors.

2. A terminal comprising a wall structure having an opening therethrough, a composite bushing structure for the opening including a member of organic insulating material in the opening having a portion projecting from one side of the wall and a lateral flange at the opposite side of the wall preventing with-

drawal of the member in one direction, and a refractory insulating member enclosing said projecting portion and sealed to the projecting portion and to the wall, and a conductor extend' 'g through both of said members.

3. A terminal comprising a wall structure having an opening therethrough, a composite bushing structure for the opening including a member of organic insulating material in the opening having a portion projecting from one side of the wall and a lateral flange at the opposite side of the wall preventing withdrawal of the member in one direction, a refractory insulating member enclosing said projecting portion, a cover element co-operating with the refractory member to therewith constitute a terminal housing, a conductor extending through said insulating members into said housing, and means cooperating between the bushing and the cover element for holding the latter in position.

4. A terminal comprising a wall structure having an opening therethrough, a composite bushing structure for the opening including a member of organic insulating material in the opening having a portion projecting from one side of the wall and a lateral flange at the opposite side of the wall preventing withdrawal of the member in one direction, a refractory insulating member having an inner portion of substantially cup-shape enclosing said projecting portion and sealed to the projecting portion and to the wall and an outer transverse web, a cover element cooperating with the refractory member and its web to therewith constitute a housing having a plurality of terminal compartments, and a conductor for each of said compartments extending through said insulating members.

5. A terminal comprising a wall having an opening therethrough, an insulating bushing in said opening having a portion projecting therefrom and a portion preventing withdrawal of the bushing in one axial direction, an insulating member enclosing, and sealed to, a portion of said projecting portion, said member also being sealed to said wall and a plurality of conductors extending through both of said insulating members.

6. A terminal comprising an outer wall and an inner wall lining having openings of different diameters therethrough, a composite bushing structure including an insulating member in the openings having a portion projecting from one side of the wall and a laterally-extending element at the opposite sides of the wall and lining preventing withdrawal of the member in one direction, said laterally-extending element having portions relatively closely fitting both of said openings and an insulating member enclosing, and secured to, said projecting portion against the wall, and a conductor extending through both of said insulating members.

7. A terminal comprising an outer wall and an inner wall lining in spaced relation thereto each having an opening therethrough, a composite bushing structure including an insulating member in said openings having a portion projecting from one side of the wall and a laterally-extending portion at the opposite sides of the wall and lining preventing withdrawal of the member in one direction, an insulating member enclosing, and secured to, said projecting portion against said wall, and a conductor extending through both of said insulating members.

8. A terminal comprising a wall having a through opening, a bushing member in the opening having a portion projecting from one side of the wall and a lateral flange at the opposite side of the wall having a plurality of end compartments, a member having an inner-end portion of substantially cup-shape over said projecting portion in sealed relation to the wall and a plurality of outer end compartments longitudinally opposite said first compartments, terminals in said compartments, conductor connecting said terminals, a cover for said outer-end compartments and means for holding said cover in position including an element extending between said members.

9. A terminal comprising a wall having a through opening, a bushing member in the opening having a portion projecting from one side of the wall and a lateral flange at the opposite side of the wall having a plurality of end compartments, a member having an inner-end portion of substantially cup-shape over said projecting portion in sealed relation to the wall and a plurality of outer end compartments longitudinally opposite said first compartments, terminals in said compartments, conductors connecting said terminals, a cover for said outer-end compartments, a conduit leading to said outer-end compartments held in position by said cover and means for holding said cover in position including an element extending between said members.

In testimony whereof I have hereunto subscribed my name this 16th day of June, 1927.

RALPH E. MARBURY.