

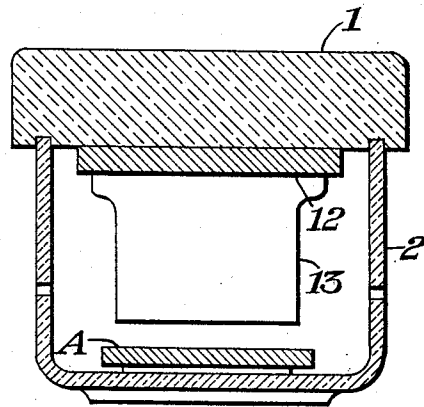
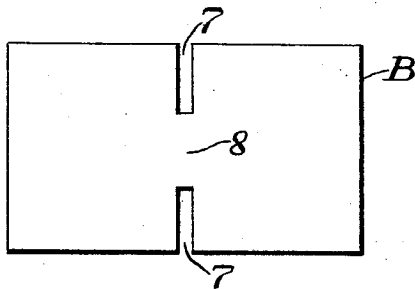
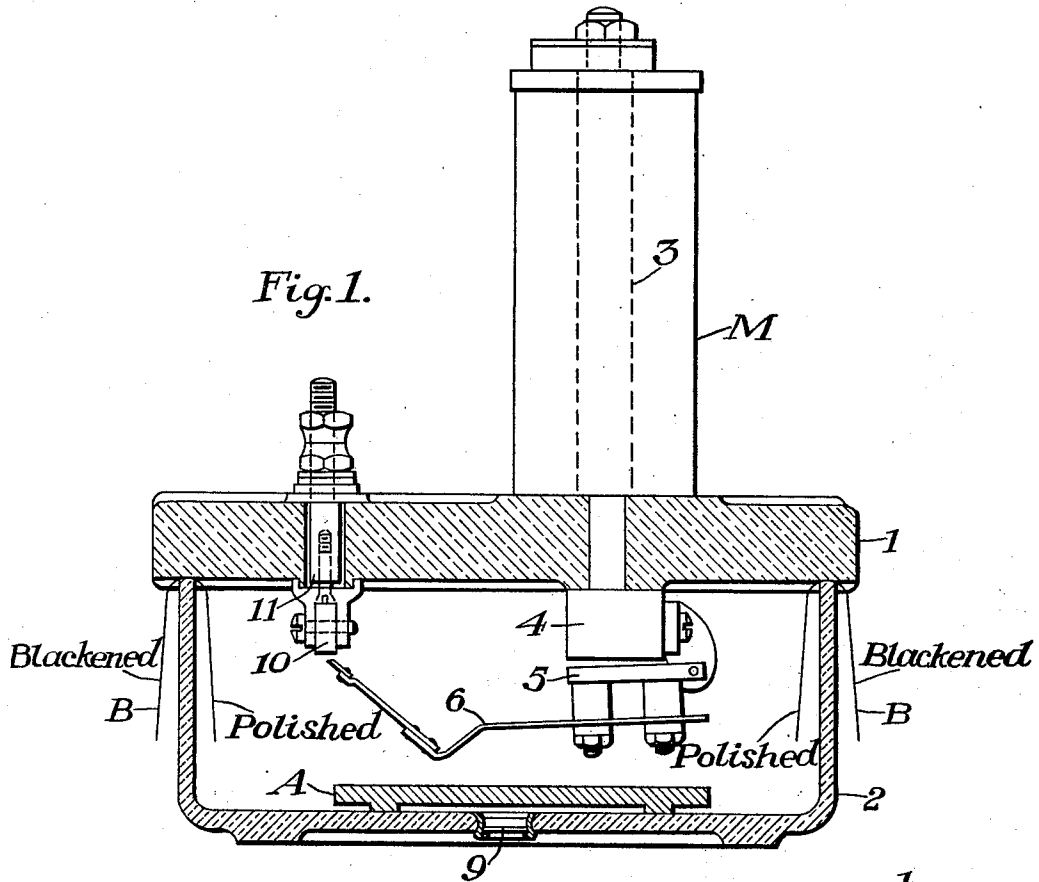
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INSTRUMENT INCLOSED IN NONMETALLIC HOUSINGS

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INSTRUMENT INCLOSED IN NONMETALLIC HOUSINGS

Application filed August 22, 1929. Serial No. 387,609.

Our invention relates to instruments inclosed in non-metallic housings, such as electrical relays, clocks, meters, etc., and has for an object the provision of means for preventing the condensation of moisture on the operating parts of such instruments.

The present application is a continuation-in-part of our co-pending application Serial No. 226,230, filed October 14, 1927, for electrical instruments.

We will describe two forms of instruments embodying our invention, and will then point out the novel features thereof in claims.

In the accompanying drawing, Fig. 1 is a sectional view showing one form of electrical instrument embodying our invention. Fig. 2 is a plan view showing one of the metal sheets B forming part of the instrument illustrated in Fig. 1. Fig. 3 is a sectional view showing another form of instrument also embodying our invention.

Similar reference characters refer to similar parts in each of the views.

Referring first to Fig. 1, the instrument which is here illustrated is an electrical relay. It comprises a porcelain top plate 1 carrying a magnet M, the windings of which are located above the plate 1. The cores 3 of the magnet M extend through the plate 1 and terminate in pole pieces 4 on the underside of this plate. A pivotally mounted armature 5 co-operates with the pole pieces 4 and in turn actuates a contact finger 6 which co-acts with a fixed contact member 10 supported in a terminal post 11 which is mounted in the top plate 1. The operating parts of the relay, that is, the parts on the underside of the plate 1, are protected by a globe 2, which is usually of glass, and which is attached to the underside of the top plate 1 by means not shown in the drawing. The globe 2 usually has a ventilating hole 9, which is covered with a sheet of gauze, this hole serving to admit air to the operating parts of the relay, and also to drain any liquid which may collect on the floor of the globe 2. The globe 2 and plate 1 constitute a non-metallic housing for the operating parts of the relay.

The operating parts of the relay shown in Fig. 1 are some times subjected to the con-

densation of moisture which may freeze and prevent the proper functioning of the instrument. This condensation can take place under two conditions:

(1) After prolonged high temperature and relatively high humidity, so that the air inside of the housing carries a considerable amount of moisture, a drop in the ambient temperature may result in condensation on the metal parts which are connected to the outside air, because the temperature of these metal parts drops faster than the temperature of the other surfaces inside the housing.

(2) During a rising temperature, if there is sufficient opening in the housing to allow the moist air from the outside to enter the housing and if the air that enters carries enough moisture to be saturated at the temperature of the metal parts exposed to it, the moisture will precipitate on the metal parts.

In order to avoid condensation of moisture on the operating parts of the relay, we have provided surfaces inside of the housing that are at a lower temperature than the parts to be protected whether the ambient temperature is rising or falling.

Referring again to Fig. 1, the housing is provided with a metal member A, such for example as brass, the mass of which member is such that while the ambient temperature is rising, the temperature of the member will remain below the temperature of the operating parts of the relay, with the result that if air laden with moisture enters the housing, the moisture will condense on the metal member A instead of on the operating parts of the relay. The member A must, of course, not be in contact with any of the operating parts of the relay.

When the ambient temperature is falling, the metal member A will be at a higher temperature than the other parts within the housing, because the operating parts of the relay have a better connection with the outside atmosphere than does the member A. We accordingly provide other surfaces which will cool more rapidly than the operating parts of the relay, so that if the air inside of the housing becomes saturated, condensation will not take place on the operating parts.

As shown in the drawing, these additional surfaces, which are indicated at B, are thin sheets of metal, one portion of each sheet being within the housing and the other portion being outside of the housing. Preferably the portion of each member B which is outside of the housing is painted black, to make it a good radiator of heat, and the portion which is inside the housing is polished. Each metal member B may be cut, as shown in Fig. 2, that is, it may be provided with recesses 7, so that the two portions of the member are connected by a neck 8. This construction is desirable when the globe 2 is in the form of a round bowl. The neck 8 must be large enough to permit the entire sheet B to be at approximately the same temperature during a rapid change in the ambient temperature. When there is a fall in the ambient temperature, each metal sheet B will follow the ambient temperature more nearly than will the operating parts of the relay, and, consequently, the inner portion of each sheet will furnish a surface inside the housing which is at a lower temperature than the operating parts of the relay, with the result that any moisture condensation will take place on the sheets B and not on the operating parts of the relay.

Obviously, there should be no good thermal connection between the metal member A and the metal sheets B.

The members A and B may be used in the same instrument or either member may be used alone, depending upon the conditions which it is desirable to correct.

Referring now to Fig. 3, the instrument which is here shown is an electric meter, a clock, or some similar device. It is inclosed in a housing comprising a top or back plate 1 and a globe 2, both of which are non-metallic and may for example be of glass. The instrument itself, which is represented at 13, is attached to a metal plate 12 which is in turn attached to the back plate 1, and this plate is relatively thin so that there is a relatively small difference of temperature between plate 12 and the outside air when the temperature of the outside air is changing. Located within the housing is a metal member A which, as in Fig. 1, makes poor contact with the housing. When the ambient temperature is rising, member A will be at a lower temperature than the plate 12 and the instrument 13, because the plate 12 has better heat conducting relation with the outside air than does the member A, with the result that any moisture which is in the housing will condense on member A instead of on the instrument 13. Of course the device shown in Fig. 3 may be equipped with sheets B as in Fig. 1 to prevent deposition of moisture on the instrument during a drop in ambient temperature.

Although we have herein shown and de-

scribed only two forms of instruments embodying our invention, it is understood that various changes and modifications may be made therein within the scope of the appended claims without departing from the spirit and scope of our invention.

Having thus described our invention, what we claim is:

1. In an instrument of the type comprising operating parts inclosed in a non-metallic housing, the combination therewith of a metal member located within the housing but out of contact with the operating parts, the mass of said member being such that while the ambient temperature is rising the temperature of the member will remain below the temperature of the operating parts with the result that if moisture laden air enters the housing the moisture will condense on the metal member rather than on the operating parts.

2. In an instrument of the type comprising operating parts inclosed in a non-metallic housing, the combination therewith of a metal member a portion of which lies within said housing and a portion of which lies outside of said housing, said member being out of contact with the operating parts of the instrument, whereby when the ambient temperature is falling the temperature of said metal member will follow the ambient temperature more rapidly than will the operating parts and so will furnish a surface inside the housing which is at a lower temperature than the operating parts with the result that moisture in the housing will condense on said member rather than on the operating parts.

3. In an instrument of the type comprising operating parts inclosed in a non-metallic housing, the combination therewith of a metal member having a blackened portion lying outside said housing and a polished portion lying within said housing, said member being out of contact with the operating parts of the instrument, whereby when the ambient temperature is falling the temperature of said metal member will follow the ambient temperature more rapidly than will the operating parts and so will furnish a surface inside the housing which is at a lower temperature than the operating parts with the result that moisture in the housing will condense on said member rather than on the operating parts.

4. In an instrument of the type comprising operating parts inclosed in a non-metallic housing, the combination therewith of a first metal member located within the housing, the mass of said member being such that while the ambient temperature is rising the temperature of the member will remain below the temperature of the operating parts with the result that if moisture laden air enters the housing the moisture will condense on the metal member rather than on the op-

erating parts, and a second metal member, a portion of which lies within said housing and a portion of which lies outside of said housing, said second member being out of contact with the operating parts of the instrument, whereby when the ambient temperature is falling the temperature of said second member will follow the ambient temperature more rapidly than will the operating parts and so will furnish a surface inside of the housing which is at a lower temperature than the operating parts, with the result that moisture in the housing will condense on the second member instead of on the operating parts.

5. In an electrical relay of the type comprising operating parts protected by a non-metallic enclosure but connected with the outside air by metallic members, the combination therewith of a metal member located within the enclosure but out of contact with the operating parts, the mass of said member being such that while the ambient temperature is rising the temperature of the member will remain below the temperature of the operating parts with the result that if moisture laden air enters the enclosure the moisture will condense on the metal member rather than on the operating parts.

6. In an electrical relay of the type comprising operating parts protected by a non-metallic enclosure, the combination therewith of a metal member a portion of which lies within said enclosure and a portion of which lies outside of said enclosure, said member being out of contact with the operating parts of the instrument, whereby when the ambient temperature is falling the temperature of said metal member will follow the ambient temperature more rapidly than will the operating parts and so will furnish a surface inside the enclosure which is at a lower temperature than the operating parts with the result that moisture in the enclosure will condense on said member rather than on the operating parts.

7. In an electrical relay of the type comprising operating parts protected by a non-metallic enclosure, the combination therewith of a metal member having a blackened portion lying outside said enclosure and a polished portion lying within said enclosure, said member being out of contact with the operating parts of the instrument, whereby when the ambient temperature is falling the temperature of said metal member will follow the ambient temperature more rapidly than will the operating parts and so will furnish a surface inside the enclosure which is at a lower temperature than the operating parts with the result that moisture in the enclosure will condense on said member rather than on the operating parts.

8. In an electrical relay of the type comprising operating parts protected by a non-metallic enclosure but connected with the out-

side air by metallic members, the combination therewith of a first metal member located within the enclosure, the mass of said member being such that while the ambient temperature is rising the temperature of the member will remain below the temperature of the operating parts with the result that if moisture laden air enters the enclosure the moisture will condense on the metal member rather than on the operating parts, and a second metal member, a portion of which lies within said enclosure and a portion of which lies outside of said enclosure, said second member being out of contact with the operating parts of the instrument, whereby when the ambient temperature is falling the temperature of said second member will follow the ambient temperature more rapidly than will the operating parts and so will furnish a surface inside of the enclosure which is at a lower temperature than the operating parts, with the result that moisture in the enclosure will condense on the second member instead of on the operating parts.

9. In combination, a non-metallic housing, a metallic member located within said housing and having comparatively good heat conducting relation with the outside air, and a second metallic member located within said housing and having comparatively poor heat conducting relation with the outside air.

In testimony whereof we affix our signatures.

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