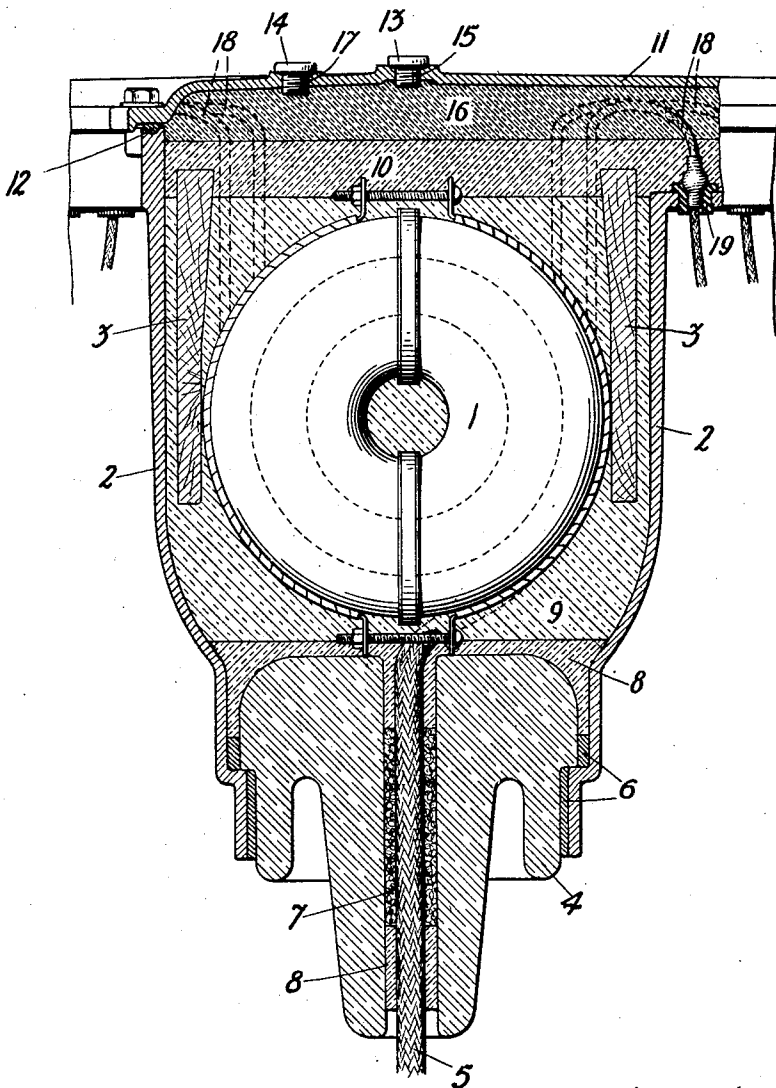


A. PRUESSMAN.
ELECTRICAL APPARATUS.
APPLICATION FILED NOV. 24, 1916.

1,244,642.

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UNITED STATES PATENT OFFICE.

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ELECTRICAL APPARATUS.

1,244,642.

Specification of Letters Patent.

Patented Oct. 30, 1917.

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To all whom it may concern:

Be it known that I, ALBERT PRUESSMAN, a citizen of the United States, residing at Berwyn, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Electrical Apparatus, of which the following is a full, clear, concise, and exact description.

This invention relates to electrical apparatus, such as loading coils, condensers, transformers and the like, and more particularly to sealing and protecting apparatus of this sort.

Heretofore, when it has been necessary to mount such apparatus in exposed positions, it has been customary to provide a housing or case in which the apparatus is placed, and to surround the apparatus with an insulating compound which, when hardened, serves to hold the apparatus in place and to protect it. Such a compound is necessarily of a low melting point in order that the apparatus may not be injured by its application. Insulating compounds which have been found especially suitable for this purpose have also been found to be subject to "cold flow." The term "cold flow" as there used refers to the property of a normally solid body to alter its shape within the range of climatic temperatures and especially within the high temperatures encountered in tropical countries when exposed to the direct rays of the sun. It has been customary to cover the insulating compound with a layer of another compound, such as asphaltum, which provides an efficient seal against moisture. Both the insulating and sealing compounds are subject to cold flow, however, and under extremely warm conditions, it has been found that the sealing compound being of greater density, tends to exchange position with the insulating compound, destroying the efficiency of the seal obtained by the sealing compound, and often displacing the coil from its proper position, with a resultant impairment of the insulation and efficiency of the apparatus.

The object of the present invention is to overcome the above difficulties and to effect an efficient separation of the insulating and sealing compounds throughout the wide range of temperature often encountered in installations of apparatus in extremely warm locations. This object is accomplished by separating the layers of insulat-

ing and sealing compounds by a layer of compound which will have no flow at the maximum temperature encountered in such service conditions.

Another object is to confine the insulating compound in place within the range of temperatures encountered in practice; while a third object is to successfully confine the apparatus treated in proper position even in event of cold flow of the insulating compound. To effect this, a part of the apparatus or the means used to position the apparatus, extends into the confining compound and is thereby effectually held against movement.

Referring to the drawing which illustrates one form of the invention, the drawing shows a cross-sectional view of an inclosed loading coil constructed in accordance therewith, and wherein a coil 1 of any desired construction is placed in a case 2 of any desired material, iron being generally used. The coil 1 is supported in proper position in the casing 2 in any desired manner; for example, wedges 3 may be used, as shown in United States Patent No. 1,168,312 to Stanley B. Kent dated January 18, 1915. The bottom of the casing 2 is provided with an opening in which a bushing 4 is placed, and a conductor 5 passes through the bushing to the coil 1. The bushing 4 is preferably held in place by leading 6. The bottom opening and bushing are unnecessary if all the conductors are led out through the top of the casing 2. In this event, a block such as the block 13 of Patent 1,168,312, might be used to position the coil a proper distance from the bottom of the casing, if desired. To insure against moisture entering the casing along the conductor 5, the latter preferably has the part of the conductor centrally of the bushing 4 wound with cotton wicking 7 to make a tight joint. A space between the outer part of the conductor and the bushing is filled with a confining compound 8, which is also run into the interior of the casing to a sufficient depth to cover the top of the bushing, care being taken to insure that the space between the conductor 5 and the inner end of the bushing is completely filled. After the compound 8 has hardened, an insulating compound 9 is then poured into the casing to a depth sufficient to cover the coil 1; the wedges 3 being long enough so that the up-

per ends thereof are not covered by the compound 9. The compound 9 may be one which is normally solid and which can be poured at a temperature below 230° Fahrenheit, and is poured into the casing while melted. One compound having the desired characteristics consists chiefly of rosin and rosin oil, but any insulating compound may be used which melts at a temperature low enough so as not to injure the coil 1 when applied thereto. The compound 9 may hold the coil 1 in position without the use of the wedges 3 or of any other supporting means. If they are omitted, the coil 1 will be supported in place until the compound 9 has hardened sufficiently to support the coil alone.

If none of the conductors are brought out of the casing below the top of the compound 9, a casing having no openings in the bottom, such as shown in Patent 1,168,312, could be used, in which case, the compound 8 would be omitted and the compound 9 poured directly into the bottom of the casing 2, until the coil 1 was surrounded thereby. The compound 8 has the same characteristics as the compound 10, hereinafter described.

After the compound 9 has been added and cooled, a layer of separating and confining compound 10 is poured on. The separating compound is not subject to cold flow within temperatures which would be reached on exposure of the casing and its contents to the direct action of the sun in extremely hot weather, or when the apparatus is positioned in abnormally warm places, as engine rooms and the like. When solid, the compound 10 has a strength great enough to confine the compound 9 and coil 1 in place under the extreme range of temperature conditions to which the apparatus may be exposed, independent of the position in which it may be placed. The separating compound 10 should be such that the compound 9 will neither mix therewith nor have any detrimental effect thereon, and is preferably of electrically non-conducting composition so that the coil need only be covered with the compound 9 to a depth such that the high temperature of the compound 10 will not injure the coil on being poured into place. It is, however, possible to expose a small part of the coil 1 to the compound 10 by adding the compound slowly until it has solidified about the exposed portion thereof. The wedges 3 are also held in place by the compound 10. This arrangement is useful in helping to hold the coil 1 in place, and is a desirable feature of the invention.

A compound produced from asphalt which has been purified and had air blown through it while heated to oxidize the asphalt, and this product fluxed with heavy

petroleum, has been found satisfactory for the compound 10, and is not subject to cold flow. This compound melts at about 390° Fahrenheit. The invention is not restricted to the use of this particular compound, however, as a variety of other compounds could obviously be used.

The casing 2 has a cover 11 which is secured thereto, a gasket 12 being interposed between the casing and cover to secure a tight joint. The cover 11 is provided with two plugs 13 and 14, the plug 13 being located at the highest point in the interior of the casing. The cover would usually be applied after the placing of the separating compound 10, and have the plugs 13 and 14 removed. A tube would be placed in each of the plug openings, the tube placed in the opening 15 permitting the air to escape from the casing, while a second sealing compound 16 is being poured into the casing through another tube located in the plug opening 17. The compound 16 is normally solid and has preferably a lower melting point than that of the compound 10. The compound 16 may consist of asphaltum fluxed with heavy petroleum, and may be subject to cold flow at the extreme high temperatures encountered when installed outside. This composition has been found to cling tenaciously to the casing and to aid considerably in the attainment of an efficient moistureproof seal. This particular composition, however, is not essential, as any desired sealing compound 16, which will not injure the compound 10, may be used in practice. The compound 16 would be poured in through a tube in the plug opening 17, as described, until the tube in the plug opening 15 contained a sufficient quantity to completely fill the casing 2 on cooling. After the compound 16 is cooled, the tubes would be removed and the plugs 13 and 14, after being coated with red lead, would be screwed in place to complete the device. The leading of the plugs aids in making the casing moistureproof.

Conductors 18 leading to the coil 1 would be brought out through suitable bushings 19 in the casing 2, the connection between the bushings and casing, and conductors and bushings being moistureproof.

What is claimed is:

1. The combination with a casing and apparatus in said casing, of a medium in said casing surrounding said apparatus, and a sealing medium in said casing covering said first named medium, said sealing medium being incapable of flow at temperatures attained by the sealing medium under high temperature service conditions.

2. The combination with a casing and apparatus inclosed in said casing, of a medium in said casing surrounding said apparatus, a sealing medium of greater density than the medium surrounding said appa-

ratus, and a separating medium intermediate said other media, said other media being capable of flow at a temperature below that at which said separating medium will flow.

5 3. The combination with a closed casing and apparatus in said casing, of a medium in said casing surrounding said apparatus, a separating medium covering said first named medium, said separating medium being incapable of flow at temperatures attained thereby under high temperature service conditions, and a sealing medium covering said separating medium and completely filling the space in said casing not occupied by said apparatus, the medium surrounding said apparatus and the separating medium.

10 4. The combination with a casing and electrical apparatus therein, of an insulating medium in said casing surrounding said apparatus, and a sealing medium covering said insulating medium to seal the same against moisture, said sealing medium being incapable of flow at temperatures attained thereby under high temperature service conditions.

15 5. The combination with a casing and apparatus inclosed therein, of a medium in said casing surrounding said apparatus, a portion of said apparatus being exposed outside of said medium, and a second medium covering said first named medium and an exposed portion of said apparatus to hold said apparatus in position, said second medium being incapable of flow at temperatures attained thereby under high temperature service conditions.

20 6. The combination with a casing and apparatus inclosed therein, of a medium surrounding said apparatus, a retaining medium covering said first named medium, a third medium covering said retaining medium and cooperating therewith to seal said apparatus, said retaining medium being solid and incapable of flow at temperatures considerably above those at which both of said other media flow, and serving to retain said other media in place.

25 7. The combination with a casing and apparatus inclosed in said casing, of a medium surrounding said apparatus, and a second medium incapable of cold flow in engagement with first named medium to confine the same within said casing.

8. The combination with a casing and apparatus inclosed in said casing, of a medium surrounding said apparatus, means extending from said apparatus exteriorly of said casing, and a second medium incapable of cold flow in engagement with said means and with said first mentioned medium to confine the latter within said casing.

9. The combination with a casing and apparatus inclosed in said casing, of a medium in said casing surrounding said apparatus, a portion of said apparatus being exposed outside of said medium, and a second medium incapable of cold flow covering said exposed portion of said apparatus and serving to hold said apparatus in position.

10. The combination with a casing and apparatus inclosed in said casing, a positioning means to locate said apparatus in place, and a second medium incapable of cold flow engaging said positioning means to hold the same against displacement.

11. The combination with a casing and apparatus inclosed in said casing, of wedges between said casing and apparatus positioning the latter, and a medium incapable of cold flow engaging said wedges to hold the same against displacement.

12. The combination with a casing and apparatus inclosed therein, of a medium in said casing surrounding said apparatus, a portion of said apparatus being exposed outside of said medium, positioning means to locate said apparatus in place, and a second medium covering said first named medium and engaging said positioning means to hold the same against displacement.

13. The combination with a casing having an opening therethrough and apparatus inclosed therein, of means leading from said apparatus to the exterior of said casing through said opening, a medium in said casing surrounding said apparatus, and a plastic medium forming a tight closure between said means leading from the apparatus and said casing to confine said first named medium within said casing, said plastic medium being incapable of flow at temperatures attained thereby under high temperature service conditions.

In witness whereof, I hereunto subscribe my name this 21st day of Nov. A. D., 1916.

ALBERT PRUESSMAN.