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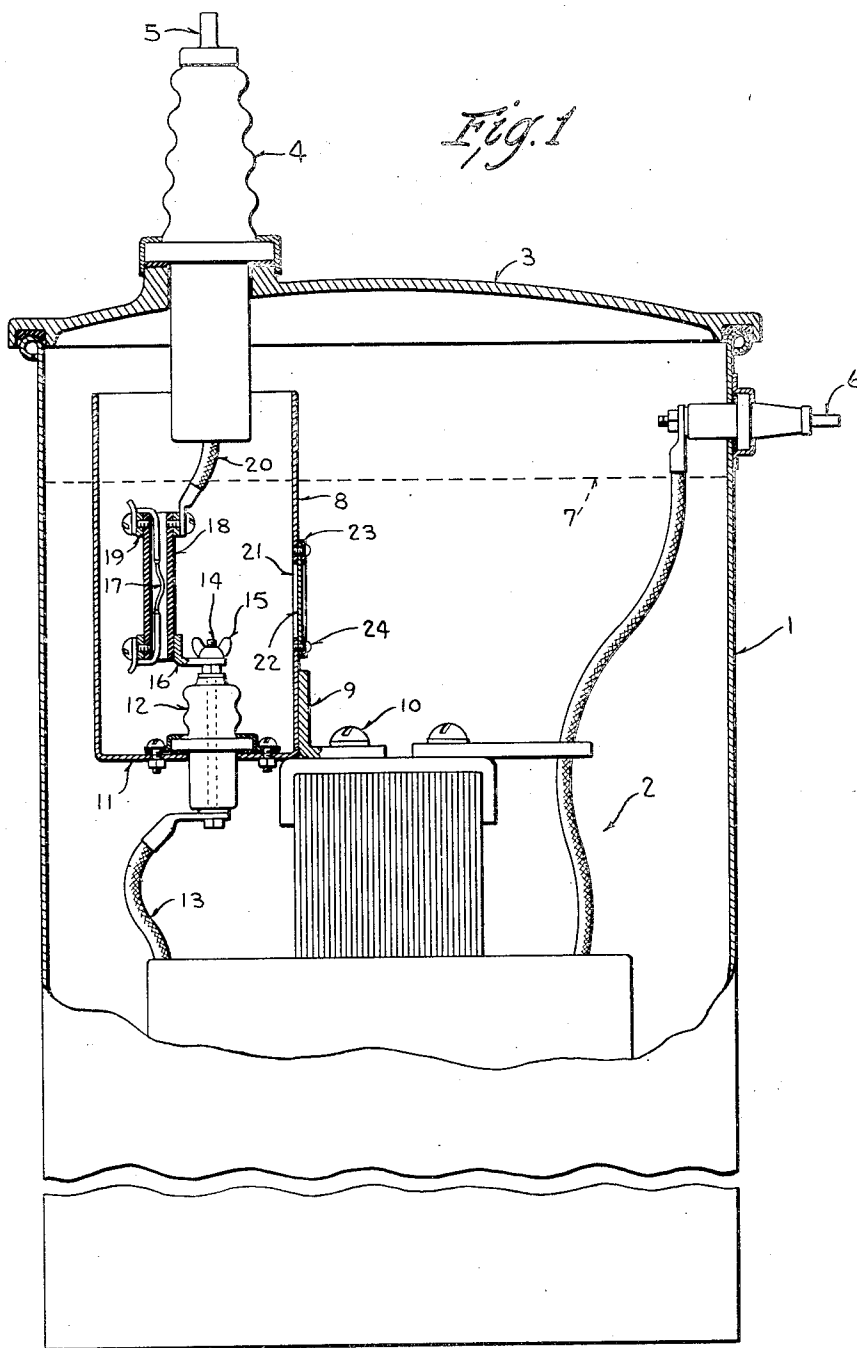
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PROTECTIVE MEANS FOR ELECTRICAL INSTRUMENTALITIES

Filed Aug. 13, 1946

2 Sheets-Sheet 1



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Fig. 2

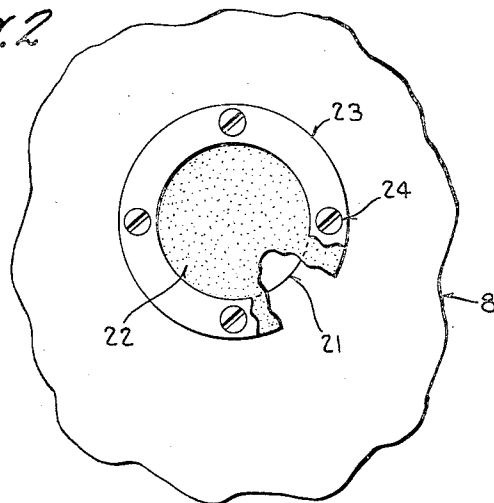


Fig. 3

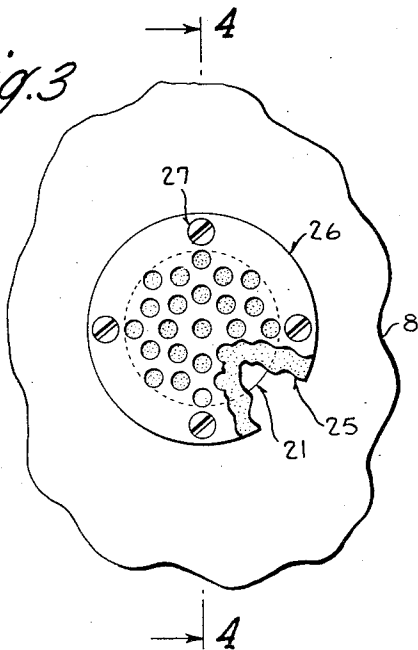
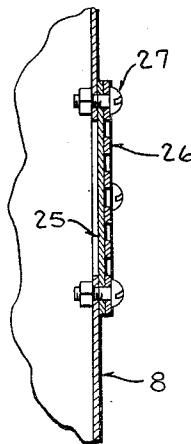


Fig. 4



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UNITED STATES PATENT OFFICE

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PROTECTIVE MEANS FOR ELECTRICAL
INSTRUMENTALITIES

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This invention relates to protective means for electrical instrumentalities.

In oil immersed electrical devices, such as transformers, it frequently happens that whenever the circuit is interrupted by means of fuses or circuit breakers either primary or secondary or by means of tap changing switches, that considerable arcing occurs during the interrupting of the circuit. This arcing contaminates the oil and liberates a considerable amount of carbon.

This invention is designed to overcome the above noted defects and objects of this invention are to provide a protective arrangement or device whereby the circuit to a transformer or other electrical instrumentality may be opened under load without contaminating the oil surrounding the transformer although the break in the circuit occurs below the oil level, means being provided for keeping the oil adjacent the point where the arcing takes place from commingling with the remaining main body of the oil except through filter means, which serves to remove carbon or other harmful material.

In greater detail, further objects of this invention are to provide protective means in the housing of an oil immersed electrical instrumentality such, for instance, as a transformer in which a vessel open at the top is provided and is arranged to house the circuit breaking agent, whether it is a fuse, a circuit breaker, a tap changing switch or other means and which is provided with a filter below the oil level so as to permit equalization of the oil levels inside and outside the small housing, the small housing being open at its top so as to prevent building up of excessive pressure therein.

Further object are to provide a construction as set forth hereinabove which is so made that when a blown fuse, for example, is renewed the operator may readily remove the contaminated oil from the small housing at the same time that he renews the fuse without disturbing the oil in the main body of the transformer or other device, thus limiting the loss of oil to a very small amount.

Embodiments of the invention are shown in the accompanying drawings, in which—

Figure 1 is a view of a housed, oil immersed transformer with parts broken away and parts in section, showing the protective means in place.

Figure 2 is an enlarged detail of the structure shown in Figure 1.

Figure 3 is a fragmentary view showing a modified construction, such view corresponding to Figure 2.

Figure 4 is a sectional view on the line 4-4 of Figure 3.

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Referring to the drawings, it will be seen that 1 indicates the housing or tank of an oil immersed transformer indicated generally at 2. Any other electrical instrumentality could be employed with this invention. The tank 1 is provided with a cover 3 through which the bushing 4 for the high tension terminal 5 of the single bushing transformer extends. One of the low voltage terminals is indicated by the reference character 6. The oil level is maintained at about the point indicated by the dotted line 7.

A small auxiliary housing or container 8 is rigidly supported from the transformer in any suitable manner, as shown in Figure 1 for instance. It may have a bracket 9 welded thereto and secured by means of a screw 10 to the upper portion of the transformer.

The auxiliary housing 8 is open at its top and closed by means of a bottom wall 11. This bottom wall is apertured and receives the insulating bushing 12 leading to the high tension lead 13 of the primary of the transformer. The bushing 12 may be provided with a threaded upper terminal 14 provided with a thumb nut 15 adapted to removably clamp the lower terminal 16 of a fuse link 17 in place. This fuse link may be mounted within a small fiber tube 18. The upper terminal 19 of the fuse construction is connected by means of a conductor 20 with the high tension terminal 5.

At a point above the bottom of the small tank or auxiliary housing 8 an aperture 21 is formed. This aperture is covered by means of a filter disk or member 22 which may consist of relatively heavy filter paper held in place by means of a ring 23, the ring in turn being removably held in place by means of screws 24. This construction is shown in greater detail in Figure 2.

If desired, the filter paper may be reinforced by an apertured disk, for example as shown in Figures 3 and 4. The filter paper is indicated by the reference character 25 and is reinforced by means of an apertured disk 26 held in place by means of screws 27.

The operation of the apparatus is as follows:

Assume that an overload occurs and that the fuse link blows. This break in the circuit occurs beneath the oil level and contaminates the oil within the small container or auxiliary housing 8. No excessive pressure builds up in this auxiliary housing 8 as it is open at its top. The oil level is maintained as the oil is free to circulate through the filter means 21 or 25, see Figures 2 and 3. However, any carbon or other harmful material is prevented from passing into the main body of

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the oil in the main tank or housing 1 and remains within the container or small auxiliary housing 8.

When the lineman renews the fuse, he may also siphon or otherwise drain out the oil from the small container or auxiliary housing 8 without disturbing the oil in the main tank 1, thus only a small amount of oil is lost. Obviously, the lineman may refill the small container or auxiliary housing 8 with oil or he may merely allow oil to pass slowly into the small container or auxiliary housing 8 from the main body of the oil in the tank 1.

It is to be distinctly understood that while the primary fuse has been shown as the circuit breaking instrumentality that any other device could be used; for instance, circuit breakers could be employed or other types of switches including primary or secondary switches such, for example, as tap changing switches.

This invention allows interruption of the circuit of a transformer or other instrumentality beneath the oil level without contaminating the entire body of oil and without building up excessive pressure in any portion of the apparatus.

While filter paper has been found satisfactory for the purpose indicated, it is to be understood that any suitable filtering means could be employed.

It will be seen that a very simple protective device has been provided by this invention which may be readily applied to existing or previously installed transformers, which may be made as standard equipment of transformers, and which is so arranged as to prevent contamination of the main body of oil in the main tank when interruption of the circuit occurs at a point below the oil level.

It is to be noted that the filtering means is readily removable and may be renewed as often as required. A further feature to be noted is that the filtering means is located above the bottom of the auxiliary housing, thus allowing liberated carbon or other sediment to settle to the bottom of the auxiliary housing away from the filtering means thus increasing the effective life of the filtering means.

It is to be understood that other insulating liquids can be used in place of oil if so desired. Therefore, the expression "oil" appearing herein is to be interpreted as covering any suitable insulating liquid.

It is to be understood that the expression "circuit interrupting means" is to be interpreted as covering fuses, circuit interrupters, tap changing switches, or other types of switches or similar means.

Although this invention has been described in considerable detail, it is to be understood that such description is intended as illustrative rather than limiting, as the invention may be variously embodied and is to be interpreted as claimed.

I claim:

1. In a device of the class described, a housing arranged to be inserted into insulating liquid, said housing having an aperture below the level

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of the liquid, a circuit interrupter mounted within the housing and immersed in said liquid, and filtering means at said aperture for preventing contamination of the liquid outside of said housing upon operation of said interrupter within said housing, said circuit interrupter having no direct communication with the liquid exteriorly of said housing.

2. In a device of the class described, a housing arranged to be partially immersed in insulating liquid, said housing having an aperture below the level of the liquid and being open at its upper end above said liquid, a circuit interrupter mounted within the housing and immersed in said liquid, and filtering means at said aperture for preventing contamination of the liquid outside of said housing upon operation of said interrupter within said housing.

3. In a device of the class described, a housing arranged to be placed in an insulating liquid, said housing having an aperture below the liquid level, a circuit interrupter mounted within said housing and immersed in said liquid, and renewable filtering means at said aperture for preventing contamination of the liquid outside said housing upon operation of said circuit interrupter, said circuit interrupter having no direct communication with the liquid exteriorly of said housing.

4. In a device of the class described, a housing arranged to be placed in an insulating liquid and having an opening above the level of said liquid, said housing having an aperture below the liquid level, a circuit interrupter mounted within said housing and immersed in said liquid, and renewable filtering means at said aperture for preventing contamination of the liquid outside said housing upon operation of said circuit interrupter.

5. In a device of the class described, a housing arranged to be placed in an insulating liquid and having an opening above the level of said liquid, said housing having an aperture below the liquid level, a circuit interrupter mounted within said housing and immersed in said liquid, renewable filtering means at said aperture for preventing contamination of the liquid outside said housing upon operation of said circuit interrupter, and reinforcing means for said filtering means.

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