Dec. 8, 1925. 1,564,656

F. WOODMANSEE

LIQUID FEED SYSTEM

Filed Jan. 22, 1920

Fig. 1.

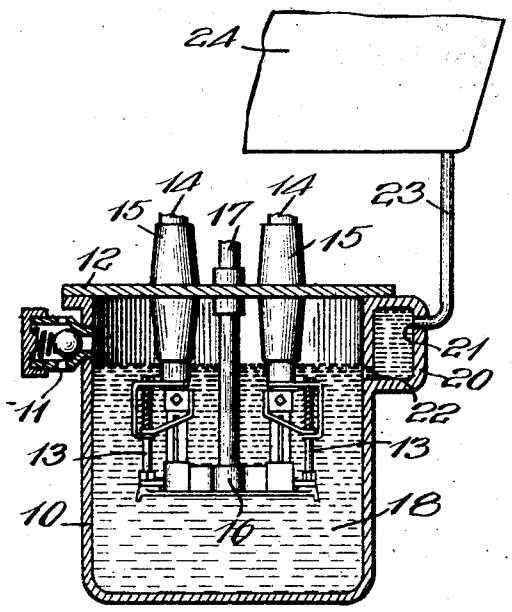


Fig. 2.

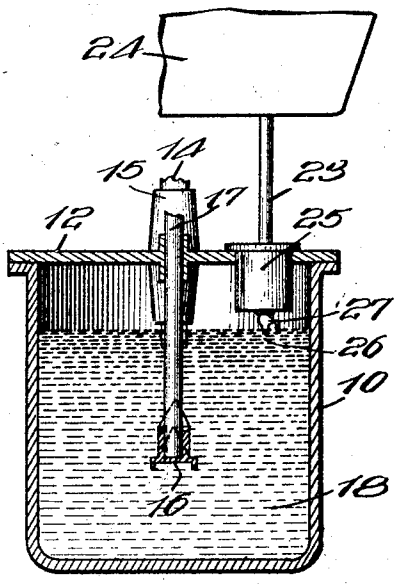
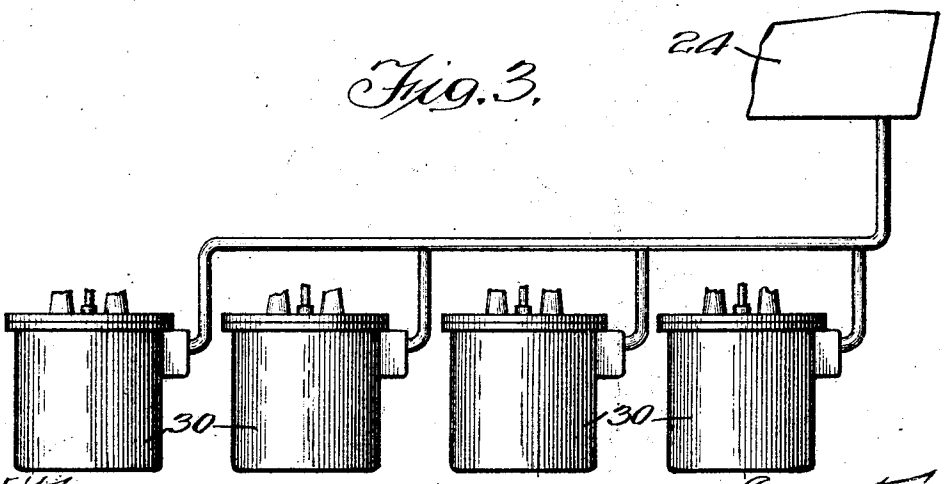


Fig. 3.



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UNITED STATES PATENT OFFICE.

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LIQUID-FEED SYSTEM.

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To all whom it may concern:

Be it known that I, FAY WOODMANSEE, a citizen of the United States, residing at Maywood, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Liquid-Feed Systems, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates generally to liquid feed systems and has been provided primarily to meet the requirement for maintaining the oil or other liquid of high insulating or dielectric qualities in circuit breakers, transformers, lightning arresters and other electrical apparatus at a proper level.

Heretofore, due to the inaccessibility and infrequent operation of apparatus of this general description, the maintenance of a proper liquid level has been frequently neglected. The hazard attending the opening of an oil switch wherein the oil has evaporated or otherwise dropped to such a level as to have no effect in quenching or extinguishing the resulting arc is only too well known to those skilled in the art. The resulting heavy arcing and consequent surging in the line frequently causes the insulation of the system to break down. The disastrous results have not only subjected the operator to considerable danger, but have caused enormous damage to apparatus.

Heretofore in the art it has been practically impossible, particularly where an installation includes a multiplicity of pole top circuit breakers or other inaccessible electrical apparatus for the operator to learn in a practical manner the condition of the oil level in each independent device prior to the operation thereof. After the switch has been opened and great damage or perhaps loss of life has been caused it is too late to rectify the error.

The primary aim of the present invention is the provision of a liquid feed system for maintaining the oil or other insulating liquid in circuit breakers and other electrical apparatus at a proper level in a simple and highly effective manner and with a minimum amount of attention. Thus I have provided positive insurance against the inevitable damage which has heretofore resulted, for example, in opening an oil switch with insufficient oil present to extinguish or quench the arc or in the operation of an oil transformer without adequate insulating liquid about the coils thereof.

In accordance with the teachings of my invention I provide a tank or reservoir having connections for liquid flow to the various electrical devices to be supplied This tank or reservoir is preferably arranged at a higher level than the apparatus to be supplied so that the liquid will flow by gravity thereto and the intake port of each of the devices is positioned so as to be sealed and the flow of liquid thereto checked when the level of the liquid is at the proper height. A drop in this liquid level through evaporation or otherwise, will uncover the intake port so as to cause a flow of liquid from the tank or reservoir to maintain the level of the liquid in the particular apparatus at the proper height.

In order to explain to those skilled in the art the manner in which the principle of my invention is to be applied and to explain a specific embodiment of the invention I shall describe the invention in connection with a typical oil circuit breaker.

In the accompanying drawings,

Figure 1 is a vertical sectional view of an oil switch showing an embodiment of my invention in connection therewith;

Figure 2 is a vertical sectional view of a switch showing an alternative embodiment of my invention in connection therewith; and

Figure 3 shows diagrammatically the invention embodied in connection with a multiplicity of electrical devices.

Referring to the drawings, the circuit breaker illustrated is typical of the oil break plunger form. The present invention is applicable in connection with any other form of oil switch. Therefore the particular switch shown will not be described in detail except where the same is necessary to set out the functioning of the present invention in connection therewith.

This switch comprises a closed vessel 10 provided with a safety valve 11. The closed casing 10 includes a cover 12 through which project electrical conductors terminating in the stationary switch contact members 13. These contact members are of a form well known in the art and need not be specifically described here. The conductors 14 which

are connected to said contact members, are led through the cover 12 by means of suitable insulators 15 which may be of any suitable type. These insulators are preferably sealed into the cover so that a tight joint is maintained.

A movable switch member 16 adapted for reciprocation into and out of contact with the stationary contact members 13 is mounted upon a suitably insulated rod or plunger 17 which rod or plunger is guided in the cover 12 and connected at its upper end with suitable operating and resetting mechanism (not shown) whereby the rod or plunger 17 is reciprocated and the movable switch member 16 thereby reciprocated into and out of contact with the stationary contact members 13, as well understood by those skilled in the art. The operation of the structure above described is obvious. The closed container 10 holds a body of liquid 18. This liquid may be oil or other suitable insulating or non-conducting liquid, as heretofore set out.

In the embodiment shown in Figure 1 the container 10 is provided with an external well 20 extending up adjacent the cover 12. The top of the well 20 is provided with an intake port 21. The bottom of the well is provided with a discharge port 22 communicating with the interior of the closed container 10 and preferably positioned so that the contact members 13 of the switch will be amply submerged when the level of the liquid in the container 10 seals the port 22.

The intake port 21 is connected by means of a pipe or conduit 23 to the bottom of a supply tank or reservoir 24 preferably of such capacity that the container 10 will be supplied over a considerable period. In such instance, only infrequent filling of the reservoir is necessary and the frequent attending of the switch is avoided. The relative positioning or location of the reservoir 24 is immaterial, it being sufficient that this tank be so arranged as to provide a flow by gravity to the well 20. In the event that such reservoir is used in connection with a single switch it might be positioned on the cover 12 of the closed container 10 if so desired.

It will now be apparent that should, for example, upon operation of the switch the level of the liquid 18 in the closed container 10 drop to such point that it would have little or no effect in quenching or extinguishing the resulting arc a flow from the tank or reservoir 24 to the container 10 by way of the conduit 23 and well 20 will immediately be set up. The level of the liquid in the container 10 will thereupon rise, sealing the port 22 and compressing the air in the container 10 above the level of the liquid to such extent that the further flow of liquid will be checked. Upon any tendency of this liquid level toward dropping, a flow will at once be set up and a substantially constant level thereby obviously maintained.

In the embodiment shown in Figure 2 the well is in the form of an auxiliary reservoir 25 mounted in the cover 12 of the closed container 10. This auxiliary reservoir is preferably sealed into the cover 12 so that a tight joint is maintained. The nozzle 26, providing communication between the auxiliary reservoir 25 and the container 10 is provided with a pet cock 27 in order to permit the operator to shut off the flow from the reservoir 24 should it be desired to disassemble the switch apparatus as to remove the casing, etc. Otherwise the details and operation of this system are substantially as described in connection with Figure 1.

In Figure 3 I have shown diagrammatically the invention embodied in connection with a multiplicity of electrical devices. The devices 30, supplied from the reservoir 24, may be a series of oil break switches, a series of transformers or other electrical apparatus, or an entire installation, including oil break switches, transformers, lightning arresters and the like.

While my invention is particularly useful in the connections above set out, and while I have illustrated the invention in connection with a typical oil switch, it is to be understood that such showing is simply illustrative and that I do not intend to limit the invention to such use or purpose only. The arrangement and form may be varied with the exposition given.

I claim:

In combination, a container, a partition dividing the container into two receptacles, one of the said receptacles being comparatively larger than the other and containing liquid and gaseous matter, the other receptacle being relatively small and containing only liquid matter, means including an aperture in the said partition for connecting the said receptacles, means connecting the smaller receptacle to a liquid supply, the said aperture being normally below the surface of the liquid in the large receptacle, means governed by the gas above the liquid in the large receptacle for causing liquid to flow from the said small receptacle through the said aperture into the large receptacle and means including a safety valve connected to the large receptacle for permitting the gas to escape therefrom whenever the pressure of the entrained gas exceeds a predetermined amount.

In witness whereof, I hereunto subscribe my name this 19th day of January, 1920.

FAY WOODMANSEE.