Feb. 2, 1932. G. JANSSON 1,843,286

SWITCH HOUSE

Filed Nov. 3, 1924

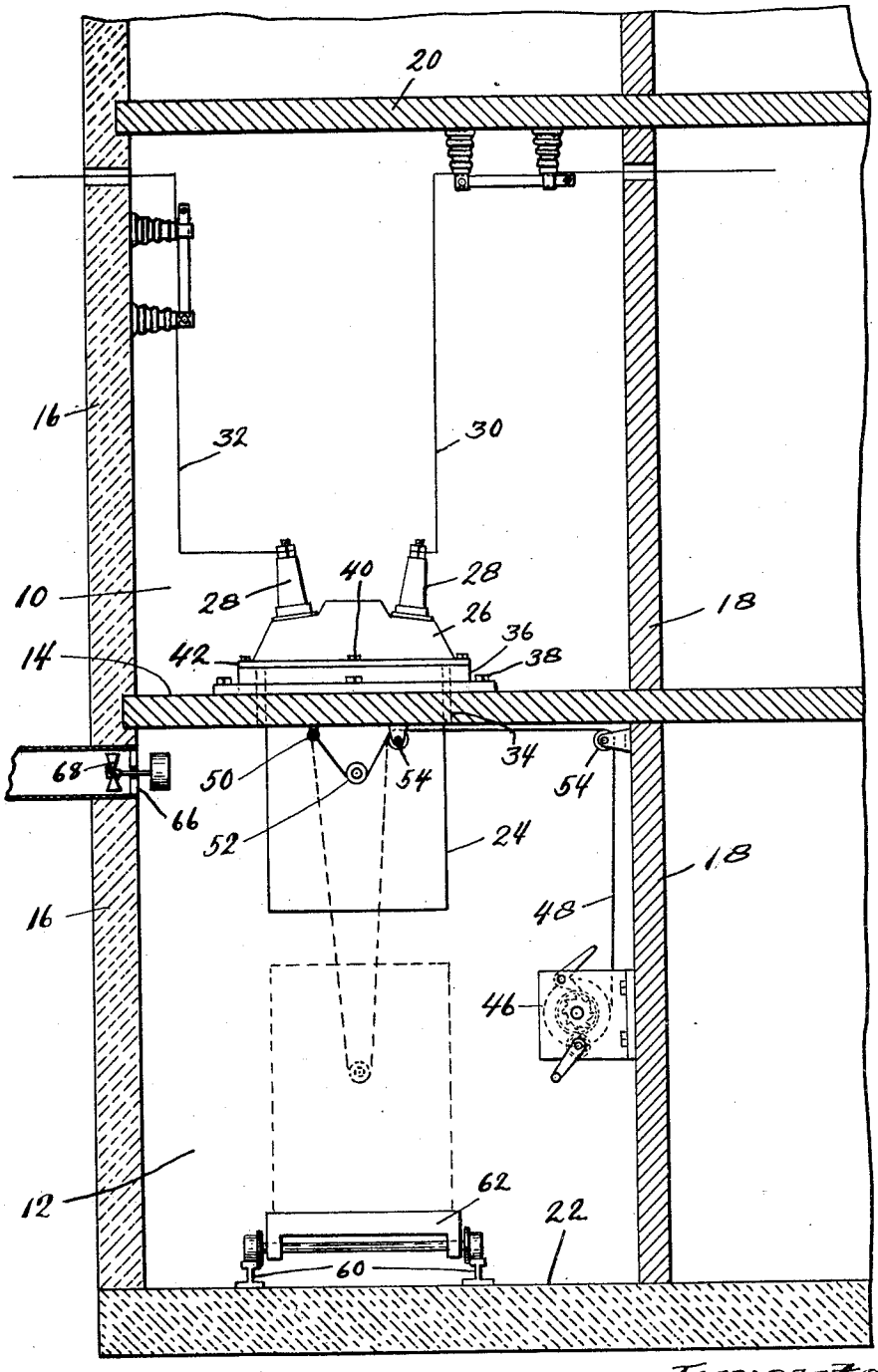


Fig. 1.

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Patented Feb. 2, 1932 1,843,286

UNITED STATES PATENT OFFICE

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SWITCH-HOUSE

Application filed November 3, 1924. Serial No. 747,693.

This invention relates to power-generating and distributing systems and particularly to control-stations as switch-houses, in said systems, and the apparatus therein contained.

Because of the relatively large amounts of power generated and transmitted, and because a fault in one part of a transmission and distribution system tends to spread by unsuspected channels to other parts of the system it has become the growing practice to isolate the various circuits and apparatus of the system from each other by interposing insulating barriers between the various circuit leads and apparatus, as, for instance, by enclosing the apparatus in closed rooms having insulating enclosing walls.

This method, however, does not protect the system from trouble caused by the overloading of some of the apparatus. When an oil immersed electric switch, for instance, interrupts its circuit under a heavy overload, highly heated gases, or even flame and burning oil may be thrown out of the switch casing and about the exposed circuit leads. The heated gases are conducting and may form a conducting path between the switch terminals and thereby cause a flash-over which cannot be controlled by the switch; and damage may ensue. Furthermore, a high pressure may be created within the switch at the moment of circuit-interruption under heavy load, and the receptacle may be blown away from its position about the switch members; or the circuit-interrupting arc may burn a hole through the wall of the receptacle. In both cases burning oil may be liberated into the room and the flames and heated gases may cause current to flow along undesired channels and thereby cause trouble in the system.

An object of this invention is the provision of a switch-house so constructed and arranged that not only are the electrical circuits and the current-conducting components of the apparatus isolated from each other, but the apparatus is isolated from the current-conductors and, especially, the casings of the oil-immersed electric switches are isolated from their exposed electric terminals.

In isolating the switch casing from its exposed terminals I provide a construction and arrangement whereby an attendant may have free working room about the terminals and also about the casing, for raising and lowering it to and from enclosing position about the contact members and for other purposes; and this constitutes a further object of the invention.

A further object is generally to improve the construction and operation of electric distribution systems and apparatus accessory thereto.

The figure is a sectional elevation, more or less diagrammatic, of a sufficient portion of a switch house to illustrate the invention.

As here shown, and in accordance with this invention, the switch house comprises an upper isolating room 10 and a lower isolating room 12 and a wall structure 14 which is common to both rooms and isolates one from the other. Said wall structure comprises the floor of the upper room and the ceiling of the lower room. The vertical walls 16 and 18 may be common to both rooms. The upper room has a ceiling 20 and the lower room has a floor 22. The enclosing walls of the two rooms may be composed of some suitable electrically insulating and fireproof material, as cement. Both rooms have other walls, not shown, which complete the enclosure of the rooms and both rooms are of such dimensions as to provide ample working space for an attendant about the apparatus therein contained.

The electric switch forming a part of this invention comprises a casing including an oil receptacle 24 and a frame 26, which frame forms a cover for the open top of the oil receptacle. Switch terminals 28 are extended through said frame from a position below the frame and within the oil receptacle to a point above the frame, where they are arranged for connection with circuit leads 30 and 32.

Said switch is common to both superimposed rooms 10 and 12 and is extended through, and disposed in, an opening 34 in the wall structure 14.

An apertured supporting plate 36, preferably in the form of an annular ring, surrounds said opening, preferably completely, and is secured in such position to the wall structure

by suitable means as bolts 38. The switch cover 26 is disposed on said plate, over its aperture, and may be secured removably thereto by bolts 40 which pass through an annular outstanding flange 42 of said cover. With this construction, the switch cover also forms a cover for the opening in the wall structure. Preferably the connection between said cover and said plate, and between said plate and said wall structure, is approximately gas tight so that hot gases or vapors, or combustible fumes, will not flow in any detrimental amount from the lower room 12 into the upper room 10.

Means are disposed in said lower room to raise said oil receptacle into position under said cover and also lower it to the floor of said lower room, for inspection of the switch contacts and for other purposes. Said raising and lowering means may comprise a windlass 46 secured to a wall 18 of the lower room and having flexible cables 48, one of which is here shown, disposed on opposite sides of the oil receptacle and extended from fixed attaching means 50 adjacent said oil receptacle to the windlass and passing over pulleys 52 carried by the oil receptacle and pulleys 54 supported by the walls of the room. The raising and lowering means may also serve to support the receptacle removably in position beneath its cover and about the current-conducting components of the switch.

Preferably a track 60 is disposed on the floor 22 of the lower room beneath the opening 34 in the wall-structure, or floor 14, of the upper room. Said receptacle may be lowered onto a truck 62 disposed on said track and having wheels 64 which engage the track, whereby the receptacle may be moved conveniently out of said room for repair and the like.

Preferably said lower room is vented to the atmosphere by suitable means as the opening 66 in the side wall 16; and the venting may be assisted by draft created in any suitable manner, as by the fan 68, which fan may be continuously operated.

With the construction shown, oil gases and vapors, and liquid oil are confined to the lower room 16 and cannot come in contact with live circuit leads in the upper room; and damage to the oil receptacle ordinarily will not result in a disturbance in the switch circuit as the switch ordinarily opens and interrupts its circuit before damage to the oil receptacle, or the expelled gases and vapors, become evident.

While the invention has been illustrated in connection with an electric switch it is equally applicable to similar types of apparatus.

I claim:

1. A two-story switch house having upper and lower stories providing two vertically disposed rooms arranged to provide free working space for an attendant and isolated from each other by a horizontal wall structure comprising the floor of the upper room and the ceiling of the lower room, an oil immersed electric switch having its oil receptacle disposed mainly in said lower room and its switch terminals and cover disposed mainly in said upper room, said rooms also having means whereby they are sealed from deleterious gaseous intercommunication.

2. A two-story switch house having upper and lower stories providing two vertically disposed rooms arranged to provide free working space for an attendant and isolated from each other by a horizontal wall structure comprising the floor of the upper room and the ceiling of the lower room, and an oil immersed electric switch having a cover supported by said wall structure in the upper room, and switch terminals extended outwardly from said cover, and an oil receptacle disposed beneath said cover and extended through an opening in said wall structure and disposed mainly in said lower room, said rooms also having means whereby they are sealed from deleterious gaseous intercommunication.

3. A switch house having upper and lower stories providing two vertically disposed rooms arranged to provide free working space for an attendant and isolated from each other by a horizontal wall structure comprising the floor of the upper room and the ceiling of the lower room, said wall structure having an opening, a cover disposed in said upper room over said opening and constituting a closure therefor, electric terminals extended above said cover into said upper room, and an oil receptacle disposed in said lower room and having its upper portion disposed in said opening and under said cover, said rooms also having means whereby they are sealed from deleterious gaseous intercommunication.

4. A switch house having upper and lower stories providing two vertically disposed rooms arranged to provide free working space for an attendant and isolated from each other by a horizontal wall structure comprising the floor of the upper room and the ceiling of the lower room, said wall structure having an opening, a cover disposed in said upper room over said opening and constituting a closure therefor, electric terminals extended above said cover into said upper room, an open top casing disposed in said lower room and having its upper portion received in said opening and its open top closed by said cover, and an electrical apparatus contained in said casing and connected with said electric terminals, said rooms also having means whereby they are sealed from deleterious gaseous intercommunication.

5. A switch house having isolated upper and lower stories providing two vertically disposed rooms arranged to provide free work-

ing space for an attendant, a terminal-supporting cover-frame disposed upon the floor of the upper room, an oil receptacle disposed in the lower room under said frame and spaced above the floor of said lower room, and means contained in said lower room to raise and lower said receptacle to and from the aforesaid relation and to and from the floor of said lower room, said rooms also having means whereby they are sealed from deleterious gaseous intercommunication.

6. A switch house having upper and lower stories providing two vertically disposed rooms arranged to provide free working space for an attendant and isolated from each other by a horizontal wall structure comprising the floor of the upper room and the ceiling of the lower room, a casing comprising a cover disposed in said upper room over an opening in said wall structure, electric terminals carried by said casing and contained in said upper room, and an open-top receptacle disposed in said lower room and under said cover and means contained in said lower room arranged to support said receptacle removably in the aforesaid relation, said rooms also having means whereby they are sealed from deleterious gaseous intercommunication.

7. A switch house having upper and lower stories providing two vertically disposed rooms arranged to provide free working space for an attendant and isolated from each other by a horizontal wall structure comprising the floor of the upper room and the ceiling of the lower room, a casing comprising a cover disposed in said upper room over an opening in said wall structure, electric terminals carried by said casing and contained in said upper room, and an open-top receptacle disposed in said lower room and under said cover, and raising and lowering means for said receptacle contained in said lower room, said rooms also having means whereby they are sealed from deleterious gaseous intercommunication.

8. A switch house having upper and lower stories providing two vertically disposed rooms arranged to provide free working space for an attendant and isolated from each other by a horizontal wall structure comprising the floor of the upper room and the ceiling of the lower room and having an opening therethrough, and a switch casing received in said opening having its frame supported by said wall structure and its electric terminals contained in said upper room, and its oil receptacle extended through said opening and contained mainly in said lower room, said rooms also having means whereby they are sealed from deleterious gaseous intercommunication.

9. A switch house having upper and lower stories providing two vertically disposed rooms arranged to provide free working space for an attendant and isolated from each other by a horizontal wall structure comprising the floor of the upper room and the ceiling of the lower room and having an opening therethrough, a supporting plate disposed in said upper room and secured to said wall structure about said opening, and an electric switch received in said opening and common to both rooms, said switch having a casing comprising upper and lower separable members, the upper member being disposed upon said plate and having switch terminals contained in said upper room, and said lower member disposed beneath said upper member and contained mainly in said lower room, said rooms also having means whereby they are sealed from deleterious gaseous intercommunication.

10. A switch house having upper and lower stories providing two vertically disposed rooms arranged to provide free working space for an attendant and isolated from each other by a horizontal wall structure comprising the floor of the upper room and the ceiling of the lower room, and having an opening therethrough, a supporting plate disposed in said upper room and secured to said wall structure about said opening, and an electric switch received in said opening, and common to both rooms, said switch having a casing comprising upper and lower separable members, the upper member being disposed upon said plate and having switch terminals contained in said upper room, and said lower member disposed beneath said upper member and contained mainly in said lower room and means to raise and lower said lower member in said lower room to and from the aforesaid relation, said rooms also having means whereby they are sealed from deleterious gaseous intercommunication.

11. A switch house having upper and lower stories providing two vertically disposed rooms arranged to provide free working space for an attendant and isolated from each other by a horizontal wall structure comprising the floor of the upper room and the ceiling of the lower room, said horizontal wall structure having an opening therethrough, an oil switch casing disposed in said lower room under said opening, a switch frame disposed in said upper room over said opening and constituting a sealing cover therefor whereby to prevent the passage of gases from said lower room and switch casing into said upper room, and switch members carried by said switch frame having their lower ends immersed in the oil in said casing and their exposed terminals in said upper room.

12. A switch house having upper and lower stories providing two vertically disposed rooms arranged to provide free working space for an attendant and isolated from each other by a horizontal wall structure comprising the floor of the upper room and the ceiling of the

lower room, said horizontal wall structure having an opening therethrough, an oil switch casing disposed in said lower room under said opening, means in said lower room arranged to support said casing removably in the aforesaid relation, a switch frame disposed in said upper room over said opening and constituting a sealing cover therefor whereby to prevent the passage of gases from said lower room and switch casing into said upper room, and switch members carried by said switch frame having their lower ends immersed in the oil in said casing and their exposed terminals in said upper room.

13. A switch house having upper and lower stories providing two vertically disposed rooms arranged to provide free working space for an attendant and isolated from each other by a horizontal wall structure comprising the floor of the upper room and the ceiling of the lower room, said horizontal wall structure having an opening therethrough, a switch frame disposed in said upper room over said opening and constituting a sealing cover therefor whereby to prevent the passage of gases from said lower room into said upper room, an oil switch casing disposed in said lower room beneath said cover, and switch members carried by said switch frame and projecting through said horizontal wall structure with their lower ends immersed in the oil in said casing and their exposed terminals in said upper room.

14. A switch house having upper and lower stories providing two vertically disposed rooms arranged to provide free working space for an attendant and isolated from each other by a horizontal wall structure comprising the floor of the upper room and the ceiling of the lower room, an oil switch casing in said lower room supported in an elevated position, a switch frame in said upper room, and switch members carried by said switch frame projecting through said horizontal wall and having their lower ends immersed in the oil in said casing and their exposed ends in said upper room, and means whereby said rooms are sealed from gaseous intercommunication.

In testimony whereof, I have signed my name to this specification.

GUSTAV JANSSON.