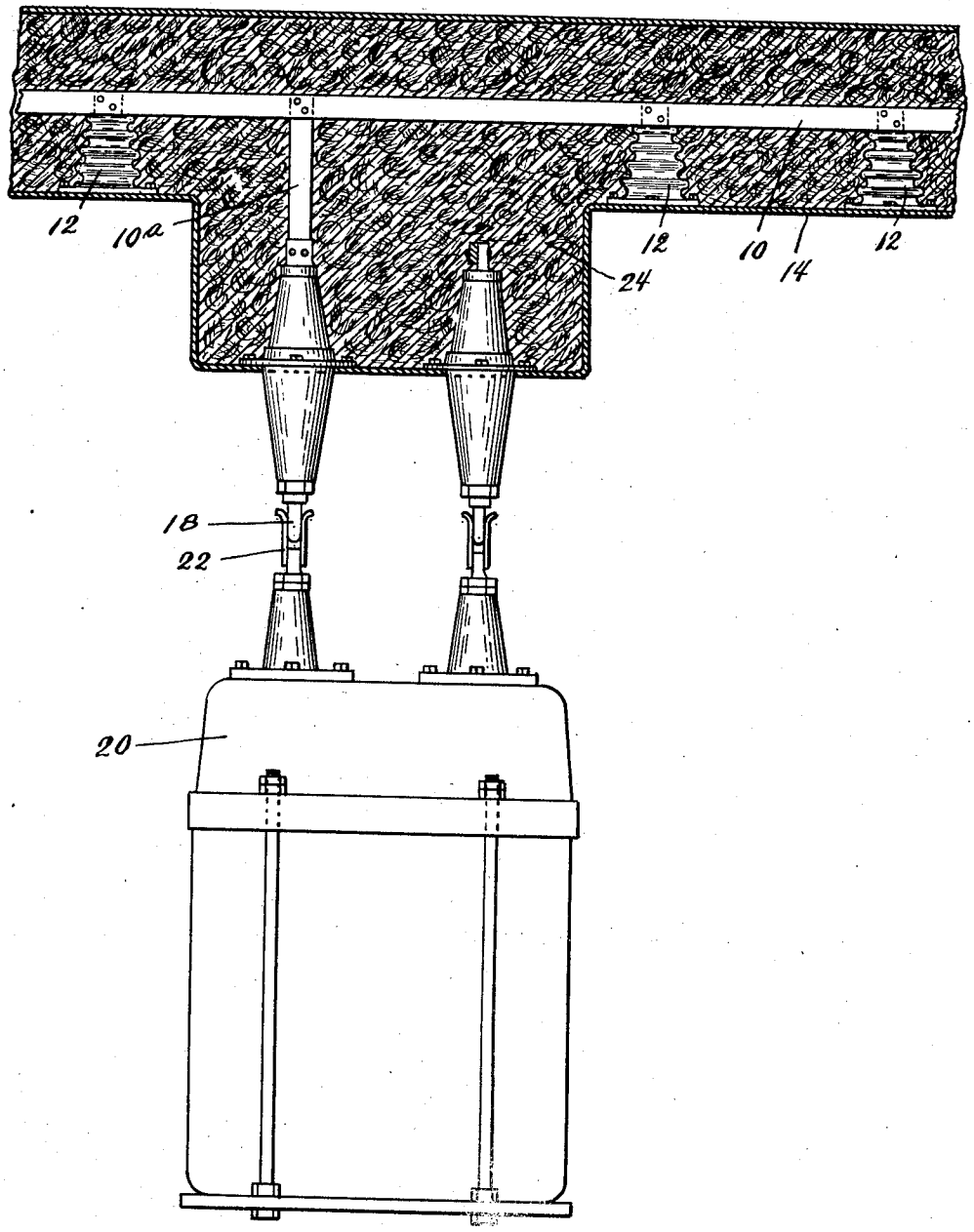
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ELECTRIC DISTRIBUTION SYSTEM AND CONDUCTOR THEREOF

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ELECTRIC DISTRIBUTION SYSTEM AND CONDUCTOR THEREOF

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4 Claims. (Cl. 173—266)

This invention relates to high tension electric distribution systems and apparatus and to the conductors thereof.

When an electric switch opens up its circuit under heavy loads or on short circuit, heated vapor and flame is frequently expelled from the switch casing. If the heated vapors or flames come in contact with the high tension conductors they form a sufficiently low conducting path between the conductor and the switch casing or other part which is at ground potential to establish a high tension flash-over arc through the conducting gas. Consequently the high tension conductors are usually inclosed in casings which are filled with oil or other insulating compound for the purpose of preventing the heated and conducting gases from coming in contact with and short-circuiting the high tension bus. The oil or insulating compound, while it is a good insulator, is highly combustible and can burn and be the source of disastrous fires. Moreover oil or compound insulation is also subject to other disadvantages unnecessary to enumerate here. Because of the combustibility of the oil and compound, and other disadvantages thereof, I have proposed a high tension conductor which is enclosed within a metal or other casing and is embedded in an inert material which prevents access of heated gases to the conductor and which has many advantages over oil and compound insulation. The preferred conductor-isolating material was a material such as sand and the use of such material is disclosed in my copending applications: Serial No. 239,790, filed Dec. 13, 1927, Serial No. 243,902, filed Dec. 31, 1927, Serial No. 252,185, filed Feb. 6, 1928, and Serial No. 260,843, filed March 12, 1928 which have eventuated into patents numbered 1,748,060, 1,859,955, 1,941,463, and 1,878,107, respectively.

When a body of sand is subject to the action of an intense electric arc the particles of sand sometimes melt and coalesce into what is in effect a vitreous rod. The resistivity of the heated sand particles or the vitreous rod formed is considerably lower than the resistivity of the cold sand. While this lowered resistivity may be of no particular importance under many conditions, it may be that under some conditions of operation, as for instance under very high potentials and where potential is desired to be restored to the conductor immediately after the interruption of the flash-over arc, the reduction in resistivity may permit the heated sand to carry a material amount of current, which is undesirable.

An object of the present invention is the combination of an enclosed high tension bus and an isolating and insulating material therefor having the functions of the sand of my said applications, which is characterized by having such a high resistance when highly heated that it will not conduct any harmful amount of current even when subjected to the highest present-day commercial voltages used at installations of this nature and preferably also by being infusable under the heat of the flash-over arc. The best material known to me at present is asbestos; and a conductor contained within an inclosing casing and embedded in a body or packing of asbestos constitutes another object of this invention.

A further object is generally to improve the construction of high tension switching systems and the insulation and isolation of the high tension conductors thereof.

The figure is a diagrammatic representation partially in section, of a high tension distribution system including oil immersed switches and a high tension bus or conductor arranged in accordance with the invention.

As here shown, the high tension bus 10 comprises a bare conductor supported on suitable spaced insulating pillars 12, within and spaced from the side walls of the metal enclosing casing 14. The branch 10*a* of the bus is passed through an insulating bushing and fixed in and extended through the bottom wall of the enclosing casing and connected with disconnect terminals 18 at lower end of the bushing. An oil immersed electric switch 20 is located beneath said casing and an insulated terminal thereof has a cooperating disconnect terminal 22 which is adapted to be connected with and disconnected from said disconnect terminal 18 by vertical movements of the switch, in a more or less usual manner.

In accordance with this invention the conductor casing 14 is filled with an insulating body 24 which preferably is asbestos, and the conductor 10 is embedded in said insulating body. The insulating body is electrically insulating. It is also characterized by being non-combustible so that it will not burn or give off combustible or other harmful vapors or gases when subjected to a flash-over arc. It is also flexible so that it can bend with the conductor and with the enclosing casing without moving away from protective relation with the conductor.

The insulating material, in accordance with this invention, is also characterized by having such high electrical resistance when highly heated that it will not conduct any harmful amount of current

even when subjected to a high difference of potential between the bus and the enclosing casing. For instance, it has been found that asbestos has a resistance of about 500,000 ohms per inch cube when at white heat. This resistance is too high to carry sufficient current to maintain the temperature of the asbestos body. The material is also characterized by being infusible under the action of the flash-over arc so that it maintains its original state under the action of a flash-over arc. As stated above the best material known to me at present is asbestos. Asbestos can be obtained in either fibrous or powdered form. I prefer to use the asbestos in its fibrous form and to pack the asbestos fibres compactly into the enclosing casing 14, and about and in intimate connection with the high tension conductor so that there will be no large voids between the conductor and the casing. For certain conditions of operation, I may use a powdered or granular material as, for instance, powdered asbestos in the voids between the fibres. Fibrous material having the characteristics above set forth is in some instances preferable to a granular material, since by the interlocking or felting of the fibres, the body can bridge over an opening in the casing 14 through which a granular material might flow.

I claim:

1. The combination of an enclosing casing, a high tension electric conductor located therein and insulated therefrom, and a packing of loose non-combustible electrically insulating felted asbestos fibres contained in said casing about said conductor and occupying the space between it and said casing, said fibres characterized by having an electrical resistance which is so high when the particles are highly heated as to inhibit the conduction of a deleterious electric current at the voltage of said conductor, said packing filling the space between said casing and said conductor so that there are no large voids therebetween and constituting means preventing access of heated gases to said conductor.

2. In a high tension electric distribution system, the combination of an enclosing casing, a high tension conductor located therein and insulated therefrom, and means which prevents access of heated gases to said conductor comprising a compact packing of loose felted asbestos fibres occupying said casing and surrounding said conductor.

3. A high tension electric distribution system as defined in claim 2 wherein said packing comprises asbestos fibres and particles of non-combustible electrically insulating granular material among the asbestos fibres.

4. In a high tension electric distribution system, the combination of an enclosing casing, a high tension bus located therein and insulated therefrom, and a packing of felted non-combustible, electrically insulating asbestos fibres contained in said casing surrounding said bus constituting means which prevents access of heated gases to said bus.

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