Oct. 2, 1934. P. R. DIJKSTERHUIS 1,975,634

COOLING MEANS

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Fig. 1

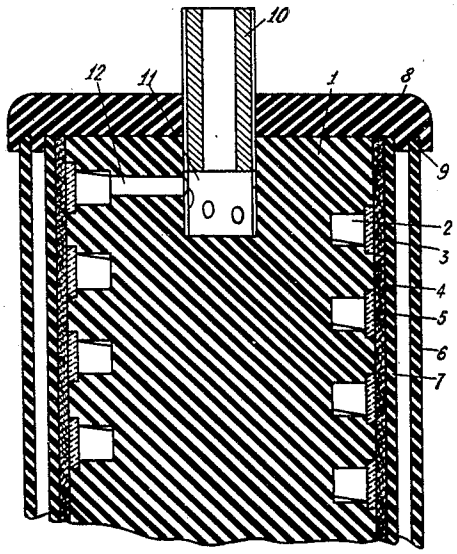


Fig. 3

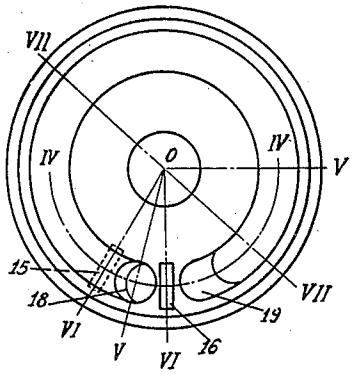




Fig. 2

Fig. 4

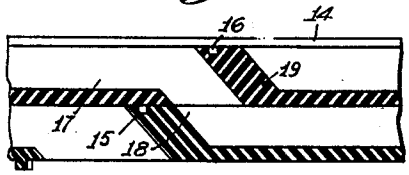


Fig. 5

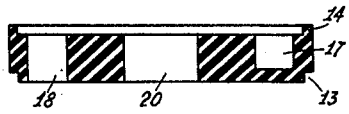


Fig. 6

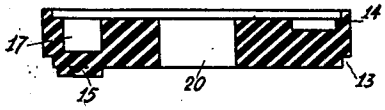
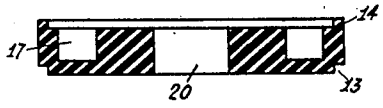


Fig. 7



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Fig. 8

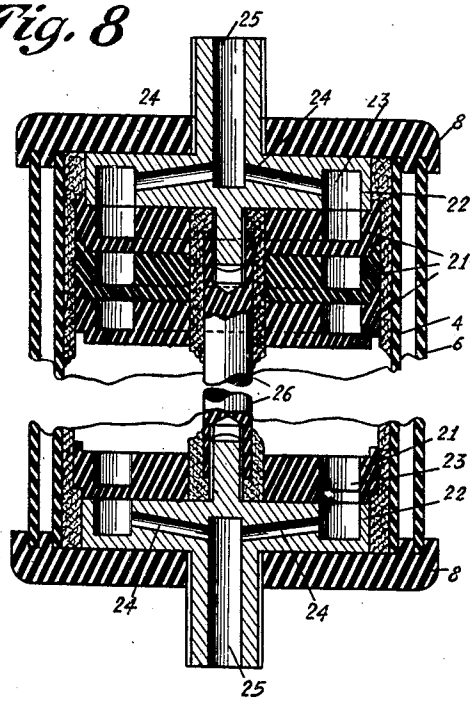
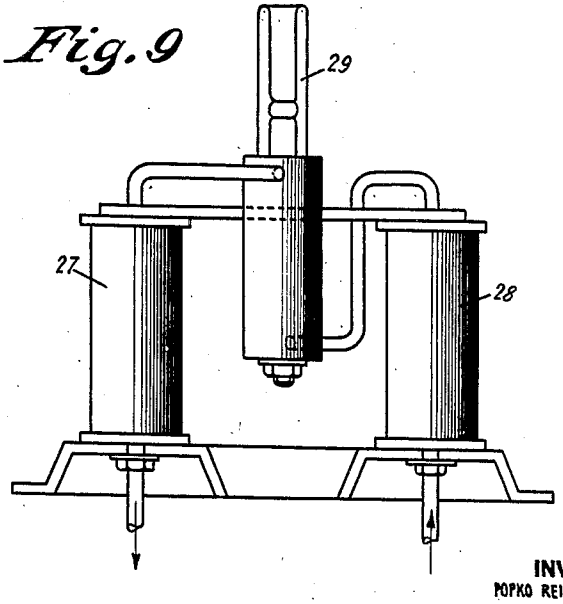


Fig. 9



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UNITED STATES PATENT OFFICE

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COOLING MEANS

Popko Reinder Dijksterhuis, Eindhoven, Netherlands, assignor to Radio Corporation of America, a corporation of Delaware

Application August 16, 1928, Serial No. 300,105
In the Netherlands September 28, 1927

4 Claims. (Cl. 173—318)

This invention relates to improvements in or relating to cooling means and has reference to a device for cooling bodies having a high potential relatively to earth.

In apparatus containing such bodies the cooling liquid, for example water, cannot be supplied directly from a non-insulated water supply conduit or reservoir, a short circuit being in that case produced between the cooled body and earth.

According to the invention an insulating body has inside a long narrow canal for the supply and discharge of the cooling liquid. Said canal may be constructed as an open slot which is covered with a strip of insulating material. Preferably, however, the insulating body is constructed of discs, each of which has a narrow slot which is substantially in the same location and communicates by a bore of the disc with the slot of the adjacent disc. The slot being rounded off, the flowing resistance for the cooling liquid at the passage from one disc into an adjacent disc is as low as possible. The piled discs are maintained in an exact predetermined position relatively to each other by projections which are arranged on the discs and which enter slots of the discs.

By the discs being pressed together a robust insulating body is obtained. This compression is preferably effected by means of a rod of insulating material inserted through central bores of the discs and by means of two metal members mounted at the ends of the insulating body.

The insulating body may be surrounded by an insulating cylinder which when arranged at some distance from the insulating body prevents the formation of condensed wat.. which might be formed on the insulating body by reason of the cooling effect of the cooling liquid. The insulating cylinder may closely embrace the insulating body. The air spaces within the insulating cylinder may be filled with insulating material. In these cases a second insulating sheath may be arranged at some distance in order to prevent condensed water. The air space between the insulating sheath and the insulating body or the insulating cylinder, if any, is hermetically closed.

A device as before described may be constructed as a supporting insulator of the body to be cooled.

For the arrangement of an electric installation a plurality of such supporting insulators may be used, one of the insulators serving to supply and another to discharge the cooling liquid. This is also advantageous in that the supporting insulators are satisfactorily cooled.

The accompanying drawings illustrate by way of example some embodiments of the invention. In the said drawings:

Figure 1 is a section of a device embodying the invention;

Figure 2 shows a detail of the said section.

Figures 3, 4, 5, 6 and 7 have reference to a construction in which the insulating body is constructed of discs, Figure 3 being a plan of such a disc, Figure 4 showing a spread section of the same and Figures 5, 6 and 7 showing sections on the lines IV—IV, V—V, VI—VI, and VII—VII in Figure 3.

Figure 8 shows a section of a device embodying the invention the insulating body of which is constructed of discs, and

Figure 9 is a view of a transmission valve mounted by means of two devices according to the invention.

Referring to Figure 1, a cylinder 1 of insulating material for example bakelite, has a helical slot 2, the section of which is shown separately in Figure 2. Figure 1 shows in addition a strip of insulating material 3 which may be for example of celluloid and which is mounted over the helical slot the enlarged part of which it enters exactly. A cylindrical box 4 of insulating material, for example bakelite, surrounds the insulating body 1 at a slight distance, all air spaces within the said cylinder being filled with insulating material 5. An insulating sheath 6 is slightly spaced apart from the cylinder 4, the air space 7 thus formed being hermetically closed by a disc 8 and a ring 9 of insulating material. The cylinder 1 has screwed into it a tube 10 which may have secured to it the connection to the body to be cooled. The cooling liquid can enter the slot 2 from the tube 10 through a chamber 11 which by some ports 12 communicates with slot 2.

According to another embodiment of the invention the insulating body is constructed of discs.

As shown in Figures 3 to 7, the discs have essentially the shape of a cylinder of small height, said cylinder having a central bore 20. At the bottom at 13 a border is removed from the material, whereas the top is provided with a vertical brim 14. These brims are slightly slanting so that the discs can be rigidly pressed together the mutual position of the discs being determined by a projection 15 which enters a slot 16 of the lower disc. The disc has a slot 17 which as shown in Figure 3, runs concentric with the periphery of the disc and almost entirely around the disc. By means of a bore 18 at one end of the slot 17 the latter communicates with the slot of the lower disc.

This bore 18 is so shaped as to reduce the flowing resistance for the cooling liquid as much as possible.

The discs are so piled that the part 19 of a slot registers with the bore 18 of the upper disc so that the cooling liquid traverses entirely the slot 17 of each disc.

The mutual position of the discs is ensured by means of the above mentioned projections 15 and

slots 16. The bottom of the slot 17 ascends at 19, a gradual passage into the slot of the upper disc being thus obtained.

Referring to Figure 8, 21 designates a pile of discs all of them being shaped as above described. At the bottom and the top of the pile there is a metal end piece 22 having a slot 23 that runs concentric with the periphery and almost entirely around the disc. This slot 23 communicates by some ports 24 with the cylindrical part 25 of the metal end piece to which the supply or discharge conduit for the cooling liquid can be connected. A rod of insulating material 26 connects the end pieces 22 and the latter being screwed into the rod 26 the discs 21 are rigidly pressed together. The insulating body formed in this manner is like the insulating body of Figure 1 surrounded by a cylinder 4 of insulating material and by an insulating sheath 6 separated by an air space from the said cylinder. The insulating body, the cylinder 4 and the sheath 6 are also in this case closed by lids 8 and the air spaces within the cylinder 4 are filled with insulating material.

Figure 9 shows an installation in which two devices as described with reference to Figure 1 are used as supporting insulators for the transmission valve 29. The liquid for cooling the anode of the transmission valve is supplied by a device 28 and discharged by a device 27.

I claim:

1. A high tension insulator for insulatingly conducting a cooling fluid for cooling electrical apparatus having a high potential relative to earth, comprising a composite insulating body having a long narrow canal for the cooling fluid, said insulating body composed of a plurality of insulated discs each having a slot running substantially circumferentially in said discs to form said canal, an aperture at one end of said slot for fluid communication with the slot of an adjacent disc, metal end closures comprising cooling tubes having a plurality of ports extending radially to distribute the cooling fluid to said canal, a tubular insulating casing enclosing said discs, and a central clamping member to bind the said discs within the casing as a unitary structure.

2. An insulating support for conveying cooling fluid to bodies having a high potential relatively to earth comprising an insulating body composed of a plurality of coaxially related discs each having a narrow slot which runs substantially circumferentially in said disc and spaced from the axis thereof, each of said discs having a bore at the termination of said slot, the bore through said disc being of a cross section area equal to the cross section area of said slot.

3. A device according to claim 2 in which the piled discs are maintained in proper progressive radial position relatively to each other by means of raised portions and cooperating slots of the discs.

4. A device according to claim 2 in which the discs each having an opening through the axis and are traversed by a rod of insulating material cooperating with two compression members for clamping the discs together.

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