

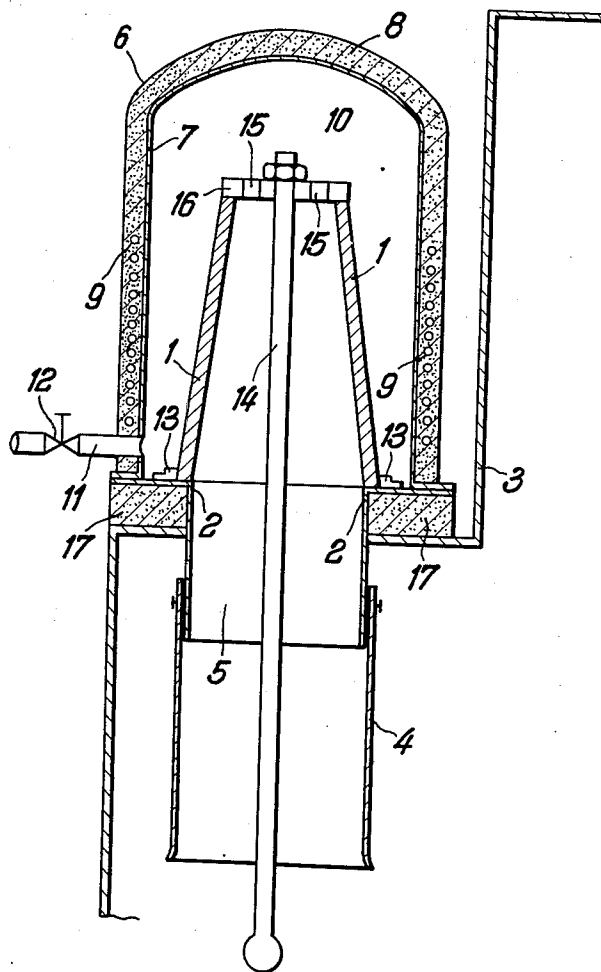
May 8, 1962

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3,033,918

SUPPORTING INSULATORS FOR ELECTROFILTERS

Filed Sept. 7, 1960



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SUPPORTING INSULATORS FOR ELECTRO-FILTERS

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Filed Sept. 7, 1960, Ser. No. 54,461

Claims priority, application Germany Dec. 19, 1959

1 Claim. (Cl. 174-139)

The invention relates to electrofilters, and more particularly to the construction of the supporting insulators in such filters.

For the ventilation of the supporting insulators, arrangements are known in which the insulators, usually formed as double conical frusta, are arranged with one half within the gas space of the electrofilter, while the other half extends outwardly and often outside the housing of the electrofilter. The part of the insulator extending into the gas space is bathed by the gas. As a result, there exists in the insulator a temperature difference between the part which is located in the gas and the part which is not located in the space through which the gas flows or extends into the free air. For that reason, such insulators have been heated, for example, by steam, hot gas or electricity, the insulator in the latter case being provided with heating windings which extend around it or with heating windings which are located in the insulator space. In some cases the supporting insulators are arranged completely inside the interior of the electrofilter.

In all cases difficulties arise, because during the operation of the electrofilter some sort of work on the insulators often is necessary. Consequently the electrofilter must be put completely out of operation if repairs are to be carried out on the supporting insulators. Also, the known constructions present the disadvantage that a gas-tight joint between the insulator and the remainder of the device is difficult. With quartz insulators this is especially difficult, because a secure fastening of such an insulator or a secure pressing on the base, which is necessary for gas-tight mounting, is not possible because of the small elasticity of the material. If the insulator temperature comes in the neighborhood of the dew point of the air or the gas, the dust adhering to it becomes moist and when the dew point is reached even wet, so that the insulating property of the insulator is reduced or completely eliminated.

The primary object of the present invention is to provide a construction for insulators which overcomes the disadvantages of the prior art devices, particularly those set forth above.

According to the invention, the supporting insulator is made in the form of a hollow cylinder or frustum of a cone, covered at the top with a perforated plate. This may be formed of quartz, porcelain, steatite or any other insulating material. It is positioned on a flange on the outer wall of the electrofilter above an inlet opening which is shielded by a cylindrical tube. The insulator is covered by a removable cap, which is secured gas-tightly on the electrofilter. In this way the interior as well as the exterior of the supporting insulator, which is located outside the electrofilter, can be ventilated by gas at the same temperature and at the same humidity as exists in the electrofilter.

In order to prevent condensation which might reduce the insulating capacity, according to a particular feature of the invention, the cap is made of metal provided with a heat insulating layer, in which heating coils for the indirect heating of the supporting insulator or for heating the gases inside the cap and thus also the insulator are

embedded. In order, when the electrofilter is not operating, to remove residual gases which may be explosive or poisonous from the cap by compressed air or in order to be able to bathe the interior of the cap along with the insulator or, when the electrofilter is in operation, to test whether the air in the electrofilter, especially in the insulator, is being displaced, according to a further feature of the invention, an air pipe, which opens into the interior of the cap, is provided which can be opened or closed by a valve.

The advantages of such an arrangement are that the supporting insulator is much more accessible for any necessary repairs, that it can be bathed inside and outside with gas, that it can be mounted gas-tight on its base, because the cap which overlies and encloses it is secured in a gas-tight manner which is considerably easier and simpler to accomplish. A further advantage lies in the decrease of the heat losses during the heating of the insulator as compared with prior arrangements. The reason for this is as follows: in order to prevent a harmful condensation on the supporting insulator it is necessary that its temperature—both of the part which is located in the clean gas as well as the part which for example extends into the air—should lie several degrees above the dew point of the gas being treated. The heat losses of those arrangements in which the insulator is arranged with one part within the gas and the other part outside the gas is, in consequence of the great heat losses which are produced by the high temperature gradients in the insulator, considerably greater than in the device according to the invention, because according to the invention almost no heat loss occurs, this being prevented by the fact that the cap is heat-insulated and by the support of the emitting device as near as possible to the electrode. Therefore, only the energy for heating up is needed and thereafter only a very small loss of heat must be compensated for. Tests have shown that electrofilters with twelve supporting insulators with three cleaning fields in ordinary arrangements require 30 to 40 kw. whereas in filters according to the invention 10 kw. is sufficient to provide the necessary heat.

Further objects and advantages of the invention will appear more fully from the following description especially when taken in conjunction with the accompanying drawings, which form a part thereof.

The drawing shows in cross-section a supporting insulator for an electrofilter constructed according to the invention.

The insulator 1 is mounted on the angular flanged ring 2 of the electrofilter wall 3 above an opening 5 which is shielded from dust by the cylindrical pipe 4. The insulator is of frusta conical shape and is held in position by a pressure ring 13 secured in position by screws or the like. Between the flange 2 and the electrofilter housing 3 is a heat insulating layer 17. Above the insulator 1 there is mounted gas-tight on the ring 2, at a distance greater than the emission range of the high-tension carrying rod 14 and the plate 16, a cap 6, which consists of a metal cap 7 which is covered with a layer of insulating material and in which are embedded heating coils 9. Into the interior 10 of the cap a pipe 11 opens, which can be opened or closed by means of a valve 12.

The gas which is present in the electrofilter 3 passes through the cylindrical tube 4 into the space inside the insulator 1. Through openings 15 which are provided in the cover plate 16 of the insulator the gas can pass into the space 10 beneath the cap. Here it can be maintained at a desired temperature by the heating arrangement 9, so that the insulator can be warmed to such a degree that the temperature is higher than the dew point of the gas, so as to avoid a harmful condensation.

While I have described herein some embodiments of my invention, I wish it to be understood that I do not intend to limit myself thereby except within the scope of the claim hereto or hereinafter appended.

I claim:

In an electrofilter having a housing with an opening thereinto, an insulator structure comprising a hollow body of insulating material arranged above said opening and having its interior communicating with the interior of the housing through the opening, shielding means arranged below said opening, and a cap above and enclosing said hollow body and having a gas-tight connection with the housing, said hollow body being at least partly open at the top so gas from the housing can enter the space be-

neath the cap, said cap being of metal and provided with an insulating layer and heating coils embedded in said layer, whereby gas from the interior of the housing can pass through the interior of said body to the space within the cap outside the body so as to be heated by said coils.

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