Sept. 19, 1944. F. BELDI 2,358,553

ANODE ASSEMBLY

Filed Dec. 16, 1941

Fig. 1b.

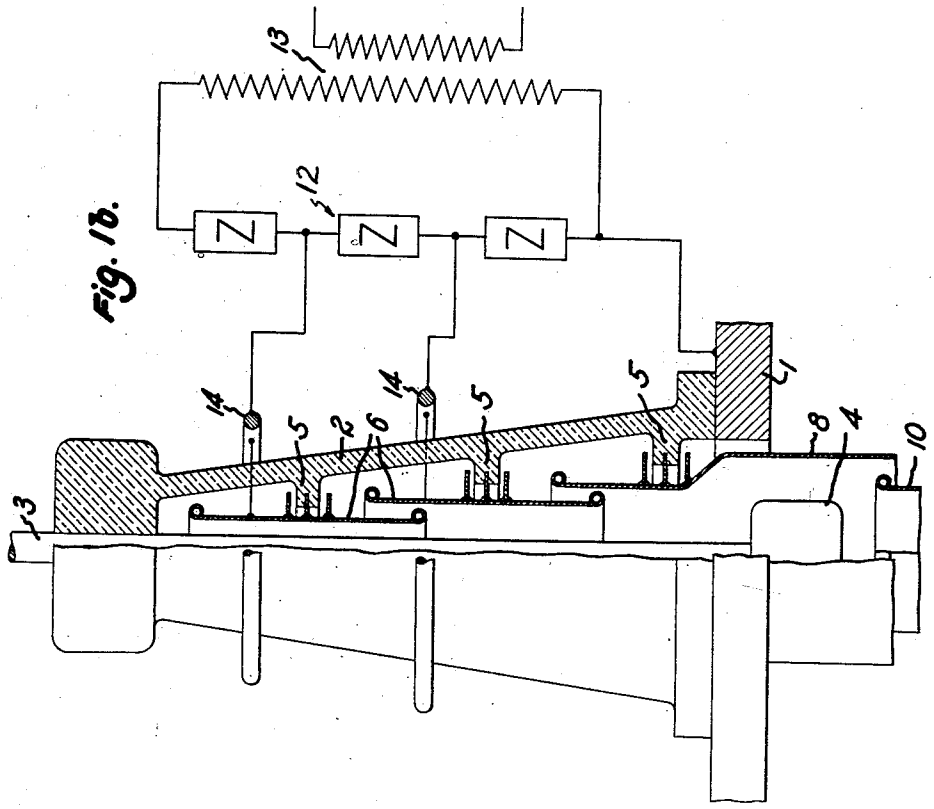
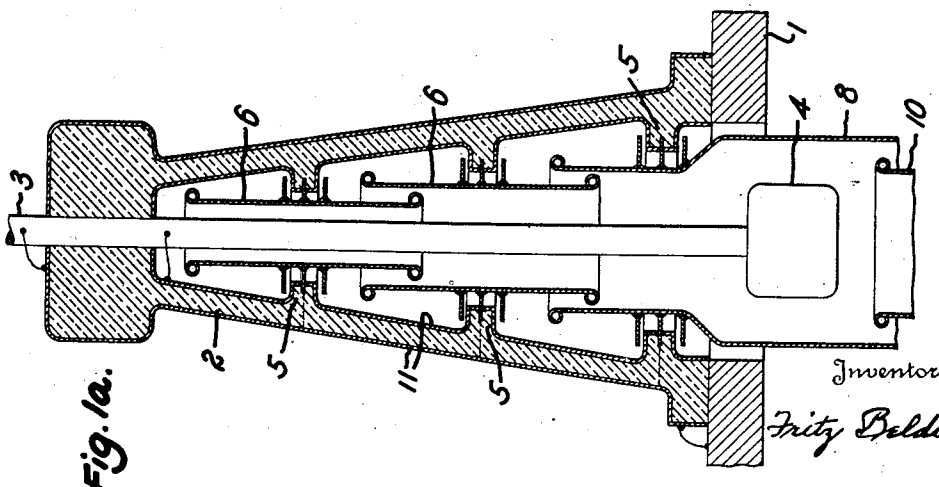


Fig. 1a.



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ANODE ASSEMBLY

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Application December 16, 1941, Serial No. 423,213
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8 Claims. (Cl. 250—27.5)

The present invention concerns an anode assembly for high voltage converters with a gas or vapour discharge path and a hollow supporting insulator mounted outside of and upon the converter casing, the anode being fixed to an anode stem supported by the head of said insulator and projecting freely into the discharge space. Inside the hollow insulator metal shields are arranged the ends of which overlap in the direction towards the anode, the radial spacing of the shields at the places of overlap and the length of said shields being so selected that the electrical fields produced between them prevent charge carriers passing beyond the annular spaces between the shields, these latter also serving to control the electrical field along the insulator in such a manner that an approximately uniform voltage drop and an approximately linear voltage distribution is obtained. As the voltage rises the number of shields increases and consequently also the condenser elements formed by the shields and connected in series with each other. The coupling, however, becomes increasingly weaker and can be disturbed to such an extent by the external capacities formed by parts of the insulator itself and its surroundings that the desired linear voltage distribution cannot be achieved. This disadvantage of the natural electrostatic control of the shields can be avoided if the shields are connected to a separate control source of adequate dimensions.

The object of the present invention is thus to achieve an improvement in anode assemblies of the kind described by controlling the shields from a separate control source.

Embodiments of the invention are illustrated diagrammatically in the accompanying drawing in which Figs. 1*a* and 1*b* show an anode assembly in longitudinal section.

Referring to the drawing by characters of reference, reference numeral 1 designates the metal casing of the converter on which the supporting insulator 2 for the anode lead is mounted. The anode 4 is fixed in the head of the insulator by means of the anode stem 3 and extends freely into the discharge space. The anode is provided with an arc guiding sleeve 8 in which a grid 10 is located. Inside the hollow supporting insulator 2 metal shields 6 are arranged concentrically around the anode stem, the ends of these shields overlapping each other in the direction towards the anode, so that the electric fields produced between the shields prevent charge carriers from the discharge space moving beyond these points of overlap. Shields 6 are fixed to flanges inside insulator 2 in such a manner that protective gaps are formed. The shields can also be arranged so that the gaps between the inside wall of the insulator and the shields are closed.

In order to control the electrical field by means of separate control voltages applied to the metal shields 6 in such a manner that a linear voltage distribution is obtained along the inside wall of the supporting insulator 2, it is possible to use the converter transformer itself as the control source, the transformer being provided with corresponding taps on the high voltage side. An auxiliary transformer can also be used for this purpose. A voltage divider located either outside or inside the supporting insulator can also serve as the source of the control voltage.

Fig. 1*a* shows how an ohmic potential divider is employed as a control source in the form of a covering 11 of high resistance material, such as graphite, on the outer or the inner surface or, as illustrated, upon both the outer and the inner surfaces of the insulator. The resistance layer or layers is provided with taps leading to the shields 6. Another possibility as regards the construction of the potential divider is to make the supporting insulator at least partly of a material which is a poor electric conductor by for instance mixing graphite with the basic material of the insulator.

As shown in Fig. 1*b* it is also possible to employ a divider 12 as a control source which is supplied by transformation either from the converter transformer, or as illustrated from an auxiliary transformer 13. The potential divider comprises a plurality of impedances Z, that may be resistive, capacitive or inductive, that are serially connected across the secondary winding of the transformer 13 and have their terminals connected to the several shields 6. A potential gradient is also established along the exterior of the anode supporting insulator 2 by potential rings 14 to which the leads to the shield electrodes 6 are connected.

I claim:

1. In a high voltage electrical converter, the combination with an anode assembly including a hollow insulator outside of and supported on the converter casing, an anode stem extending through said insulator and supporting an anode within the casing, and tubular metal shields telescoped within each other inside said insulator and displaced radially and axially from each other, of a voltage divider electrically isolated

from said anode stem and having spaced points connected to the respective shields, and a potential source substantially independent of the voltage impressed on said anode stem connected across said voltage divider to determine the potentials established on the respective shields.

2. In a high voltage electrical converter, the invention as recited in claim 1 wherein said voltage divider comprises resistive impedance.

3. In a high voltage electrical converter, the invention as recited in claim 1 wherein said voltage divider and potential source are located outside of the insulator.

4. In a high voltage electrical converter, the invention as recited in claim 1 wherein said potential source is a transformer.

5. In a high voltage electrical converter, the invention as recited in claim 1 wherein said potential source is a transformer and said potential divider comprises resistive impedance.

6. In a high voltage electrical converter, the invention as recited in claim 1 wherein said potential source is a transformer and said potential divider comprises capacitive impedance.

7. In a high voltage electrical converter, the invention as recited in claim 1 wherein said potential source is a transformer and said potential divider comprises inductive impedance.

8. In a high voltage electrical converter, the invention as recited in claim 1, in combination with potential rings outside of said insulator and connected to said potential divider to establish a potential gradient along the exterior of said insulator.

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