

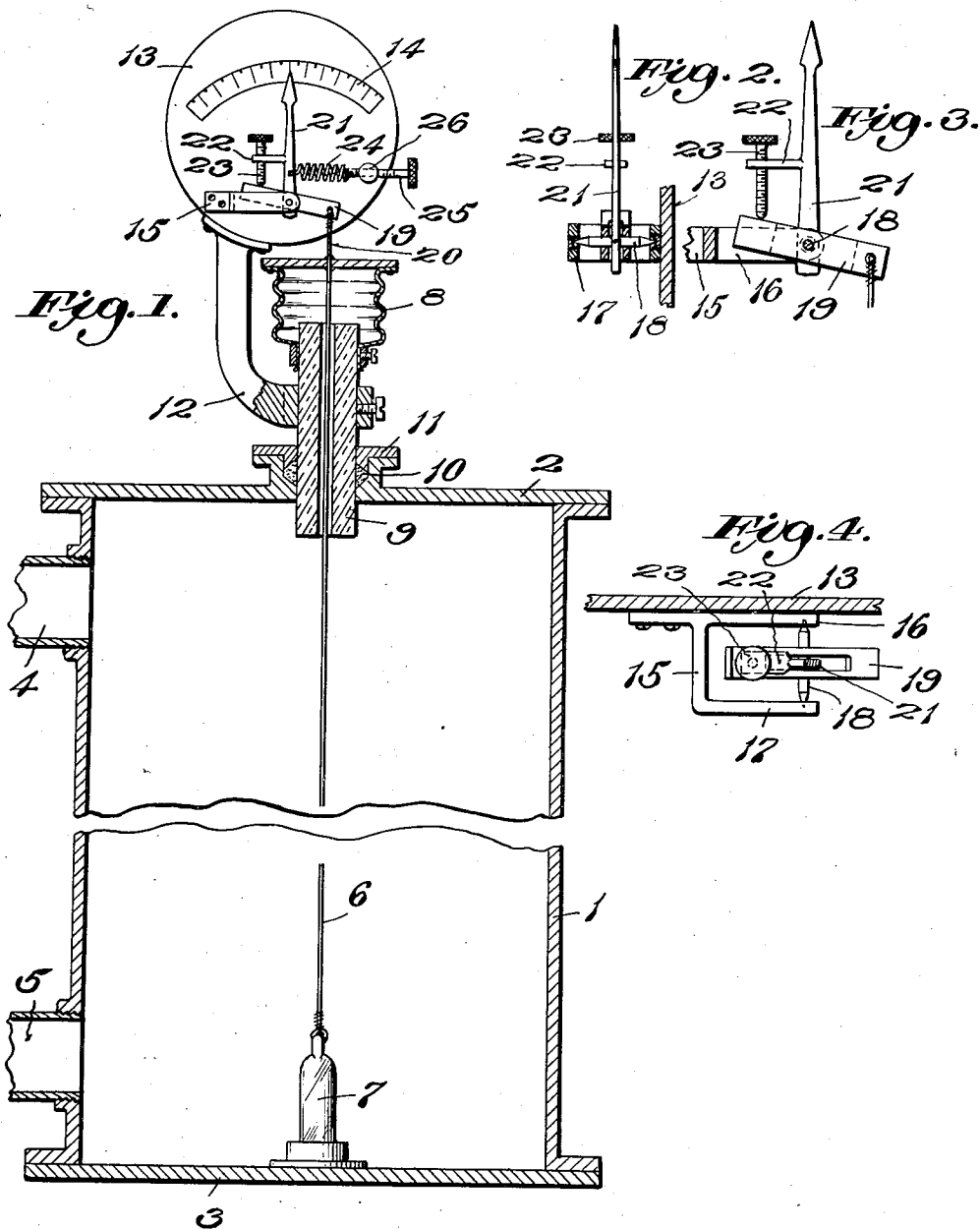
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APPARATUS FOR ELECTRICAL TREATMENT OF FLUIDS

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APPARATUS FOR ELECTRICAL TREATMENT OF FLUIDS

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This invention relates to apparatus for electrical treatment of fluids and it relates more particularly to a combined electrical discharge device and pyrometer.

5 The invention relates generally to a type of apparatus in which the fluid to be treated is passed through a suitable treating chamber in which it is subjected to the action of a high tension electric field maintained between opposed electrodes, the electric field generally being characterized by a continuous or intermittent silent or corona electric discharge between the electrodes. One of the electrodes is usually of small surface area and sharp contour and the other usually has a comparatively extended smooth surface. A characteristic construction embodying the above features comprises a treating chamber, substantially circular in cross section, the interior walls of which constitute the electrode having the more extended surface, and a fine wire extending axially of the chamber and constituting the opposed electrode of small surface area and sharp contour. The electrical discharge may be unidirectional or it may take place in alternating directions between the electrodes according to the use to which the apparatus is put, but in any event in all such uses the more intense electrical field about the electrode of sharper contour performs an important function in electrically charging or otherwise acting upon the fluids treated, for the acceleration of reactions therein or for precipitation of particles therefrom, and that electrode has generally been termed the discharge electrode, the other being generally termed the receiving or collecting electrode.

40 In using apparatus of the type just described, it is often desirable to treat fluids at high temperatures and in this connection it is desirable to measure the temperature in the treating chamber, especially as this temperature must sometimes be controlled within fairly close limits. In view of the foregoing conditions however, especially because of the use of the high tension current, measurement of temperature in the treating chamber is sometimes made with

difficulty or inconvenience and in any event involves the use of extra or special equipment.

The general object of the present invention is to provide an apparatus of the type hereinbefore mentioned, a portion of which functions as part of the treating apparatus and also as part of means for measuring the temperature in the treating chamber, thus reducing the amount of equipment needed.

Another object of the invention is to provide improved means of measuring high temperatures especially suitable for use under the conditions hereinbefore mentioned.

The foregoing and other objects and novel features of the invention will appear more clearly from the concrete embodiment hereinafter described and illustrated in the accompanying drawings forming a part hereof, but it is to be understood that the embodiment referred to is merely illustrative of my invention and that other embodiments may be made within the scope of the invention as defined in the appended claims.

In the drawings, Fig. 1 is a vertical longitudinal sectional view of one type of apparatus in which my invention is embodied, and

Figs. 2, 3 and 4 are enlarged fragmentary views showing details of the pointer adjustment mechanism.

Referring to the drawings, the treating chamber for receiving the fluids to be treated is composed of a tubular section 1 (much shortened as here shown to bring it within the allowable limits of the drawings), substantially circular in cross section and of conducting material; and upper and lower heads or covers 2 and 3, respectively, removably secured thereto, the interior walls of this chamber, and more particularly the tubular section, forming the electrode of larger area employed in the apparatus.

The fluids to be treated are passed upwardly or downwardly through the treating chamber as desired through conduits or openings 4 and 5 provided near the top and bottom, respectively, of the treating chamber.

The discharge electrode 6 may consist, for

example, of a fine wire which is suspended axially in the vertically extending tube 1, very small gage nichrome wire being suitable for the purpose.

5 The parts of the apparatus thus far described are of well known construction and arrangement and my invention relates more particularly to novel means for utilizing the discharge electrode not only as a discharge electrode, but also as a temperature measuring element to indicate the temperature in the treating chamber.

The discharge electrode 6 is stretched between a lower insulator 7, secured to the inside of lower cover plate 3, and a flexible closure member or cap 8 adjustably mounted on hollow upper insulator 9. The discharge electrode is freely movable in the hollow upper insulator 9 which surrounds the upper portion of said electrode. Upper insulator 9 extends through an opening in upper cover plate 2, the joint between the insulator and the cover plate being closed by suitable packing 10 and packing gland 11 which also tends to hold the insulator in place.

Also adjustably mounted on insulator 9 and held in place therein by any suitable clamping or other retaining means is an arm or bracket 12 which supports suitable indicating mechanism, said indicating mechanism being connected to the movable end of the discharge electrode 6 so that as said electrode expands and contracts under changes of temperature in the treating chamber, such changes of temperature will be shown by the indicating mechanism. The indicating mechanism may vary in structure within the broad scope of the invention, but in the present instance it comprises the dial 13 provided with a suitable scale 14. Mounted on the dial 13 is a bracket 15 between the arms 16 and 17 of which is pivotally mounted intermediate its ends at 18 lever 19, one end of which is connected by the link or connection 20 to the flexible closure member or cap 8 and the electrode 6 so that movement of said electrode is thereby transmitted to lever 19. Loosely mounted on pivot 18 is a pointer or index member 21 having a laterally extending lug or projection 22 in which is screw threaded an adjustment screw 23. One end of the adjustment screw 23 is urged into contact with lever 19 by the compression spring 24, one end of which is connected to the pointer 21 and the other end being connected to a screw 25 adjustably mounted by screw threads or the like in pin 26 mounted on dial 13. It will at once be seen that spring 24 acts through pointer 21, screw 23 and lever 19 to maintain the discharge electrode under suitable tension and that the adjustment screw 23 provides means for adjusting the

relative angular position of lever 19 and pointer 21.

In setting up the apparatus, the discharge electrode is first secured to the lower electrode 7, and bracket member 12 and flexible closure 8 are adjusted along the upper insulator 9 to place a certain amount of tension upon the discharge electrode, the members 8 and 12 providing a rough adjustment for this purpose. The members 8 and 12 are then clamped in place and the tension of the spring 24 is regulated by the screw 25 and then by means of the screw 23 the fine adjustment mechanism is suitably regulated to position the pointer 21 in the proper place with regard to the scale 14 on the dial 13.

It will thus be seen that the discharge electrode 6 functions not only as a discharge electrode, but also as a temperature measuring element, not only reducing the amount of equipment needed, but eliminating the necessity of any projecting parts in the treating chamber with their attendant disadvantages.

It is to be understood that the invention is not limited to the exact construction illustrated and described and that various changes in details of construction can be made without departing from the scope of the invention as set out in the claims.

What is claimed is:

1. In apparatus for electrical treatment of fluids, a combined electrode and temperature measuring element.

2. In apparatus for electrical treatment of fluids, a discharge electrode, a collecting electrode and means for insulating said electrodes, one of said electrodes also constituting a temperature measuring element.

3. In apparatus for electrical treatment of fluids, a treating chamber, a discharge electrode therein, and means connected to said electrode operable by the expansion and contraction of said electrode to indicate the temperature in said treating chamber.

4. In combination with a treating chamber, a combined discharge electrode and expansion element within said chamber and extending through an opening therein, indicating means connected to said combined discharge electrode and expansion element and permitting movement of said expansion element, and means for sealing said opening and permitting movement of said expansion element and discharge electrode to be transmitted to said indicating means.

5. In combination with a treating chamber, a combined discharge electrode and expansion element within said chamber and extending through an opening in one wall thereof, a tubular insulator extending in said opening and surrounding said electrode and expansion element, expansible

means mounted on said insulator and connected to said electrode and expansion element, and indicating means connected to said expansible means.

6. In combination with a treating chamber, a combined discharge electrode and expansion element extending vertically therein, upper and lower insulators for holding said electrode and expansion element in place, said upper insulator comprising a hollow tube surrounding said electrode and expansion element, expansible means connected to said electrode and expansion element, said expansible means being mounted on said upper insulator and sealing one end thereof, and indicating means connected to said expansible means.

7. In apparatus for electrical treatment of fluids, a treating chamber, a combined discharge electrode and expansion element extending into said chamber through an opening in one wall thereof, a tubular insulator extending in said opening and surrounding said electrode and expansion element, an expansible cap connected to said electrode and expansion element, said cap mounted on said insulator and sealing the same, and indicating means operated by said electrode and expansion element.

8. In a pyrometer, the combination, with a chamber for the medium whose temperature is to be measured, of an expansion element within said chamber, indicating means on the exterior of said chamber, connected to said expansion element, and expansible means sealing said chamber and permitting movement of said expansion element to be transmitted to said indicating means.

9. In a pyrometer, the combination, with a chamber for the medium whose temperature is to be measured, of an expansion element within said chamber, expansible means sealing one end of said chamber, said expansion element connected to said expansible means and freely moving the same, and indicating means connected to said expansible means.

10. In a pyrometer, the combination, with a chamber for the medium whose temperature is to be measured, of an expansion element within said chamber, expansible means adjustably mounted on one end of said chamber and sealing the same, one end of said expansion element being fixed and the other end being connected to said expansible means, and indicating means connected to said expansible means.

11. In a pyrometer, an expansion element and indicating means, said indicating means comprising a pivoted lever to which one end of said expansion element is connected, a pivoted pointer, said lever and pointer having a common pivot point, a

dial, and means for adjusting the relative position of said lever and pointer.

12. In a pyrometer, an expansion element having one end fixed and the other end movable, indicating means, and means acting through said indicating means for maintaining said expansion element under tension, said indicating means comprising a pivoted lever to which the movable end of said expansion element is connected, a pivoted pointer, said lever and pointer having a common pivot point, a dial, and means for adjusting the relative angular position of said lever and pointer.

In testimony whereof I hereunto affix my signature.

JOHN J. JAKOSKY.

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