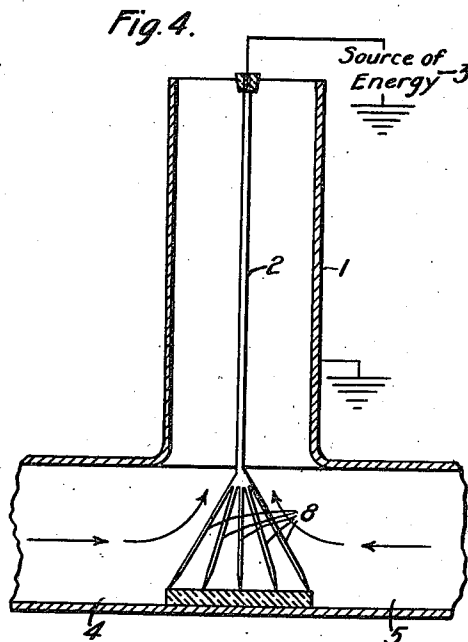
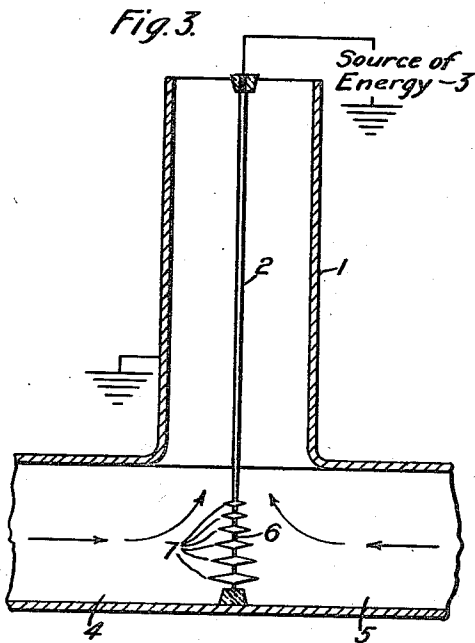
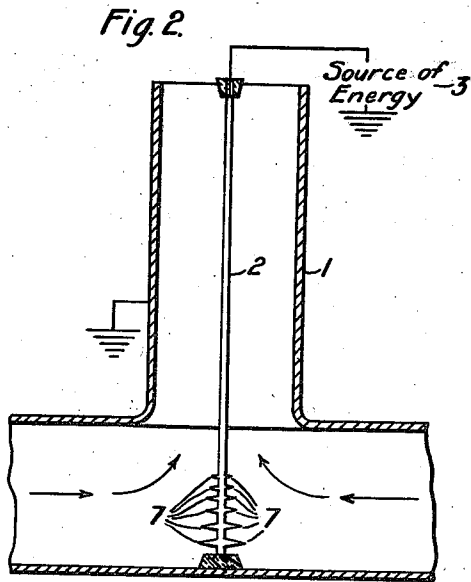
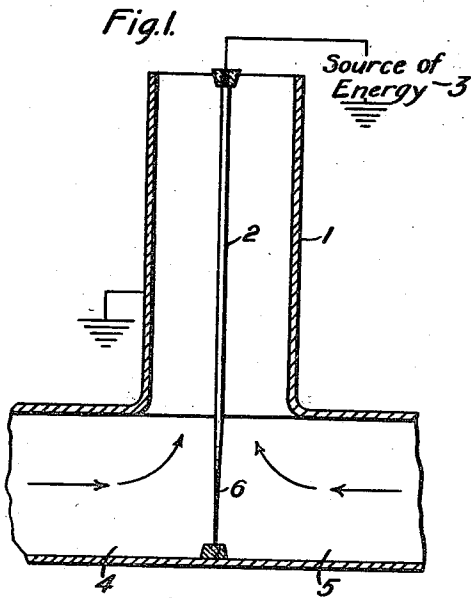


O. H. ESCHHOLZ.
DISCHARGE ELECTRODE FOR PRECIPITATING SYSTEMS.
APPLICATION FILED FEB. 15, 1919.

1,425,637.

Patented Aug. 15, 1922.



WITNESSES:

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DISCHARGE ELECTRODE FOR PRECIPITATING SYSTEMS.

1,425,637.

Specification of Letters Patent. Patented Aug. 15, 1922.

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To all whom it may concern:

Be it known that I, OTTO H. ESCHHOLZ, a citizen of the United States, and a resident of Wilkesburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Discharge Electrodes for Precipitating Systems, of which the following is a specification.

My invention relates to apparatus for electrically precipitating suspended particles from fluid streams and it has especial relation to apparatus of the character designated in which a particular arrangement of electrode systems is employed in order to pre-ionize the fluid being treated, thereby greatly increasing the rate of precipitation and, at the same time, materially decreasing the area and cost of the collecting electrode.

For a better understanding of my invention, reference may be had to the accompanying drawing in which Fig. 1 is a partially diagrammatic and partially sectional view of apparatus of one form constructed in accordance with my invention, and Figs. 2, 3 and 4 are similar views illustrating modifications of the apparatus shown in Fig. 1.

In the precipitation of solid particles from flowing fluid streams, it is desirable to pre-ionize, if possible, the fluid being treated before it passes into the treating chamber and comes under the influence of the collecting electrode. If, therefore, a system of precipitation is used in which the ionizing or discharge electrode is extended somewhat beyond the collecting electrode in order that the fluid may come under the influence thereof, prior to its passage into the treating chamber, an intense ionization will take place and a much greater rate of precipitation be obtained than would otherwise be possible.

In the past, however, attempts to practice the above described method of precipitation have been more or less unsatisfactory on account of a tendency for a spark-over to take place from the discharge electrode. It is apparent that such a tendency will be present when it is understood that, in order to obtain a sufficient degree of corona from the discharge electrode, a relatively high potential must be impressed upon the entire length of this electrode and that, when a sufficiently high voltage is impressed upon the discharge electrode to cause the corona emission from that portion which extends

beyond the collecting electrode, the value of such a voltage may be high enough to cause a spark-over to occur in that region in which the collecting electrode and the passage electrode are collateral.

I have discovered that, if the portion of the discharge electrode which extends beyond the collecting electrode and projects into the fluid stream being treated, is formed in such manner that, although the distance of extension increases, the tendency for corona emission remains constant, the above described method of precipitation may be practiced, such pre-ionization of the fluid being obtained that the above-described advantages of such a system are realized. Although I have illustrated only four forms which the extended portion of the discharge electrode may assume, it will be obvious, after a consideration of the ensuing descriptive matter, that many other forms may be adopted for this extended portion of the discharge electrode without material variation in the results secured.

In each figure of the accompanying drawing, is shown, a collecting electrode 1, which constitutes a treating chamber, and a co-acting electrode 2 positioned within such chamber. Energy for the operation of the system may be derived from any suitable source of energy shown at 3, one terminal of the source of potential being connected to the electrode 2 and the other terminal thereof being grounded, the latter connection conforming to the grounded connection of the collecting electrode or treating chamber 1. Fluid-inlet passages 4 and 5 lead from the point of production or storage of the fluid to be treated and are instrumental in conducting the fluid into the treating chamber.

It will be observed that a portion 6 of the discharge electrode 2 projects somewhat beyond the coacting electrode 1 and into the incoming fluid stream. The projecting portion 6 is so formed that, instead of the field intensity at the surface thereof decreasing rapidly as the distance from the collecting electrode increases, it is maintained substantially uniform. In the case of a cylindrical electrode, this may be accomplished by tapering the projecting portion, since it is well known that the smaller the diameter of a discharge electrode, the greater is the corona emission therefrom. It is apparent

that, since the corona emission is of the same intensity as, or even of higher intensity than, that existing within the treating chamber, the fluid which comes under the influence thereof before its entrance into the treating chamber is materially ionized, and the rate of precipitation in the treating chamber is, therefore, greatly increased.

In the modification shown in Fig. 2, is illustrated another means whereby the projecting portion 6 of the discharge electrode may be caused to emit intense corona. In this figure, a plurality of pointed elements 7 are shown as integral with the projecting portion, and it will be observed that the lengths of these pointed elements, and, therefore, their tendency to emit corona, increases as the distance of the projection from the collecting electrode increases.

In Fig. 3, a still further modification is illustrated in which the pointed elements 7 are combined with the tapered form illustrated in Fig. 1, and, in some instances, it may be desirable to employ this form of extended electrode to obtain the most satisfactory pre-ionizing conditions.

A form of projected portion which may be desirable for use in connection with a chain or very small wire electrode is shown in Fig. 4 and comprises a pyramidal nest of very fine wires 8. The fluid, in passing over and through this nest of wires, becomes sufficiently pre-ionized to materially increase the rate of precipitation, as hereinbefore described.

While I have shown only four forms which my invention may assume, it is apparent to those skilled in the art that many modifications may be made therein, without departing from the scope of the appended claims.

I claim as my invention:

1. In a system of precipitation, a discharge electrode, a collecting electrode co-acting therewith, the discharge electrode extending beyond the collecting electrode, the projecting portion thereof being tapered, the

part of said projecting portion having the least cross-sectional area being disposed a greater distance from the collecting electrode than the remainder thereof, and further pre-ionizing means integrally associated with said projecting portion.

2. In a system of precipitation, a collecting electrode, and a discharge electrode co-acting therewith and extending beyond said collecting electrode for pre-ionizing the gas to be treated, the extended portion of said discharge electrode comprising elements of triangular form with the apex located nearest said collecting electrode.

3. In a system of precipitation, a collecting electrode, and a discharge electrode co-acting therewith and extending beyond said collecting electrode for pre-ionizing the gas to be treated, the extended portion of said discharge electrode comprising a plurality of transversely-extending elements gradually increasing in length as the distance from said collecting electrode increases.

4. In a system of precipitation, a collecting electrode, and a discharge electrode co-acting therewith and extending beyond said collecting electrode for pre-ionizing the gas to be treated, the extended portion of said discharge electrode comprising a plurality of pointed elements of different lengths arranged in triangular form with the base or longest element farthest from said collecting electrode.

5. In a system of precipitation, a collecting electrode, a discharge electrode co-acting therewith and extending in tapering form beyond said collecting electrode for pre-ionizing the gas to be treated, and a plurality of pointed elements of different lengths transversely associated with the tapering end of said discharge electrode and arranged to taper in the opposite direction thereto.

In testimony whereof, I have hereunto subscribed my name this 31st day of Jan. 1919.

OTTO H. ESCHHOLZ,