Apr. 10, 1923.

1,451,418

E. P. DILLON ET AL

ELECTRIC PRECIPITATOR

Filed June 15, 1922

2 sheets-sheet 1

Fig. 1.

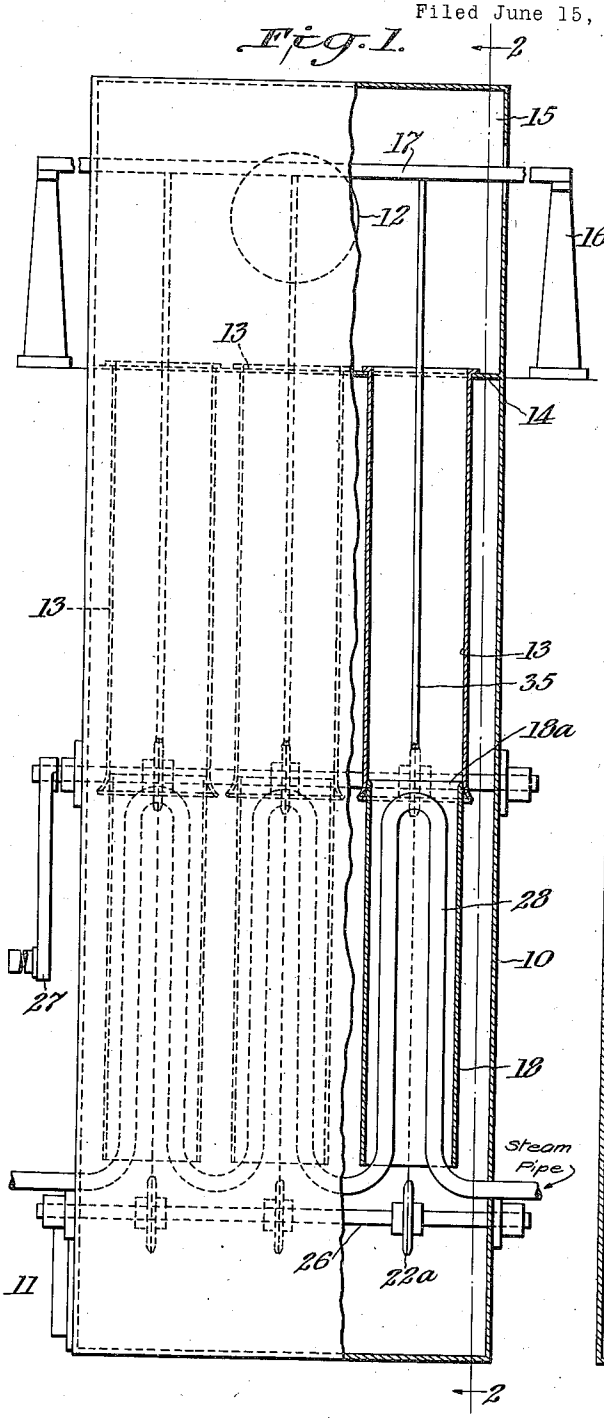
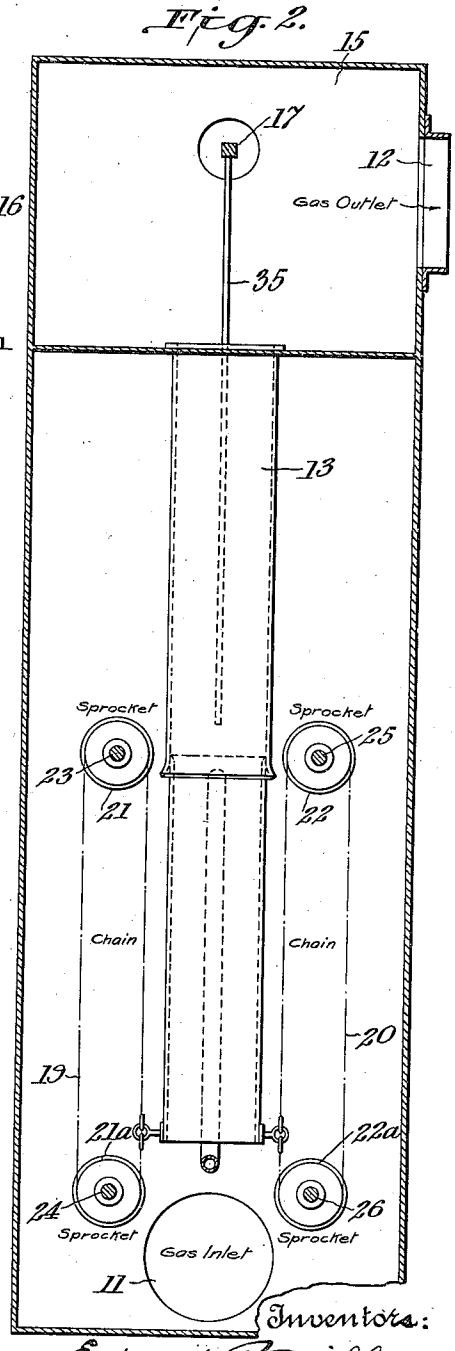


Fig. 2.



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2 sheets-sheet 2

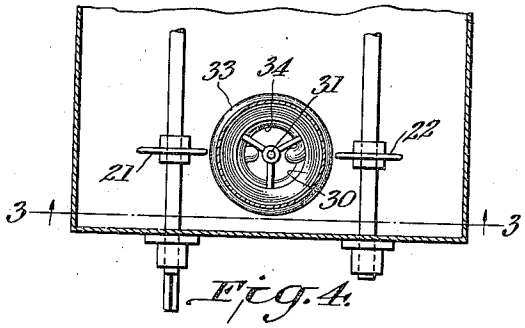


Fig. 4.

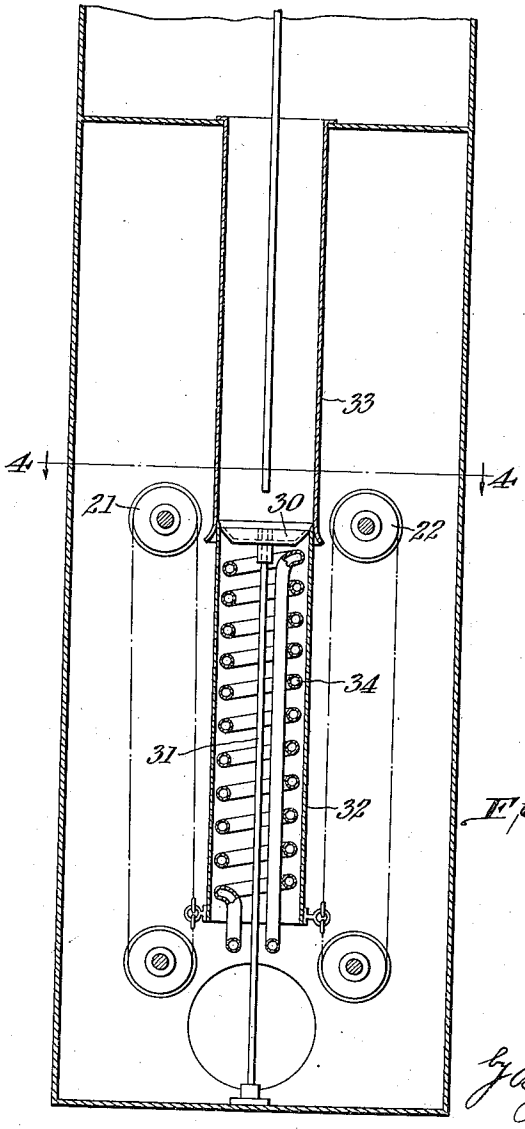
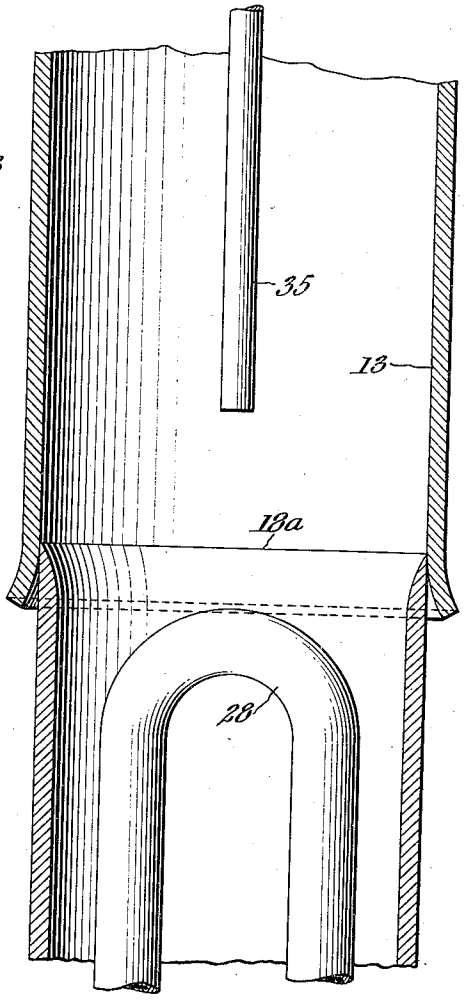


Fig. 3.

Fig. 5.



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Patented Apr. 10, 1923. 1,451,418

UNITED STATES PATENT OFFICE.

EDWARD P. DILLON AND ALBERT A. HEIMROD, OF NEW YORK, N. Y., ASSIGNORS TO RESEARCH CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

ELECTRIC PRECIPITATOR.

Application filed June 15, 1922. Serial No. 568,571.

To all whom it may concern:

Be it known that we, (1) EDWARD P. DILLON and (2) ALBERT A. HEIMROD, citizens of the United States, residing at (1) 860 Riverside Drive, New York, (2) 867 West 181st Street, New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Electric Precipitators, of which the following is a specification.

This invention relates to electric precipitators and more particularly to an apparatus of the type referred to which is adapted for the separation from gases of viscous or semi-viscous material or, in general, of material which has a tendency to firmly adhere to the collecting electrodes.

As is well known, the presence of tar or other similar material in gases presents a difficult problem for the application of electric precipitators because the particles precipitated out of the gas stream against the surface of the collecting electrode stick with considerable tenacity and cannot be removed by ordinary means such as rapping or jarring mechanism.

In the past various arrangements have been proposed for forcibly removing the tar by means of scrapers. Most of such arrangements, however, have been either complicated in construction or operation or both, or have been inefficient.

It is the general object of the invention to provide an electric precipitator, simple in construction and operation, containing simple means for removing the viscous deposit from the collecting electrodes.

It is a particular object to provide an electric precipitator containing simple means for automatically and continuously cleaning the collecting electrodes during the normal operation.

For a full understanding of the invention, its principles of operation and the advantages derived, reference is made to the accompanying drawings in which—

Fig. 1 is a side elevation partly in section of an embodiment of the invention;

Fig. 2 is a section taken at right angle to Fig. 1.

Fig. 3 is a section similar to Fig. 2 of a modified form of the invention; and

Fig. 4 is a fragmentary sectional view taken on line 4—4, Fig. 3; and

Fig. 5 is a fragmentary view on a larger scale of a detail.

In Figs. 1 and 2, 10 represents a precipitator casing having the gas inlet 11 and the outlet 12. For the sake of example the casing contains three tubes or pipes 13 mounted at their upper ends in the bottom 14 of the outlet manifold 15. Upon insulators 16 is supported a bar 17 from which are suspended the discharge electrodes 35. The arrangement of the tubes 13 which are the collecting electrodes and the discharge electrodes 35 represents one well known arrangement of the prior art and does not constitute a part of the specific novelty.

Below the tubes 13 are mounted tubes 18 the external diameter of which is substantially equal to the internal diameter of tubes 13. The upper edge of the tube 18 is formed to provide a cutting or scraping edge 18^a.

The tubes 18 are supported upon endless chains 19 and 20 driven by sprocket wheels 21, 21^a and 22, 22^a. All sprocket wheels 21, 21^a, 22 and 22^a are mounted upon common shafts 23, 24, 25 and 26 respectively, which may be operated by a crank 27 or in any other suitable manner.

By turning the crank 27, the tubes 18 may be raised to scrape the collecting electrodes 13. The tubes 18 and the chains 19 and 20 are of course so dimensioned that the tubes 13 can be scraped throughout their lengths.

Below the pipes 13 are mounted in series pipe sections 28 co-extensive with the length of the tubes 18 when they are in their lowest position. The pipe sections 28 form part of a circulating system for steam or other suitable heating medium.

The operation is obvious: The pipes 18 in their upward movement scrape the deposit from the pipes 13 and during the downward movement come under the thermal effect of the heated pipe sections 28 with the result that the tar is sufficiently softened to flow out of the pipes 18. The speed of the chains 19 and 20 may of course be adjusted to suit particular requirements.

The steam coils have been specifically referred to merely as a convenient means for applying heat to the sections 18. It is understood that within the scope of the invention many arrangements are applicable, inside or outside pipes 18, for imparting

heat to the tar or other material scraped from pipes 13.

In some cases it may be more advantageous to provide a mechanical cleaner for the tubes 18. As indicated in Fig. 3 a stationary scraper 30 may be mounted upon a rod 31 extending upwardly into tube 32. The scraper 30 is preferably disposed adjacent to the lower end of tube 33. During the upward movement of the tube 32 the deposit is removed from the tube 33 and during the downward movement of tube 32 the scraper 30 removes the material from the tube 32. The scraper 30 may be any centrally perforated disk-like body having a peripheral scraping edge.

If desired the tube 32 may of course be heated, as for instance by a steam coil 34, to combine with this form the advantages of the heating effect previously described.

For the sake of simplicity only one form of raising mechanism is shown. However, as is fully understood by the expert, a large number of mechanisms is available for raising the tubes 18 and 32. It is also obvious that there is considerable latitude as to the form and the characteristics of the scraping edge of the tubes 18 and 32. It is furthermore understood that the scraper 30 and its mode of operation may be materially changed within the scope of the invention.

The principal advantage of a device of the character described lies in the simplicity of the construction operating while the precipitator is in operation. The scraping tubes may be made of thin material whereby no material difference is introduced between the tube 13 and the tube 18. Both tubes, in fact, function as collecting electrodes under substantially the same conditions.

We claim:

1. The combination with a stationary tubular body constituting a collecting electrode and a discharge electrode therein, of a tubular member having a sliding fit in the tubular body and provided at one end with means defining a scraper edge and means engaging the other end of the tubular member for reciprocating the same.

2. The combination with a stationary tubular body constituting a collecting electrode and a discharge electrode therein, of a thin-walled tubular member having a sliding fit in the tubular body and having a scraper edge at one end, and means engaging the other end of the tubular member for reciprocating the same, the tubular body and the tubular member having substantially the same length.

3. The combination with a tubular collecting electrode and a discharge electrode, of a tubular member having a sliding fit in the collecting electrode, means at one end of the tubular member defining a scraper edge, means for reciprocating the tubular member and means for heating the tubular member.

4. Apparatus according to claim 3 in which the heating means is stationary and disposed adjacent the path of motion of the tubular element remote from the collecting electrode.

5. Apparatus according to claim 4 in which the heating means is disposed within the compass of the tubular member.

6. The combination with a tubular collecting electrode and a discharge electrode, of a tubular member having a sliding fit in the collecting electrode, means at one end of the tubular member defining a scraper edge, means for reciprocating the tubular member and means for scraping the inner surface of the tubular member.

7. Apparatus according to claim 6 in which the scraping means is constructed and arranged to scrape the tubular member while the latter is moving relatively to the collecting electrode.

8. Apparatus according to claim 6 in which the scraping means is axially stationary.

9. Apparatus according to claim 8 in which the scraping means is a disk-like element supported upon an axially extending rod.

10. The combination with a tubular collecting electrode and a rigid discharge electrode extending into the same substantially to the end thereof, of a tubular member having a sliding fit in the collecting electrode and having a scraper edge at the end facing toward the support for the discharge electrode, and means engaging the other end of the tubular member for reciprocating the same.

11. Apparatus according to claim 10 including means remote from the collecting electrode for heating the tubular member.

12. Apparatus according to claim 11 in which the heating means is stationary and disposed in proximity to the path described by the tubular member.

In testimony whereof, we affix our signatures.

EDWARD P. DILLON.
ALBERT A. HEIMROD.