

July 5, 1932.

R. HEINRICH
GAS PURIFICATION
Filed Feb. 3, 1931

1,865,907

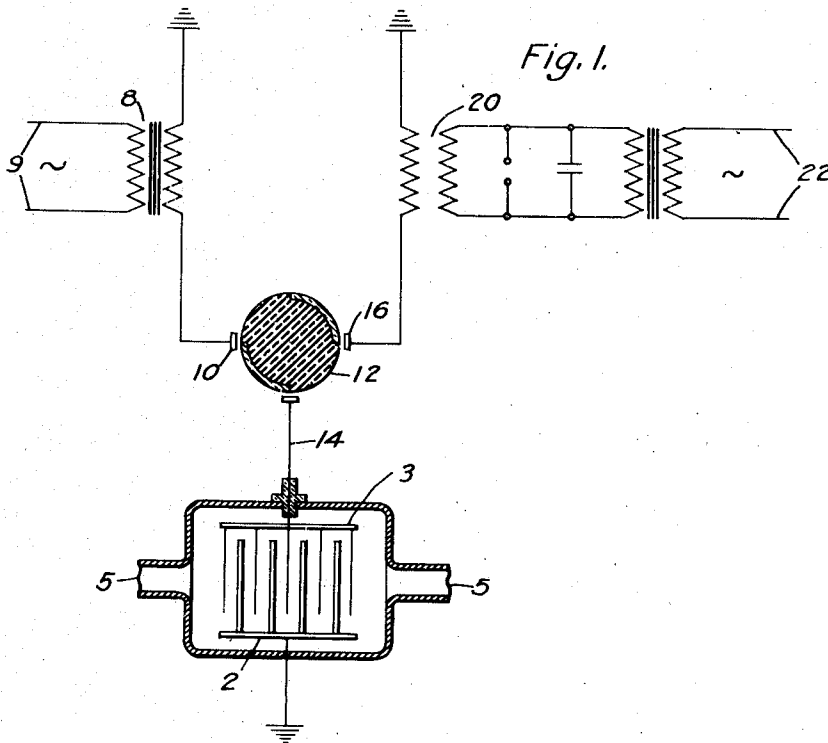
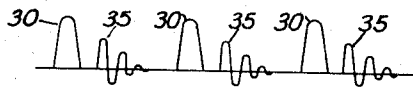


Fig. 2.



WITNESSES:
Fred. L. Wilharm
S. A. Strickland

INVENTOR
Richard Heinrich
BY
Wesley K. ...
ATTORNEY

UNITED STATES PATENT OFFICE

RICHARD HEINRICH, OF BERLIN-SUDENDE, GERMANY, ASSIGNEE TO WESTINGHOUSE
ELECTRIC & MANUFACTURING COMPANY, A CORPORATION OF PENNSYLVANIA

GAS PURIFICATION

Application filed February 3, 1931, Serial No. 513,150, and in Germany February 10, 1930.

My invention relates to gas purification and particularly to apparatus for removing fine gas particles by coagulating them into larger gas particles which are readily removed by ionization.

In the treatment of gas by electrical means to remove impurities therein, it has been noted that very fine dust, such as that found in the ventilating air of office buildings, requires much more energy to precipitate than the same weight of larger particles.

By the use of my invention it is possible to take advantage of the lesser deposition energy of the larger particles by coagulating or collecting the finer particles into comparatively large easily charged particles. I accomplish this result by subjecting the gas being treated to alternate high-tension direct current impulses and high-frequency damped alternating current impulses. The alternating current impulses coagulate the fine dust into conglomerate masses which are charged by the high-tension direct current impulse and driven from suspension to the collecting electrodes.

Other objects and advantages of my invention will be apparent from the following detailed description taken in conjunction with the accompanying drawing, in which:

Figure 1 is a schematic diagram of an apparatus according to my invention, and

Fig. 2 is a time current diagram showing the manner in which the alternate impulses are applied according to my invention.

The apparatus disclosed in the drawing comprises a treating chamber 1 having a collecting electrode 2 therein and a charging or ionizing electrode 3 electrically insulated and separated from the collecting electrode.

The treator chamber 1 is provided with suitable passages 5 for the admission or discharge of the gas to be treated, which is conducted through the treator chamber in any desired manner, such as by a blower or fan, by natural draft or other means.

A high tension transformer 8 supplied from an alternating current line 9 provides a source of high-tension electrical current. In the preferred embodiment of my invention,

one side of the high-tension secondary is grounded and the other side is lead to the terminal 10 of a synchronous commutator 12. The lead 14 is provided from the commutator to the charging electrode 3 of the precipitator. The commutator 12 is synchronized with the high-tension output of the transformer 8 so that during alternate half cycles the transformer is connected through the commutator to the electrode 3 to provide a direct or unidirectional current impulse to the electrode. During the other half cycle the transformer 8 is disconnected from the electrode and during this half cycle the commutator 12 connects electrode 3 to a terminal 16 of a high-frequency generator such as a Tesla transformer 20, which is, in turn, fed by an alternating current line 22 which may be, if desired, identical with the line 9.

In the operation of my device, the commutator 12 alternately connects electrode 3 to the transformers 8 and 20 so that the gases in the treator are alternately subjected to high-tension unidirectional currents and to damped high-frequency alternating currents. This is graphically illustrated in Fig. 2, which shows the time current relation in my device, the high-tension unidirectional surge being illustrated by the loops 30 of the curve and the high-frequency surge by the loops 35. The damped high-frequency surge coagulates or conglomerates the small particles of the impurities in the gas into comparatively large particles, which are then charged by the succeeding unidirectional surge and driven to the collecting electrodes. This alternate coagulation and charging is repeated many times during the passage of the gas adjacent to the electrodes so that all or comparatively all of the fine particles will be coagulated and precipitated with the expenditure of a comparatively small amount of energy to that which would be necessary to charge and precipitate each small particle as originally found in the gas.

While I have shown and described a specific embodiment of my invention, it is apparent that changes and modifications could be made therein without departing from the spirit and scope of my invention. I desire, therefore,

that only such limitations shall be imposed as are indicated in the appended claims or as may be necessitated by the prior art.

I claim as my invention:

5 1. A precipitator comprising a precipita-
tor chamber, a set of collecting and a set of
ionizing electrodes therein and means for
applying alternately unidirectional and
damped alternating current to the set of ioniz-
ing electrodes.

10 2. A treater for cleaning gas comprising a
treating chamber, means for passing the gas
to be treated through the chamber, a collect-
ing electrode in said chamber for collecting
15 the foreign matter in the gas, a charging
electrode separated from the collecting elec-
trode, a transformer for supplying a high
voltage current, a transformer for supplying
a high frequency alternating voltage and
20 means for alternately connecting said trans-
formers to the charging electrode.

3. A gas purifier comprising a chamber
through which the gas to be purified is passed
a plurality of electrodes in the chamber, a
25 source of pulsating high tension current, a
source of damped high frequency current and
means for alternately connecting said sources
to an electrode in said chamber.

4. A treater comprising a treating cham-
30 ber, a charging electrode, means for produc-
ing a damped high frequency current for
coagulating the particles to be precipitated,
means for producing a high tension current
for ionizing the particles and means for alter-
35 nately connecting said currents to the charg-
ing electrode.

5. A treater for cleaning gaseous fluids
comprising a treating chamber, a plurality of
electrodes therein, a transformer for supply-
40 ing high tension currents, a transformer for
supplying high frequency damped currents
and a synchronous commutator for alternate-
ly connecting said transformers to one of
said electrodes.

45 In testimony whereof, I have hereunto sub-
scribed my name this 12th day of January
1931.

RICHARD HEINRICH.

50

55

60

65