

April 28, 1959

S. MATTS
ELECTROFILTERS

2,884,087

Filed Oct. 2, 1956

2 Sheets-Sheet 1

FIG. 1.

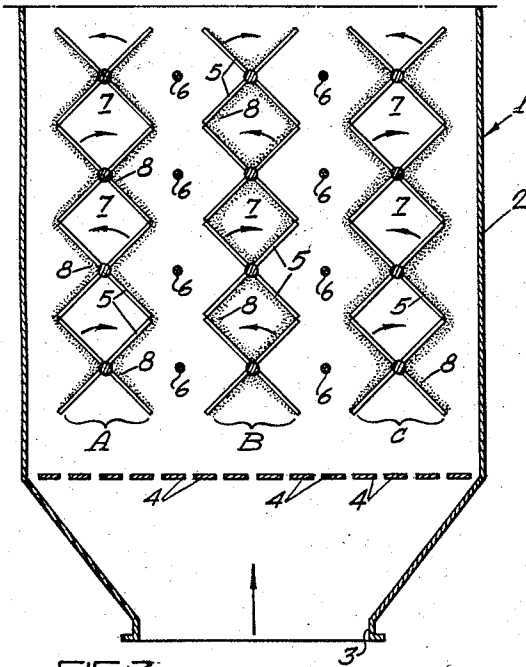


FIG. 2.

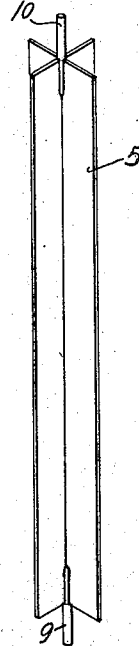


FIG. 3.

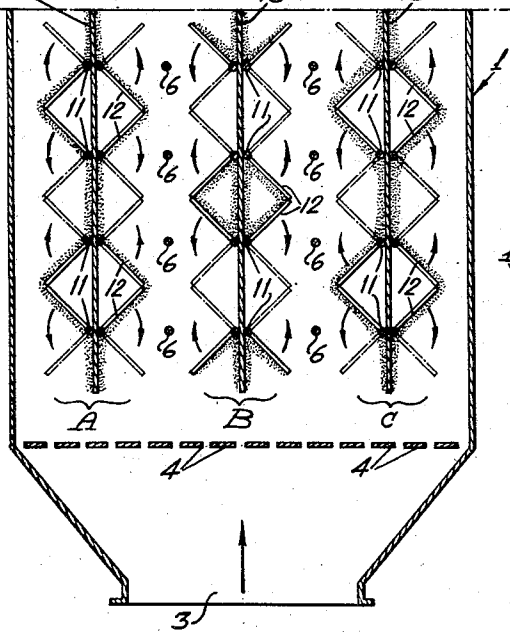
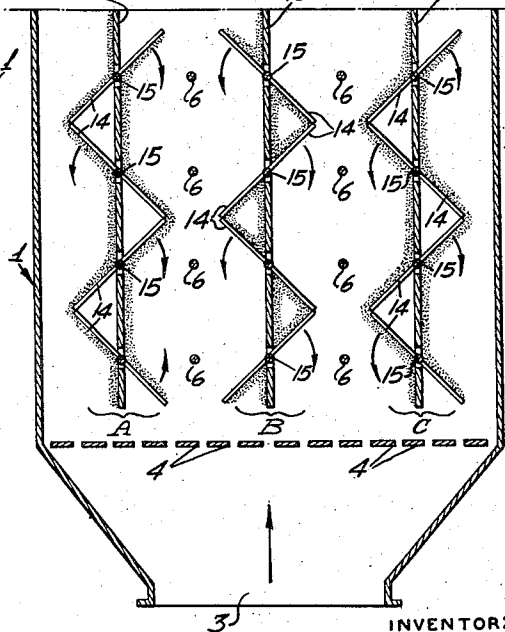


FIG. 4.



INVENTOR:
SIGVARD MATTS
BY *Howson & Howson*
ATTYS.

April 28, 1959

S. MATTS
ELECTROFILTERS

2,884,087

Filed Oct. 2, 1956

2 Sheets-Sheet 2

FIG. 5e

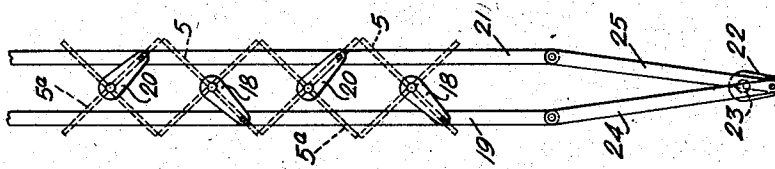


FIG. 5d

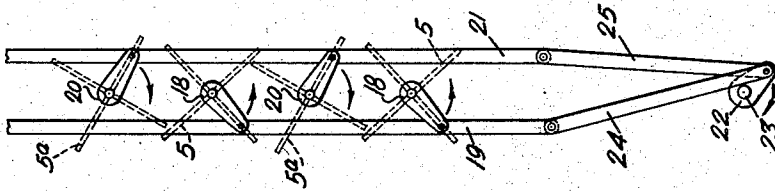


FIG. 5c

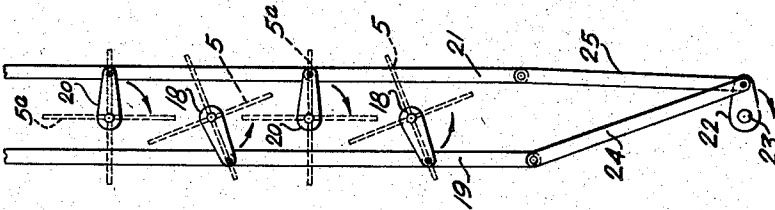


FIG. 5b

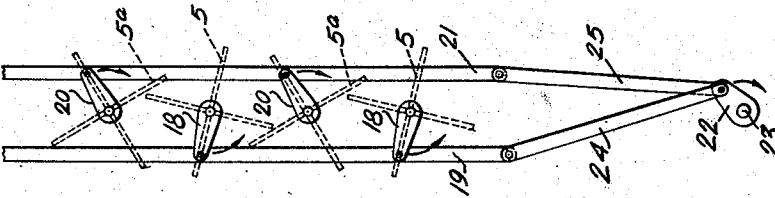
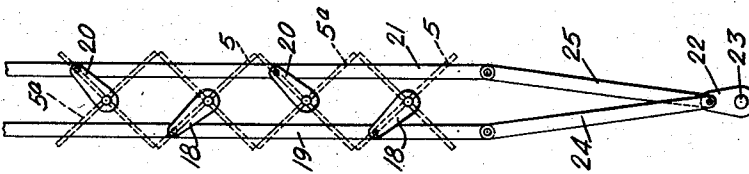


FIG. 5a



INVENTOR:
SIGVARD MATTS
BY *Howson & Howson*
ATTYS.

1

2,884,087

ELECTROFILTERS

Sigvard Matts, Jonkoping, Sweden, assignor to AB Svenska Flaktfabriken, Stockholm, Sweden

Application October 2, 1956, Serial No. 613,506

Claims priority, application Sweden October 27, 1955

4 Claims. (Cl. 183—7)

When cleaning gases by means of electrofilters it is of great importance that the dust precipitated on the collecting electrodes be removed from the gas current without any substantial part thereof being picked up again by the gas current. There have been prior attempts to solve this problem by forming the electrodes as so called "hollow box electrodes" with double walls equipped with slots. It has also been conventional practice to form special grooves in the electrofilter to remove dust therefrom. The present invention relates to a new, effective and inexpensive arrangement to solve the above mentioned problem.

The arrangement according to the invention relates to electrofilters, preferably designed for a horizontal gas flow and having collecting electrodes in form of a number of vertical plates for collecting precipitated dust, said plates being arranged on both sides of the discharge electrodes in rows parallel to the flow direction of the gas current. The new arrangement is characterized in that each of the rows of the collecting electrodes consists of a series of separate plates arranged close to each other, and being rotatable about their vertical shafts and movable into two different working positions by suitable operating means. The plates are constructed in such a manner that the plates in these two positions partly have exposed collecting surfaces facing the discharge electrodes and partly form closed vertical channels shielded from the gas current. The channels are formed by two adjacent electrode units arranged close to each other, and enclose the dust which was deposited on the electrodes in a preceding working position. The dust, for example by vibrating the electrodes, may be caused to fall down in the channels without any risk of its being picked up again by the gas current.

Other characteristics for the apparatus made according to the invention will be evident from the following description with reference to the accompanying drawings, wherein

Fig. 1 is a horizontal section of a part of an electrofilter made according to the invention.

Fig. 2 shows in perspective a part of an electrode in form of a four-armed wing wheel.

Fig. 3 is a view similar to Fig. 1 showing a modified electrofilter having electrodes which consist of a number of plates arranged on both sides of a common wall.

Fig. 4 is a view similar to Fig. 1 showing a modified electrofilter having electrodes which consist of a number of plates extending through the common wall.

Figs. 5a to 5e inclusive show a suitable operating means for the collecting electrodes.

In Fig. 1, an electrofilter 1 having a main casing 2 and an inlet 3 operates to filter a gaseous medium which is distributed at the inlet by means of a number of distributing plates 4, and then passes the collecting electrodes 5 and the discharge electrodes 6 arranged in rows A, B, and C. In the embodiment shown in Fig. 1, the collecting electrodes consist of vertical four-armed wing wheels formed by two plane plates crossing each other at

2

right angles and being rotatable about their vertical shafts 9—10 (Fig. 2) which are arranged in transverse alignment with the discharge electrodes 6. The wheels of the collecting electrodes are arranged to be rotatable a quarter of a turn at each operation by operating means, for example as shown in Figs. 5a—5e. Alternate wheels are turned to the left, and the intermediate wheels are turned to the right with a certain phase shift between the rotations to the left and to the right as indicated by the arrows. Between adjacent wheels of the collecting electrode in the same row there will occur closed spaces 7 which are shielded from the gas current. These spaces constitute vertical channels, in which dust being deposited on the electrodes at the preceding working position, for example by vibrating the electrodes, can be caused to fall down without any risk of the dust being picked up again by the gas current. The precipitated dust 8 accumulates on the faces of collecting electrodes facing the discharge electrodes as shown in the row A. When adjusting the electrodes to the position shown in row B, the dust will be enclosed in the vertical channels and shielded from the gas current.

In Figs. 3 and 4, corresponding elements to those in Figs. 1 and 2 have the same reference numbers. Figs. 3 and 4 respectively show different embodiments of the collecting electrodes. In Fig. 3 the collecting electrodes 12 are formed out of a number of plane plates arranged on both sides of a common fixed plate wall 13 which is parallel to the flow direction of the gas current and coextensive with the central plane of the electrode. The plates are rotatably mounted along one of their edges at the plate wall 13 with its pivotal axis 11 in transverse alignment with a discharge electrode. The rows A and C on one side and the row B on the other side illustrate the different working positions of the pivoted plates, and the location of the channels for precipitated dust.

In Fig. 4 the rows A, C and the row B respectively illustrate in the corresponding manner the location of the channels for dust in the two working positions of the plates 14. The collecting electrodes are in this case formed out of a number of plates 14 which as indicated at 15 are pivotally mounted in slots made in the common wall 16. The two halves of the plates on both sides of the common wall will thus be pointing in diametrically opposite directions.

Figs. 5a to 5e show a suitable arrangement for operating the electrodes. In this arrangement, a certain phase shift is obtained between the clockwise and counter-clockwise rotation. Thus, there is no chance for interference between the ends of the plates during operation. As shown in Figs. 5a to 5e, the alternate electrodes 5 have cranks 18 interconnected by rods 19, and the intermediate electrodes 5a have cranks 20 interconnected by rods 21. The rods 19 and 21 are connected to a crank 22 on an operator shaft 23 by means of connecting rods 24 and 25 respectively. Rotation of the shaft 23 therefore alternately rotates the electrodes 5 and 5a a quarter of a turn in opposition to one another.

While certain embodiments of electrodes and one form of operating mechanism have been herein illustrated and described, it is not intended to limit the invention to such disclosure, but changes and modifications may be made therein and thereto within the scope of the following claims:

What I claim is:

1. An electrofilter having discharge and collecting electrodes mounted for horizontal gas flow therebetween, said collecting electrodes being mounted on both sides of the discharge electrodes in rows having a vertical center plane parallel to the flow direction of the gas, each collecting electrode comprising a series of separate flat vertically disposed plates mounted for pivotal movement about a

3

vertical axis in said center plane between clockwise and counterclockwise limit positions and extending angularly outward at both sides of the center plane, the free edge of each plate in one of its limit positions engaging the free edge of an adjacent plate in its opposite limit position to form a closed channel between said plates and the vertical center plane to shield one face of each plate from the gas flow and expose the opposite face of each plate to the gas flow, the free edge of each plate in its opposite limit position engaging the free edge of an adjacent plate in its one limit position to form a different closed channel between the latter plates and the vertical center plane to shield the opposite face of the plate from the gas flow and expose the one face of each plate to the gas flow, and operating means to dispose said plates alternately in their opposite limit positions.

2. An electrofilter according to claim 1 wherein every four plates of each series are joined together at right angles to form a vertically-elongated four-armed wing wheel, said operating means being operable to rotate alternate wheels in each electrode clockwise a quarter turn

4

and the intermediate wheels in each electrode, counterclockwise a quarter turn with a phase shift between said clockwise and counterclockwise rotations.

3. An electrofilter according to claim 1 including a plane fixed wall plate coextensive with said center plane of each collecting electrode and cooperating with said pivotally mounted plates to form said closed channels.

4. An electrofilter according to claim 3 including means defining a vertical slot in said fixed wall and characterized in that the pivotally mounted plates on opposite sides of the fixed wall are joined together to form a single plane element passing through said slot.

References Cited in the file of this patent

UNITED STATES PATENTS

1,549,753	Edler	Aug. 18, 1925
2,036,323	Engert	Apr. 7, 1936

FOREIGN PATENTS

90,856	Austria	Jan. 25, 1923
--------	---------	---------------