

March 16, 1971

W. STEUERNAGEL
CLEANING DEVICE FOR ELECTROSTATIC DUST COLLECTOR
DISCHARGE ELECTRODES

3,570,217

Filed July 8, 1969

2 Sheets-Sheet 1

Fig. 1

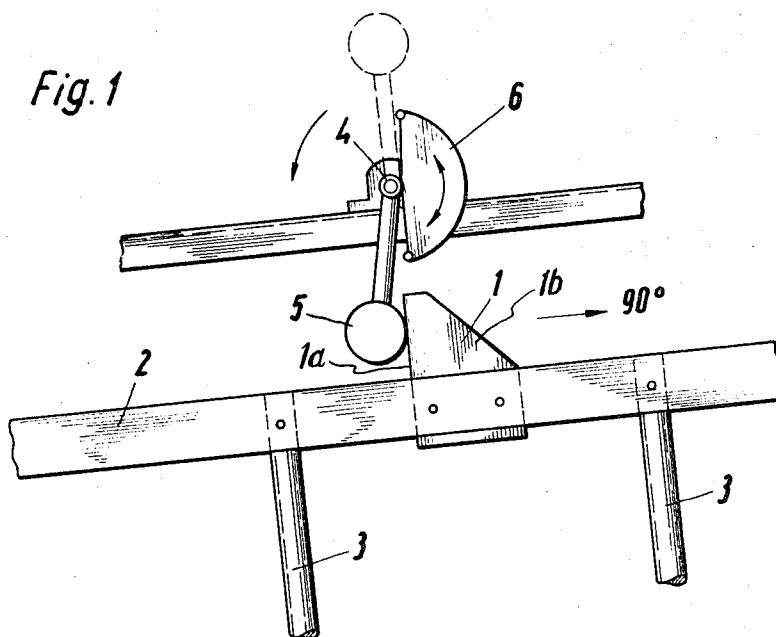
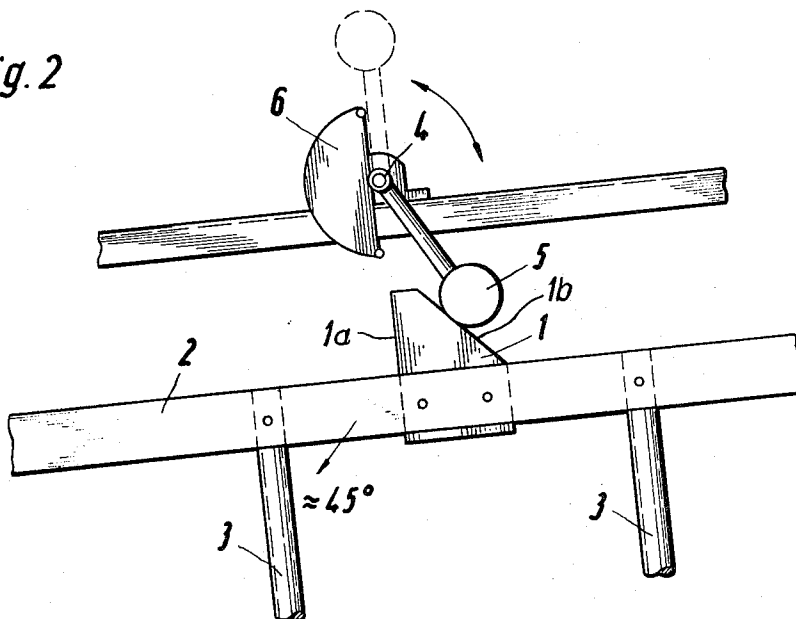


Fig. 2



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Fig. 3

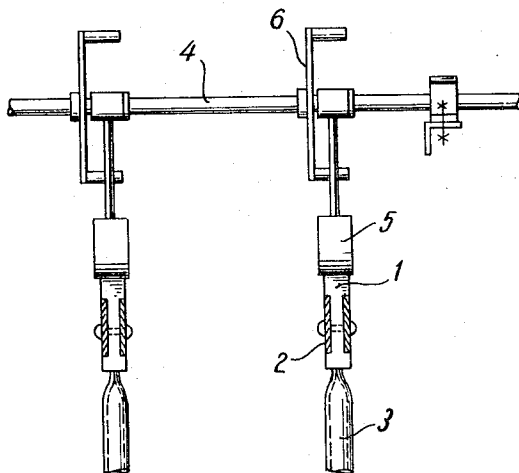
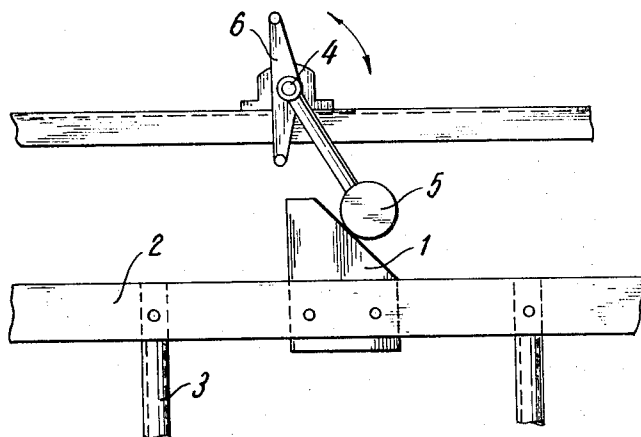


Fig. 4



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Filed July 8, 1969, Ser. No. 839,907

Claims priority, application Austria, July 15, 1968, A 6,820/68

Int. Cl. B03c 3/76

U.S. Cl. 55—112

4 Claims

ABSTRACT OF THE DISCLOSURE

Dust is shaken from the discharge electrodes in an electrostatic dust separator by means of hitting an anvil secured to the framework, from which the electrodes are hung, with a freely falling hammer which alternately strikes a vertical side and an inclined side of the angles to produce vibrations in different directions and intensity.

In electrostatic gas cleaning, the dust settles not only upon the collecting electrodes provided for this purpose, but after some time the discharge electrodes are also covered with dust. Therefore, it is necessary within predetermined periods to remove the dust not only from the collecting electrodes but also from the discharge electrodes by vibration.

Among the various methods of cleaning the electrodes in most cases the shaking by rapping is preferred. German Pat. 406,451 describes for instance the rapping of the electrodes of an electrostatic dust collector by means of rappers which are actuated by electromagnets in a predetermined rhythm. German Pat. 561,511 discloses a falling hammer which knocks via a rod the subjacent electrodes. Special constructions have been developed for discharge electrodes. Germany Pat. 1,001,671 shows such a rapping device for discharge electrodes. In this case, the framework carrying the discharge electrodes is rapped periodically by means of falling hammers. German registered Design 1,964,221 shows an arrangement for the rapping of two discharge electrode frames by means of falling hammers actuated by a cam shaft, in which the hammers are arranged between the two discharge electrode frames and are knocking against a rapping frame connected firmly to the discharge electrode frames. Falling hammer constructions for the cleaning of electrodes are disclosed in German registered Design 1,865,538 and for instance in the Swedish Pat. 163,339. Substantially in all such constructions rapping is executed in one direction, either vertically from above or from below as described in the two German Pats. 406,451 and 561,511 and in German Pat. 1,001,671, or laterally as disclosed in the German registered Designs 1,964,221 and 1,865,538. In this the rapping energy should be transmitted most effectively to the discharge electrodes via the supporting frames with as little energy loss as possible. Experience has shown that good results could be obtained with rapping blows of different intensity. For instance German registered Design 1,865,538 proposes first to have a hammer of low weight drop upon the anvil and subsequently a hammer of greater weight. In this, however, the rapping energy is transmitted in the same direction. Surprisingly it has been found that a good cleaning of the electrodes can be obtained by rap-

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ping for instance a discharge system in different directions.

The object of this invention is to produce a means for rapping an electrode framework to obtain vibrations of different direction and different intensity.

In general, these objects are obtained by constructing a device for the cleaning of discharge electrodes in electrostatic dust collectors by vibrating the electrode supporting framework by means of falling hammers, the rapping blows being of different directions and of different intensity and exerted upon an anvil firmly connected to the supporting framework and in which the anvil is rapped on two sides, the one side being vertical and the opposite side having an acute angle to the vertical.

In a further development the falling hammer is movably mounted like a pendulum above the anvil.

In this the falling hammers are actuated by semicircular driving plates, or by two-armed levers.

The means by which the objects of this invention are obtained are described more fully with respect to the accompanying drawings, in which:

FIG. 1 is a front view of the device with the hammer shown in one position; and

FIG. 2 is a similar view with the hammer shown in a second position.

FIG. 3 is a side view of the device shown in FIG. 1;

FIG. 4 is a front view of the device with a two armed lever means.

The anvil 1 having a vertical side 1a and an inclined opposite side 1b is arranged on and firmly connected to the supporting framework 2 carrying the electrodes, not shown, by means of intermediate rods 3. Above this is a rotatable rapping shaft 4 on which the hammer 5 is freely swingable and being actuated by the semi-circular driving plate 6 to give pendulum movement. This semi-circular driving plate 6 or two armed lever means 6' are rigidly connected to the rapping shaft 4. Hammer 5 is lifted by the semi-circular movement of the means 6 or 6' in upright position as shown in dotted lines in FIGS. 1 and 2 and falls by its own weight onto the anvil 1. Thereafter hammer 5 is lifted by semi-circular movement of means 6 or 6' in opposite direction and falls onto the other side of the anvil 1. As the figures show, the hammer hits the left vertical side 1a of the anvil transmitting the rapping energy upon the supporting frame in a horizontal direction. Subsequently after the driving plate has lifted the hammer, it falls and hits the inclined right side 1b of the anvil for vibrating the supporting frame at an angle of approximately 45°. This device thus changes the transmitting angle of the rapping energy between two successive alternate blows which in addition are of different intensity. The different intensity of the hammer blows is caused by the fact that in hitting the vertical side of the anvil a greater height of fall exists than it does when the hammer hits the inclined side. Furthermore, the different transmitting angle causes an additional different distribution of the energy.

Having now described the means by which the objects of this invention are obtained, I claim:

1. A vibrating device for cleaning dust from the discharge electrodes in an electrostatic dust collector comprising a framework for holding the discharge electrodes, an anvil having one vertical side and an inclined opposite side and being firmly connected to said framework, and falling hammer means above said anvil for alternately

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rapping each side to produce rapping blows of different direction and intensity in vibrating said framework.

2. A device as in claim 1, said falling hammer means having a pendulum movement.

3. A device as in claim 2, further comprising semi-circular driving plate means for lifting said hammer means.

4. A device as in claim 2, further comprising two-armed lever means for lifting said hammer means.

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U.S. Cl. X.R.

55—300; 173—99, 100