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ELECTRIC PRECIPITATING APPARATUS

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Fig. 1.

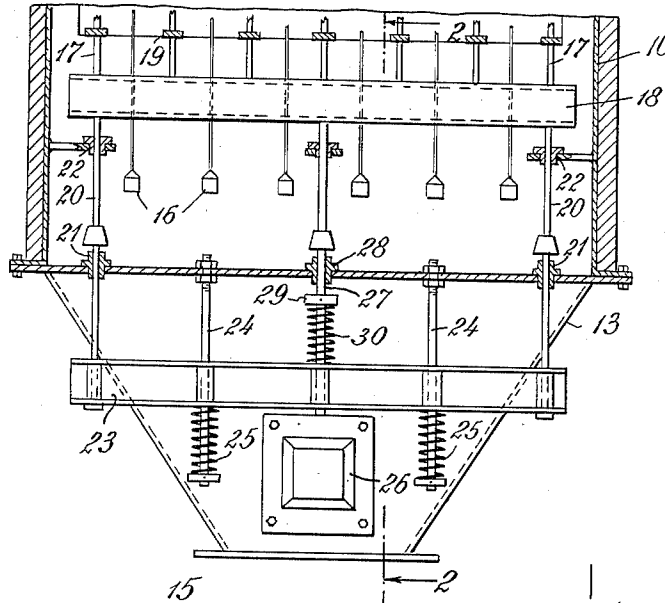
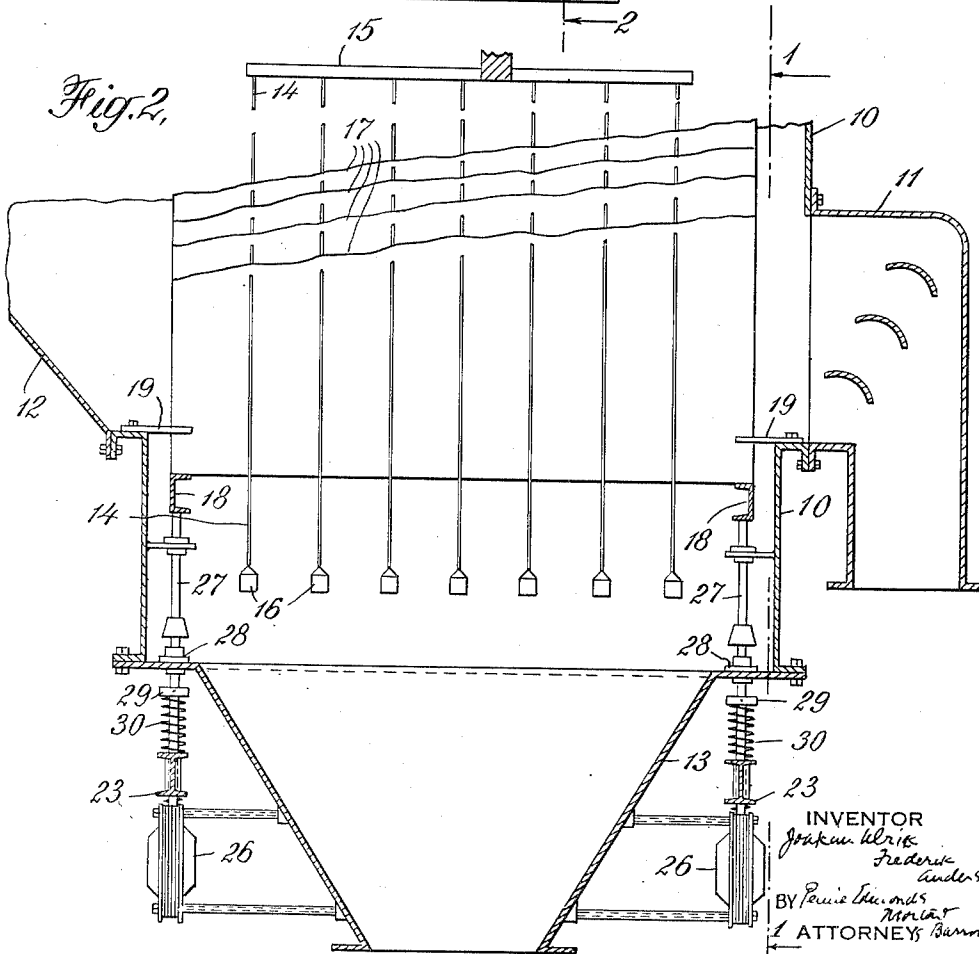


Fig. 2.



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ELECTRIC PRECIPITATING APPARATUS

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4 Claims. (Cl. 183—7)

1

This invention relates to electric precipitation apparatus of the type containing ionizing wires arranged between collecting electrodes of sheet form and is concerned more particularly with an electric precipitator containing novel means for vibrating the collecting electrodes to prevent the accumulation of dust thereon. Electric precipitators containing sheet electrodes have, heretofore, been provided with electromagnetic means for subjecting the electrodes to transverse vibration, that is, vibration at right angles to the plane thereof, in order to free the electrodes from accumulated dust. Such transverse vibration of the collecting electrodes is ordinarily at right angles to the direction, along which gravity acts, and the vibrating means thus do not take advantage of the force of gravity.

The present invention is directed to the provision of a novel electric precipitator in which the collecting electrodes of sheet form are mounted vertically and are subjected to vertical vibration in the plane thereof. Vibration of the electrodes in this manner effectively removes accumulated dust therefrom.

For a better understanding of the invention, reference may be made to the accompanying drawing, in which

Fig. 1 is a vertical sectional view, on the line 1—1 of Fig. 2, through an electric precipitator constructed in accordance with the invention; and

Fig. 2 is a sectional view on the line 2—2 of Fig. 1.

The precipitator illustrated includes a casing 10 having an inlet 11 for gases to be treated, an outlet 12 for the treated gases, and a hopper 13 at its lower end for collection of the precipitated material. Within the casing are mounted rows of ionizing electrodes in the form of wires 14 supported in any convenient manner, as from a frame structure 15, and loaded with individual weights 16 at their lower ends. Collecting electrodes 17 of sheet form and either plain or corrugated are mounted between the rows of ionizing wires and the collecting electrodes are supported on their lower edges on beams 18 within the casing and are kept separated in their vibratory movement by guide plates 19 attached to the inner wall of the casing.

The beams 18 are supported on pairs of rods 20, which pass through the casing wall through sealed openings 21 and are maintained in vertical position by guides 22 attached to the casing wall. At their lower ends, the rods are connected to beams 23 lying outside the casing. Bolts 24 at-

2

tached to the casing wall extend through beams 23 and a spring 25 encircles each bolt and bears at its lower end against the head of the bolt and at its upper end against the under surface of beam 23. With this arrangement, the structure consisting of beams 18, the collecting electrodes 17, and beams 23 are resiliently supported for vertical movement by springs 25.

A vibratory electromagnet 26, which may be supplied with alternating current, is disposed below each of the beams 23 and a rod 27 is connected to the armature of the magnet and extends upwardly through an opening in beam 23 and through a sealed opening 28 in the bottom wall of the casing to terminate against the bottom of beam 18. The rod carries a collar 29 below the bottom of the casing and a spring 30 encircles the rod and bears at its upper end against the collar and at its lower end against the top of beam 23. The spring prevents a downward movement of the rod, which would permit the armature of the electromagnet to make contact therewith.

In the operation of the apparatus, the electromagnets are fed with alternating current and, as the current attains its maximum, the armatures of the electrodes are attracted downwardly and move rods 27 with them, so that the upper ends of the rod are free of their beams 18. In such downward movement of rods 27, the springs 30 are compressed and, when the current through the electromagnets drops to zero, the springs cause rods 27 to move upwardly to strike their beams 18 with powerful strokes. The blows thus applied to beams 18 cause movement of the collecting electrodes 17 in the planes thereof and, when the electromagnets are de-energized, the beams 18 and associated beams 23 and the collecting electrodes drop down with their fall cushioned on springs 25. The collecting electrodes are thus vibrated vertically in their planes at a frequency depending upon the frequency of the current supplied to the electromagnets. It has been found that ordinary frequencies, such as 50 cycles, are satisfactory, so that the electromagnets may be supplied from ordinary supply lines.

It is not necessary, during the operation of the precipitator, that the collecting electrodes should be continuously vibrated, and it has been found satisfactory to vibrate the electrodes, as described, for short periods of, for example, two seconds at intervals of five to ten minutes. With the construction described, the vibration of the electrodes is effected without causing vibration of

3

the casing, because of the absorption of the vibration of the electrodes and their supporting structure by springs 25.

I claim:

1. An electric precipitator which comprises a casing, a plurality of collecting electrodes of sheet form mounted face to face within the casing and spaced apart, supports on which the electrodes rest freely on their lower edges, a spring-pressed member independent of the supports and engaging each support, and means for moving each member away from its support in a direction parallel to the planes of the electrodes and then releasing the member to permit it to strike the support.

2. An electric precipitator which comprises a casing, supporting means mounted within the casing, a plurality of collecting electrodes resting freely on their lower edges on the supporting means and extending vertically face to face and spaced apart, resilient means for supporting the electrode-supporting means, and spring-actuated means for intermittently striking the supporting means to move the latter and the electrodes upwardly, the resilient means cushioning the subsequent downward movement of the electrodes and their supporting means.

3. An electric precipitator which comprises a casing, a plurality of collecting electrodes of sheet form mounted face to face within the casing and spaced apart, supports on which the electrodes rest freely on their lower edges, a spring-pressed member independent of the supports and engaging each support, and magnetic means for

4

moving each member away from its support in a direction parallel to the planes of the electrodes and against the resistance of its spring then releasing the member, the spring expanding to cause the member to strike its support.

4. An electric precipitator which comprises a casing, a plurality of vertical collecting electrodes of sheet form mounted face to face within the casing and spaced apart, a pair of horizontal supports within the casing at opposite sides of the electrodes, the electrodes resting on their lower edges on the supports, a pair of horizontal members outside the casing beneath the respective supports and connected thereto through the casing wall, resilient means supporting the supports and members, and means intermittently striking the supports from beneath to raise the supports and electrodes and then allow them to drop with their fall cushioned by the resilient means.

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