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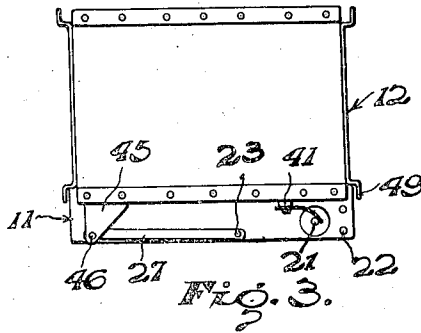
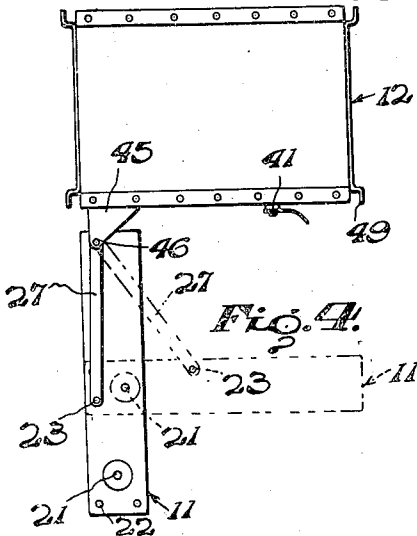
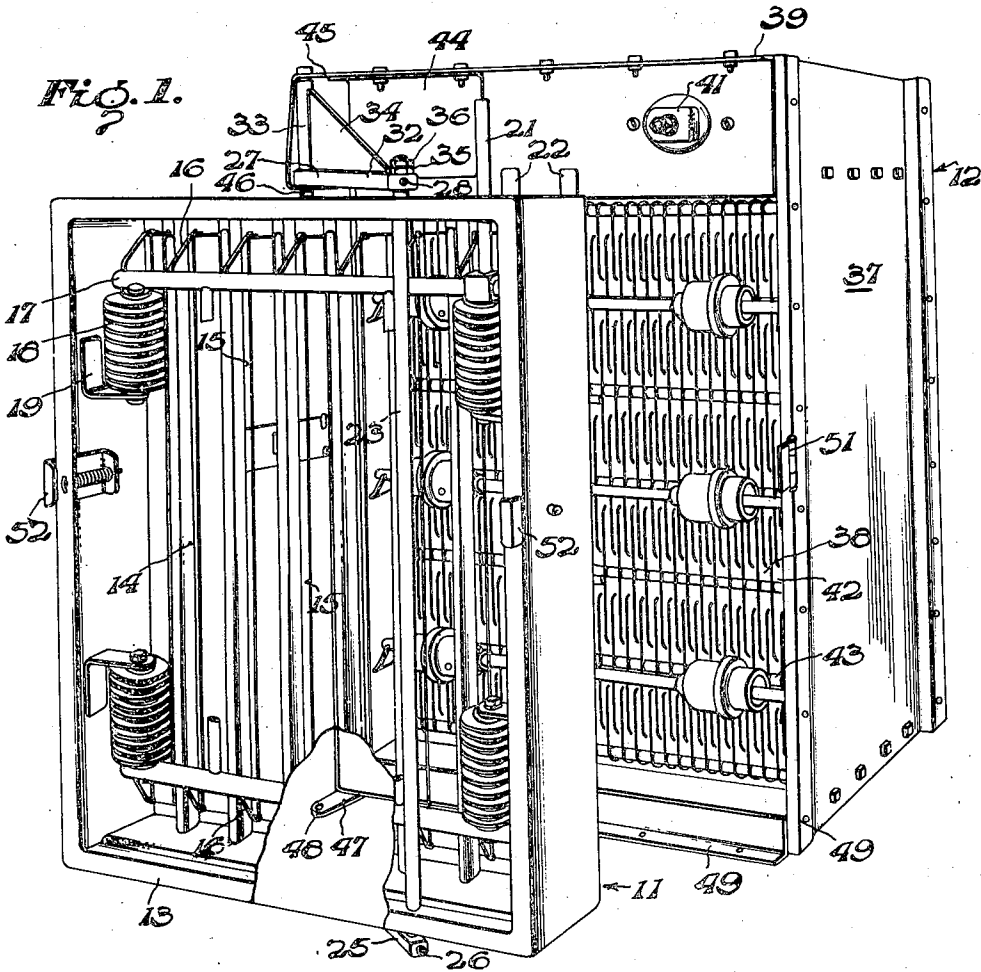
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2,486,521

ELECTRICAL DUST PRECIPITATOR

Filed March 29, 1946

2 Sheets-Sheet 1



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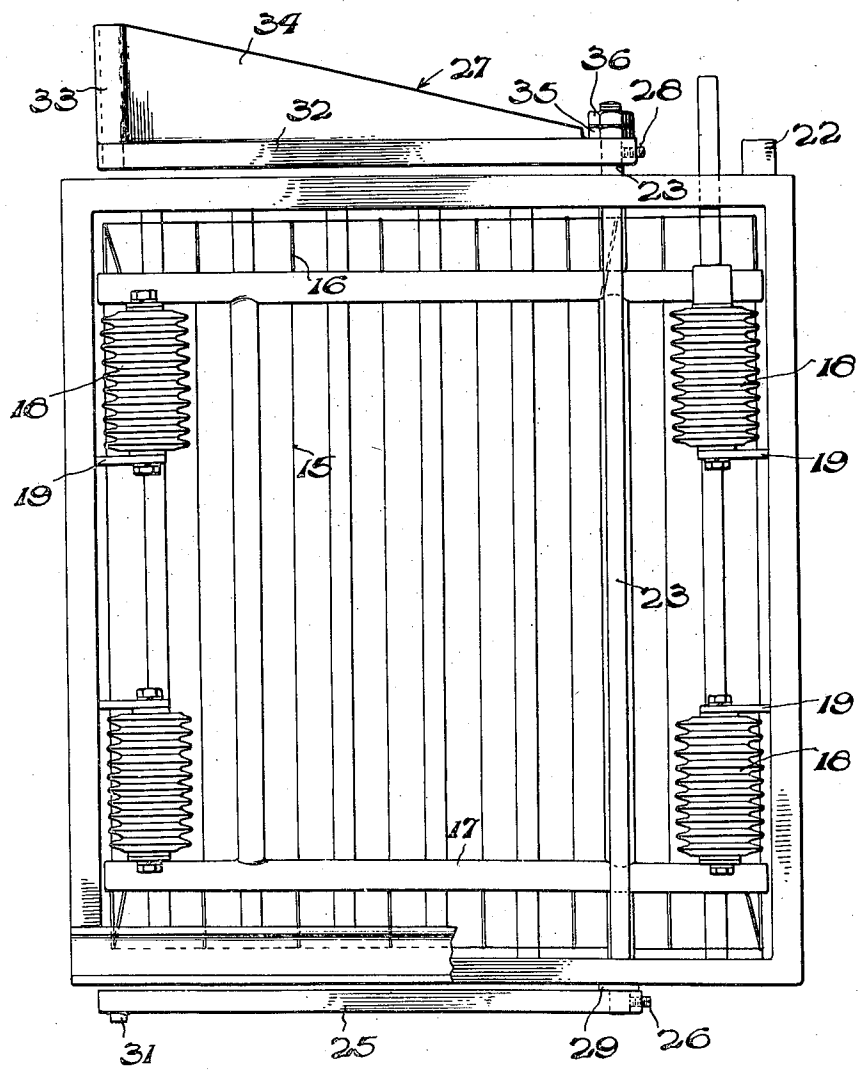
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FIG. 2.



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## UNITED STATES PATENT OFFICE

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## ELECTRICAL DUST PRECIPITATOR

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9 Claims. (Cl. 183—7)

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This invention relates to an electrical dust precipitating unit, and more particularly to the ionizer assembly thereof.

Electrical dust precipitating units of the type disclosed herein are usually mounted in combination with air conditioning units and in combination with air conduits rendering them difficult of access. With the advent of the removable unit electrode assembly of the type disclosed in my copending application S. N. 591,283, filed May 1, 1945, wherein the electrode assemblies are designed to be bodily removed through an end of the precipitator housing for cleaning and replacement, the problem of access becomes even more important. The problem of access to the ionizer is also important as the electrodes thereof require cleaning at intervals and the ionizing wires require replacement. For efficient operation, it is necessary that the ionizer be mounted closely adjacent the precipitating unit. This close relation coupled with the combination of all elements within relatively confined air conduits further increases the problem.

As a solution to the above problem, it is an object of my invention to provide an electrical dust precipitating unit wherein all the several elements thereof are readily accessible for both the repair and replacement of parts.

A further object of my invention is the provision of a novel ionizer construction in combination with a precipitator cell of the type employing bodily removable plate electrode assemblies wherein the ionizer can be readily displaced from its operative position to a position enabling access to and removal and replacement of the electrode plate assemblies.

Further objects and advantages will appear from the following description taken in connection with the attached drawings wherein:

Fig. 1 is a perspective of an electrical dust precipitating unit embodying the present invention wherein the ionizer is shown in a position displaced from its operative position.

Fig. 2 is a front elevation of the ionizer showing the pivotal supporting means therefor.

Fig. 3 is a diagrammatic plan of the unit in operative position.

Fig. 4 is a view similar to Fig. 3, showing the ionizer in one access position in full lines and in another access position in broken lines.

Referring to Fig. 1, the unit includes an ionizer 11 and a precipitating cell 12. The ionizer includes a generally rectangular frame 13 supporting a plurality of electrodes 14 with relatively fine ionizing wires 15 therebetween. Wires 15 are stretched between the heavier wires 16 mounted on bus bars 17, supported in turn on insulators 18, the latter being supported on the frame 13 by brackets 19. The ionizing wires are thus insulated from frame 13, a charge being imparted

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thereto through a conductor rod 21 extending from the top of the frame and protected during displacing of the ionizer by lugs 22 secured to the top of the frame.

A supporting pivot rod 23 extends vertically through suitable apertures in the top and bottom of the frame and is secured to a lower laterally extending arm 25 through an aperture in the arm and a set screw 26 and to an upper laterally extending arm 27 having an aperture therein and a set screw 28. The pivot rod apertures in the frame are of a size permitting the rod to rotate therein as a pivot. A washer 29 is inserted between arm 25 and the bottom face of frame 13, the opposite end of the arm being provided with a downwardly extending pin 31.

The upper arm 27 is formed of a horizontally extending section 32, apertured at one end to receive rod 23 and formed at the opposite end with an upwardly extending tubular section 33, a bracing web 34 being connected to both sections 32 and 33. Members 32, 33 and 34 are preferably formed as one piece or secured together as by welding to provide a rigid structure.

A securing nut 35 plus a lock nut 36 is threaded onto the upper end of rod 23. With this arrangement, the entire weight of the ionizer is borne by arm 27 through pivot rod 23, washer 29 and arm 25 serving only as a guide or aligning means as later explained. By reason of the set screws 26 and 28 which secure the pivot rod 23 to the arms in a manner to prevent its rotation, there is no twisting of the rod or consequent distortion of the ionizer frame.

The precipitator cell 12 includes a generally rectangular housing 37 with an open-ended section 38 and an upper housing 39 for housing a power pack, a wiring tunnel and related equipment (not shown). A contact clip 41 extends from housing 39 for contact with rod 21.

Section 38 of the cell may be formed as an integral unit with a fixed or removable electrode assembly or assemblies therein or may be provided with tracks for the reception of a plurality of electrically opposite plate electrode assemblies in the manner and of the type disclosed in my above identified application, reference being made thereto for a more complete description. It is believed sufficient for the present invention to state that the electrodes usually comprise a grounded set 42 and a charged set 43, the plates thereof being interleaved in the path of gas flow. However it is to be understood that my invention is also adapted for use with other types of precipitator or collecting cells.

An outwardly extending bracket 44 is welded or otherwise secured to housing 39 adjacent one side thereof, the extending legs 45 thereof being spaced apart to receive tubular section 33 and the adjacent end of portion 32 of arm 27, legs 45 being

apertured and connected by a pivot 46 extending through the aperture and the included portions of the arm 27. An extending bracket 47 is provided on the lower end of cell 37 with an aperture 48 in vertical alignment with the apertures in bracket 44 to receive pin 31.

With the lower and upper arms 25 and 27 mounted in their respective brackets, the ionizer can be swung into its operative position in the path of gas flow as shown in Fig. 3. To insure its proper position and to prevent undesirable leakage of gas around the ionizer cell, flanges 49 are preferably provided on the cell to aid in the proper positioning of the ionizer and assist in the sealing. The ionizer may be secured in the operative position by suitable fastening means preferably of the latch type as shown at 51 and 52.

In the disclosed arrangement the ionizer is mounted for revolution about pivot 46 and for rotation about pivot rod 23, enabling easy access to both sides of the ionizer and the adjacent end of the cell. In the position shown in Fig. 3, the bus bar side of the ionizer is accessible. In the position shown in Fig. 4 in broken lines, the electrode side is accessible. If it is desired to remove the electrode plate assemblies from the interior of the cell, the ionizer can be moved to the position shown in full lines in Fig. 4 or in some other position out of the way. This accessibility to both the ionizer and the cell is possible even in a relatively narrow and restricted conduit because of the many possible positions of the ionizer.

It will be noted that rod 23 is not positioned at the center of the ionizer but to one side of the center so that the length of arms 25, 27 between their pivot centers is in excess of one-half of the width of the ionizer. Preferably pivot 23 is positioned from the closest end of the ionizer frame a distance equal to about 40% of the width of the frame. This offset of the pivot has been found to increase greatly the flexibility of position of the ionizer.

From the foregoing, it will be seen that I have provided a relatively compact assembly that is both rugged and strong, yet easily accessible for necessary replacement and repair. The structure by which this is accomplished is simple and does not require lifting of the relatively heavy ionizer.

Having described my invention, I claim:

1. An electrical dust precipitating unit, comprising: an open-ended precipitator cell having a passage for the flow of gas therethrough; an open-ended ionizer operatively positioned to extend transversely across the upstream open end of the cell in closely adjacent relation thereto so that the gas flow passes successively through both; and means to support the ionizer for movement bodily from its transverse operative position to an inoperative position in which it extends longitudinally along one side of the gas flow at a substantial distance in advance of the upstream end of the cell so as to permit access to said cell.

2. The unit of claim 1 wherein the supporting means includes: a cell supported pivot having an axis about which the ionizer may be swung bodily into and out of its operative position; and an ionizer supported pivot having an axis about which the ionizer may be turned when swung out of its operative position.

3. The unit of claim 2 wherein the cell supported pivot is located on the same side of the gas flow as the ionizer in its inoperative position.

4. The unit of claim 2 wherein the ionizer supported pivot is offset from the center of the ionizer toward that side of the ionizer, which, in its operative position, extends along the other or opposite side of the gas flow.

5. The unit of claim 2 wherein: the cell supported pivot is located along said one side of the gas flow; the ionizer supported pivot is offset from the center of the ionizer toward that side of the ionizer, which, in its operative position, extends along the other or opposite side of the gas flow; and an arm is provided extending from one pivot to the other and pivotally connected to both.

6. The unit of claim 5 wherein: said cell supported pivot and arm extend above the ionizer and the ionizer supported pivot projects upwardly from upper end of the ionizer; and corresponding cell and ionizer supported pivots and connecting arm are provided at the bottom of the ionizer for guiding purposes.

7. An electrical dust precipitating unit, comprising: an open-ended precipitator cell having a passage for the flow of gas therethrough; an open-ended ionizer operatively positioned to extend transversely across the upstream open end of the cell in abutting relation thereto so that the gas flow passes successively through both; a bracket secured to the upper end of the cell to extend upstream over the top of the ionizer along one side of the gas flow; a vertically arranged pivot secured to the bracket; another pivot secured to the ionizer to extend upwardly from the top of the ionizer at a point offset from the center of the ionizer toward the opposite side of the gas flow; and an arm extending from one pivot to the other and connected to both for swinging movement about the axis of the bracket pivot; said bracket, pivots and arm being constructed and arranged to support said ionizer for movement bodily from its transverse operative position to an inoperative position in which it extends longitudinally along said one side of the gas flow at a substantial distance in advance of the upstream end of the cell so as to permit access thereto.

8. The unit of claim 7 wherein: said bracket supported pivot provides an axis about which the ionizer may be swung bodily into and out of its operative position; and said ionizer pivot provides an axis about which the ionizer may be turned when swung out of its operative position.

9. The unit of claim 8 wherein an ionizer guide means is provided comprising: a cell supported bracket positioned to extend forwardly from the cell underneath the ionizer in alignment with the first-mentioned bracket; an ionizer pivot positioned to project downwardly from the bottom of the ionizer in alignment with the first-mentioned ionizer pivot; and a guide arm pivotally connected to the bottom ionizer pivot and also to the bottom bracket for swinging movement about a bottom bracket axis which is aligned with the axis of the upper bracket pivot.

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