United States Patent

Testone

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[54] IONIZED AIR PROJECTOR

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[52] **U.S. Cl.**.....**317/4**, 317/2 F, 250/49.5 GC

[51] **Int. Cl.**.....**H05f 3/06**

[58] **Field of Search**.....317/2 F, 4, 262 A; 250/49.5 TC; 313/325

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Assistant Examiner—Harry E. Moose, Jr.
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[57] **ABSTRACT**

Apparatus for projecting ionized air comprising a conductive tube connected to an air source and to an AC source, and having a row of extending points, beside which are air discharge passages; a grounded conductive shield around the tube has opposed rows of air inlet and outlet apertures, the former receiving the ends of the points.

9 Claims, 3 Drawing Figures

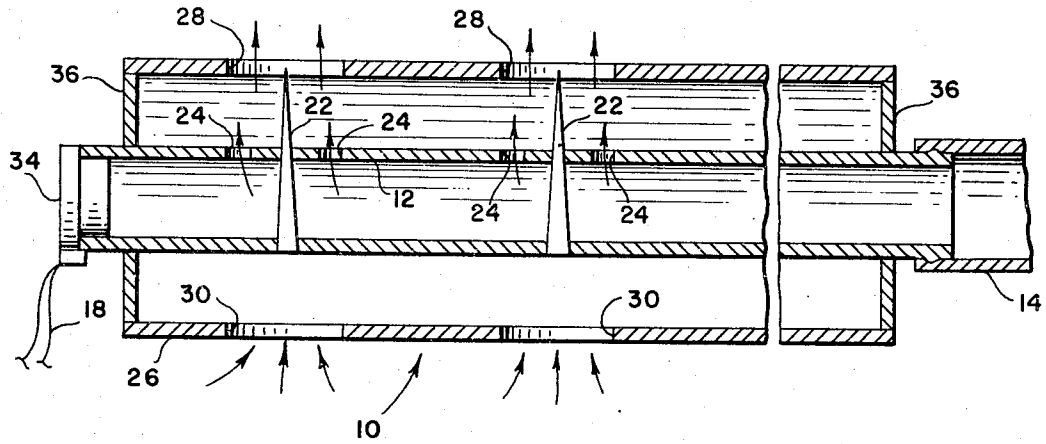


FIG. 1

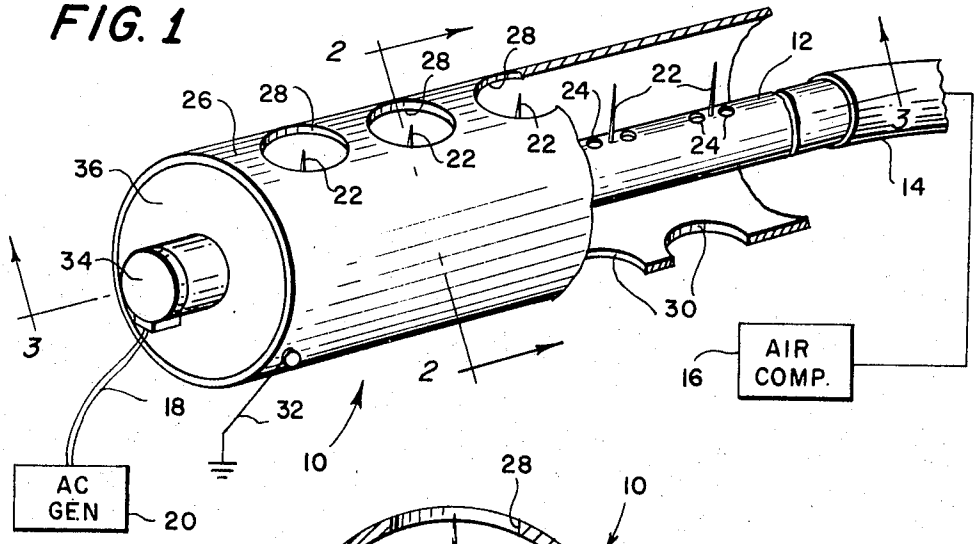
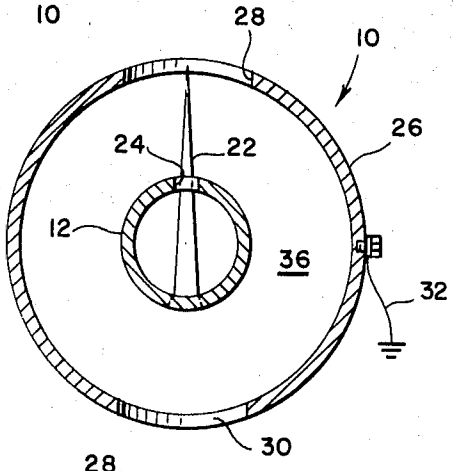


FIG. 2



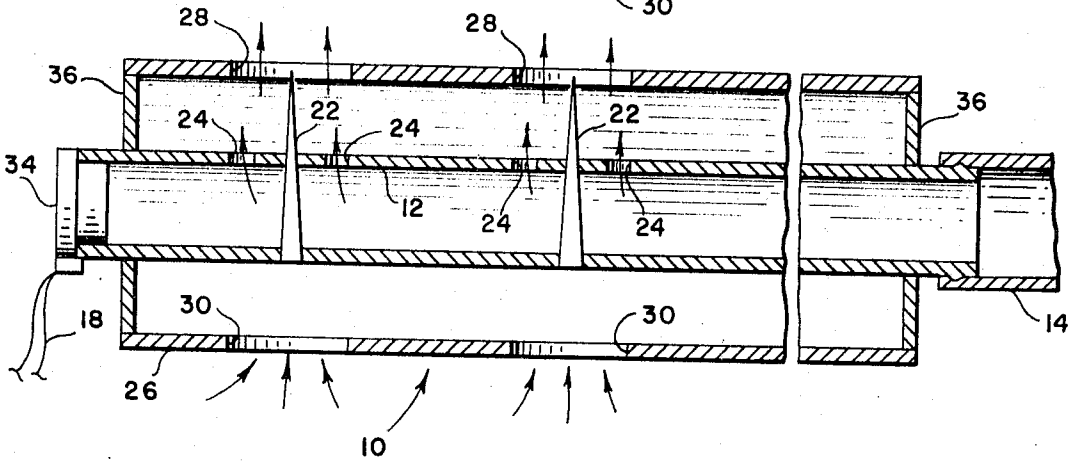


FIG. 3

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IONIZED AIR PROJECTOR

BACKGROUND OF THE INVENTION

The present invention relates to a device for projecting a stream of ionized air, air being ionized and then carried along by a stream of air under pressure.

In many industries, such as the plastic industry, the printing industry and the paper converting industry, static electricity is generated by the machinery being used and/or the work material, and has a deletorious effect upon the operation of such machinery. To overcome this, devices have been provided to reduce or eliminate the static electricity and among the devices for this purpose are so-called static eliminators, these being devices for generating a stream of air which includes ionized air. The ionized air is generated in these devices by the application of relatively high-voltage alternating current electricity to a structure including a series of ionizing points. Where it is desired to eliminate static at a particular location, or in a particular region, the ionized air which is generated is blown by a compressed airstream in the desired direction. Devices of this nature which have been previously used have either not provided for the projection of the ionized air, or where a barlike structure was provided for ionizing, the air for conveying the ionized air was obtained from an exterior compressed air tube positioned so as to direct compressed air tangentially to the ionizing apparatus. Such a construction was unwieldy, costly to manufacture, and was difficult or impossible to position in much existing machinery with which it was intended to be used.

Among the objects of the present invention are to provide an ionized air projector of barlike configuration which is economical to manufacture, which can be positioned in relatively small spaces within existing machinery, which will project ionized air at a considerable distance in order to eliminate static electricity, and which is efficient and reliable in operation.

SUMMARY OF THE INVENTION

An apparatus is provided for ionizing air and for projecting the ionized air in a carrier airstream. An inner tube of conductive material has a row of spaced, generally outwardly extending ionizing points, which are preferably radially extending from the tube. Air passages are provided adjacent each of the points, and the tube is closed at one end, being connected to a source of compressed air at the other end, so that compressed air enters the tube and leaves through the small air passages, one of which lies on either side of each of the ionizing points. The tube is provided at its other end with a connection to a source of high-voltage alternating current. Annular insulators on the tube support an outer shield of conductive material, which is connected to ground. This shield has a first row of air outlet apertures, each ionizing point terminating substantially at the center of each aperture. A row of air inlet apertures is provided, the apertures of the two rows being diametrically opposed.

DESCRIPTION OF THE DRAWING

FIG. 1 is a perspective view, with parts broken away, of an ionized air projector in accordance with the present invention.

FIG. 2 is a cross-sectional view taken on the line 2—2 of FIG. 1.

FIG. 3 is a cross section view taken on the line 3—3 of FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings, wherein like or corresponding reference numerals are used to designate like or corresponding parts throughout the several views, there is shown in FIG. 1 an ionizing projector 10 of generally barlike, elongate configuration. The projector 10 comprises an inner tube 12 of conductive material connected at one end with a conduit 14 which leads from a source of compressed air 16. The other

end of tube 12 is connected by a lead 18 to a high-voltage alternating current generator 20. As may be seen in FIG. 1, tube 12 has a plurality of ionizing points 22 extending therefrom. The points 22 are in a row, and are axially spaced along the tube 12. Air passages 24 extend through the wall of tube 12 (see also FIG. 2).

Supported in surrounding relationship to the tube 12 is a shield 26 of generally tubular configuration, shield 26 having a first row of air outlet apertures 28 and a second row of air inlet apertures 30. Shield 26, which is of generally tubular configuration, has a conductor 32 secured to it, which is connected with ground.

Referring now to FIG. 2, there may be seen the conductive tube 12 and an ionizing point 22, which may be seen to have its head pressed into an opening in the wall of tube 12, and its point or terminal end in the air outlet aperture 28 in tubular shield 26. An air passage 24 may be seen to be adjacent the ionizing point 22, and as indicated, in its preferred form, the axis of ionizing point 22 is coincident with the axis of air outlet aperture 28 and air inlet aperture 30. Further, the axis of each of the air passages 24 is substantially parallel to the axis of ionizing point 22.

Referring now to FIG. 3, the tube 12 will be seen to be closed at its end opposite the end connected with conduit 14 by a suitable plug 34. Inwardly of the plug 34 and conduit 14 are annular insulator discs 36, of which a plurality may be used, as deemed necessary, in accordance with the length of the projector 10.

Also to be seen in FIG. 3 are arrows representing the issuance of air from the tube 12 through the air passages 24, that air, being under compression, issuing at relatively high velocity generally radially of tube 12 and carrying ions generated at the points 22 outwardly of the projector 10 through the air outlet apertures 28 in the tubular shield 26. Due to the high velocity of the air issuing through the air passages 24, air will be drawn into the space between the tube 12 and the shield 26, through the air inlet apertures 30, which may be seen to be in radial alignment with the air outlet apertures 28, respectively.

Ionized air generated at the several-ionizing points 22 is projected radially outwardly of the projector 10, and the ionized air will carry for a relatively great distance, distances of approximately 5 feet being obtained thereby achieving significantly good results of static elimination.

The ionized air projector of the present invention may be made in various diameters and in various lengths, the diameter of tube 10 being conventionally three-fourth inch to 1 inch and the voltage of the alternating current may be in the range between 3,000 and 7,000 volts. The voltage will vary depending upon such parameters as the diameter of the tube.

There has been provided an economical and efficient ionized air projector. The ionized air projector in accordance with the present invention is capable of being used in a wide variety of installations, and occupies a minimum of space while having the ability to project ionized air over a relatively great distance for the efficient and effective removal of static electricity from machinery and material. The utilization of the inner tube for both current conduction and the passage of compressed air provides an easily placed ionizing air projector, and the orientation of the ionizing points, the air passages and the air inlet and outlet apertures relative to each other provides for effective ionized air generation and projection.

It will be obvious to those skilled in the art that various changes may be made without departing from the spirit of the invention and therefore the invention is not limited to what is shown in the drawings and described in the specification but only as indicated in the appended claims.

I claim:

1. Apparatus for projecting ionized air comprising:

a tube of conductive material having a series of ionizing points extending therefrom;

means for connecting said tube with a source of compressed air and with a source of alternating current;

air passage means extending through the wall of said tube for directing air generally along said points;

grounded shield means of conductive material about said tube and having outlet apertures for air from within said tube;

each said point terminating substantially within a said aperture; and

additional aperture means for admitting atmospheric air into the space between the tube and shield.

2. The apparatus of claim 1, and insulating means supporting said tube and shield means in spaced relationship.

3. The apparatus of claim 1, said points being in a line and, axially spaced along said tube.

4. The apparatus of claim 3, there being at least two said air passages between each two points.

5. The apparatus of claim 1, the axes of said points, said apertures and said air passage means being substantially parallel.

6. The apparatus of claim 1, said additional aperture means comprising inlet apertures in said shield means.

7. The apparatus of claim 1, said inlet apertures being in a row and said outlet apertures being in a row, the apertures of one row being diametrically opposite the apertures of the other row.

8. The apparatus of claim 7, wherein the axes of said points, said apertures and said air passage means are substantially parallel.

9. Apparatus for projecting ionized air comprising:

a tube of conductive material,

a tubular shield of conductive material surrounding said tube, said shield having a first series of radially extending apertures therein, and a second series of apertures each diametrically opposed to an aperture of said first series,

insulator means mounting said tube substantially concentrically within said shield,

a row of points electrically connected with said tube and extending therefrom, said points being axially spaced along said tube and each terminating substantially within a said aperture of said first series,

air passages extending through said tube and directed generally toward the apertures of said first series,

said tube having one end closed and having at the other end means for connection to a source of air under pressure,

means for connecting said tube to a source of alternating current, and

means for grounding said shield.

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