Aug. 20, 1935. R. J. McRAE 2,012,015

DEMOUNTABLE IONIZING DEVICE

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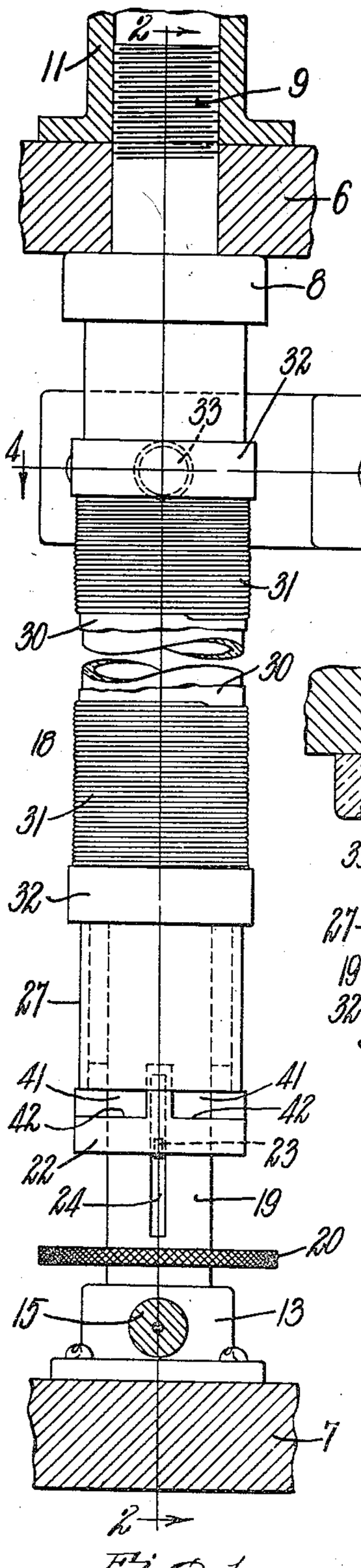

Fig. 1.

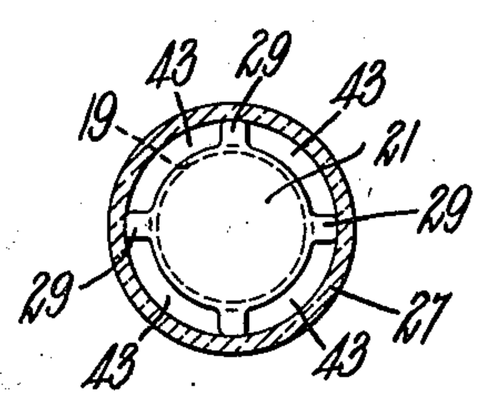

Fig. 3.

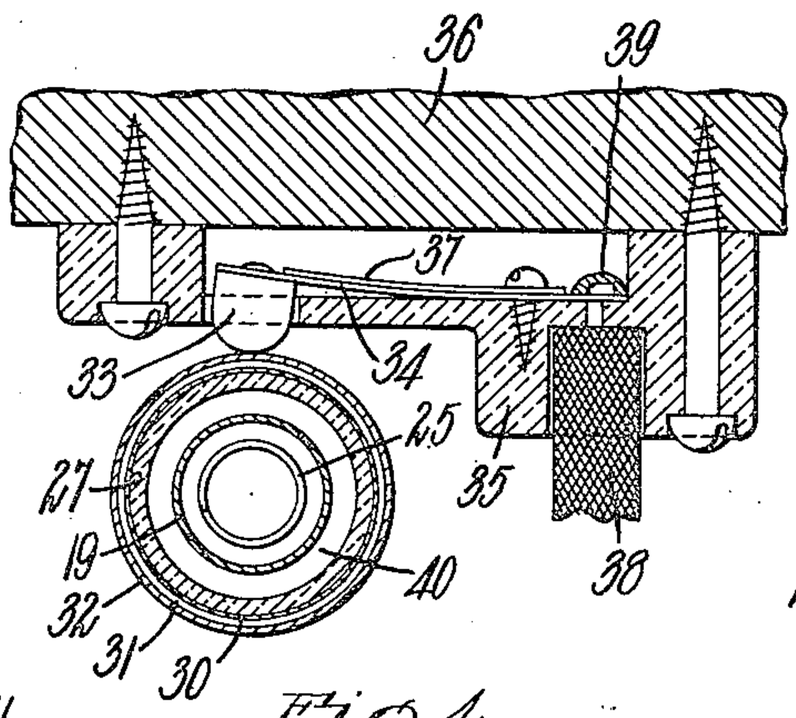

Fig. 4.

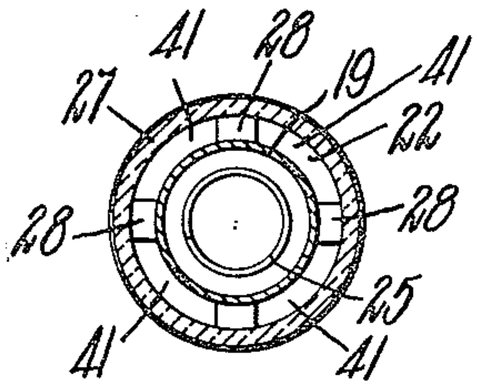

Fig. 5.

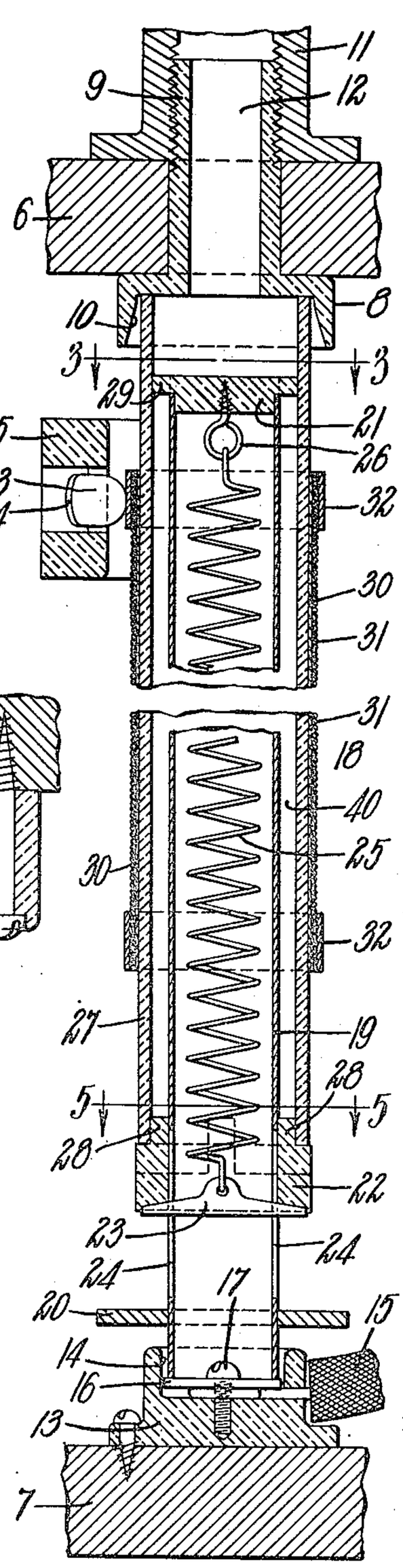

Fig. 2.

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DEMOUNTABLE IONIZING DEVICE

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7 Claims. (Cl. 204—32)

This invention relates to a demountable ionizing device and has for its object to provide an ionizing device of novel structure which may be easily and quickly attached to or detached from its retaining structure without danger of breaking the dielectric tube thereof, providing the user exercises reasonable care.

Another object of the invention is to provide a novel structure whereby the ionizing device may be interposed in the electric circuit of which it forms a part without it being necessary to use tools of any form, make any adjustments therein, or connect any electric conductors thereto, the actual electric connections or disconnections being made automatically when the device is inserted in or removed from its supporting structure.

The invention consists in a demountable ionizing device as set forth in the following specification and particularly as pointed out in the claims thereof.

Referring to the drawing:—

Fig. 1 represents a front elevation of an ionizing device embodying my invention, the central portion thereof being broken away to save space in the drawing and the retaining members therefor being illustrated in section.

Fig. 2 is a vertical longitudinal section taken on the line 2—2 of Fig. 1, looking in the direction of the arrows on said line.

Fig. 3 is a detail horizontal section taken on the line 3—3 of Fig. 2.

Fig. 4 is a detail horizontal section taken on the line 4—4 of Fig. 1.

Fig. 5 is a detail horizontal section taken on the line 5—5 of Fig. 2.

Like numerals refer to like parts throughout the several views of the drawing.

In the drawing, 6 and 7 represent upper and lower retaining members for the device of this invention, the member 6 being the shelf portion of a cabinet in which the device is located and the member 7 being the bottom of said cabinet. Mounted in the retaining member 6 is a positioning member or socket 8 constructed of insulating material and having a shank portion 9 embodied therein and being recessed at 10 upon its under side. The shank portion 9 extends upwardly through the upper retaining member 6 and is connected in any suitable manner to a conduit 11 by means of which the ionized gases generated in the device are conducted to any suitable point. A passage 12 extends through the member 8.

Mounted upon the lower retaining member 7 in axial alignment with the positioning member 8 is a positioning member or socket 13 constructed of insulating material. A recess 14 is provided in the upper surface of the socket 13 and an electric conducting wire 15 terminates in this recess beneath and in contact with an electric contact member 16, said wire and contact member being secured in unison to the socket 13 by means of a screw 17. Yieldingly interposed between the sockets 8 and 13 is an ionizing device 18 having a tubular metallic electric conducting member 19 embodied therein, the lower extremity of which rests upon and makes electric contact with the contact member 16. A finger piece 20 is rigidly secured to the conducting member 19 at a point thereon adjacent to its lower end.

Mounted in the upper extremity of the conducting member 19 is a spacing member 21 constructed of insulating material. Mounted upon the periphery of the conducting member 19 at a point adjacent to its lower extremity and just above the finger piece 20 is a spacing member 22 also constructed of insulating material. The spacing member 22 rests upon and is supported by a member 23 which is mounted in slots 24 provided in the conducting member 19, said spacing member 22 resting upon the portions of said supporting member 23 which project outwardly through said slots. The supporting member 23 for the positioning member 22 is in turn supported from the upper positioning member 21 through the medium of a coil spring 25, the lower extremity of which is attached to the member 23 and the upper extremity of which is connected to a screw-eye 26 mounted in the positioning member 21.

A dielectric tube 27, preferably composed of a high-melting point low-expansion glass, is supported and positioned at its lower extremity upon the spacing member 22 in axial alignment with the tubular electric conducting member 19. At its upper extremity the dielectric tube 27 is positioned in spaced relation to the electric conducting member 19 by means of the spacing member 21. Projections 28 and 29 are provided upon the spacing members 22 and 21 respectively for the purpose of holding the dielectric tube 27 and electric conducting member 19 in spaced relation to each other. Located upon the outer surface of the dielectric tube 27 is a layer of metallic foil 30, around which is wound a coil or ribbon of wire 31. The wire 31 is preferably wound around the metallic foil 30 while the wire is hot, thereby obtaining a tight fit when the wire cools. Preferably, also, the cross-sectional area of the wire 31 is greater than the cross-sectional area of the metallic foil 30.

Metallic bands 32 are provided at the upper and lower end portions of the coil 31 and said bands are spaced at equal distances from the upper and lower extremities of the dielectric tube 27 in order that said tube may be mounted in a reversed position upon the conducting member 19 if desired. The upper metallic band 32 is adapted to make an electric contact with a contact member 33 which is mounted upon a spring 34 in turn secured to an insulating block 35 fastened to a supporting structure 36 which constitutes a side wall of the cabinet in which the device is mounted. A second spring 37 is provided for the purpose of reinforcing and stiffening the spring 34. An electric wire 38 is connected to the spring 34 at 39 completing the electric connection to the contact member 33. The electric wires 15 and 38 lead to the secondary coil of a step-up transformer well known to those skilled in the art.

In the operation of the device a voltage difference is created between the metallic conducting member 19 and the metallic foil 30 and coil of wire 31 thereon, and when this voltage difference is sufficiently high a brush discharge will pass across the annular space 40 separating the conducting member 19 and tube 27 and ionize the air therein by flow therethrough. The air to be ionized enters the annular space 40 through spaces 41 provided between the lower extremity of the dielectric tube 27 and a surface 42 provided upon the spacing member 22 between the projections 28 thereof. After being ionized in the annular space 40 the gases pass outwardly from said annular space at the top thereof through spaces 43 provided in the upper spacing member 21 between projections 29 thereof. The gases then pass into the conduit 11.

When it is desired to attach the ionizing device 18 to its retaining members, the electric conducting member 19 is inserted in the socket 13 with the lower end of said conducting member resting upon the electric contact member 16. The dielectric tube 27 is then grasped and pushed downwardly upon the conducting member 19 against the tension of the spring 25 until the upper extremity of said tube clears the lower edge of the flange of the socket 8. Upon being released, the spring 25 will force the upper extremity of the dielectric tube into contact with the bottom of the recess 10 of the socket 8 and thereafter hold said upper extremity of said tube in yielding engagement with said socket 8. At this time also the lower extremity of the electric conducting member 19 is in yielding engagement with the contact member 16. At the same time that the ionizing device 18 is placed in position in the sockets 8 and 13 the upper band 32 will engage the yielding electric contact member 33. The electric connections, therefore, to the ionizing device are made automatically when said device is placed in its supporting sockets without it being necessary to use any tools, make any adjustments, or connect any electric wires to said device.

After the ionizing device has been removed from its retaining structure, the tubular electric conducting member 19 may be removed from within the dielectric tube 27 and all the various parts thereof cleaned, or said parts may be replaced easily and quickly when necessary, without it being necessary to obtain the service of a skilled mechanic.

I claim:

1. The combination with spaced apart retaining members, of a socket for each of said members, an electric contact member mounted on one of said sockets, a tubular electric conducting member seated in the socket with said contact member and contacting therewith, a yielding electric contact member, a dielectric tube slidably mounted upon and surrounding said conducting member, a spring mounted within said tubular conducting member and operatively connected to said dielectric tube, whereby the latter is held in yielding engagement with the other of said sockets, and an electric conducting member surrounding said dielectric tube and contacting with the yielding electric contact member.

2. The combination with spaced apart retaining members, of a socket for each of said members, an electric contact member mounted on one of said sockets, a tubular electric conducting member seated in the socket with said contact member and contacting therewith, a yielding electric contact member, a spacing member slidably mounted upon the electric conducting member, a spring within said electric conducting member and yieldingly supporting said spacing member, a dielectric tube seated upon said spacing member, said spacing member and tube being adapted to yield axially with said spring upon the electric conducting member and said tube being adapted to yieldingly engage the other of said sockets, and an electric conducting member surrounding the dielectric tube and contacting with the yielding electric contact member.

3. The combination with axially aligned sockets, of an electric contact member mounted upon one of said sockets, a tubular electric conducting member positioned at one extremity thereof in engagement with said electric contact member, another electric contact member positioned adjacent to the other of said sockets, a spacing member slidably mounted upon the exterior of said conducting member, another spacing member at the outer extremity of said conducting member, a spring extending through said tubular conducting member and yieldingly connecting said spacing members together, a dielectric tube spaced apart from said electric conducting member by said spacing members and yieldable axially in unison with said first-named spacing member and relatively to the conducting member to yieldingly engage the last-mentioned socket, and a coil of wire mounted upon the dielectric tube and electrically connected to the second-named electric contact member.

4. The combination with axially aligned sockets, of an electric contact member mounted upon one of said sockets, a tubular electric conducting member positioned at one extremity thereof in engagement with said electric contact member, a yieldable electric contact member positioned adjacent to the other of said sockets, a spacing member slidably mounted upon the exterior of said conducting member, another spacing member seated at the outer extremity of said conducting member, a spring extending through the conducting member and yieldingly connecting said spacing members together, a dielectric tube seated upon said slidable spacing member and also slidable upon said second-named spacing member and spaced apart from said conducting member by both of the spacing members, said dielectric member yieldingly engaging the other of said sockets, and a coil of wire surrounding the dielectric tube and electrically connected to the yieldable electric contact member.

5. An ionizing device comprising, in combina-

tion, an electric conducting member, a dielectric tube slidably mounted upon and surrounding said conducting member and spaced apart therefrom, an electric conducting member wound around said dielectric tube, and a spring operatively connected at its opposite ends to the opposite ends of the first-named conducting member and dielectric tube to force said first-named conducting member and dielectric tube in opposite directions and into yielding engagement with a supporting structure.

6. An ionizing device comprising, in combination, a tubular electric conducting member, a dielectric tube slidably mounted thereon, an electric conducting member upon said dielectric tube, and a spring within said tubular conducting member and operatively connected at its opposite ends to the opposite ends of the tubular conducting member and dielectric tube, whereby said member and tube are forced in opposite directions into yielding engagement with a supporting structure.

7. An ionizing device comprising, in combination, a tubular electric conducting member, a dielectric tube slidably mounted thereon, means to hold said conducting member and tube spaced apart and insulated one from another, an electric conducting member upon the dielectric tube, and a spring extending longitudinally through the tubular conducting member and operatively connected at its opposite ends to the tubular conducting member and dielectric tube, whereby said member and tube are forced in opposite directions into yielding engagement with a supporting structure.

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