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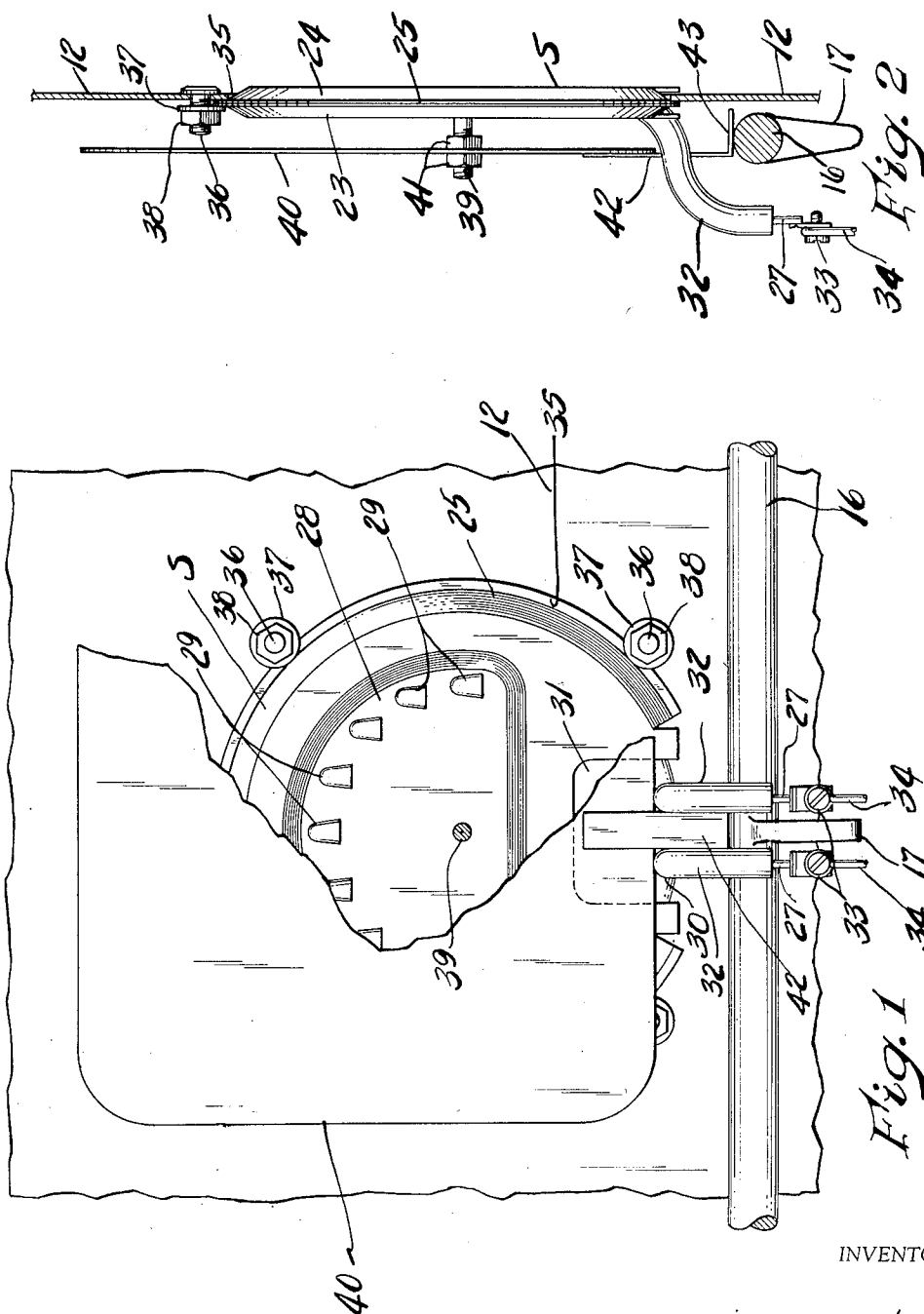
J. W. HEBERT

2,701,294

HEATING UNIT FOR INCINERATORS

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2 Sheets-Sheet 1



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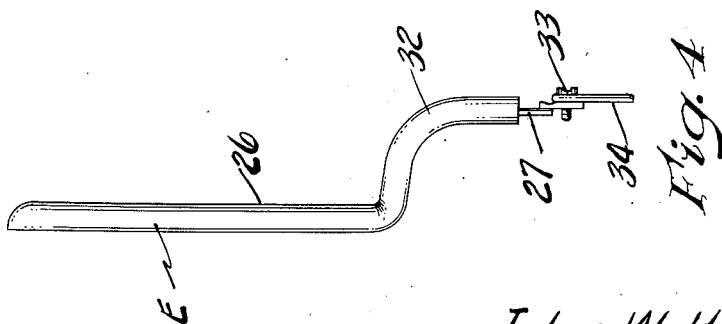
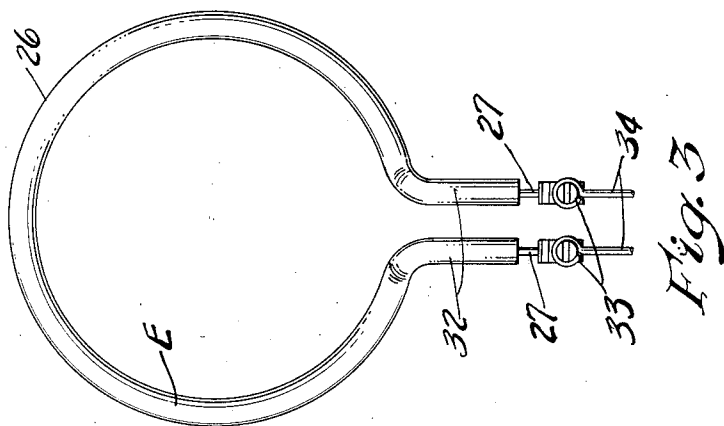
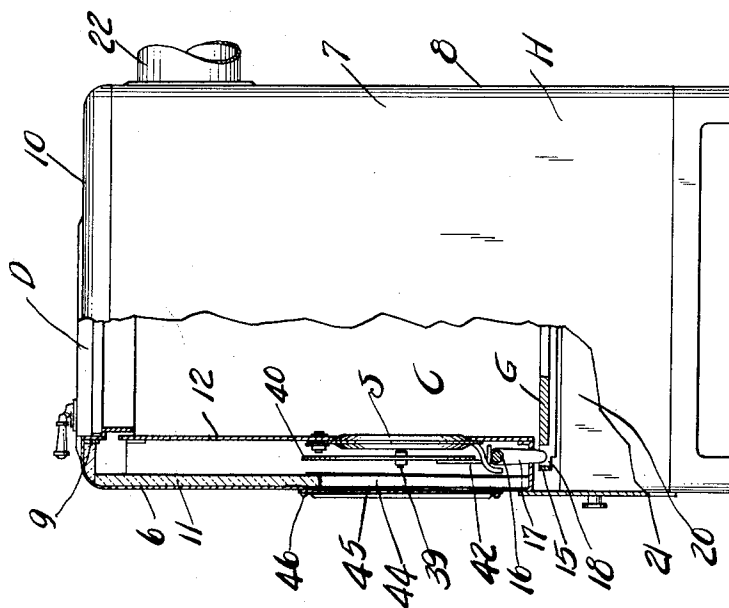
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HEATING UNIT FOR INCINERATORS

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HEATING UNIT FOR INCINERATORS

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Application February 1, 1952, Serial No. 269,515

7 Claims. (Cl. 219—35)

This invention relates to electric heating units and more particularly to heating units of the type used in dehydrating and igniting garbage in garbage disposal incinerators and the like.

One of the primary objects of my invention is to design a heating unit which can be mounted in the wall of the combustion chamber of a downdraft incinerator and thus serve to not only directly dehydrate and ignite the refuse in the charging chamber, but also to pre-heat the incoming air flowing upwardly between the inner and outer walls of the incinerator and thence into the combustion chamber.

Another object of the invention is the provision of a heating device of the type described which includes baffle means for protecting the outer wall of the incinerator from excessive heat radiation at the point of mounting of the device.

A further object of the invention is to provide an electric heater unit which includes a stamped alloy sheath of substantial surface area with a heater element in facial contact therewith, thereby increasing the radiation surface of the unit and contact with the refuse to be burned, as well as the rate at which the heat can be taken from the heater unit.

A further object is to provide a sheath of substantial surface area for the heating element so that the temperature of the heat-emitting surface rises slowly and evenly to ignition temperature, thus providing a dehydrating period for drying and driving off odors gradually, thereby assuring combustion of all materials or refuse in the charging chamber.

A further object still is to provide a sheathed element which makes possible a drying period of varying length, said period being varied by intermittently supplying electric current to the device.

A further object still is to provide means for retaining the free ends of the substantially annular heating element in parallel, spaced relation, thus eliminating the possibility of damaging short circuits.

Another object is to provide an electric heating device which can also be positioned to pre-heat the charging air flowing upwardly between the inner and outer walls of the incinerator, thereby increasing the circulation rate of the air.

A still further object is to provide such a heating device which is easily mountable and demountable in the incinerator, and which is easily accessible for inspection and/or repair should such inspection and repair become necessary.

A still further object is to provide an electric heating unit composed of a minimum number of parts all of which can be easily and economically manufactured and assembled.

Other objects and advantages of the invention will become apparent during the course of the following description wherein:

Fig. 1 is a fragmentary, front elevational view showing my heating unit mounted in the inner wall of the combustion chamber of an incinerator, the baffle plate being broken away to more clearly show the assembly.

Fig. 2 is a vertical, edge elevational view thereof.

Fig. 3 is a face view of the electric heating element only.

Fig. 4 is an edge elevational view thereof.

Fig. 5 is a side elevational view of an incinerator showing my electric heating unit in place therein, parts being broken away to more clearly show the mounting and location of the unit.

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Referring now more particularly to the accompanying drawings in which I have shown one embodiment of my invention, and wherein is shown an incinerator casing H comprising front, side and rear walls 6, 7 and 8 respectively, and having a charging opening 9 in the top 10 thereof, with a hinged door D forming a closure for same.

The walls of the casing are properly insulated with sheet insulation 11, and an inner shell 12 is hung in the casing to form a combustion chamber C in which refuse and garbage (not shown) are placed, said shell being spaced from the walls of the casing H to form air passages therebetween, and a grate G is reciprocatingly mounted on the tracks 14 provided in said casing.

The grate G forms the bottom of the inner shell 12 and is of greater area than the lower open end thereof, said grate being formed with a forwardly projecting lug 15, and for a purpose to be presently described.

A transversely disposed shaker rod 16 spans the casing H, and is journaled in bearings (not shown) provided in the side walls 7, one end of the rod projecting through one of said side walls to accommodate a crank (not shown) as usual.

A depending leg 17 is provided on the shaker rod 16 at a point intermediate its length, the free end of said leg extending into an opening 18 provided in the lug 15 of the grate G, so that the grate may be reciprocated as the shaker rod is actuated.

An opening 19 is provided in the front wall 6 of the casing H, and an ash drawer 20 extends into said opening below the grate G so that ash dislodged from the grate as it is actuated is discharged into said drawer, the front end 21 of said drawer normally forming a closure for said opening. The refuse etc. is fed to the combustion chamber through charging door 11 and air flows upwardly between the outer casing shell and the combustion chamber, thence downwardly over and through the refuse, and thence out through a smoke pipe 22 provided in the rear wall 8 to atmosphere.

The above describes an incinerator such as shown in Patent No. 2,488,405, issued to me under date of November 15, 1949, and I do not deem it necessary to show and describe it in further detail, as the instant invention is directed broadly to the electric heating unit and combination with the incinerator.

The heating unit proper comprises a sheath S formed of substantially disc-shaped plates 23 and 24 respectively, these plates being preferably formed of stainless steel with the outer edges pressed inwardly as at 25, and these edges are welded together with the heating element E interposed between the plates, said element including a tube 26 formed of an alloy of proper characteristics for heat dissipation and corrosion resistance, and co-extensive therewith and embedded therein is a resistance wire 27, the free ends of which extend a predetermined distance from the ends of the tube.

Semi-circular, inwardly pressed areas 28 are provided in each plate as shown, and are disposed in facial contact when assembled, and a plurality of vents or louvers 29 are stamped in said inwardly pressed areas for ventilation and release of excess heat which might otherwise destroy the element. These contacting areas 28 conduct the heat away from the electric element and at greater range than would occur if the heater element were spaced uniformly from the sheath at all points.

An opening 30 is provided in the lower edge of the sheath S and the plate 24 is cut away as at 31 to accommodate the outwardly bent sections 32 of the heating element, which lead downwardly therefrom in spaced-apart relation, as clearly shown in Fig. 4 of the drawings, terminals 33 being provided on the ends of the wire 27 for connection of lead wires 34 which lead to a source of electrical energy.

An opening 35 of substantially the same shape as the sheath S is provided in the wall 12 of the inner shell, and the edge 25 of the heating unit fits the marginal edge of said opening, and is held in place by circumferentially spaced bolts 36, washers 37 being provided on said bolts and overlie the edge 25 of the sheath, and nuts 38 serve to secure the sheath in position.

A threaded post 39 extends outwardly from the face of the sheath S and a baffle plate 40 is mounted on said post

in spaced relation with the sheath and is held in position by means of nuts 41 as usual. This baffle 40 is positioned vertically as shown, and extends into the air space between the casing and inner shell 12, said baffle being of slightly larger area than the sheath, and is designed to reflect heat radiated from said sheath and protect the immediate adjacent area in the outer casing from excessive heat radiation. It is therefore important that the baffle be formed of heat and corrosion resistant metal having proper heat resisting characteristics.

A downwardly depending leg 42 is welded or otherwise secured to the lower edge of the baffle plate 40 and extends between the free projecting ends of the resistance element to retain them in spaced relation and prevent short circuits etc., the free end of said leg being turned as at 43 to eliminate interference with the shaker rod 16.

An opening 44 is provided in the front wall 6 of the casing H to provide easy access to the heating unit, and a plate 45 forms a closure for said opening and can be held in place by screws 46 as usual.

When the heating unit is mounted in position in the shell 12, the inner face thereof will be substantially flush with the inner face of said shell and will be positioned to dehydrate and then ignite any refuse placed in the combustion chamber, and when the unit is energized, it will dry and ignite the refuse and will also pre-heat the air flowing upwardly in the casing between the inner and outer shells and into the combustion chamber, thus assisting in the dehydrating of the refuse and the incineration thereof.

The heating element must transfer sufficient heat to the sheath to bring it to a temperature where it will ignite the material in the charging member. Since the surface area of the sheath is so much greater than that of the heating element, it takes some time to bring the sheath to this temperature, and during this period the refuse in the chamber is thoroughly dried, both by direct radiation from the sheath and its temperature increases, and by the pre-heating of the air circulating through the chamber.

It will thus be seen that I have perfected a very efficient heating unit for incinerators which effectively dehydrates and ignites the refuse as well as preheating the incoming air and with a minimum of current consumption.

It is to be understood that the form of the invention shown and disclosed is to be taken as a preferred embodiment of the invention and that various changes in the shape, size and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claims.

What I claim is:

1. The combination with a downdraft incinerator having inner and outer spaced apart shells, the inner shell having an opening therein, of a heating unit which includes a relatively flat sheath releasably mounted in the opening in the inner shell, with its inner face substantially flush with the inner shell said sheath having inwardly pressed areas covering the greater portion of the faces of the edges of said sheath and said inwardly pressed areas forming a peripheral passage, a heating element mounted in said passage with its free ends projecting outwardly from said sheath for connection to a source of electrical energy, and a baffle plate supported on said sheath and in the space between the inner and outer shell forming a radiating surface for preheating incoming air and protecting the outer shell from excessive heat.

2. The combination with a garbage incinerator having inner and outer spaced apart shells, a heating unit which includes a relatively flat sheath mounted in the inner shell with its inner face substantially flush with the inner face of the inner shell, centrally disposed inwardly pressed sections in said sheath covering substantially the faces thereof and circumferentially spaced louvers provided in said sections, a substantially circular heating unit mounted in said sheath around the inwardly pressed sections with its free ends projecting from the lower end of its sheath and connected to a source of electrical energy, a baffle plate mounted on said sheath and positioned in the space between the inner and outer shell, and a depending leg on said baffle extending between the projecting free ends of the heating element for maintaining them in spaced relation.

3. A heating unit for refuse incinerators comprising a relatively flat sheath adapted to be releasably mounted

in the front wall of the incinerator combustion chamber with its face substantially flush with the inner face of the chamber wall, said sheath comprising a pair of oppositely disposed dished plates with the extreme edges thereof welded together, inwardly pressed, centrally disposed areas covering the greater portion of the faces of the sheath formed in each plate and disposed in facial contact when the plates are assembled, the space between the edge sections and the inwardly pressed areas forming a peripheral passage, said sheath having an opening therein communicating with said peripheral passage, a split annular heating element in said peripheral passage extending but once around said sheath with its free end sections projecting through the opening in the sheath for connection to a source of electrical energy, and circumferentially spaced vents through said inwardly pressed areas for dissipating heat generated therein.

4. The combination defined in claim 1 in which a split annular heating element is provided in said peripheral passage extending but once around said sheath with the free ends thereof projecting from said sheath at contiguous points.

5. The combination with a downdraft incinerator having inner and outer substantially vertically disposed spaced apart shells forming a passage therebetween for air to flow upwardly therethrough, of a sheath mounted in the inner shell, a heating element mounted in said sheath, a laterally extending support on said sheath, and a substantially vertically disposed plate on said support in said passage forming a radiating surface for preheating incoming air and protecting the outer shell.

6. A heating unit for refuse incinerators comprising a relatively flat sheath adapted to be releasably mounted in the front wall of the incinerator combustion chamber with its face substantially flush with the inner face of the chamber wall, said sheath comprising a pair of oppositely disposed dished plates with the extreme edges thereof welded together, inwardly pressed, centrally disposed areas covering the greater portion of the faces of the sheath formed in each plate and disposed in facial contact when the plates are assembled, the space between the edge sections and the inwardly pressed areas forming a peripheral passage, a heating element in said peripheral passage with its free end sections projecting from the sheath for connection to a source of electrical energy, circumferentially spaced vents in said inwardly pressed areas for dissipating heat generated therein, a laterally projecting threaded post extending from the one face of the sheath, and a baffle plate adjustably mounted on said post in spaced relation with the adjacent face of said sheath.

7. A heating unit for refuse incinerators comprising a relatively flat sheath adapted to be releasably mounted in the front wall of the incinerator combustion chamber with its face substantially flush with the inner face of the chamber wall, said sheath comprising a pair of oppositely disposed dished plates with the extreme edges thereof welded together, inwardly pressed, centrally disposed areas covering the greater portion of the faces of the sheath formed in each plate and disposed in facial contact when the plates are assembled, the space between the edge sections and the inwardly pressed areas forming a peripheral passage, a heating element in said peripheral passage with its free end sections projecting from the sheath for connection to a source of electrical energy, circumferentially spaced vents in said inwardly pressed areas for dissipating heat generated therein, a portion of said sheath being cut away and the free ends of the heating element extending laterally from said sheath in parallel, spaced relation, a baffle plate mounted on said sheath and spaced from the adjacent face thereof, and means on said baffle for holding the ends of the heating element in spaced relation.

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