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OIL BURNING APPARATUS
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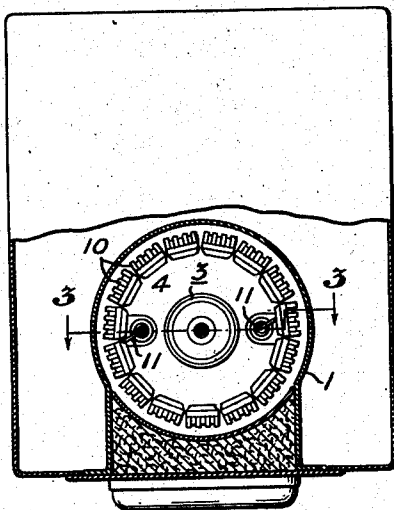


Fig. 1

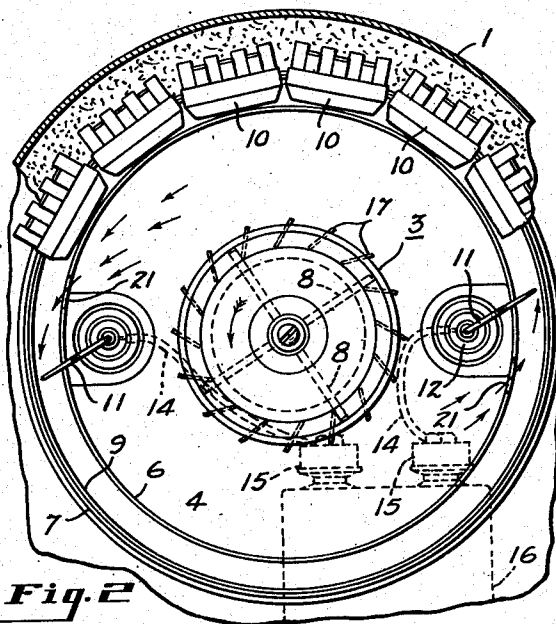


Fig. 2

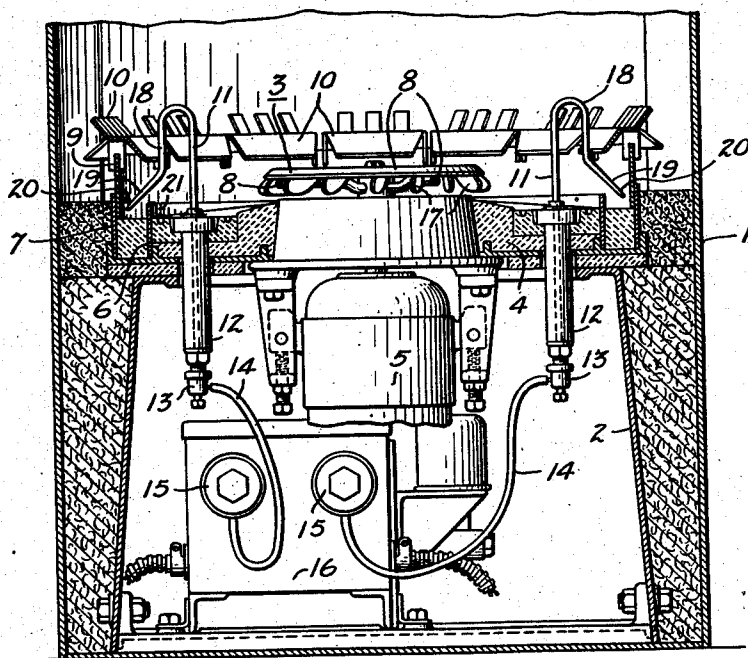


Fig. 3

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OIL BURNING APPARATUS

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8 Claims. (Cl. 158—4)

This invention relates to oil burning apparatus of the rotary type and more particularly to electrical ignition means therefor.

One of the objects of the present invention is to provide new and improved ignition means for oil burning apparatus of the rotary type.

Another object is to provide oil burning apparatus of the so called "wall flame" type in which oil and air are discharged from a rotating distributing device against a substantially endless member spaced from the distributing device; with electrical ignition means of a character which will quickly and efficiently ignite the oil, and which will be free at all times from the formation of carbon deposits.

A further object is to provide rotary oil burning apparatus with spark ignition means of improved construction in which carbon will not form upon the ignition electrodes, and in which the formation of carbon across the spark gap is prevented.

With the above and other objects in view which will be apparent from the following detailed description, the present invention consists in certain features of construction and combinations of parts to be hereinafter described with reference to the accompanying drawing, and then claimed.

In the drawing which illustrates a suitable embodiment of the present invention,

Fig. 1 is a horizontal section through a furnace, taken above the oil burning unit,

Fig. 2 is an enlarged fragmentary plan view of the oil burning unit, showing in greater detail the ignition means and

Fig. 3 is an enlarged vertical section taken substantially upon line 3—3 of Fig. 1.

In oil burning apparatus of the so-called rotary wall flame type, one of the disadvantages of electric spark ignition devices heretofore used is that there is a tendency for carbon to form not only upon the ignition electrode or electrodes, but also across the spark gap. This is highly objectionable, both from the standpoint of inefficient and slow ignition and of explosions which frequently result in carbon deposits on or across the electrodes.

In the present invention, however, the tendency toward carbon formation on the electrodes and across the spark gap is obviated.

Referring to the accompanying drawing in which like numerals refer to like parts throughout the several views, the oil burning apparatus is shown in association with an annular shell 1 which defines a furnace combustion chamber.

The oil burning apparatus, however, forms the subject matter of a copending application Serial No. 95,395, filed August 11, 1936. Briefly this apparatus includes a supporting structure 2 mounted within the furnace or shell 1, which supports a rotary oil and air projecting device 3 disposed above a refractory hearth structure 4, and a driving motor 5 disposed below the hearth structure 4.

Associated with the hearth structure 4 are 10 spaced concentric inner and outer endless members 6 and 7 of heat resistant metal, the inner member 6 being disposed below the path of travel of the oil thrown outwardly by oil discharge tubes 8 carried by the projecting device 15 3. Mounted within the outer member 7, but spaced outwardly of the member 6 is an endless band 9 or ring of heat resistant metal, and supported upon the upper edge of this band are a plurality of metallic directing or deflecting elements 10.

The band 9 in the illustration shown, being of metal, is grounded, and forms one of the electrodes for the ignition device.

As shown more clearly in Fig. 3, the hearth 25 structure 4, carries a pair of substantially diametrically opposed electrodes 11 of heat resistant metal, each of which is vertically disposed and mounted in a non-conductive element 12 carried by the hearth structure 4, and extending 30 below the hearth structure.

The lower ends of the electrodes 11 are provided with connector caps 13 which are connected by means of leads 14 with the terminals 15 of a transformer 16 supported below the hearth 35 structure.

Each electrode 11 extends well above the path of travel of the air being discharged by the fan blades 17 of the distributing device 3 and is provided with a reversely bent portion 18, the end 19 40 of which bends outwardly and extends over the inner endless member 6 and terminates in spaced relation with respect to the flame ring 9. Also, the reversely bent portions 18 of the electrodes are inclined from the vertical in the direction of rotation of the projecting device 3, as indicated in Fig. 2, for a purpose to be later described. As shown in Fig. 3, the tip 20 of the reversely bent portion 18 is disposed slightly below the upper edge of the endless member 6 and between 50 the members 6 and 9, and the member 6 is provided with a notch 21 in advance of each electrode and extending downwardly to the hearth structure 4.

It is to be understood, that one or more elec- 55

trodes 11 may be employed and that they may be of the continuously or intermittently operating type, and, also, that a separate electrode instead of the ring or band 9 may be employed.

5 In any event, the electrode 11 has a portion extending above the path of the air discharged by the projecting device 3 and this portion is, therefore, exposed to the heat of combustion so that it, during operation of the oil burning apparatus, 10 becomes heated to such an extent that any oil which may strike the tip 20 thereof is immediately vaporized, thus preventing the formation of carbon on the tip 20. Also, the ring or band 9 becomes heated to such an extent that the 15 oil which impinges against the same is, during normal operation, immediately vaporized, thus obviating the formation of carbon deposits.

As a further precaution against the formation of carbon deposits across the electrodes, the 20 notches 21 are provided so that a portion of the air discharged by the projecting device 3, which naturally strikes the endless member 6, is allowed to pass through the slot 21 and travel through the space between the members 6 and 9 so that 25 it passes between the electrode 11 and the other electrode, which, in the construction illustrated, is the band 9, with the result that the travel of air therebetween has the tendency of keeping the space, through which the ignition sparks pass, 30 free from carbon deposits. This is also assisted by the fact that the reversely bent portions of the electrodes 11 are inclined from the vertical in the direction of rotation of the projecting device 3 whereby the sparks pass at least partially 35 in the direction of travel of the air between the bands 6 and 9.

Although a single embodiment of the invention has been herein shown and described, it will be understood that numerous modifications of the construction shown may be resorted to without departing from the spirit of this invention 40 as defined in the appended claims.

What I claim is:

1. In an oil burning apparatus for furnaces 45 having a combustion chamber, a hearth element extending across the combustion chamber, a rotary device having a rotary oil and air projecting head disposed above said hearth for projecting oil and air in generally horizontal paths, a substantially endless element extending upwardly 50 from said hearth for intercepting oil and air projected by said head, an ignition electrode having a spark discharge tip disposed adjacent the path of projected oil and spaced from said endless element, and a second element associated 55 with said hearth and extending upwardly therefrom inwardly of said tip in spaced relation with respect to said first element for intercepting a portion of the projected air, the upper edge of said second element being disposed below the 60 path of projected oil and having an opening therein near said electrode tip, whereby a portion of the air intercepted by said second element will flow through said opening into the space between said elements and travel through 65 the space between said spark discharge tip and first element.

2. In an oil burning apparatus for furnaces 70 having a combustion chamber, a hearth element extending across the combustion chamber, a rotary device having a rotary oil and air projecting head disposed above said hearth for projecting oil and air in generally horizontal paths, a substantially endless element extending upwardly from said hearth for inter-

cepting oil and air projected by said head, an 5 ignition electrode having a spark discharge tip disposed adjacent the path of projected oil and spaced from said endless element, and a second element associated with said hearth and extending upwardly therefrom inwardly of and above 10 said tip in spaced relation with respect to said first element for intercepting a portion of the projected air, the upper edge of said second element being disposed below the path of projected 15 oil, said electrode having a portion disposed out of the path of the projected air and subjected to the heat of combustion, whereby said electrode, during normal operation, becomes sufficiently heated to vaporize any oil which may 20 contact said tip.

3. In an oil burning apparatus for furnaces 25 having a combustion chamber, a hearth element extending across the combustion chamber, a rotary device having a rotary oil and air projecting head disposed above said hearth, a substantially 30 endless element extending upwardly from said hearth for intercepting oil and air projected by said head, an ignition electrode having a spark discharge tip disposed adjacent the path of projected oil and spaced from said endless element, 35 and a second element associated with said hearth and extending upwardly therefrom inwardly of and above said tip in spaced relation with respect to said first element for intercepting a portion of the projected air, the upper edge of said second 40 element being disposed below the path of projected oil and having an opening therein, whereby a portion of the air intercepted by said second element will flow through said opening into the space between said elements and travel 45 through the space between said spark discharge tip and first element, said electrode having a portion disposed out of the path of the projected air and subjected to the heat of combustion, whereby said electrode, during normal operation of said 50 apparatus, becomes heated by the heat of combustion to vaporize any oil which may contact said electrode tip.

4. In an oil burning apparatus, the combination 55 with an oil and air discharging means for discharging oil and air in generally horizontal paths, and an element in the path of the oil and air for intercepting the same, of an electric ignition means igniting the oil intercepted by 60 said element, including an electrode having a tip portion disposed substantially in the path of the oil and a second portion thereof disposed out of the path of the oil and air discharged from said first means and arranged to be subjected 65 to the heat of combustion whereby said one electrode during normal operation of said apparatus, will be heated by the heat of combustion to vaporize oil which may strike said tip portion and thereby prevent the formation of carbon thereon.

5. An oil burning apparatus comprising means 70 for discharging oil and air in generally horizontal paths, and ignition means including an electrode disposed in the path of oil and air discharged by the first means to intercept the oil, and a second electrode of heat resistant metal having a portion extending across the path of the oil and air and a reversely bent portion having a spark discharge tip spaced from said first 75 electrode and cooperative therewith to ignite the intercepted oil, at least the connection between said first portion and said reversely bent portion being disposed out of the path of the air and subjected to the heat of combustion whereby, dur-

ing normal operation of the apparatus, said second electrode will become sufficiently heated to vaporize any oil striking said tip and thereby prevent the formation of carbon thereon.

5 6. An oil burning apparatus comprising means for discharging oil and air in generally horizontal paths, and ignition means including an electrode disposed in the path of oil and air discharged by said first means to intercept the oil, and a second electrode of heat resistant metal having a spark discharge tip spaced from said first electrode cooperative therewith to ignite the intercepted oil, said second electrode having a portion disposed out of the path of the air and subjected to the heat of combustion, whereby said second electrode, during normal operation of the apparatus, will become sufficiently heated to vaporize any oil which may strike said tip, and thereby prevent the formation of carbon thereon.

10 7. An oil burning apparatus comprising a rotating head for projecting oil and air in generally horizontal paths, an endless element surrounding said head in spaced relation, for intercepting the oil, at least a portion of the intercepting surface of said endless element forming an ignition electrode and a second electrode of heat resistant metal having a spark discharge

tip spaced from said first electrode and cooperative therewith to ignite the intercepted oil, said second electrode having a portion disposed out of the path of the air and subjected to the heat of combustion, whereby said second electrode, during normal operation of the apparatus, will become sufficiently heated to vaporize any oil which may strike said tip, and thereby prevent the formation of carbon thereon.

10 8. An oil burning apparatus comprising a rotating head for projecting oil and air in generally horizontal paths, a substantially endless upright element of heat resistant metal for intercepting the oil and air, said element forming one ignition electrode, a second electrode of heat resistant metal having a spark discharge tip spaced from said first electrode and cooperative therewith to ignite the intercepted oil, said second electrode having a portion disposed out of the path of the air and subjected to the heat of combustion, whereby said second electrode, during normal operation of the apparatus, will become sufficiently heated to vaporize any oil which may strike said tip and thereby prevent the formation of carbon thereon.

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