July 23, 1957 F. GOLDBERGER KONSTANDT 2,800,174

NON-PRESSURE LIQUID FUEL BURNER

Filed March 23, 1953 2 Sheets-Sheet 1

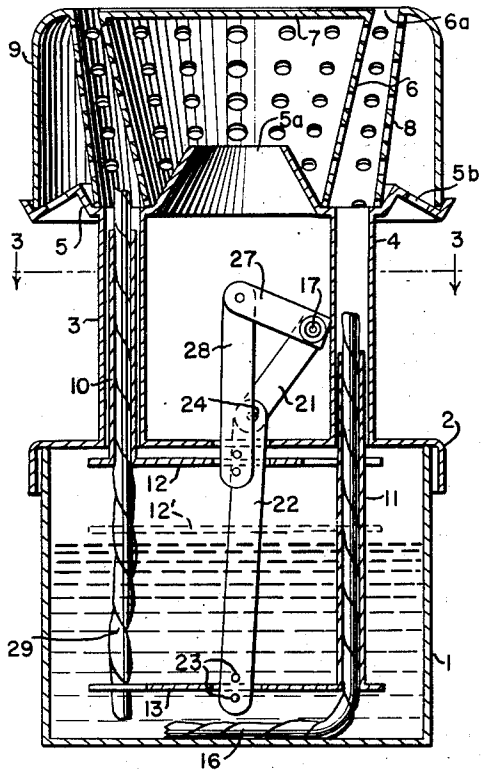


FIG.1

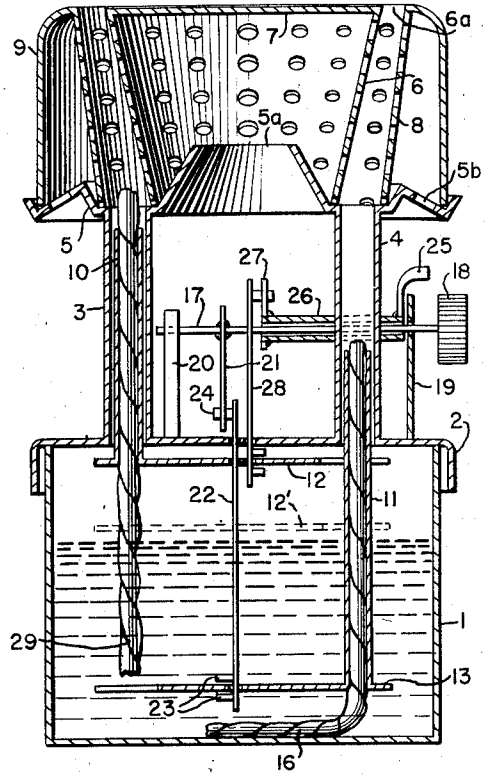


FIG.2

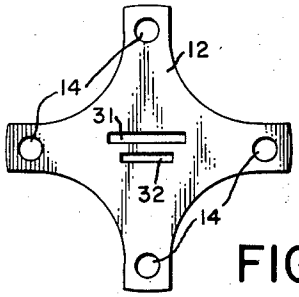


FIG.4

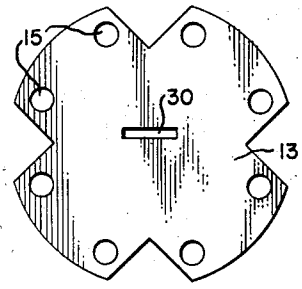


FIG.5

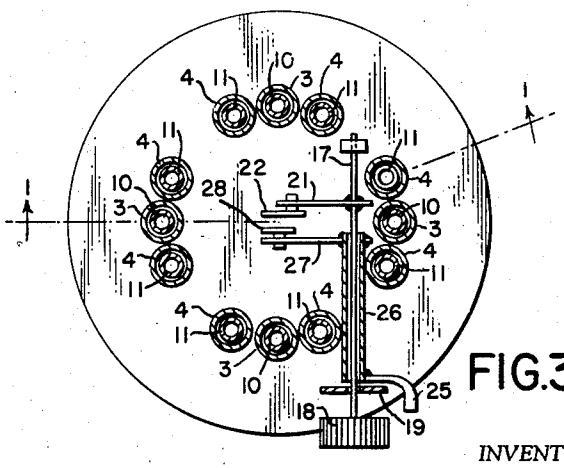


FIG.3

INVENTOR

FRANCISCO GOLDBERGER KONSTANDT

BY Singer, Stern & Carlberg

ATTORNEYS

July 23, 1957 F. GOLDBERGER KONSTANDT 2,800,174

NON-PRESSURE LIQUID FUEL BURNER

Filed March 23, 1953 2 Sheets-Sheet 2

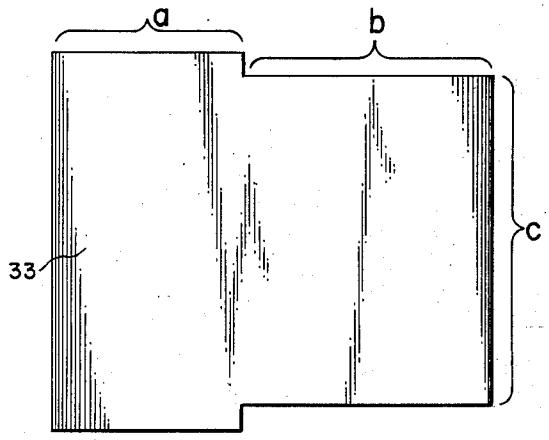


FIG.6

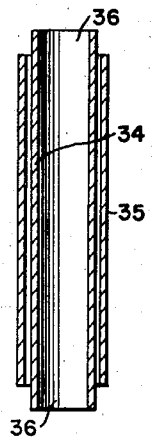


FIG.8

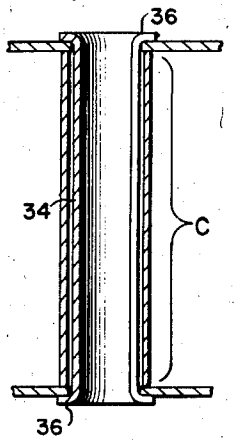


FIG.9

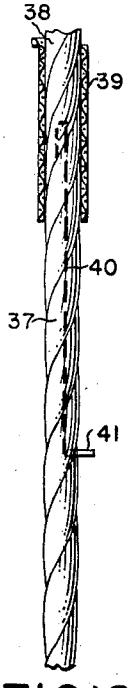


FIG.10

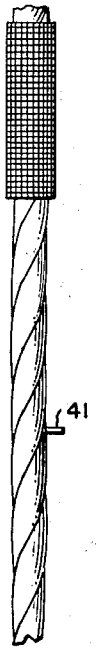


FIG.11

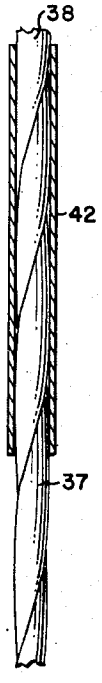


FIG.12

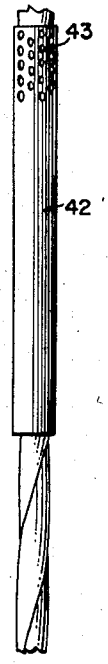


FIG.13

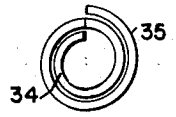


FIG.7

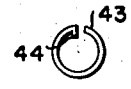


FIG.14

INVENTOR

FRANCISCO GOLDBERGER KONSTANDT

BY Singer, Stern & Carlberg

ATTORNEYS

United States Patent Office 2,800,174 Patented July 23, 1957

2,800,174

NON-PRESSURE LIQUID FUEL BURNER

Francisco Goldberger Konstandt, Buenos Aires, Argentina

Application March 23, 1953, Serial No. 344,111

10 Claims. (Cl. 158—88)

The present invention relates to improvements in liquid fuel burning heating apparatus and it consists of the matters hereinafter described and more particularly pointed out in the appended claims. The invention is more especially concerned with heating apparatus employing wicks in the burner thereof for conveying fuel from a reservoir, forming the base of the apparatus, to a fuel vaporizing and burning zone in the head of the apparatus and which head is arranged in spaced relation above the reservoir and is formed for the inlet of air to support combustion of fuel in said zone as well as for the passage of the products of combustion from said zone for purpose of use.

One of the objects of the present invention is to provide heating apparatus of the kind above mentioned including a fuel burner of the wick type and which is of simple construction for easy assembly and low cost production, which is economical in the consumption of fuel and may be readily kept in a clean condition for efficient and safe operation.

Another object of the invention is to provide apparatus of this kind which includes a novel arrangement of burner and pilot wick whereby the burning of the fuel may be easily and accurately adjusted and controlled for efficient combustion.

The above mentioned objects of the invention, as well as others along with the advantages thereof, will more fully appear as the specification proceeds.

According to one embodiment of the present invention the apparatus includes a non-pressure liquid fuel burner of the wick type which vaporizes the wick fed fuel in an annular burning zone between, coaxial perforated jackets or shells and has a fuel container situated beneath said combustion zone. Several fixed tubes are arranged in a circular form on the said fuel container and extend upwardly therefrom to communicate at the top, with said zone, the said fixed tubes having slidable therein, other tubes for containing wicks. Said other tubes are connected to vertically displaceable carrier members, operated by external control means characterised in that the wicks and their tubes are divided into pilot and burning groups respectively, the control of one group being independent of the control of the other and the wicks of the pilot group being arranged between associated wicks of the burning group.

In a preferred form of the invention the number of the wicks of the burning group is twice the number of the wicks of the pilot group, the wicks of the first mentioned group serving to provide the ordinary flame for heating purposes and the wicks of the second mentioned group serving to provide the pilot lights.

A preferred embodiment of the invention is illustrated by way of example in the accompanying drawings, in which

Fig. 1 is a vertical section through the complete apparatus and its burner as taken along line 1—1 of Fig. 3.

Fig. 2 is another vertical section through the apparatus, taken on a plane at a right angle to that of Fig. 1.

Fig. 3 is a horizontal sectional view through a part of the apparatus as taken cut along line 3—3 of Fig. 1.

Figs. 4 to 14 are views of several details of the parts of the burner and which will be more fully referred to as the specification proceeds.

The apparatus includes a fuel container or reservoir 1 provided with a removable cover 2. On the said cover 2 are several upright tubes arranged in a circle, some of the tubes 3 serving to guide pilot light wicks and others 4 to guide the ordinary flame wicks. On the top ends of said tubes 3 and 4 there is arranged the base of a vaporiser or burner head 5. This vaporiser or head consists of a perforated inner cone 6 provided with an imperforate lid or top 7 and a concentric perforated outer cone 8 having a top 9, that includes an imperforate side wall and top flange. This combination of cones, with their tops, supported on the base 5 forms the burner head of the apparatus and the space between said cones forms the annular burning zone in said head. Instead of the two perforated cones 6 and 8 two perforated and concentrical cylinders may be substituted.

The base of the vaporizer or burner head is provided with a central air inlet opening 5^a and a plurality of air inlet openings 5^a between the bottom end of the outer cone or shell 8 and the bottom end of the imperforate side wall of the top 9. It is through said openings, that air enters the head to support combustion of fuel in the annular burning zone. The outer periphery of the top 7 and the inner periphery of the flange at the upper end of the side wall of the top 9 coact to provide an annular opening or space 6^a that registers with the top of the annular burning zone and provides an outlet for the products of combustion generated in said zone.

Within each fixed tube 3 is a movable tube 10 and in each fixed tube 4 a movable tube 11. The lower ends of said tubes 10 are fixed on an upper plate 12 in the reservoir, whilst the lower end of said tubes 11 are fixed on another and lower plate plate 13 in said reservoir. Both plates 12, 13 are so constructed that their respective tubes 10 and 11 may pass said plates without jamming or otherwise interfering with each other. As is seen in Figs. 4 and 5 the plate 12 is provided with openings 14 in which the tubes 10 are fixed, whereas the plate 13 is provided with openings 15 in which the tubes 11 are fixed, the number of openings 15 being preferably twice the number of openings 14. The burner illustrated in the accompanying drawings has twelve outer tubes 3, 4, twelve inner tubes 10, 11, and twelve wicks 16, 29, eight of the latter identified by 16, being intended for the ordinary flame or burning purpose, and four, identified by 29, for the pilot lights.

It is to be noted from Figs. 2 and 4 that peripheral portions of each plate 12 and 13 are removed for the free passage of the tubes 10 and 11, carried by the other plate. Also it is to be noted from Fig. 3, that there is one tube 10 disposed between each tube of the adjacent tubes 11 and whereby each pilot wick 29 carried by a tube 10 is disposed between two associated tubes 11 and in operative position for the ignition of the burner wicks 16 in said tubes 11.

Between the cover 2 and the base of the vaporiser or burner head, there are control means for the wicks 16 and 29 respectively mounted in such a way as to pass between two of the tubes 4. The control means consist of two independently acting groups or parts, one group serving to move the plate 13 up or down together with its associated inner tubes 11 housing the flame or burner wicks 16 and the other group serving to likewise move the plate 12 with its associated tubes 10 housing the pilot light wicks 29.

The first of the said means consists of a horizontally disposed shaft or rod 17 having a button 18 at its outer

end, the said rod 17 being mounted on supports 19, 20 rising from the reservoir cover 2. Said rod is adapted to move the plates 13 vertically by means of a lever 21, link 22, keys 23, through a pivotal connection 24.

The control means of the plate 12 is somewhat similar and consist of a handle 25 fast with a tube 26 which encircles the rod 17 and a lever 27 pivotally connected to an arm 28, the latter being connected to the plate 12.

The plate 13 is provided with a slot 30 in which the link 22 is movably engaged. In order to enable the link 22 to reach the plate 13 without fouling the plate 12, the latter is provided with a corresponding slot 31. Another slot 32 in plate 12 is the same as the slot 30 in plate 13.

The outer tubes 3, 4, are made of metals which are poor thermal conductors as, for instance, a very thin iron sheet. These tubes are, according to a satisfactory construction in practice, at least 1½ in. long so that the wicks may be sufficiently retracted in order to be extinguished and to effect the desired thermal insulation between the vaporiser and the fuel container 1. In this manner, the heating of the fuel in the container 1 and the risk of explosion are avoided.

The said tubes 3, 4, serve at the same time as hollow posts and separators between the cover 2 and the vaporizer base 5. They may be made from a sheet tin blank (Fig. 6) 33, in the shape of two rectangles, the portion with the base *a* being higher than the portion with the base *b*. This sheet 33 is rolled or convoluted approximately twice, the higher portion of the said sheet forming the inner turn 34 whilst the outer turn 35, the height of which is defined by the height *c* of the second portion of the sheet 33, acts as a separator (see Figs. 7, 8 and 9). This arrangement has several advantages; it eliminates the necessity of providing separators and allows the tubes 3, 4, to be fixed without welding to the cover 2 and to the base of the vaporiser 5, as for instance, by riveting them to the same, since the inner turn 34 projects at both ends beyond the outer turn 35 in such a manner as to leave free margins 36 for riveting. Moreover, the two tightly rolled turns or convolutions close the seam of the tube sufficiently for its purposes. It is possible to apply, to the portion limited by *b* and *c* of the sheet 33, an adhesive material or a sheet of paper so as to reinforce the same.

The new burner has several stranded wicks which, however are manufactured in a novel manner. The use of cotton wicks for feeding fuel by capillary action has the disadvantage that their tips become charred and worn. Asbestos wicks, which do not wear down, may not be used when the container is situated beneath the combustion space in view of their inadequate capillary action. According to the present invention, a cotton wick 37 feeds the fuel up to a point adjacent the combustion zone or space where the liquid is absorbed by an asbestos wick portion 38 intimately and directly joined to the cotton wick. The cotton wick 37 extends from the fuel container to approximately half the length of an outer wire mesh sleeve 39 or, the wick may be protected by a perforated pipe or tube 42 to half of its perforated portion 43 where it is fastened to the asbestos wick 38. In order to arrange the wick at a required level in the inner tubes 10, 11, a wire 40 provided with a stop 41 may be employed as well as a relatively longer sleeve 42. It is possible, moreover, to provide the sleeve 42 with an inner flange 44, see Fig. 14, in order to secure the wick.

The wicks 29 for the pilot lights may be of a relatively smaller diameter than that of the wicks 16 intended for the common flame combustion or burning purpose, in which case the other components related to the pilot lights will be correspondingly dimensioned.

The operation of the burner will be readily understood from Figs. 1 and 2; the plate 12 carrying the tubes 3 is at its maximum level of its upward displacement and wherein the tips of the pilot light wicks 29 extend above the level of the base of the vaporiser 5 in the lower portion of the annular zone or space between the perforated walls of the concentric cones 6 and 8 respectively. By turning the rod 17 through the knob 18 the wicks 16 and their tubes 11 are raised or elevated through the lever 21, link 22 and plate 13. When the plate 13 has been so elevated, the tips of the wicks 16 in the tubes 11 show or are exposed in the bottom of the combustion zone between the cones 6 and 8 on or about the same level as the tips of the wicks for the pilot lights 29. This is due to the fact that the tubes 11 are considerably longer than the tubes 10. Since the wicks 16 are arranged in such a manner as to be always adjacent an ignited pilot light wick, upon coming into the combustion zone or space they too are ignited. The most convenient system is to arrange a pilot light wick 29 between two ordinary flame or burner wicks 16.

When it is desired to extinguish the flame the knob 18 is turned in the opposite direction and the wicks 16 descend within the tubes 4. These tubes are poor heat conductors and are so dimensioned that when the wicks are lowered into a cold zone, vaporisation is stopped. Only the pilot light wicks 29 are still burning and they, in their turn, are extinguished when the handle 25 is turned, lowering the plate 12 to the level indicated with dotted lines 12' in Figs. 1 and 2.

It is pointed out that air entering the inlet openings 5a in the base of the vaporizer or burner head, not only asserts in supporting combustion in the zone between the cones or shells 6 and 8, but it keeps the upright wall of the top 9 in such a relatively cool condition that accidental contact with the latter will not result in injury to parts of the person accidentally touching the same.

It is to be understood that modifications may be made in the construction of the burner within the scope of the appended claims.

What I claim is:

1. A liquid fuel burning heating apparatus embodying therein, a fuel reservoir, a burner head including upright concentric spaced circular walls forming an annular fuel burning zone and having openings in said walls for entry of air to support combustion in said zone, said walls being arranged to allow passage of the products of combustion from said zone, guide tubes supporting said head in spaced relation above said reservoir and opening at their bottom and top ends into said reservoir and said zone respectively, a set of pilot wick holders and a set of burner wick holders arranged one in each guide tube, a pilot wick in each pilot wick holder, a burner wick in each burner wick holder and with each pilot wick in igniting relation to at least one of said burner wicks, a first carrier in the reservoir to which the bottom ends of the set of pilot wick holders are attached for a raising and lowering movement therewith, a second carrier in said reservoir to which the bottom ends of the set of burner wick holders are attached for a raising and lowering movement therewith, and means operable from outside the reservoir for imparting a raising and lowering movement to said first and second carriers, the one independently of the other.

2. A heating apparatus as set forth in claim 1, in which there is a pilot wick holder disposed between each two of the burner wick holders.

3. A heating apparatus as set forth in claim 1, in which the first carrier has peripheral recesses for the passage of the wick holders attached to the other carrier.

4. A heating apparatus as set forth in claim 1, in which the manually operable means is disposed between the reservoir and the burner head.

5. A heating apparatus as set forth in claim 1, in which the manually operable means includes horizontally disposed shaft like parts disposed between the reservoir and the burner head.

6. A heating apparatus as set forth in claim 1, in

which said guide tubes, said burner head and said wick holders are mounted upon a top for the reservoir as a unitary assembly.

7. A liquid fuel burning heating apparatus embodying therein a fuel reservoir having a top, a burner head including upright concentric spaced circular walls forming an annular fuel burning zone and having openings in said walls for entry of air to support combustion in said zone, said walls being arranged to allow passage of the products of combustion from said zone, guide tubes arranged in a circle on the top of said reservoir for supporting said head in spaced relation above said reservoir and opening at their bottom ends through said top into said reservoir and opening at their top ends into said zone, said guide tubes being arranged in arcuately spaced groups about said circle, a set of pilot wick holders and a set of burner wick holders, arranged one in each guide tube, a pilot wick in each pilot wick holder, a burner wick in each burner wick holder, there being a pilot wick tube in one guide tube of each group, and the burner wick tube, one burner wick in each of the burner wick holders of each group being in ignition relation to the pilot wick in the same group, a first carrier in the reservoir to which the bottom ends of the set of pilot wick holders are attached for a raising and lowering movement therewith, a second carrier in said reservoir to which the bottom ends of the set of burner wick holders are attached for a raising and lowering movement therewith and means operable from above the top of the reservoir for imparting a raising and lowering movement to said first and second carriers, the one independently of the other.

8. A heating apparatus as set forth in claim 7, in which each group of guide tubes are three in number and the guide tube of each group and containing the pilot wick tube is disposed between the other two of the guide tubes of the same group and containing the burning wick tubes.

9. A liquid fuel burning heating apparatus embodying therein a fuel reservoir having a top, a burner head including upright concentric spaced circular walls forming an annular fuel burning zone and having openings in said walls for entry of air to support combustion in said zone, said walls being arranged to allow passage of the products of combustion from said zone, guide tubes arranged in a

circle on the top of said reservoir for supporting said head in spaced relation above said reservoir and opening at their bottom ends through said top into said reservoir and opening at their top ends into said zone, said guide tubes being arranged in arcuately spaced groups about said circle, a set of pilot wick holders and a set of burner wick holders, arranged one in each guide tube, a pilot wick in each pilot wick holder, a burner wick in each burner wick holder, there being a pilot wick tube in one guide tube of each group and the burner wick tube, one burner wick in each of the burner wick holders of each group being in ignition relation to the pilot wick in the same group, a first carrier in the reservoir to which the bottom ends of the set of pilot wick holders are attached for a raising and lowering movement therewith, a second carrier in said reservoir to which the bottom ends of the set of burner wick holders are attached for a raising and lowering movement therewith, a pair of coaxial, horizontal shafts arranged above the top of the reservoir and extending through a space between two adjacent groups of guide tubes with their inner ends inside the circle of said tubes and with their outer ends outside said circle of said guide tubes, means connecting the inner end of each of said shafts with said first and second mentioned carriers respecting and operable to raise and lower the same in a turning movement of said shafts and means on the outer ends of said shaft for imparting a turning movement thereto.

10. A heating apparatus as set forth in claim 1, in which the second carrier has peripheral recesses for the passages of the wicks in the wick holders attached to the first carrier.

References Cited in the file of this patent

UNITED STATES PATENTS

114,906	Beebe	May 16, 1871
145,667	Martin	Dec. 16, 1873
765,976	James	July 26, 1904
1,089,966	Ruppel	Mar. 10, 1914
1,161,524	Phillips	Nov. 23, 1915

FOREIGN PATENTS

588	Great Britain	Feb. 12, 1878
532,239	Great Britain	Jan. 21, 1941