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LIGHTING DEVICE

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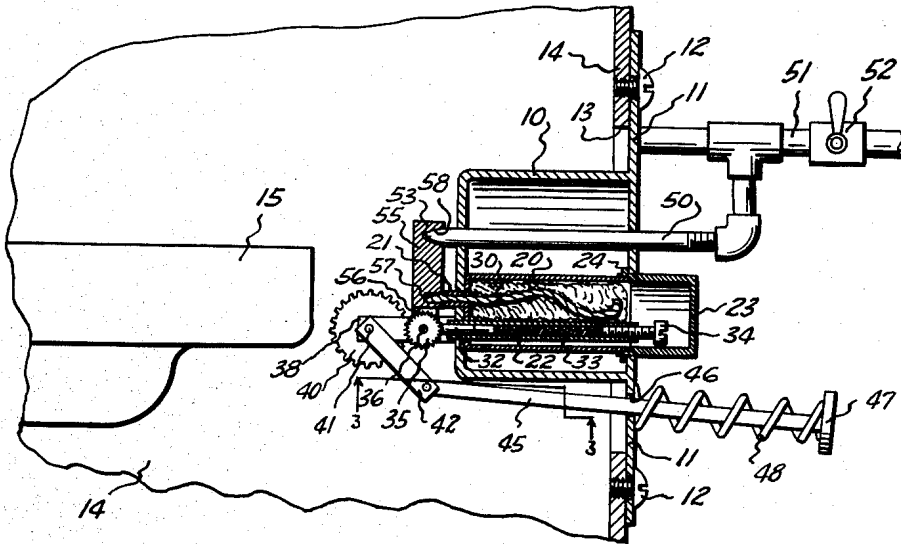


Fig. 1

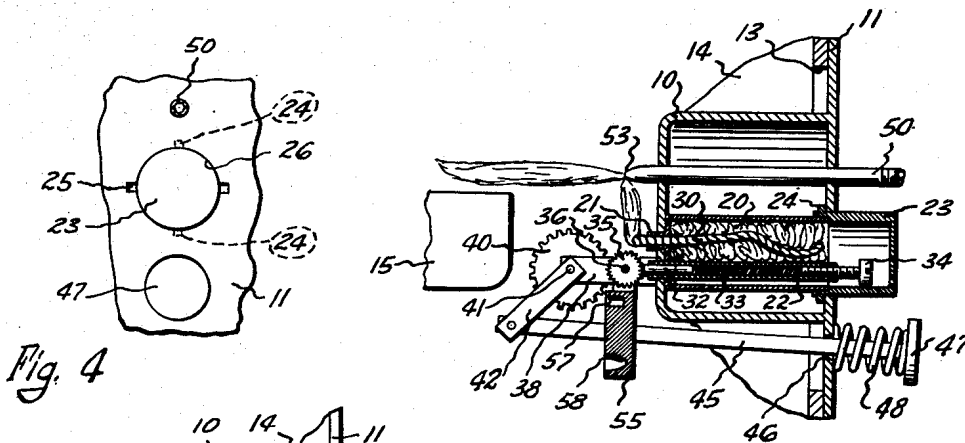


Fig. 2

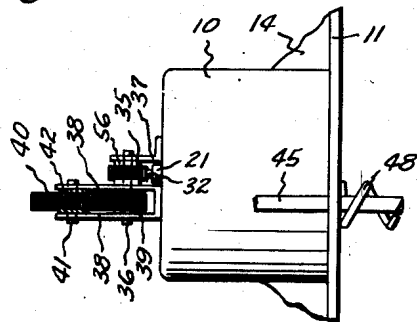


Fig. 3

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LIGHTING DEVICE

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5 Claims. (Cl. 67—20.1)

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This invention relates to new and useful improvements in lighting devices.

One object of the invention is to provide an improved lighting device which is adapted to be used for the ignition of heaters or burners or the like and which eliminates the use of matches.

An important object of the invention is to provide a lighting device having incorporated therein a source of flame independent of the fuel supplied to the burner which is to be ignited, thus supplying a flame positively providing for ignition of the burner fuel.

A further object of the invention is to provide a lighting device, of the character described, having a flame supporting element independent of the burner which is to be ignited, and wherein the fuel supporting element may be ignited prior to permitting flow of fuel to the burner, whereby the burner fuel is ignited by the flame of the lighter.

Another object of the invention is to provide a lighting device, of the character described, which may be positively ignited prior to and independently of the opening of the fuel control valve in the line supplying the main burner.

A still further object of the invention is to provide a lighting device which may be used for igniting substantially any type of fuel and which is particularly adapted for use with burners supplied with natural gas, butane, or other hydrocarbon gas type fuels, as well as with liquid fuels, such as oil or kerosene.

Still another object of the invention is to provide a device of the character described which may be detachably secured to a heating device for igniting the same, whereby it may readily be serviced, replaced or adjusted.

Another object of the invention is to provide a device of the character described which may readily be attached to heating devices, such as furnaces, heaters, ranges, and the like already in use, to provide a means for igniting the same, such attachment being effected with very nominal alteration of the heating device.

A further object of the invention is to provide a device which is safe, convenient, efficient, clean and easy to use, eliminating the dangers of explosions, burns and the like incident to the use of matches as a source of ignition of the heating devices.

Additional objects and advantages of the invention will readily be apparent from the reading of the following description of a device constructed in accordance with the invention, and refer-

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ence to the accompanying drawings thereof, wherein:

Figure 1 is a view, partly in elevation and partly in section, of a lighting device constructed in accordance with the invention and showing the same installed in a heating device,

Figure 2 is a view, similar to Figure 1, showing the lighting device in ignited position,

Figure 3 is a view, partly in elevation and partly in section, taken on the line 3—3 of Figure 1.

Figure 4 is an enlarged fragmentary view illustrating the manner in which the fuel cylinder is secured in the housing.

In the drawings, the numeral 10 designates a lighter housing, which is illustrated as being substantially cylindrical in shape and as having its ends closed but may be of any desired configuration. The housing is provided at its outer end with an external annular flange 11 attached to or formed integral with the housing, whereby the housing may be secured by screws 12 or other suitable means within an opening 13 formed in the cover 14 or other portion of a heating device adjacent to the burner 15 thereof.

An elongate, preferably cylindrical, fuel container or cylinder 20 is adapted to be releasably secured within the housing. A wick sleeve 21 is formed on the inner end of the fuel cylinder and projects therefrom, and the bore of the sleeve communicates with the bore of the fuel cylinder. An elongate flint tube 22 having its inner end projecting beyond the inner end of the fuel cylinder is securely fastened in the cylinder and extends longitudinally therein, as clearly shown in Figures 1 and 2. A cup-shaped cap member 23 has the inner open end of its bore enlarged and adapted to engage over the outer open end of the fuel cylinder to close the same. Spaced upstanding lugs 24 formed on the periphery of the cap near its inner end are adapted to slide through correspondingly spaced notches 25 formed in the periphery of an opening 26 in the outer end of the housing 10.

When the fuel cylinder has been inserted through the opening 26 until the projecting wick sleeve and flint tube are positioned in openings therefor in the inner end wall of the housing so as to preclude rotation of the fuel cylinder, the lugs 24 may enter through the notches 25 and the cap member 23 may be rotated on the fuel cylinder to position the lugs out of alignment with the notches, whereby the fuel cylinder and closure cap will be securely held in position in the lighter housing.

An elongate wick 30 is mounted in the wick

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sleeve 21 and extends into the bore of the fuel cylinder, where it is surrounded by a mass of cotton, wool or other suitable material adapted to absorb and retain the fuel with which the cylinder is filled. The fuel thus will travel through the wick to the exterior exposed end thereof, where it may be lighted or ignited and will burn to supply a flame for igniting purposes. A flint 32 of suitable pyrophoric material is slidably in the flint tube 22 and is urged outwardly thereof by a spring 33. The pressure of the spring may be adjusted by manipulation of an adjusting screw 34 which is threaded into the outer end of the flint tube.

A striking wheel 35, which is serrated on its outer periphery in the customary manner and is positioned to be engaged by the outer end of the flint 32, is securely fixed on a shaft 36 which is journaled at one end in an upstanding ear member 37 mounted on the inner end wall of the lighter housing 10 to one side of the opening through which the flint tube projects. The other end of the shaft 36 extends through a pair of elongate spaced supporting members 38 which are also securely fixed to the inner end wall of the lighter housing on the opposite side of the opening through which the flint tube extends. A small driven gear wheel 39 is securely fixed on the shaft 36 between the upstanding support members 38, as clearly shown in Figure 3, whereby rotation of the driven gear wheel 39 will rotate the shaft 36 and, in turn, rotate the striking wheel 35 to cause the serrations thereon to strike sparks from the flint 32 in the usual manner.

For driving the driven gear wheel 39, a large driving gear wheel 40 is securely fixed on a shaft 41 which has its ends journaled in the outer ends of the supporting member 38. The external gear teeth on the large driving gear wheel 40 mesh with the external teeth on the small driven gear wheel 39, whereby rotation of the driving wheel will cause rotation of the driven wheel. It is preferable that the diameter of the large driving gear be so chosen that for any given amount of rotation of said driving gear the driven gear will be rotated approximately twice the amount that the driving gear is turned.

A pair of lever arms 42 have one end securely connected to the shaft 41, whereby when said lever arms are swung through an arc they rotate the shaft and cause the driving gear wheel to be rotated therewith.

The outer ends of the lever arms 42 are pivotally pinned or connected on opposite sides of the inner end of an elongate operating rod or shaft 45 which extends outwardly therefrom through an opening 46 formed in the flange 11 adjacent the cylindrical lighter housing. A push button or head 47 is provided on the extreme outer end of the operating shaft for engagement by the hand of the user, whereby the shaft may be pushed inwardly to swing the lever arms 42 to cause the drive wheel 40 to be rotated. When the driving gear wheel is thus rotated, the driven gear 39 will likewise be rotated and turn the striking wheel to strike sparks from the flint 32 to ignite the wick 30.

A helical coiled spring 48 surrounds the operating rod 45 and is confined between the head 47 and the flange 11 of the lighter housing. This spring constantly exerts its force to urge the operating rod 45 outwardly with respect to the flange of the housing, whereby the lever arms 42 are normally resiliently held in the position illustrated in Figure 1, and the operating rod

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may be pressed inwardly when it is desired to cause sparks to be struck from the flint to ignite the wick and provide a flame at the inner end of the lighter housing. When the operating rod has been pressed inwardly to the position shown in Figure 2, the pressure applied to the head 47 may be released, whereupon a spring 48 will move the operating rod outwardly to return the same to the position illustrated in Figure 1, where it is again ready for use.

A pilot fuel pipe 50 is connected to the fuel supply line 51 between the fuel control valve 52 and the main burner and extends through the inner end wall of the housing 11 at a point just above the fuel container or cylinder 20. The end of the pilot pipe is tapered and its bore is reduced to provide a small jet opening at the extreme inner end 53 thereof. The jet end 53 projects through the inner end wall of the lighter housing 10 at a point spaced above the wick 30, whereby the flame of the burning wick will ignite the fuel flowing from the jet opening in the pilot pipe. The fuel so ignited will be ejected toward the main burner 15 to ignite the fuel flowing therefrom. Obviously, the wick of the lighter may be ignited and burning prior to opening the fuel control valve to permit the fuel to flow through the pilot pipe, whereby accidental explosions are prevented.

An elongate cover or extinguishing member 55 has a pair of yoke arms 56 at one end which are secured to the shaft 36 on each side of the striking wheel 35, whereby the elongate cover member is swung through an arc as the shaft is turned. The extinguishing or cover member is provided with a recess 57 near its inner end which is adapted to engage over the wick sleeve 21 and to receive the wick 30 of the lighter when in the position shown in Figure 1, whereby the flame on the wick is snuffed or extinguished. A tapered substantially conical recess 58 is formed near the outer end of the cover member and is adapted to engage over the tapered inner end of the pilot pipe to extinguish the pilot flame and to close off flow of fuel from the pilot pipe.

While the foregoing construction is preferable, the extinguisher or cover member may be terminated just beyond the recess 57 which is adapted to cover the wick 30 of the lighter. Thus, the pilot flame of the fuel flowing through pilot pipe 50 may continue to burn so long as the main fuel valve remains open. This construction may be preferable where the fuel supplied to the main burner is controlled by a remote control thermostat or other means for intermittently cutting off flow of fuel to the main burner to maintain an even temperature, or the like. In such event the cover or extinguisher member 55 would merely cover the wick 30 to extinguish the flame thereon when the plunger rod 45 is released to permit the parts of the lighter to move to the position shown in Figure 1.

In operation, the lighting device is connected to the heating device in the manner described and shown in the drawings. When it is desired to ignite the main burner of the heating device, the plunger head 47 is pressed inwardly to force the plunger rod 45 inwardly. Inward movement of the plunger rod will swing the lever arms 42 through an arc to rotate the driving gear wheel 40 in a clockwise direction. Rotation of the driving gear wheel will, in turn, cause rotation of the driven gear wheel 39 in a counterclockwise direction, and rotation of the driven gear wheel and the shaft 36 on which it is mounted will

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cause rotation of the striking wheel 35 in the same direction to cause the striking wheel to strike sparks from the flint 32. Obviously, as the shaft 36 is rotated, the cover member 55 is also swung through an arc to uncover the wick 30, whereby the spark struck from the flint by the striking wheel will ignite the wick to provide a flame at and above said wick. When the wick has been ignited, the fuel control valve may be opened to permit fuel to flow through the main line to the main burner and through the pilot pipe 50 to the orifice jet at its inner end, where the fuel will be ignited by the flame from the wick 30 and will provide a pilot flare directed outwardly from the end of the pilot pipe to the main burner to ignite the fuel flowing from said main burner.

When the main burner has been ignited, the plunger rod operating the driving wheel may be released, whereupon the spring 48 will force the plunger rod outwardly to rotate the driving wheel in the opposite or counterclockwise direction. Such counterclockwise rotation of the driving wheel will turn the driven gear wheel 39 in the opposite or clockwise direction to cause the shaft 36 and the cover member 55 mounted thereon to swing back to the position shown in Figure 1, where the cover member extinguishes the flame on the wick and closes the end of the pilot pipe 50.

Of course, should the cover member 55 be shortened, in the manner already described, so as not to include the recess 58, the cover member will merely extinguish the flame at the wick 30 and permit the pilot flame to continue to burn when the plunger rod 35 is released to return to the position shown in Figure 1.

From the foregoing, it will readily be seen that a lighting device has been provided which includes a lighter mechanism having a wick which is ignited from a sparking mechanism, the ignited wick furnishing a flame as a source of ignition of the fuel flowing from the pilot pipe. The ignited pilot flame will in turn ignite the fuel flowing from the main burner of the heating device. It will also be seen that the device is simple, having few moving parts; that it is removably mounted on the heating device and may be easily removed therefrom for servicing or replacement of worn parts; and that it may be readily attached to present existing heaters with only a very nominal alteration therein. It is also manifest that the provision of the wick flame permits ignition of various types of fuel such as natural gas, butane, or other hydrocarbon gas fuels, as well as liquid fuels such as oil or kerosene, or the like, which would be difficult to ignite by sparks alone. Furthermore, the device eliminates the use of matches, provides for ease of lighting, is convenient, efficient, and clean in use, and provides for a source of flame at the inner end of the pilot pipe before the fuel is permitted to flow through the pilot pipe to ignite the burner, whereby the hazards of explosions, burns and the like are substantially eliminated.

The foregoing description of the invention is explanatory only, and changes in the details of the construction illustrated may be made by those skilled in the art, within the scope of the appended claims, without departing from the spirit of the invention.

What I claim and desire to secure by Letters Patent is:

1. A lighting device adapted to be mounted on a heating device for igniting the main burner

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thereof and including, a housing adapted to be connected to the heating device, a pilot pipe carried by the housing and adapted to be connected with the fuel supply line of the heating device and having its outlet end projecting from the housing and directed toward the main burner of the heating device when the housing is secured to the heating device, an ignitable element having an independent source of fuel and having means detachably engaging the housing whereby said ignitable element is releasably carried by the housing spaced below and adjacent the outlet end of the pilot pipe and adapted to be ignited to provide a source of flame at the outlet end of said pilot pipe for lighting fuel flowing therefrom, the lighted fuel flowing from the pilot pipe being directed to the burner of the heating device for igniting the same, and sparking means on the housing and operable from exteriorly of said housing and independently of the flow of fuel through the pilot pipe for igniting the ignitable member.

2. A lighting device adapted to be mounted on a heating device having a main burner for igniting the same and including, a housing adapted to be connected to the heating device, a pilot fuel pipe carried by the housing and adapted to be connected with the fuel supply line of the heating device and positioned in said housing with its outlet end projecting from the housing and directed toward the main burner of the heating device, a fuel container independent of the heating device fuel supply line and having catch members engageable with the housing for releasably securing the fuel container in the housing and having an ignitable member projecting from the housing below and adjacent the outlet end of the pilot pipe, and sparking means carried by the housing adjacent the ignitable member and operable from exteriorly of said housing for igniting the ignitable member when desired, whereby said ignitable member may be ignited to provide a lighting flame at the outlet end of the pilot pipe for igniting fuel flowing from said pilot pipe.

3. A lighting device including, a housing adapted to be connected to a heating device, a pilot fuel pipe carried by the housing and positioned with its outlet end projecting through an opening in the housing to deliver a jet at the burner of the heating device, said pilot fuel pipe being adapted to be connected to the fuel line supplying the burner of the heating device, an independent fuel container having catch members engageable with the housing for releasably connecting said container to the housing and having a wick sleeve projecting through an opening in the housing below and adjacent the outlet end of the pilot pipe, an ignitable wick projecting from the outer end of the wick sleeve below the outlet tip of the pilot pipe, a striking wheel carried by the housing adjacent the wick, pyrophoric means carried by the housing exposed adjacent the wick and engageable by the striking wheel, and means operable from exteriorly of the housing and heating device for rotating the striking wheel to cause sparks to be struck from the pyrophoric means to ignite the wick to provide a lighting flame at the outlet tip of the pilot pipe for igniting fuel flowing from said pilot pipe.

4. A lighting device adapted to be mounted on a heating device having a main burner and a pilot burner and including, a housing having means for securing it to the heating device, a pilot fuel pipe carried by the housing and positioned to

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deliver a jet at the burner of the heating device and having means for connecting it to the fuel line of said heating device, ignitable means releasably secured on the housing spaced below and adjacent the outlet end of the pilot pipe and having a separate source of fuel independent of the pilot pipe, means on said ignitable means for releasably holding the same in position on the housing, and means for igniting said ignitable means operable independently of the supply of fuel to the main burner and pilot pipe for igniting said ignitable member independently of the fuel flow from the pilot pipe and burner, whereby the ignitable member may be ignited prior to commencement of flow of fuel through the pilot pipe to provide a flame at the tip of the pilot pipe for positively igniting fuel flowing therefrom, whereby the pilot pipe delivers a jet flame at the burner of the heating device to ignite the same.

5. A lighting device including, a housing adapted to be connected to a heating device, a pilot fuel pipe carried by the housing and positioned with its outlet end projecting through an opening in the housing to deliver a jet at the burner of the heating device, said pilot fuel pipe being adapted to be connected to the fuel line supplying the burner of the heating device, an independent fuel container releasably carried by the housing and having a wick sleeve projecting through an opening in the housing below and adjacent the outlet end of the pilot pipe, an ignitable wick projecting from the outer end of the wick sleeve below the outlet tip of the pilot

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pipe, a striking wheel carried by the housing adjacent the wick, pyrophoric means carried by the housing exposed adjacent the wick and engageable by the striking wheel, means operable from exteriorly of the housing and heating device for rotating the striking wheel to cause sparks to be struck from the pyrophoric means to ignite the wick to provide a lighting flame at the outlet tip of the pilot pipe for igniting fuel flowing from the pilot pipe, a cover member carried by the housing and normally covering the ignitable wick and the outlet tip of the pilot pipe and swingable from covering position when the striking wheel is rotated to ignite the wick, and means for returning said cover member to position covering the wick and the outlet tip of the pilot pipe to extinguish flame thereat and cut off fuel flow from said pilot pipe.

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