This invention relates to igniters for gasoline, gas and oil burning equipment, and consists more particularly in new and useful improvements in an igniter having an adjustable center electrode for accurately setting the gap between the center electrode and a ground terminal located in the combustion chamber with which the igniter is used.

In fuel burners of the type in question, ignites are generally made without a ground electrode, ignition usually being effected by the spark jumping from the center electrode of the igniter to some part of the case within the combustion chamber. Thus, after an igniter is installed, it is impossible to adjust the gap setting within the closed area of the combustion chamber without first removing the cover of the latter. Ordinarily, after removing the cover of the combustion chamber, it has been necessary to bend the center electrode to obtain the proper gap which not only consumes considerable time but is expensive. Furthermore, the bending of the center electrode often causes a fracture of the insulator through which the electrode passes which, of course, destroys the effectiveness of the igniter.

An object of the present invention is to provide an igniter having a longitudinally adjustable center electrode whereby the gap setting may be accurately obtained within the enclosed area of the combustion chamber without the necessity of removing the cover or any portion thereof or bending the center electrode of the igniter.

Another object of the invention is to provide an igniter for a fuel burner including a longitudinally adjustable center electrode and externally controlled means cooperating therewith for accurately determining the gap between the firing end of the center electrode and the ground terminal within the combustion chamber.

A further object of this invention is to provide an igniter of this character having a center electrode of sufficient length to extend longitudinally from both ends of the insulator when its firing end is projected into contact with the fixed ground terminal in the combustion chamber, said center electrode being retractable in said insulator and including means for retaining the same in a selected retracted position to establish a fixed gap between the firing end of the electrode and the ground terminal.

With the above and other objects in view which will appear as the description proceeds, the invention consists in the novel features herein set forth, illustrated in the accompanying drawings, and more particularly pointed out in the appended claims.

Referring to the drawings in which numerals of like character designate similar parts throughout the several views:

FIG. 1 is a diagrammatical sectional view of a fuel burner with the igniter of the present invention installed in its initial position and shown partially in section;

FIG. 2 is a similar view showing the igniter with its center electrode in adjusted position to define a predetermined gap; and

FIG. 3 is an enlarged fragmentary detail of the flanged upper end of the center electrode.

In the drawings, 5 represents the cover of a conventional gasoline heater having a hollow dome-like portion 6 which is diagonally drilled and threaded as at 7 to receive the threaded end of an igniter, generally indicated at 8. The igniter consists of a steel shell 9, the lower end of which is threaded as at 10 to engage the threads 7 in the dome 6. An insulator 11 is simply welded to the shell 9 and projects longitudinally from the upper and lower ends thereof, its lower end extending into the combustion chamber 12, closed by the cover 5 and its upper end forming an insulator head 13 which may be tapered as shown in the drawings.

A center electrode 14 is adapted to slidably engage a complementary bore in the insulator 11 and is provided at its upper end with means for adjusting its longitudinal position in the insulator. This adjusting means comprises an enlarged threaded member 15, preferably welded as at 23, to the end of the electrode 14 and adapted to engage complementary threads 16 in the enlarged terminus of the bore in the insulator 11. A radial flange 21 is fixed to the threaded member 15 intermediate the ends of the latter and is arranged to abut the adjacent end of the insulator head 13 when the threads 15 are fully inserted in the threaded bore 16.

That portion of member 15 beyond the flange 21 may be reduced in diameter and threaded as at 15a to receive a terminal nut (not shown) for securing an electrical conductor in place on the electrode. Also, the extremity of part 15a may be transversely notched or slotted as at 17 to receive a screwdriver or other suitable instrument to facilitate the insertion and removal of the center electrode with respect to the bore of the insulator 11 to adjust the gap, as will later appear.

The center electrode 14 is of such a length that when the igniter 8 is screwed into the threaded opening 7 in the dome 6, the center electrode projects downwardly into the combustion chamber 12, beneath the cover 5, with its firing end 18 in contact with a ground terminal formed by a convenient internal part of the casing structure forming the combustion chamber. In the form of the invention shown in the drawings, a projection 19 formed on the underside of the cover 5, serves as the ground terminal for the center electrode 14.

Before installation, the center electrode 14 is inserted in the insulator 11 and the threaded member 15 screwed into the threaded bore 16 until the flange 21 butts the outer end of the insulator head 13. A jam nut 20 is installed on the threaded portion 10 of the shell 9, as far as it will go, the threaded area 10 being of such a length that the jam nut 20 may be backed off from the inner end of the threaded area to permit the necessary longitudinal adjustment of the insulator shell in the threaded opening 7.

The igniter thus assembled, is installed in the dome 6 and combustion chamber 12 until the firing end 18 of the center electrode 14 strikes the ground terminal 19. With the igniter in this position, while maintaining the contact between 18 and 19, the jam nut 20 is advanced on the threaded area 10 until it firmly engages the outer face of the dome 6, thus locking the igniter securely in place. With a suitable tool inserted in slot 17, the center electrode 14 is now removed from the bore in the insulator 11 and a gap control lock washer 22 is slipped over the threaded member 15 and brought in contact with the underside of the flange 21 as shown in FIG. 2. Thereafter, the complete center electrode assembly is reinserted in the insulator 11 and screwed tightly in place in the threaded bore 16, collapsing the gap control lock washer 22 between the end of the insulator head 13 and the underside of the flange 21. This gap control lock washer 22 has a thickness designed to give the desired gap or spacing of the firing end 18 of the center electrode, from the ground terminal 19 so that when in place, the washer 22 maintains a predetermined gap in the combustion chamber 12. In other words, if the ground terminal 19 is parallel to the firing end 18 of the center electrode 14,
the gap is definitely spaced from the ground terminal 19, a distance equal to the thickness of the lock washer 22 as will be seen in FIG. 2 of the drawings. However, should the end of the center electrode contact 19 at an angle, the washer 22 thickness would have to be such as to give the desired gap between 18 and 19. Thus, in that case, the washer thickness would not be equal to the gap.

While we have shown and described a gap control lock washer such as 22 for determining the spacing of the firing end 18 of the center electrode from the ground terminal, any suitable means may be employed for maintaining a predetermined retraction of the firing end of the center electrode to establish and maintain an accurate gap setting between the center electrode and the ground terminal.

It will thus be seen that with this improved igniter assembly, an accurate gap setting may be obtained within the enclosed area of a combustion chamber, without the necessity of removing the cover or in any way interfering with the burner equipment.

From the foregoing, it is believed that the invention may be readily understood by those skilled in the art without further description, it being borne in mind that numerous changes may be made in the details disclosed without departing from the spirit of the invention as set forth in the following claims.

We claim:

1. In a fuel burner having a casing structure forming a combustion chamber, and an igniter receiving opening remotely aligned with a fixed internal part of the casing structure of said chamber, said part adapted to serve as a ground terminal, a single electrode fuel igniter assembly externally adjustable for gap setting after installation, said assembly comprising a shell, an insulator in said shell, a center electrode shiftable longitudinally in said insulator and of a length to enable its firing end to be projected through said insulator, a radial flange fixed on said center electrode and engageable with the adjacent end of said insulator for initially limiting the projection of said center electrode through said insulator, said shell being attachably insertable in said opening to position the firing end of said center electrode in contact with said fixed ground terminal, means for locking said shell in said position, means for retracting said center electrode in said insulator to separate the firing end of said center electrode from said ground terminal, and separable means adapted to be interposed between said flange and the adjacent end of said insulator to define and maintain a predetermined gap between said firing end and ground terminal.

2. A fuel igniter assembly as claimed in claim 1, wherein said last-named means comprises a spacer adapted to embrace said center electrode in abutting relation with said flange and said insulator.

3. A fuel igniter assembly as claimed in claim 1, wherein said last-named means comprises a spacer of a thickness determining the desired gap spacing between a firing end of the center electrode and the ground terminal.

4. A fuel igniter as claimed in claim 3 wherein said spacer is a lock washer.

5. A fuel igniter as claimed in claim 1, wherein the outer end of said center electrode is screw-threaded to engage complementary threads in said insulator whereby said center electrode may be adjusted longitudinally with respect to said insulator.

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