

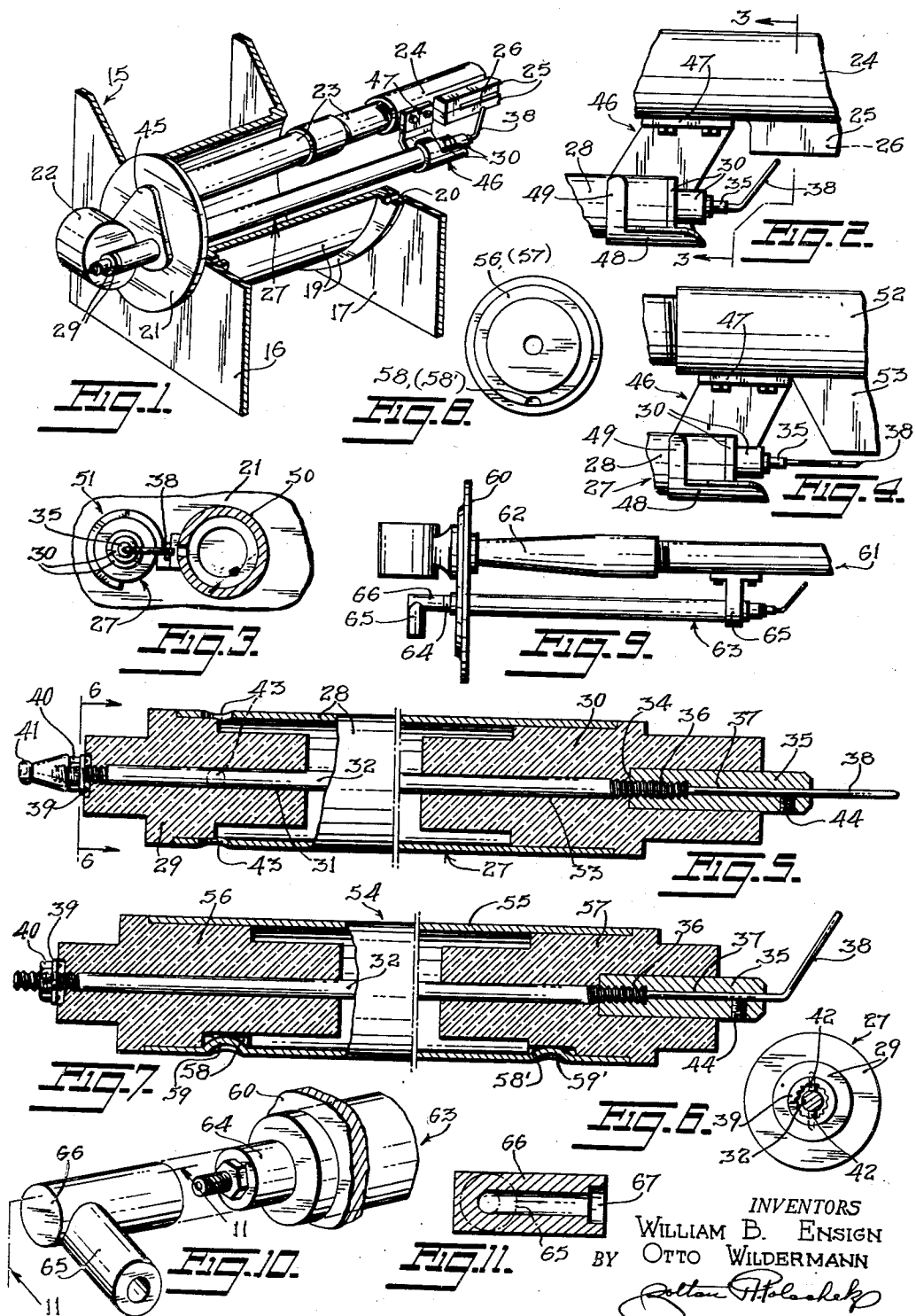
March 20, 1951

W. B. ENSIGN ET AL

2,545,945

IGNITION ELECTRODE DEVICE FOR GAS BURNERS

Filed Dec. 3, 1948



INVENTORS
WILLIAM B. ENSIGN
OTTO WILDERMANN

BY *John H. Schalk*
ATTORNEY

UNITED STATES PATENT OFFICE

2,545,945

IGNITION ELECTRODE DEVICE FOR
GAS BURNERSWilliam B. Ensign, New Rochelle, N. Y., and Otto
Wildermann, River Edge, N. J.

Application December 3, 1948, Serial No. 63,266

8 Claims. (Cl. 175-115)

1

This invention relates to new and useful improvements in gas burner adjuncts, and more particularly, the aim is to provide a novel and improved electrically operated spark-ignition means for gas burners and such a means which is especially valuable for use in connection with baking ovens of the large capacity and efficient type employed in baking establishments and otherwise industrially.

The type of gas burner with which the ignition means of the present invention is adapted to function with marked advantage is one wherein the burner orifices consist of a multiplicity of closely spaced openings along a plurality of crimped or corrugated metal bands or ribbons and between the ribbons and at opposite sides of a pair or stack thereof, thereby to obtain the various beneficial results set forth in U. S. Patent No. 2,210,069 issued to us. A burner of this kind has come to be known in the art as a band oven burner.

The use of a band oven burner so constituted that the number of burners in an oven of a given capacity may be considerably reduced (with a corresponding reduction of burner accessories) as further taught in our copending U. S. patent application Ser. No. 9525 filed February 19, 1948 is obviously important, for the reason just indicated, and because, further, for each burner eliminated, the necessary oven sleeve, extended through a wall portion of the oven and through which the burner must pass, is also eliminated. The more of these structures that can be eliminated, the less heat loss will result. Reduction of heat loss, to the maximum extent possible, naturally is desirable; and is actually, as a matter of fact, essential to perfect control of the baking temperature and to the maintenance of a uniform temperature throughout the oven interior, for producing a standard baked product. Needless to say, the saving of fuel is likewise an important although a secondary advantage. Moreover, not only does a reduction in the number of burners result in a reduction in the number of ignition devices required, with consequent lowering of the initial installation cost, but the maintenance troubles and expense are correspondingly diminished. However, with dual burners used such as disclosed in the patent application last referred to, a completely dependably operating ignition means is a necessity.

According to the present invention, there is provided an electrically operated ignition means which is highly efficient and of unusual operational dependability and so especially adapted for

2

use even with a dual band burner; the new ignition means being characterized by its structurally self-complete nature, its insulatedly conductive interior, its ready and varied adjustability in regard to its sparking electrode, its capacity to be given good connection to a current supply line, and its easy mountability on and for projection through the oven-wall carrying the associated burner, and this last in a way to hold down heat loss at the place of mounting of said ignition means.

An important advantage of the present electrode is that it is mechanically and dielectrically strong and of simple construction for use in combination with the burner plate, electrode holder and burner in a manner to form a very desirable unit for industrial ovens, especially for the baking industry.

A further advantage of an electrode constructed in accordance with the present invention is that it may be readily installed and removed without disturbing any other parts of the oven; such as the oven plates, burners and so on.

Still another advantage of the electrode constructed in accordance with the present invention is that the Nichrome tip may be adjusted so that when the entire assembly is installed, it is held by an electrode bracket mounted on the burner with a stop which prevents the electrode from being advanced beyond the predetermined point.

Another object of the present invention proposes forming the Nichrome tip so that it can be adjusted with relation to the burner without making any changes in the construction of the electrode assembly in a manner so that practically all of the Nichrome tip may be used as the tip thereof becomes burned off.

The invention further proposes the construction of an electrode which can be used for other types of burners other than the new conventional over burner of the multiple or long running flame type.

It is further object of the present invention to construct a sparking electrode for use with a gas-fired oven which is simple and durable and which can be manufactured and sold at a reasonable cost.

For further comprehension of the invention, and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings, and to the appended claims in which the various novel features of the invention are more particularly set forth.

In the accompanying drawings forming a material part of this disclosure:

Fig. 1 is a fragmentary perspective view, partially broken away, showing a typical oven wall construction, and also a burner and a now preferred embodiment of the new ignition means extended through said wall construction for entry into the oven.

Fig. 2 is an enlarged fragmentary top plan view of portions of said burner and ignition means at their ends adjacent to said wall construction.

Fig. 3 is a vertical section, as though taken on the line 3—3 of Fig. 2, but showing a different type of attaching bracket for the electrode end of the ignition means.

Fig. 4 is a view similar to Fig. 2, showing said ignition means in association with a slightly different form of burner and with said electrode inclined toward the burner at a different angle from that indicated in Fig. 2.

Fig. 5 is a view partly in side elevation but mainly in axial section of the barrel or long-cartridge type ignition means of the invention, and showing details of one now favored interior construction for such unit.

Fig. 6 is a transverse section, taken on the line 6—6 of Fig. 5.

Fig. 7 is a view similar to Fig. 5, but showing details of another now favored interior construction for said unit.

Fig. 8 is an end elevation of a ceramic insulator.

Fig. 9 is a fragmentary side elevation view, showing a different kind of oven wall, another possible mounting of a unit pursuant to the invention in relation to said wall and to a burner of another type than that indicated in Figs. 1, 2 and 4, and an elbow conduit for use as an auxiliary to the unit.

Fig. 10 is an enlarged exploded perspective view, showing certain of the parts in Fig. 9.

Fig. 11 is a section taken on the line 11—11 of Fig. 10.

Referring to the drawings more in detail, and first to Fig. 1, the aforesaid oven end wall construction, as a whole marked 15, includes spaced walls 16 and 17. Mounted between the two walls 16 and 17 there is a tubular sleeve 19 suitably secured to both walls, as indicated, in regard to the wall 17, at 20. An end plate 21, suitably attached to the wall 16 at the exterior thereof, carries a device 22 for controlling the richness of the combustion mixture and having a suitable aperture for affording a connection between a pipe 23 and a gas supply line not shown but having a cock to be turned for starting the supply of gas and for adjustment to obtain a desired rate of gas supply. Said pipe 23 leads to an end of a burner 24. The burner 24 shown is one of the kind last hereinabove discussed, having vertically spaced side flanges 25 for providing therebetween a line of corrugated-band-established burner orifices 26.

The new ignition means, as a whole marked 27, includes, as best shown in Figs. 5 and 6, a cylindrical metal tube 28, desirably of stainless steel, a ceramic insulator 29, and another ceramic insulator 30. The insulator 29 has a central bore 31 of a cross-section for slidably receiving a brass or other suitably metallic rod 32 threaded at opposite ends. The insulator 30 along the main portion of its length is similarly bored, as at 33, for also receiving said rod. This bore 33 is enlarged to provide an annular shoulder 34 against which may be abutted the inner end of a

cylindrical member 35, desirably of stainless steel although practicable of use when made of brass or the like. The tube 28 and the rod 32 can be made in various lengths and be interchangeable to adjust the device to oven walls of different thicknesses.

At one end the member 35 has extended axially thereof a recess 36 internally threaded to match a threaded end of the rod 32. Coaxial with this recess said member 35 has a bore 37 of smaller diameter than the bore 31 and extending to the opposite end of said member 35; this bore 37 for receiving the sparking electrode 38, which latter is desirably made of a high resistance and high melting point metal such as Nichrome.

At the threaded end of the rod opposite to its end threadedly connected to the member 35, said rod carries a washer 39 of the familiar type having around its inner periphery a circumferentially spaced series of slightly canted teeth, and beyond said washer, a nut 40 and an internally threaded terminal 41. The insulator 29, at its face against which is to lie said washer, has two oppositely located and radially extending recesses, these marked 42 in Fig. 6. Thus, on tightening the nut 40, the two insulators 29 and 30 clamped tightly at the annular flanges thereon intermediate the ends thereof against the ends of the tube 28, thereby properly holding in position the rod 32; and twisting of said rod relative to the member 35 is prevented, during tightening of said nut, by entry of washer teeth into said recesses 42.

As ventilation means, the tube 28 is apertured at points spaced 90° apart therearound; three of such apertures being indicated at 43 in Fig. 5. While the breathing apertures 43 are shown adjacent the outer end of the tube 28, they may be formed anywhere along the length thereof.

For anchoring in a desired degree of protrusion the outer length of the electrode 38, the projected end of the member 35 is provided radially with a tapped hole, and the latter carries an Allen-type set-screw 44.

With the end portion of the ignition unit which carries the terminal 41 extended through a suitable aperture in the conventional oven plate 45 (Fig. 1) mounted on the plate 21, the opposite end of said unit is cradled in a bracket 46 having a leaf 47 at which the bracket is secured as indicated at a desired location on the burner 24. The major portion of said bracket is shaped to provide a curl or cradle 48 cut away near its free end portion to provide a longitudinally curved claw 49. Thereby the ignition unit 27 is securely held in the exactly correct position to which it will have been adjusted for delivering an ignition spark to the gas allowed to make exit from the burner at its orifices 26, from current supplied to the rod 32 by way of a supply wire attached at the terminal 41. This shape of the bracket 46 also provides a clear view of the electrode tip so that the spark and the burner flame can be seen.

Referring to Fig. 3, this shows a burner 50 of a type other than the burner 24 having secured thereto as indicated a bracket 51 for the adjacent end of the ignition unit 27; which bracket, constructed according to the principle embodied in the bracket 46, is modified in that its attaching leaf corresponding to the leaf 47 is offset laterally from the cradle corresponding to the cradle 48, and also permits the spark and burner flame to be viewed.

Referring to Fig. 4, with the same parts here shown as in Fig. 2, but with the burner, here

marked 52, having wider flanges 53 than the flanges 25, this illustrates a different angle of inclination of the electrode 38 toward the burner than in the case of Fig. 2. It is to be emphasized that the said electrode is contemplated to be bent, if necessary, in any appropriate direction and at any angle, but always so as to have its sparking point, as at its tip, so located as to have the emitted spark leap to the burner at a point properly adjacent to a desired group of the orifices 26.

Referring next to Figs. 7 and 8, the new ignition means as here shown is as a whole marked 54. The tube corresponding to the tube 28 is designated 55. The two insulators, also desirably of ceramic material, are respectively shown at 56 and 57. These are in principle of construction similar to the insulators 29 and 30, but of dimensions lengthwisely thereof somewhat different from said insulators 29 and 30; it being noted that while the insulator 30 is of greater over-all length than the insulator 29, the two insulators 56 and 57 are of the same over-all length and of the same external contour. Thus each of the insulators 56 and 57 is alike in that each has, at one side of the exterior of its cylindrical portion of next to the largest diameter an elongated recess; such recess marked 58 in the case of the insulator 56 and 58' in the case of the insulator 57. Consequently, Fig. 8, as indicated by the additional parenthetical reference numerals there applied, may be taken as an end elevation of the insulator 56, looking toward the left in Fig. 7, or as an end elevation of the insulator 57, looking toward the right in Fig. 7. For interlocking with the recesses 58 and 58' of the insulators 56 and 57, the tube 55 has instruck teats 59 and 59', thereby to hold said insulator against rotating in the tube incidental to tightening up of a nut to clamp the two insulators against the ends of the tube; it being explained that in all other respects except those just noted the structure of Figs. 7 and 8 is exactly like that of Figs. 5 and 6, and both include the same parts 32, 36, 38, 39, 40 and 44, while the insulator 56 is internally formed as is the insulator 29 and the insulator 57 is internally formed as is the insulator 30.

In Figs. 5 and 6, and also in Figs. 7 and 8, the parts have been drawn to substantially full scale; with the length of the tube in each case ranging, for the usual installation, from about 11" to about 18" or other desired lengths.

Referring finally to Figs. 9 and 10, the plate 60 corresponds to the plate 21 of Fig. 1. The burner is indicated at 61, and a conical gas feed pipe therefor is designated 62. The ignition unit is as a whole marked 63, and may be taken as corresponding either to the unit 27 or the unit 54. A bracket 65 is shown as comprising an attaching base having offset therefrom a ring portion for encircling the ignition unit, and thereby permit sight of spark and burner flame. For attachment to the terminal carrying end of said unit, at the outer end of the insulator 64 thereof (the latter corresponding to the insulator 29 or the insulator 56), with that end of the unit projected outwardly of the plate 60, there is provided an elbow insulator 66 tubular from end to end for the passage therethrough of the wire connected to said terminal. Said tubulation may be enlarged at one end as indicated at 67, for having frictionally fitted therein the perimetral surfaces of the nut of the ignition unit 63 corresponding to the nut 40.

While we have illustrated and described the

preferred embodiments of our invention, it is to be understood that we do not limit ourselves to the precise constructions herein disclosed and the right is reserved to all changes and modifications coming within the scope of the invention as defined in the appended claims.

Having thus described our invention, what we claim as new, and desire to secure by United States Letters Patent is:

1. A sparking electrode for use with an oven having spaced walls with a tubular sleeve mounted in one of the walls and closed at its outer end by an oven plate and a gas burner extended eccentrically through the oven plate, comprising an elongated tube adapted to be mounted through the oven plate along side the gas burner, tubular insulators closing the ends of said tube, a rod of conductive material extended through said tubular insulators, said rod having its end at the outer end of said tube extended from the respective insulator for attachment to a conductor wire, a bracket adapted to be mounted on the burner for supporting the inner end of said tube, a cylindrical member mounted on the inner end of said rod within the inner insulator, a sparking tip having one end inserted into said cylindrical member and its other end adapted to be extended therefrom towards the burner, and means for holding the sparking tip in various longitudinal adjusted positions relative to said cylindrical member permitting the position of said tip with relation to the burner to be adjusted as the end thereof becomes burned away during use.

2. A gas burner igniting device comprising an elongated tube, an insulator having a portion projected into one end of said tube, a second insulator having a portion projected into the other end of said tube, said first insulator having a bore extended concentrically therethrough, said second insulator having a concentric bore of a diameter corresponding to the diameter of the bore of said first insulator extended in from its inner end to a point midway of its length, said second insulator having a concentric bore of a diameter larger than its first bore extended inward from its outer end and meeting its first bore forming a shoulder between said bores of different diameter in said second insulator, a tubular member for mounting a sparking electrode extended into said bore of larger diameter in said second insulator and abutting said shoulder, said tubular member being formed in its inner end with a threaded recess in end alignment with the bore of smaller diameter formed in said second insulator, a rod having a threaded end passed through the bores of corresponding diameter formed in said insulators and threaded into said threaded recess in said tubular member, said rod having its other end threaded and projected beyond the outer end of said first insulator, said insulators having external shoulders abutting the opposite ends of said elongated tube, and a nut threaded onto the threaded other end of said rod and abutting the said outer end of said first insulator for drawing on said rod to hold said tubular member in engagement with the internal shoulder of said second insulator and said external shoulders of said insulators in engagement with the ends of said elongated tube.

3. A gas burner igniting device comprising an elongated tube, an insulator having a portion projected into one end of said tube, a second insulator having a portion projected into the other end of said tube, said first insulator having a

bore extended concentrically therethrough, said second insulator having a concentric bore of a diameter corresponding to the diameter of the bore of said first insulator extended in from its inner end to a point midway of its length, said second insulator having a concentric bore of a diameter larger than its first bore extended inward from its outer end and meeting its first bore forming a shoulder between said bores of different diameter in said second insulator, a tubular member for mounting a sparking electrode extended into said bore of larger diameter in said second insulator and abutting said shoulder, said tubular member being formed in its inner end with a threaded recess in end alignment with the bore of smaller diameter formed in said second insulator, a rod having a threaded end passed through the bores of corresponding diameter formed in said insulators and threaded into said threaded recess in said tubular member, said rod having its other end threaded and projected beyond the outer end of said first insulator, said insulators having external shoulders abutting the opposite ends of said elongated tube, and a nut threaded onto the threaded other end of said rod and abutting the said outer end of said first insulator for drawing on said rod to hold said tubular member in engagement with the internal shoulder of said second insulator and said external shoulders of said insulators in engagement with the ends of said elongated tube, said insulators being formed of ceramic material.

4. A gas burner igniting device comprising an elongated tube, an insulator having a portion projected into one end of said tube, a second insulator having a portion projected into the other end of said tube, said first insulator having a bore extended concentrically therethrough, said second insulator having a concentric bore of a diameter corresponding to the diameter of the bore of said first insulator extended in from its inner end to a point midway of its length, said second insulator having a concentric bore of a diameter larger than its first bore extended inward from its outer end and meeting its first bore forming a shoulder between said bores of different diameter in said second insulator, a tubular member for mounting a sparking electrode extended into said bore of larger diameter in said second insulator and abutting said shoulder, said tubular member being formed in its inner end with a threaded recess in end alignment with the bore of smaller diameter formed in said second insulator, a rod having a threaded end passed through the bores of corresponding diameter formed in said insulators and threaded into said threaded recess in said tubular member, said rod having its other end threaded and projected beyond the outer end of said first insulator, said insulators having external shoulders abutting the opposite ends of said elongated tube, and a nut threaded onto the threaded other end of said rod and abutting the said outer end of said first insulator for drawing on said rod to hold said tubular member in engagement with the internal shoulder of said second insulator and said external shoulders of said insulators in engagement with the ends of said elongated tube, said elongated tube being formed with breathing apertures closely adjacent said first insulator.

5. A gas burner igniting device comprising an elongated tube, an insulator having a portion projected into one end of said tube, a second insulator having a portion projected into the other end of said tube, said first insulator having a

bore extended concentrically therethrough, said second insulator having a concentric bore of a diameter corresponding to the diameter of the bore of said first insulator extended in from its inner end to a point midway of its length, said second insulator having a concentric bore of a diameter larger than its first bore extended inward from its outer end and meeting its first bore forming a shoulder between said bores of different diameter in said second insulator, a tubular member for mounting a sparking electrode extended into said bore of larger diameter in said second insulator and abutting said shoulder, said tubular member being formed in its inner end with a threaded recess in end alignment with the bore of smaller diameter formed in said second insulator, a rod having a threaded end passed through the bores of corresponding diameter formed in said insulators and threaded into said threaded recess in said tubular member, said rod having its other end threaded and projected beyond the outer end of said first insulator, said insulators having external shoulders abutting the opposite ends of said elongated tube, and a nut threaded onto the threaded other end of said rod and abutting the said outer end of said first insulator for drawing on said rod to hold said tubular member in engagement with the internal shoulder of said second insulator and said external shoulders of said insulators in engagement with the ends of said elongated tube, and means for retaining said insulators against rotation relative to said elongated tube.

6. A gas burner igniting device comprising an elongated tube, an insulator having a portion projected into one end of said tube, a second insulator having a portion projected into the other end of said tube, said first insulator having a bore extended concentrically therethrough, said second insulator having a concentric bore of a diameter corresponding to the diameter of the bore of said first insulator extended in from its inner end to a point midway of its length, said second insulator having a concentric bore of a diameter larger than its first bore extended inward from its outer end and meeting its first bore forming a shoulder between said bores of different diameter in said second insulator, a tubular member for mounting a sparking electrode extended into said bore of larger diameter in said second insulator and abutting said shoulder, said tubular member being formed in its inner end with a threaded recess in end alignment with the bore of smaller diameter formed in said second insulator, a rod having a threaded end passed through the bores of corresponding diameter formed in said insulators and threaded into said threaded recess in said tubular member, said rod having its other end threaded and projected beyond the outer end of said first insulator, said insulators having external shoulders abutting the opposite ends of said elongated tube, and a nut threaded onto the threaded other end of said rod and abutting the said outer end of said first insulator for drawing on said rod to hold said tubular member in engagement with the internal shoulder of said second insulator and said external shoulders of said insulators in engagement with the ends of said elongated tube, said insulators being formed with recesses extended outward from their inner ends, and teats formed on the ends of said elongated tube and engaging said recesses retaining said insulators against rotation relative to said tube.

7. A gas burner igniting device comprising an

elongated tube, an insulator having a portion projected into one end of said tube, a second insulator having a portion projected into the other end of said tube, said first insulator having a bore extended concentrically therethrough, said second insulator having a concentric bore of a diameter corresponding to the diameter of the bore of said first insulator extended in from its inner end to a point midway of its length, said second insulator having a concentric bore of a diameter larger than its first bore extended inward from its outer end and meeting its first bore forming a shoulder between said bores of different diameter in said second insulator, a tubular member for mounting a sparking electrode extended into said bore of larger diameter in said second insulator and abutting said shoulder, said tubular member being formed in its inner end with a threaded recess in end alignment with the bore of smaller diameter formed in said second insulator, a rod having a threaded end passed through the bores of corresponding diameter formed in said insulators and threaded into said threaded recess in said tubular member, said rod having its other end threaded and projected beyond the outer end of said first insulator, said insulators having external shoulders abutting the opposite ends of said elongated tube, and a nut threaded onto the threaded other end of said rod and abutting the said outer end of said first insulator for drawing on said rod to hold said tubular member in engagement with the internal shoulder of said second insulator and said external shoulders of said insulators in engagement with the ends of said elongated tube, said tube and said rod being interchangeable with tubes and rods of different lengths to vary the length of the igniting device.

8. A gas burner igniting device comprising an elongated tube, an insulator having a portion projected into one end of said tube, a second insulator having a portion projected into the other end of said tube, said first tube having a bore extended concentrically therethrough, said second insulator having a concentric bore of a diameter corresponding to the diameter of the bore of said first insulator extended in from its inner end to a point midway of its length, said

second insulator having a concentric bore of a diameter larger than its first bore extended inward from its outer end and meeting its first bore and forming a shoulder between its bores of different diameters, a tubular member for mounting a sparking tip extended into said bore of larger diameter in said second insulator and abutting said shoulder, said tubular member being formed in its inner end with a threaded recess in end alignment with the bore of smaller diameter formed in said second insulator, a rod having a threaded end passed through the bores of corresponding diameter formed in said insulators and threaded into said threaded recess in said tubular member, means on the other end of said rod for drawing on said rod to hold said tubular member in engagement with the internal shoulder of said second insulator and said insulators in position on the ends of said tube, said tube and said rod being interchangeable with tubes and rods of different lengths to vary the length of the igniting device, a sparking tip having one end inserted into the outer end of said tubular member and its other end directed toward the burner it is to ignite, and means for holding said tip in various longitudinal adjusted positions relative to said tubular member so that the end of said tip may be adjusted with relation to its respective burner as that end becomes burned away during use.

WILLIAM B. ENSIGN.
OTTO WILDERMANN.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,789,430	Dibble	Jan. 20, 1931
1,790,739	Antrim	Feb. 3, 1931
1,928,428	Irwin	Sept. 26, 1933
2,212,875	Camp	Aug. 27, 1940
2,304,200	Plein et al.	Dec. 8, 1942
2,423,809	De Lancey	July 8, 1947
2,441,284	Parrish	May 11, 1948
2,451,369	Yarin	Oct. 12, 1948