Nov. 12, 1929. M. H. BRADEN 1,735,629

HYDROCARBON BURNER

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Fig. 1.

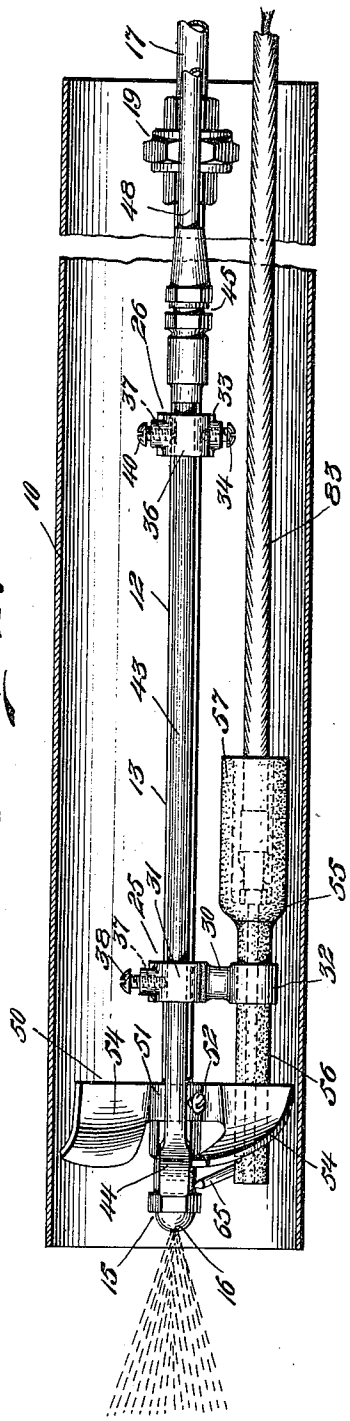
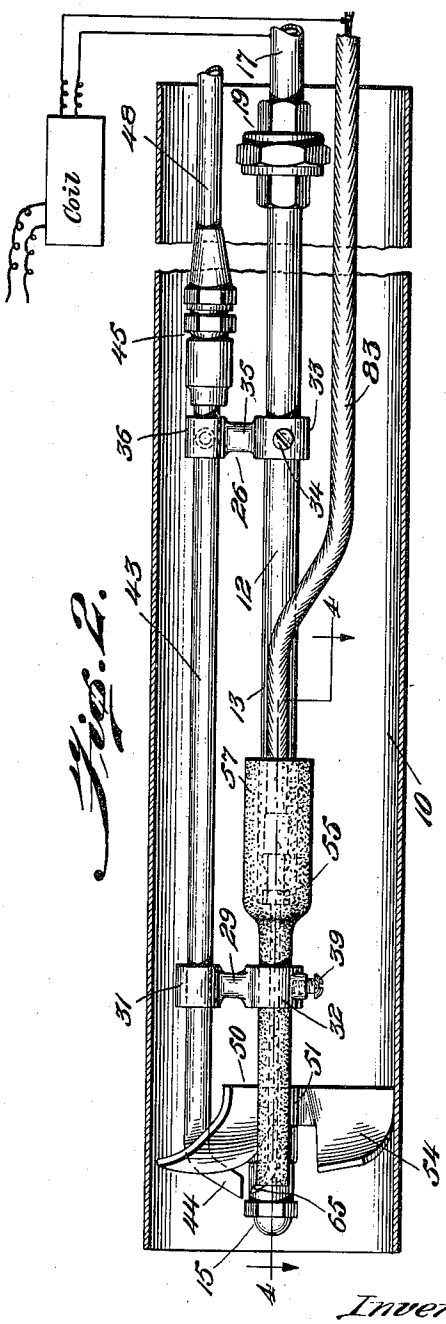


Fig. 2.



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Fig. 4.

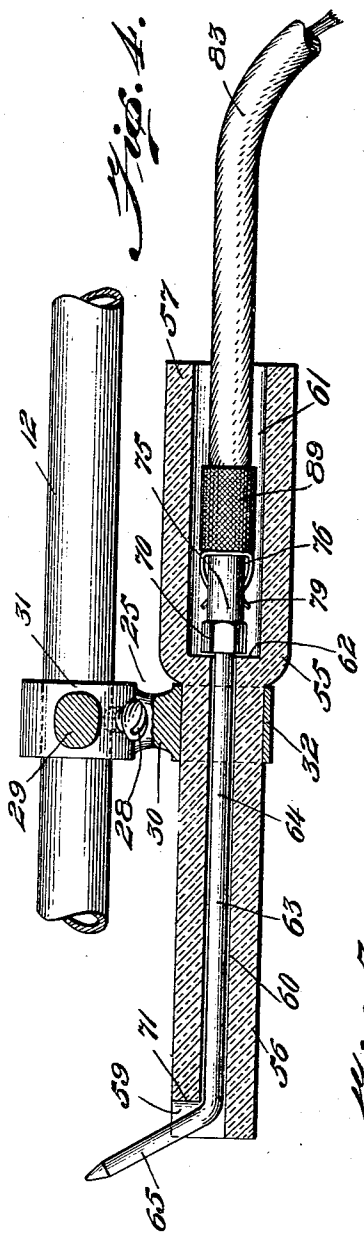


Fig. 5.

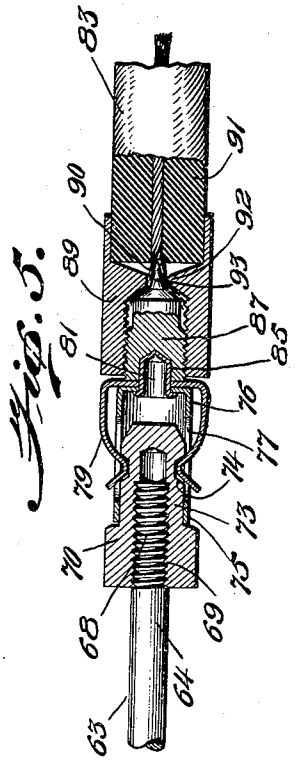


Fig. 6.

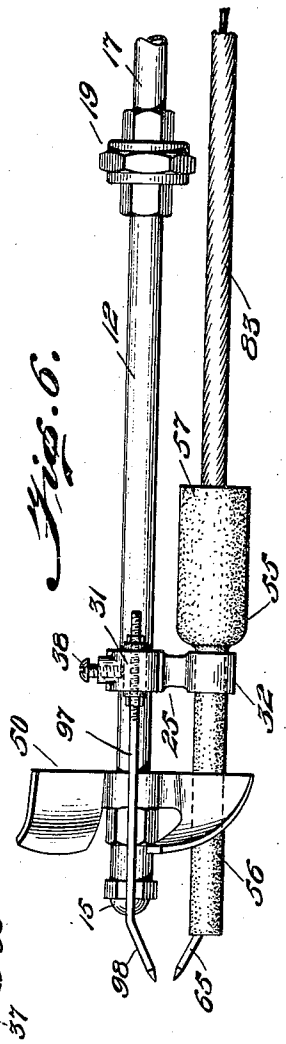
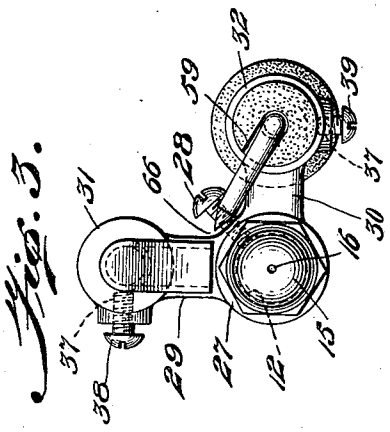


Fig. 7.



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UNITED STATES PATENT OFFICE

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HYDROCARBON BURNER

Application filed February 14, 1929. Serial No. 339,896.

My invention relates to hydrocarbon burners and more particularly to the combustion assembly thereof.

The essential objects of my invention are to prevent the accidental escape of the electric current from the inclosed members of the assembly to the outer tubular casing; to effectively insulate the individual members of the combustion assembly from each other; to attain these ends in a simple structure conforming to the present requirements of the underwriters without extensive corporeal change; to prevent the derangement of the spark by accidental movement of the electrode or metal conductor; to provide and properly insulate a means for connecting the flexible and metallic portions of the electrode; to prevent the fracture of the insulating shield by the expansion of the electrode; and to effect these purposes in a simple and inexpensive structure.

To the above ends primarily my invention consists in such parts and in such combinations of parts as fall within the scope of the appended claims.

In the accompanying drawings which form a part of this specification

Figures 1 and 2 are a plan view and side elevation respectively of a burner or combustion assembly embodying my invention, showing in both instances the enclosing casing or tube in central longitudinal section,

Figure 3, an end elevation of the assembly omitting the casing and the air deflector,

Figure 4, a longitudinal section of the insulating shield in an adjusted longitudinal position, taken on line 3—3 of Figure 2 showing adjacent portions fragmentarily,

Figure 5, a central longitudinal section of the terminal plug and socket connection, and

Figure 6, a partial plan view of a modified form of my invention.

Like reference characters indicate like parts throughout the views.

In the drawings 10 represents the common barrel or tube projecting from the body or casing of any usual or preferred hydrocarbon burner, the showing of the casing being herein omitted. This tube forms a conduit for the air for carburation impelled by a fan or otherwise.

Arranged coaxially of the barrel is the body portion 12 of a nozzle 13 having the usual spraying tip 15 upon its outer end for the discharge through its orifice 16 of atomized hydrocarbon mixed with air under pressure constituting the fuel mixture. The latter is conducted through the usual fuel pipe 17 attached by a pipe coupling 19 to the rear end of the nozzle body, and fixed to the metallic burner frame.

Adjustably mounted upon the forward and rear portions respectively of the nozzle body are brackets 25 and 26. The first comprises a hub 27 fixed by a set screw 28 to the nozzle body 12, and adjustable thereon, from which radiate a vertical arm 29 and a horizontal arm 30 carrying terminal bearings 31 and 32 respectively. The bracket 26 consists of a hub 33 fixed by a set screw 34 to said body and adjustable thereon, a vertical arm 35, and a terminal bearing 36. The bearings 31, 32 and 36 are respectively provided with threaded perforations 37 for the reception of adjusting or set screws 38, 39 and 40.

The gas means which is purposed to supply the pilot flame consists of a tube 43 slidably mounted in the bearings 31 and 36, and adjustably retained therein by the set screws 38 and 40. The forward end 44 of the gas supply tube or conductor is inwardly inclined to a point laterally adjacent the nozzle tip 15. The rear end of the tube is connected by a pipe coupling 45 or otherwise to a tube 48 leading to any usual source of gas supply.

An air deflector 50 comprises a hub 51 adjustable upon the nozzle body 12 by a set screw 52, and radial volute wings or arms 54 integral with the hub. The deflector arms impart a swirling motion to the air current emerging from the mouth of the barrel 10 which motion is imparted to the burner flame fed by the fuel mixture emerging from the orifice of the nozzle.

A porcelain insulating member or shield 55 comprises a tubular body portion 56 and a skirt portion 57 of enlarged diameter. The portion 56 is a sliding fit in the bearing 32 wherein it is retained by the set screw 39. The

insulator is thus circularly and axially adjustable. A longitudinally disposed radial slot 59 in the forward end of the insulator body 56 communicates with the bore or opening 60 of the latter which extends to the enlarged bore or opening 61 in the enlarged portion 57 and forms a resultant internal annular shoulder 62.

Mounted in the insulator is an electrode 63 comprising a shank 64 loose in the bore 60, and an inwardly inclined point 65 passing loosely through the slot 59 and extending to a point laterally adjacent both to the nozzle tip 15 and to the end of the portion 44 of the pilot tube, where a spark gap 66 is formed between the electrode point and the nozzle tip and pilot. The distance between the side walls of the slot 59 is slightly greater than the diameter of the electrode point 65. The inner end of the electrode shank projects a short distance into the skirt portion of the insulator and the projecting portion is provided with a thread 68 extending nearly to the insulator shoulder 62. This thread engages the thread 69 of a nut 70 which cooperates with the end bounding wall 71 of the slot 59 to retain the electrode loosely in position. Upon the end of the nut 70 is an electrode post 73 provided with an annular recess 74 to form an engagement shoulder for a socket member 75. The latter consists of a ferrule 76 slidable over the post 73 and provided with lateral slots 77 to admit spring fingers 79 which yieldingly register in the recess 74. The fingers are fixed by a stud 81 to the closed end of the ferrule. The socket member 75 is attached to the end of a flexible insulated conductor 83 in any preferred manner. In this instance the stud 81 is soldered or otherwise fixed, in an axial opening 85, to an exteriorly threaded post 87 engaging an interiorly threaded sleeve 89 which embraces the end of the conductor 83 whose cable portion 90 extending beyond the insulation 91 is penetrated, spread, and clamped to an internal shoulder 92 of the sleeve by means of a tapered projection 93 upon the end of the post 87. The conductor 83 extends to any suitable source of electrical energy, and forms one side of the electrical ignition or spark circuit, the opposite side of which is grounded in the metallic frame of the burner to which the metal nozzle 12 is electrically connected, as roughly diagramed in Figure 2.

In operation the gas emerging from the mouth of the pilot tube 43 into the spark gap 66 is ignited by the spark, and in turn ignites the fuel hydrocarbon spray emerging from the nozzle tip into the ultimate flame.

When for service or other purposes it is desired to remove the electrode 63 a pull on the conductor 83 disengages the socket member 75 from the electrode terminal or post 73. After the withdrawal of the conductor 83 with its socket, a socket wrench is inserted into the skirt portion of the insulator or shield and is applied to the polygonal side of the nut 70 to disengage the latter from the electrode 64 and enable the electrode to be withdrawn partially or wholly. To reassemble, the described steps are reversed, and the conductor pushed into the insulator to snap the socket 75 into engagement with the post 74.

It will be noted that all the metallic connections between the electrode and conductor are thoroughly housed within the skirt 57 of the shield 55 and thus protected from the nozzle body 12, gas tube 43, and barrel 10; also, that the post and socket form of connection facilitates the employment of the character of insulator shown. The insulator both shields the entire length of the electrode shank 65 from the nozzle, deflector and barrel, but is circularly and longitudinally adjustable in the bracket bearing 32.

It will be observed that after the electrode point has been circularly adjusted it is prevented from excessive accidental lateral movement by the side walls of the slot 59.

The loose engagement of the electrode shank and point and of the nut 70 with the insulator allows for the relatively greater degree of expansion of the former and thus prevents cracking of the latter, whereby the electric current might occasion short circuiting with the exterior members of the burner assembly.

In Figure 6 the gas tube 43 and its auxiliary bracket 26 is omitted, and in bracket bearing 31 is mounted a wire 97 with an inwardly inclined point 98, and electrically connected with the nozzle 12 through the metallic bracket 25. In this instance the insulator 55 is forwardly adjusted to bring the electrode point 65 into a position in advance of the nozzle tip 15 and adjacent the point 98 with which it cooperates to form a spark for igniting the spray discharging from the nozzle.

The invention has been described in connection with the specific embodiments shown, and it will be understood that the invention is not to be limited by such specific showing except for such limitations as the claims impart.

I claim:—

1. In a hydrocarbon burner assembly, a nozzle, an insulator supported by the nozzle adjacent thereto, an electrode in electrical circuit with the nozzle mounted in the insulator cooperating with the nozzle to form a spark, an electric conductor extending into the insulator, and means inclosed in the insulator for detachably connecting the electrode and conductor.

2. In a hydrocarbon burner assembly, a nozzle, a bracket upon the nozzle, a tubular insulator carried by the bracket and provided with a longitudinal slot in one end, and electrode in electrical circuit with the

nozzle comprising a shank extending axially of the insulator, and an inclined spark point on one end projecting through the slot to form a spark gap with the nozzle, and a conductor electrically connected with the other end of the electrode.

3. In a hydrocarbon burner assembly, a nozzle, a tubular insulator supported by the nozzle in substantial parallelism therewith and adjacent thereto comprising a body portion and an enlarged end portion, an electrode in electrical circuit with the nozzle comprising a shank mounted in the body portion extending into the end portion, and an inclined spark point upon one end of the shank projecting from the insulator to a point adjacent the nozzle, a nut upon the other end of the shank in the end portion, and a flexible conductor electrically connected with the nut within the end portion.

4. In a hydrocarbon burner assembly, a nozzle, a bracket upon the nozzle, a tubular insulator carried by the bracket in parallelism with the nozzle comprising a body portion provided in one end with a radial longitudinally disposed slot, an electrode in electrical circuit with the nozzle comprising a shank in the insulator, and an inclined spark point extending through the slot to form a spark gap with the nozzle, a post within the insulator carried by the shank of the electrode, a socket detachably engaging the post, and a flexible conductor extending into the other end of the insulator attached to the socket and electrically connected with the electrode.

5. In a hydrocarbon burner assembly, a nozzle, a bracket upon the nozzle, a tubular insulator adjustably mounted in the bracket comprising a body portion provided in one end with a slot, an electrode comprising a shank in the insulator, and a spark point extending through the slot to form a spark gap with the nozzle, a nut upon the inner end of the electrode within the insulator, a post on the nut, a flexible conductor in electrical circuit with the nozzle extending into the other end of the insulator, and a socket on the conductor yieldingly engaging the post within the insulator.

6. In a hydrocarbon burner assembly, a nozzle, a tubular insulator supported by the nozzle comprising a body portion provided with a longitudinally disposed slot in its outer end, and an enlarged portion, an electrode comprising a shank loose in the body portion extending into the enlarged portion, and an inclined spark point projecting through the slot to a point adjacent the nozzle, said shank being provided upon its inner end with a thread spaced from the body portion, a nut engaging the thread, and a flexible conductor electrically connected with the nut.

7. In a hydrocarbon burner assembly, a nozzle, a bracket upon the nozzle including a bearing, an insulator slidably mounted in the bearing, a set screw in the bearing engaging the insulator, an electrode comprising a shank wholly within the insulator, and an exposed spark point cooperating with the nozzle to form a spark gap, and an electric conductor connected at one end within the insulator to the electrode.

8. In a hydrocarbon burner assembly, a nozzle, a bracket on the nozzle comprising radial arms, a gas tube disposed substantially parallel with the nozzle mounted in one arm and including an inclined end portion terminating adjacent the side of the nozzle, an insulator substantially parallel with the tube mounted in the other arm, and an electrode in the insulator including a spark point terminating laterally adjacent both the nozzle and the inclined portion of the tube.

9. In a hydrocarbon burner assembly, a nozzle, a metallic bracket mounted upon an intermediate portion of the nozzle comprising radially disposed arms, a terminal rod mounted in one arm, an inclined point upon one end of the rod in advance of the nozzle, an insulator mounted in the second arm, an electrode comprising a shank wholly enclosed in the insulator, and an exposed point upon one end terminating adjacent the first point, and an electric conductor connected within the insulator to the other end of the electrode and in electric circuit with the nozzle.

In testimony whereof I have affixed my signature.

MARSHALL H. BRADEN.