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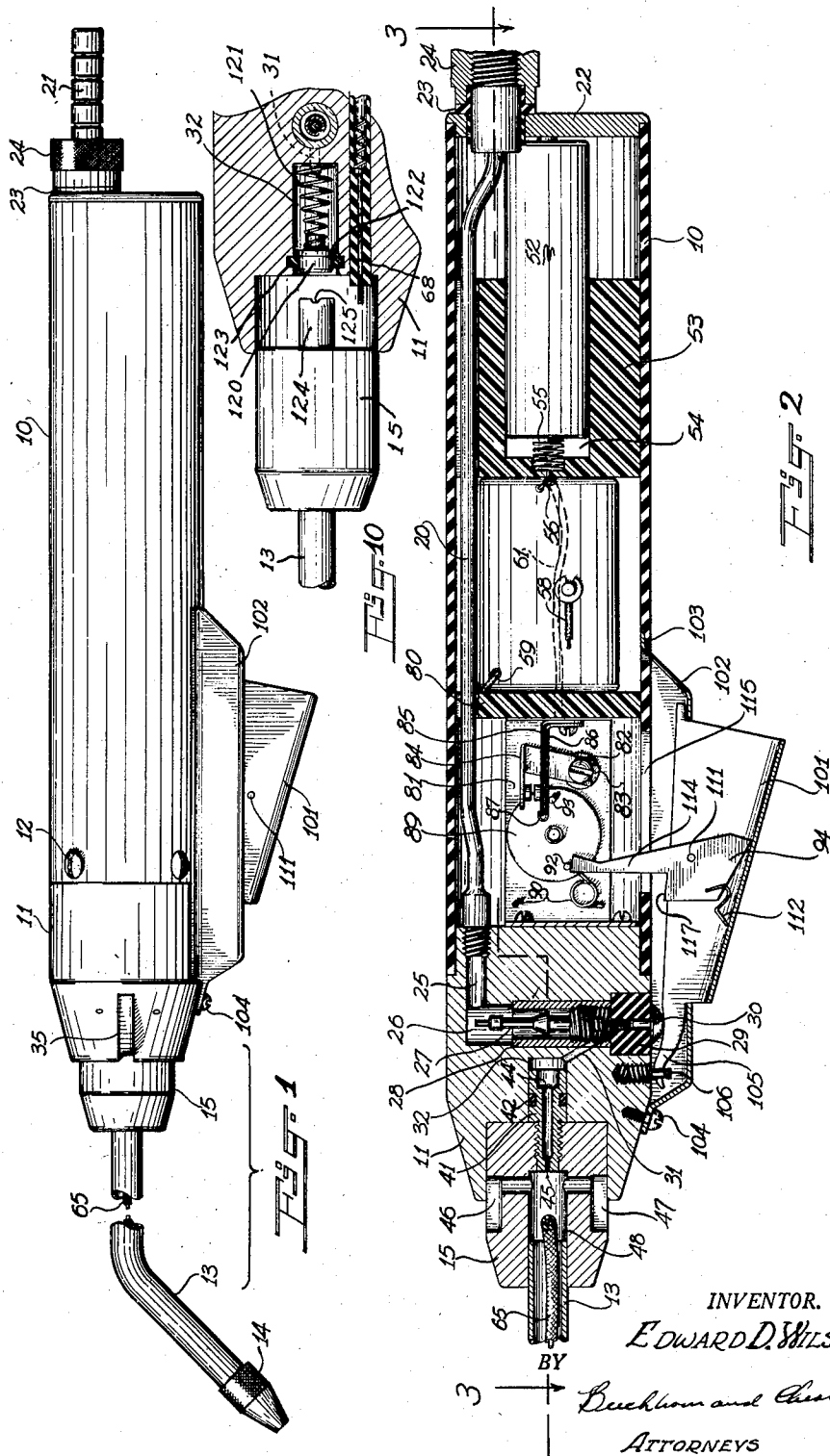
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ELECTRICAL IGNITION GAS TORCH

Filed March 10, 1952

2 Sheets-Sheet 1



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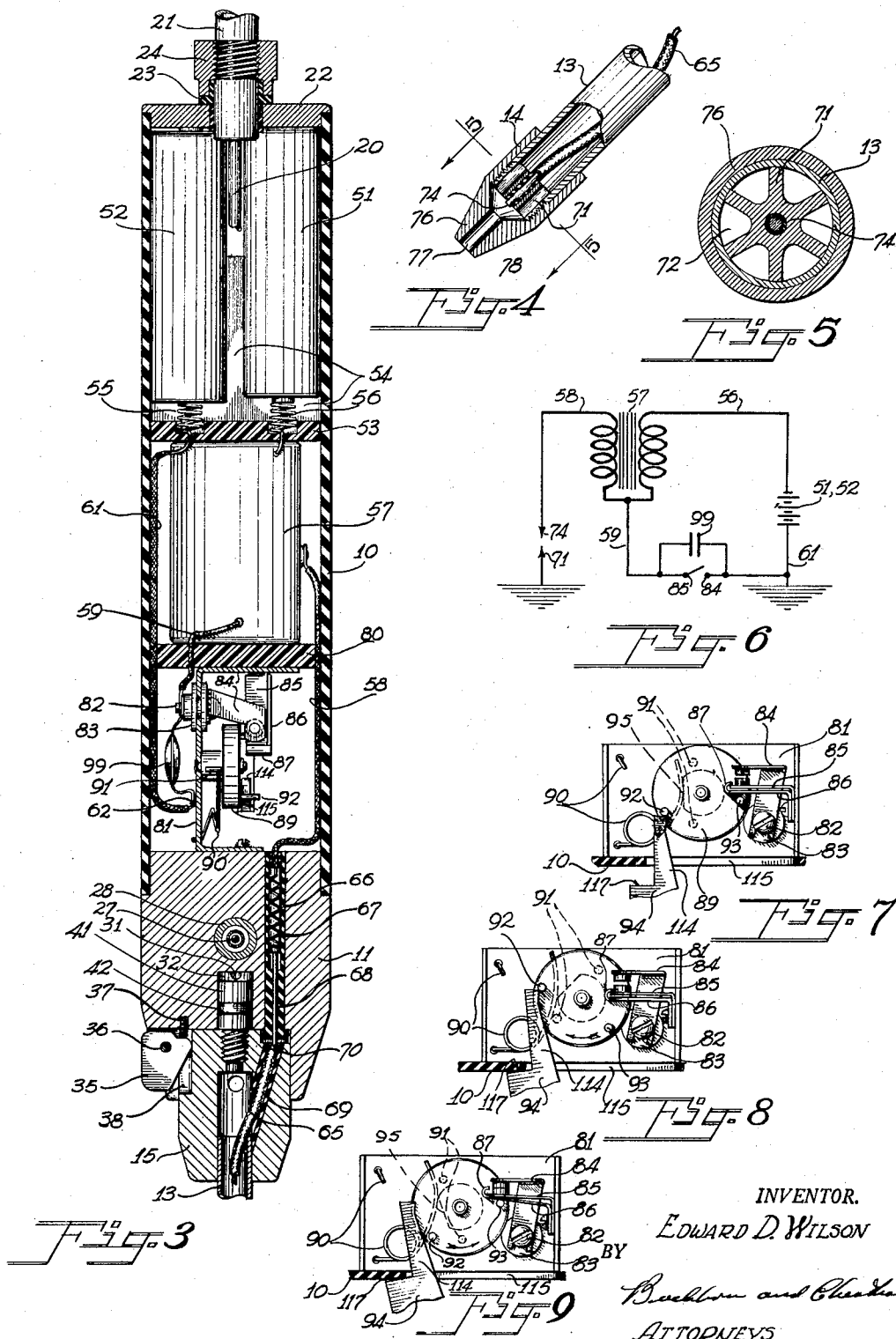
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2,888,066

ELECTRICAL IGNITION GAS TORCH

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4 Claims. (Cl. 158—27.4)

The present invention relates to blowpipe type gas torches of the type used for soldering, brazing or welding and having built-in igniter means.

In my prior Patents Nos. 2,232,893, issued February 25, 1941, and 2,477,917, issued August 2, 1949, are disclosed gas torches having built-in igniter means, the ignition mechanism including relatively movable flint and striker steel elements. The torches disclosed in my aforementioned patents have been widely adopted and have enjoyed considerable commercial success. It is a primary object of the present invention to provide certain improvements in gas torches and more particularly with respect to the ignition means incorporated therein.

More specifically, it is an object of the present invention to provide a new and improved self-contained electrically igniting blowpipe type gas torch.

A still further object of the present invention is to provide a new and improved torch of the class described including a hollow handle within which is incorporated an electrical power supply connected to an ignition electrode disposed inside of the flame tip for igniting the gas flowing therethrough.

Another object of the present invention is to provide a new and improved torch of the class described having electrical power supply means provided in the handle thereof and a single manual control lever extending externally of the handle operatively connected to a valve controlling the flow of gas to the burning tip and to the electrical power supply means in such a manner that when the lever is depressed for using the torch, the gas valve is opened and an arc is produced at an ignition electrode arranged within the flame tube adjacent its outer end for igniting the gas.

A further object is to provide a new and improved ignition electrode arrangement for a torch of the class described.

Another object of the invention is to provide a new and improved removable flame tube for a torch of the class described.

In accordance with the illustrated embodiment, the torch includes a handle having a passage for inflammable gas therethrough and having a flame tube mounted on one end of the handle in communication with the passage, a valve being provided in the handle for controlling the flow of gas through the passage. An electrical power supply means is provided within the handle which is connected to an ignition electrode arranged in the outer end of the flame tube. A manual control lever is provided on the outer surface of the handle which is operatively connected to the control valve and also to the electrical power supply means so that when the lever is depressed as for using the torch, the valve is first opened to permit gas to flow through the flame tube and immediately thereafter, an electrical arc is produced at the ignition electrode for igniting the gas.

Further objects and advantages of the present invention will be apparent from a perusal of the following description taken in connection with the accompanying draw-

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ings wherein like numerals refer to like parts throughout, while the features of novelty will be pointed out with greater particularity in the appended claims.

In the drawings,

Fig. 1 is a longitudinal elevation illustrating a gas torch of the present invention constructed in accordance with one modification thereof;

Fig. 2 is a longitudinal view through the torch shown in Fig. 1 with the casing and certain other parts shown in section to better illustrate internal details;

Fig. 3 is a longitudinal view taken through the torch, with certain parts broken away, or shown in section, but at right angles to the view shown in Fig. 2 and generally in the direction indicated by the arrow 3—3 of Fig. 2;

Fig. 4 is an enlarged sectional view through the flame tip shown in Fig. 1 and illustrating more particularly the electrode arrangement provided in the end of the flame tube;

Fig. 5 is a sectional view drawn to an enlarged scale and taken along the line 5—5 of Fig. 4;

Fig. 6 is a schematic wiring diagram illustrating the electrical connection arrangement of the various elements provided within the torch;

Figs. 7, 8 and 9 are detail views illustrating the switch mechanism incorporated in the torch and shown in various successive positions during normal operation thereof; and

Fig. 10 is a fragmentary view, partly in section, illustrating a portion of the torch constructed in accordance with a further modification of the invention.

Referring now to the drawing and particularly to Fig. 1, the blowpipe or torch of the present invention is comprised of a hollow handle defined in part by a cylindrical tube 10 preferably of insulating material such as, for example, horn fiber, the tube 10 being secured to a head portion 11 by means of screws 12. Secured to the end of the head portion 11 and extending outwardly therefrom is a flame tube 13 having a removable tip 14 threadedly secured to the outer end thereof, the opposite end of the flame tube 13 being anchored to the bushing 15 which, in turn, is removably secured to the head 11 in a manner to be described more fully hereinafter.

Referring now to Figs. 2 and 3, which illustrate the cylindrical tube 10 in longitudinal cross-section so as more clearly to illustrate the internal arrangement of the various parts as mounted within the handle, a passage for inflammable gas is provided therethrough in the form of a tube 20, the outer end of which is anchored within the end of a hose fitting 21 through which connection may be made to a source of inflammable gas supply through a flexible hose (not shown). The fitting 21 extends through a cooperating opening provided through the removable metal end cap or disc 22 and is insulated therefrom by a collar and bushing of insulating material indicated at 23. The end cap 22 is removably secured in place in an abutting relation against the end of the tube 10 by means of a knurled nut 24 cooperatively and threadedly arranged about the base of the fitting 21. The opposite end of the metallic tube 20 is secured to the head member 11 in communication with a passage 25 which in turn communicates with a valve well 26 extending in the direction transversely of the longitudinal axis of the handle. Arranged within the well 26 is a suitable valve element 27 which may, for example, be an ordinary automobile tire valve element, the valve element being shown in this instance threaded into a sleeve 28 which is arranged with a tight press fit within the intermediate portion of the well 26. Arranged within the enlarged outer end portion of the well 26 is a cylindrical rubber bushing 29 having an opening therethrough somewhat larger in diameter than the valve stem. Arranged within the outer end of the bushing 29

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is a round headed stud 30 having a stem projecting inwardly of the bushing, the inner end of the stem being normally slightly spaced away from the adjacent end of the valve stem. Communicating with the outer end of the valve well is a passage 31 which extends diagonally inwardly toward the axis of the handle and opens into a bore 32 provided for the cooperative reception of the inner end of the burner assembly unit.

The burner unit will now be described, which includes the bushing 15, the flame tube 13 and the tip 14 previously mentioned. The bushing 15 is of cylindrical configuration and is fitted cooperatively into an axial bore of corresponding diameter provided in the end of the head member 11. For retaining the burner unit in position and for preventing accidental dislodgment of the burner unit from the handle, a friction dog 35 is mounted within a slot provided in the head member 11 and is retained therewithin by means of a transverse pin 36 shown more clearly in Fig. 3. The dog 35 is resiliently biased in the clockwise direction as viewed in Fig. 3 by means of a small spring 37 provided for that purpose between the head member 11 and a lip of the dog projecting inwardly of the bore provided in the head member. One side of the bushing 15 is provided with a groove 38 extending in the longitudinal direction which is adapted cooperatively to receive the inwardly projecting lip of the dog 35. The depth of the groove 38 is such that as the bushing 15 is inserted into the cooperating bore in the head member, the lip of the dog 35 engages with the bottom of the groove 38 and the dog 35 is rotated about the pivot pin 36 in the counterclockwise direction against the bias of spring 37. With the disposition of the lip frictionally engaging the bottom of groove 38 relative to the position of the pivot pin 36, as shown, accidental withdrawal of the bushing 15 from the handle is prevented. By manually pressing against the portion of the dog projecting from the outer surface of the head member 11, the locking action of the dog lip against the bushing 15 may be broken whereupon the burner unit may readily be separated from the handle.

Threaded coaxially into the end of the bushing 15 is a jet element 41 of cylindrical configuration and of such a diameter as to fit relatively snugly into the cylindrical recess 32. In order to effect a substantially gas-tight seal therebetween, a rubber ring 42 is mounted within an annular groove provided about the element 41. A small disc of very fine wire mesh material 44 is secured within an enlarged outer end portion of the axial bore provided through the jet element 41 defining a flash arrester. This screen also serves as a filter for the inflammable gas to prevent clogging of the fine jet opening 45 provided in the opposite end of the jet element 41. Air for mixing with the gas emerging from the jet orifice 45 is drawn through a pair of passages 46 and 47 provided in the bushing 15. The flame tube 13 is suitably secured such as by brazing in the outer end of the bore 48 in the bushing 15 and extends axially outwardly therefrom. The details of construction of the tip 14 will be described in connection with the ignition system.

In accordance with the present invention, any suitable self-contained source of electrical potential may be provided within the hollow handle of the torch capable of producing a high voltage arc discharge at an ignition electrode arranged within the burner tip and for igniting the inflammable gas flowing therethrough. Suitable self-contained sources for electrical potential may be either of the magneto-electric type or of the battery type. In this instance, a high voltage generating means is provided in the handle including a low voltage battery, a high tension coil, a condenser and a control switch connected in a conventional manner. As shown in the drawings, Fig. 3, a pair of small vest-pocket size flashlight batteries 51 and 52 is provided within the outer end of the tubular handle member 10 immediately adjacent the removable end cap 22, the batteries being arranged in a

side-by-side relation but facing in opposite directions whereby the metallic end cap 22 in and of itself serves to make electrical connection between the unlike polarity end terminals of the batteries held in a firm contacting relation against the end cap. The batteries are maintained in a proper position within the handle by means of a block 53 of insulating material of cylindrical outer configuration and having a transverse slot 54 provided therethrough of a width so as cooperatively to receive the batteries 51 and 52. Mounted in the bottom of the slot 54 are helical contact-making springs 55 and 56 which engage and make electrical contact with the battery terminals opposite the end cap 22. Arranged adjacent the block 53 is a high tension coil 57 having one terminal thereof connected to the contact spring 56, another terminal connected to the ignition electrode through the conductor 58 and a third terminal connected to the switch mechanism through conductor 59. The battery contact spring 55 is connected through conductor 61 to ground, such as to the switch frame as indicated at 62.

Neglecting, for the moment, the details of the switch mechanism, the electrode structure arranged within the tip and flame tube together with the electrical connection arrangement thereof to the conductor 58 will now be described. As previously mentioned, the burner element is removably attached to the handle and, accordingly, provision must be made for effecting an insulated electrical contact between the conductor 58 and an electrical conductor 65 which extends through the hollow flame tube 13. As shown in the view of Fig. 3 which illustrates the torch head member 11 in cross section, it will be observed that conductor 58 is electrically connected to one end of a helical compression spring 66 mounted within a surrounding tubular member 67 of insulating material. The opposite end of the spring 66 bears against the head of a contact pin 68 longitudinally slidable within the tubular member 67, which pin is biased outwardly of the handle. The end of the conductor 65 is securely anchored in the bushing 15 and insulated therefrom by a sleeve 69 of insulating material, the conductor 65 being provided with a contact 70 at the end thereof adapted to be engaged by the end of the pin 68 as the bushing 15 is attached to the head member 11.

Referring now more particularly to the enlarged detail views of Figs. 4 and 5, it will be observed that the other end of the conductor 65 is mounted within a metal bushing 71 which, in turn, is secured with a press fit into the outer end of the tube 13. The metal bushing 71 is provided with a plurality of grooves 72 extending longitudinally thereof throughout its full extent, which define passages for inflammable gas flowing through the tube 13 and serves as a back-fire arrester. It is to be understood that the conductor 65 extending through the tube 13 is insulated. The end of the conductor extends through a cooperating opening provided in the center of the bushing 71 and is insulated therefrom either by means of a separate sleeve of insulating material or by a continuation of the insulation provided about the remainder of the conductor. The end of the conductor 65 projects a very slight distance from the forward end of the bushing 71 and defines an ignition electrode 74. As previously indicated, the electrode portion of the conductor 65 is secured in any suitable manner to the bushing 71 and preferably is secured thereto before the bushing 71 is inserted into the end of the tube 13. Upon insertion of the bushing 71 into the end of the tube 13 the surplus length of the conductor 65 will cause it to buckle somewhat as indicated in Fig. 4 which will cause the conductor to exert a certain amount of pressure in the outward direction thereby tending to offset any tendency which the conductor might otherwise experience to crawl back into the tube 13 and thus pull the electrode end out of the bushing 71.

Threaded upon the exterior end portion of the tube 13 is a flame tip 76 having an axial opening 77 extending

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therethrough, the inner end portion of the opening 77 flaring outwardly to the outer diameter of the tube 13 and defining an ignition chamber 78 surrounding the electrode 74. Inasmuch as the bushing 71 is grounded to the tube 13 by reason of the press fit mounting there-
within, the bushing and the ignition electrode 74 define a spark gap means between which arcing will occur upon application of ignition potential to the ignition electrode 74.

Referring now to the views of Figs. 2 and 3, the details of the switch device will be described. The switch device includes a U-shaped metal frame member 81, one end flange of which is suitably secured to a transversely extending disc 80 of insulating material fitting snugly within the surrounding tube 10, the opposite parallel flange portion of the frame being suitably secured to the inner transverse surface of the torch head member 11. The conductor 59 is electrically secured to a stud 82 securely fastened to and extending through the switch frame member 81 and insulated therefrom by means of a bushing 83 of insulating material, the opposite end of the stud 82 being electrically connected to the contact member 84. A cooperating contact is provided upon a small leaf spring member 85 which is secured to the adjacent flange of the frame member. A second small leaf spring 86 extends parallel with the leaf spring contact bearing member 85 in slightly spaced relation therefrom, the outer end of the leaf spring 86 being doubled back upon itself as indicated at 87 overlying the extreme outer end of the leaf spring 85 as illustrated more clearly in the views of Figs. 7, 8 and 9. It is to be understood that the leaf spring 85 is so biased as normally to urge its contact into closed circuit relationship with respect to the contact mounted on the member 84. The second leaf spring 86, however, is oppositely biased and being slightly stronger than the spring 85 normally holds the contacts apart or in the open circuit condition.

Mounted for free rotation upon the frame 81 is a wheel 89 which is biased to a particular position by means of a spring 90, one end of the spring being secured to the frame 81, the opposite end of the spring 90 normally resting upon the flattened side 95 of a hub portion of wheel 89. A pair of pins 91 are provided on the wheel 89 projecting outwardly therefrom on opposite sides of the flattened hub portion 95 for purposes to be hereinafter described. The normal or rest position of the wheel 89 with the end of the spring 90 resting against the flattened side 95 of the wheel hub is shown in the enlarged detail view of Fig. 7. Projecting outwardly from the front side, or to the right as viewed in Fig. 3, is a further pair of pins 92 and 93. The pin 92 is arranged for cooperative engagement by a trigger element 94 while the pin 93 is adapted to engage with the underneath side of the leaf spring 86, as viewed in Figs. 7, 8 and 9, as will be more fully described.

Referring more particularly to the views of Figs. 1 and 2, manual operating means for simultaneously opening the valve 27 for permitting the flow of inflammable gas to the burning tip and for causing arcing at the electrode is provided in the form of a pivoted lever 101. This lever is U-shaped in cross section and projects outwardly through an elongated slot provided in a cap piece 102. One end of the cap 102 is hooked into a slot provided in the tube 10 as indicated at 103, while the forward end of the cap is fastened to the head member 11 by means of screw 104. The forward end of the lever 101 is bifurcated, the bifurcated end portions 105 being hooked under the thread of a T-shaped screw 106 which is threaded into the head member 11. The lower edges of the bifurcated portions 105 of the lever 101 are adapted to engage against the head of the button 30 and upon depression of the lever 101 against the handle, the button 30 will be pushed inwardly to compress the rubber bushing 29 while the stem of the button 30 engages against the stem of the valve to force the latter to the

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open position. Upon release of the lever, the resiliency of the rubber bushing 29 will force the head 30 and the lever outwardly to the normal valve closed condition illustrated in Fig. 2. For effecting adjustment of the lever 101, the T-headed screw 106 may be screwed either inwardly or outwardly, thereby changing the pivotal point for the lever 101 relative to the surface of the button 30.

Pivotaly mounted between the parallel side walls of the U-shaped lever 101 is the trigger element 94 mounted upon the pin 111 and normally biased in the clockwise direction as viewed in Fig. 2, by means of a small spring 112 operatively connected between the trigger element and the lever member 101. The inner end portion 114 of the trigger element 94 projects through a slot 115 in the tubular casing 10. The inner end portion 114 of the trigger element normally assumes a position of rest in engagement with the pin 92 on wheel 89. As the lever 101 is pressed inwardly toward the handle, the wheel 89 is rotated in the clockwise direction as shown more clearly in Fig. 8. As the lever 101 reaches its inner limit of travel, the shoulder 117 provided on the trigger element 94 engages against the outer surface of the tubular casing 10 at the end of the slot 115 causing the trigger element to rotate in the counterclockwise direction about its pivotal supporting pin 111 and against the bias of spring 112, and thereby causes the outer end portion of the trigger part 114 to slip off the pin 92 on the switch wheel 89. In the view of Fig. 8, the pin 92 is shown just about to slip off the end of the trigger portion 114. As soon as this occurs, and due to the biasing effort of the spring 90 bearing against the flattened wheel hub 95, the wheel 89 is suddenly released for rotation in the counterclockwise direction as indicated by the arrow on the wheel in Fig. 9, whereupon the pin 93 strikes against the underneath surface of the spring 86 to propel the same upwardly because of the inertia of the wheel 89. The upward movement of the spring 86 permits the contact 85 to move upwardly into engagement with the contact 84 to close the circuit from the battery through the high tension coil 57. The spring 90 is selected so as to have sufficient strength to supply sufficient inertia to the wheel 89 to cause the same to move the spring 86 upwardly into engagement with the contact 85 as shown in Fig. 9, whereupon the counterclockwise rotation of the wheel will be stopped and the action of the spring 90 against the flattened hub surface 95 will cause the wheel to reverse direction and ultimately come to its rest position as shown in Fig. 7. The foregoing action causes or permits the contacts 84, 85 to remain closed for a momentary dwell period, starting at the instant the contact 85 first touches the contact 84 and continuing through the interval during which the spring 86 is moved upwardly relative to the contact 85 and into engagement therewith and thereafter downwardly as the wheel 90 returns to rest position, whereupon the doubled end 87 of the spring 86 engages the contact 85 and returns it to the normally open position of the switch as shown in Fig. 7. This dwell period of switch closure is for the purpose of effecting magnetization of the core of the high tension coil 57. Upon reopening of the contacts, the flux field of the high tension coil 57 is caused suddenly to collapse while the inertia current flows into the condenser 99 connected in any suitable manner across the switch contacts, which condenser immediately thereafter again discharges to produce an arc between the electrode 74 and the bushing 71 previously described. The arrangement of the trigger 94 and the wheel 89 serves as an escapement linkage connection whereby the switch is closed and automatically reopened each time the lever 101 is pressed down. The pins 91 adjacent the opposite sides of the flattened surface 95 of the wheel hub are adapted to engage the spring 90 and serve as emergency stops to prevent rotation of the wheel 89 beyond the point where the spring 90 would lose contact with the surface 95.

The wiring diagram for the various electrical elements incorporated in the torch is shown in Fig. 6 with reference numerals applied thereto corresponding to reference numerals as applied to the corresponding parts in the other views of the drawings. It is not believed necessary to describe further the operation of the circuit inasmuch as it will readily be recognized by one skilled in the art as a more or less conventional battery operated ignition circuit. The significant feature of the circuit is that the switch contacts are normally opened and hence there is no current drain upon the batteries when the torch is either lying idle or in use. Power is drawn therefrom only during the brief interval of time that the contacts of the switch mechanism are closed by actuation of the escapement linkage connection of the switch operating lever 101. Thus the batteries, even though small in size, will nevertheless serve effectively over a long period of time but may readily be replaced when completely worn out. Access to the battery compartment may be had by removing the nut 24 and the end cap 22.

It will be noted that switch frame 81, high tension coil 57 and dry cell mounting block 53 are all attached to the head member 11. This construction permits the tube 10 to be withdrawn by sliding the same axially and rearwardly relative to the head member, after removing screws 12, lever cover plate 102 and the end plate 22, so as to expose the switch and other parts for maintenance of the same.

In Fig. 10 is illustrated a further modification of the invention which incorporates a safety valve in the torch head to prevent accidental ignition of the gas when the burner unit is removed from the handle. In the modification as previously described, it will be understood that if the operating lever 101 were depressed when the flame tube or burner unit 13 is removed from the head 11, the valve 27 would be opened permitting inflammable gas to flow through the passage 31 into the recess 32. An arc might also occur between the conductor 53 and the adjacent side wall of the head 11, which arc would ignite the gases flowing from the recess 32. In the modification illustrated in Fig. 10, a safety valve is provided in the recess 32, comprising a valve plug 120 biased outwardly of the recess by means of a spring 121 arranged between the bottom of the recess and the plug. The plug 120 is provided with an enlarged annular flange 122 around its inner end and which is adapted to fit against a rubber O-ring 123 arranged within a cooperating annular recess provided in the side wall of the recess 32 adjacent its outer end. The jet element 124 secured to the bushing 15 is similar to the jet element 41 as previously described, with minor exceptions. It will be recalled that the jet element 41 was provided with a rubber O-ring 42 mounted within a cooperating annular groove for effecting sealing engagement with the smooth cylindrical side wall of the recess 32. The jet element 124 in this instance is provided with a smooth cylindrical outer wall which, upon insertion of the bushing 15 into the cooperating recess provided in the head 11, projects into the recess 32, depressing the valve plug 120 and effecting a sealing engagement with the O-ring 123. The end of the jet element 124 is transversely grooved as indicated at 125 to permit the gas flowing past the valve plug flange 122 to pass into the central passage provided through the jet element.

It will thus be seen that according to the present modification, whenever the burner unit comprising the flame tube 13 and bushing 15 is removed from the torch head 11, the valve 120 will automatically close so as to prevent the passage of gas from the torch in the event that the lever 101 should be pressed.

Having described the invention in what is considered to be a preferred embodiment thereof, it is desired that it be understood that the specific details shown and described are merely illustrative and that the invention may be carried out in other ways. I claim as my inven-

tion all such modifications as come within the true spirit and scope of the appended claims.

I claim:

1. In a gas torch including a handle, means defining a passage for inflammable gas through the handle, a burner unit mounted on said handle in communication with said passage, means in said burner unit defining a spark gap for igniting gas flowing therethrough, a source of electrical potential in said handle, said source including battery, coil and condenser devices, circuit means including a switch connecting said devices to said spark gap means for causing ignition sparking thereat, said switch comprising a pair of relatively movable contacts, a circular inertia element mounted for rotation about its axis, resilient means biasing said inertia element to a rest position, a lever on said handle, and means including an escapement linkage for connecting said lever to said inertia element to rotate said inertia element against the bias of said resilient means in one direction and thereafter to release said inertia element whereby said resilient means causes said inertia element to rotate in the opposite direction to effect closing of said contact elements, closing of said contact elements permitting energization of said coil and subsequent opening of said contacts causing sparking at said gap.

2. In a gas torch including a handle, a passage for inflammable gas through the handle, a burner unit mounted on said handle in communication with said passage, means in said burner unit defining a spark gap for igniting gas flowing therethrough, a source of electrical potential including a battery, a coil, and a condenser in said handle, and circuit means connecting said source to said spark gap means for causing ignition sparking thereat, said circuit means including a switch comprising a pair of relatively movable contact elements normally biased out of contact with one another, an inertia wheel operatively associated with said switch and having a rest position, spring means biasing said wheel to said rest position, said inertia wheel adapted upon rotation in a given direction from said rest position to engage said switch and move the same into contact, a lever on said handle, pawl means operatively associated with said lever for momentarily engaging said wheel upon operation of said lever and effecting rotation of said wheel in the direction opposite said given direction and then releasing the same whereby said spring means causes said wheel to rotate in said given direction to cause closure of said switch contact elements whereupon said coil is energized from said battery and arcing caused across said spark gap upon reopening of said switch contact elements.

3. In an electrically igniting blowpipe having a handle and a burner unit mounted on one end of said handle, a spark gap means in said burner unit for producing an igniting spark, high voltage generating means in said handle connected to said spark gap means for producing a spark thereat, said high voltage generating means including a high tension coil, a battery for charging the same, and switch means for connecting said battery to said high tension coil comprising a first contact and a second contact, spring means operatively connected with said second contact for normally biasing the same out of engagement with said first contact, an operating lever, and inertia means responsive to operation of said lever for causing said second contact to move into engagement with said first contact and to remain in engagement therewith for a sufficient dwell period to effect magnetization of the core of said coil, whereafter arcing is caused at said spark gap.

4. A blowpipe having a hollow handle and a burner unit mounted on one end thereof, said burner unit having a spark gap means for producing an igniting spark, high voltage generating means mounted in said handle connected to said spark gap means for producing a spark thereat, said high voltage generating means including a high tension coil, a battery for charging the same, and

switch means for connecting said battery to said high tension coil comprising a pair of relatively movable contacts, an operating lever, and inertia means responsive to operation of said lever for actuating said contacts to closed condition for a sufficient dwell period to effect magnetization of the core of said coil, thereafter permitting said contacts to open to cause arcing at said spark gap means.

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