

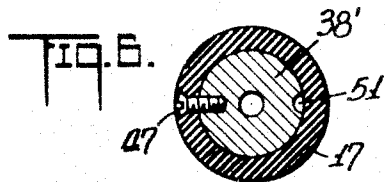
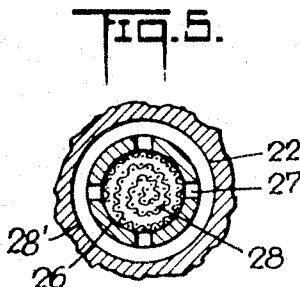
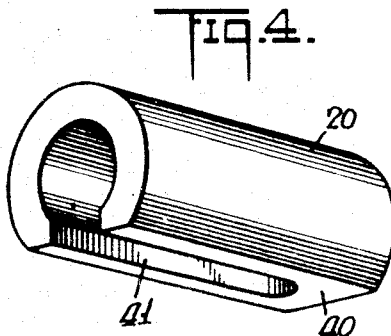
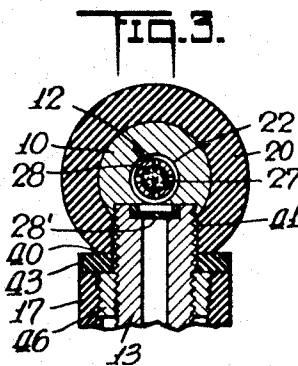
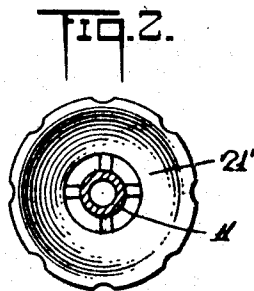
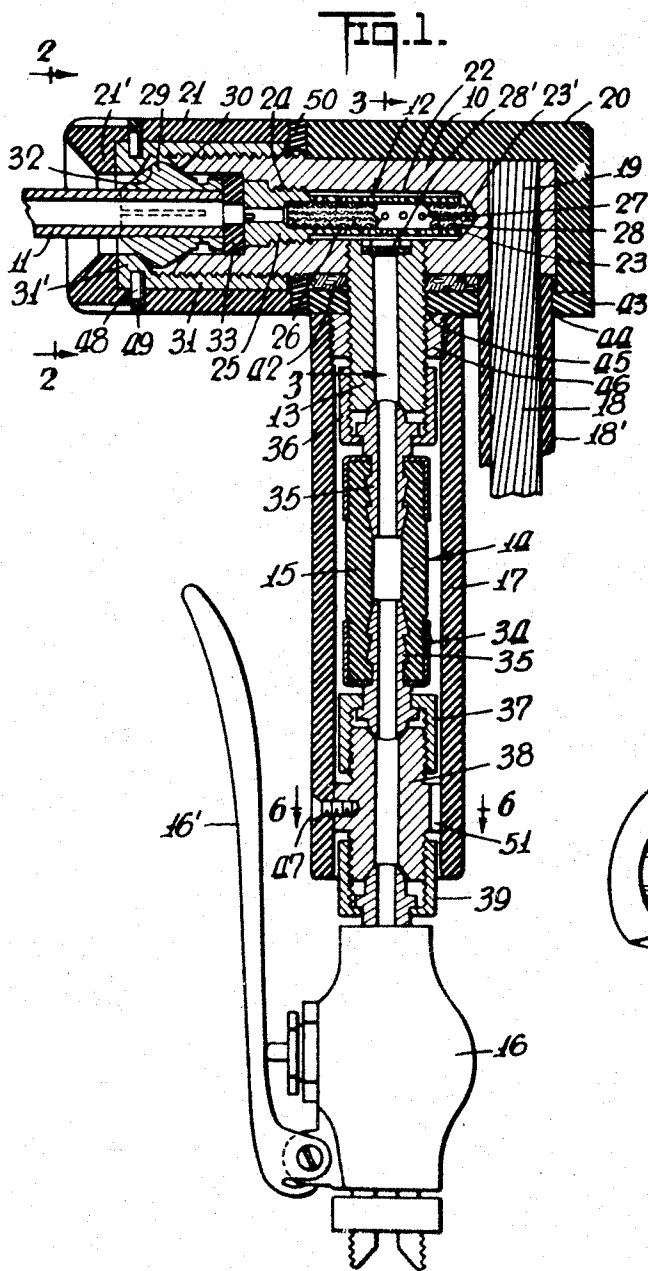
March 18, 1947.

C. KANDEL

2,417,650

CUTTING TORCH

Filed Feb. 2, 1945



INVENTOR
Charles Kandel
BY
Dean L. Lusk & Hirsch
ATTORNEYS

UNITED STATES PATENT OFFICE

2,417,650

CUTTING TORCH

Charles Kandel, Jackson Heights, N. Y.

Application February 2, 1945, Serial No. 575,807

28 Claims. (Cl. 219-15)

1

The present invention relates to electric cutting torches and, while applicable to other uses, has been particularly designed and has particular utility for the use of divers in cutting metal under water.

It is among the general objects of the invention to provide a cutting torch of the above type which is compact, rugged, durable and entirely safe and easy to manipulate in use; and which, more specifically, is substantially proof against harm to the diver, whether from mechanical injury as a result of flash or backfire or from electric shock, even when working under salt water.

It is among other objects to provide such torch in which the electrical insulation of all metal parts, including the current conducting parts and the gas conduit parts that might be exposed to electric potential, is effected reliably without the use of insulating tape or soft dielectric sheeting vulcanized or cemented in place and with substantial avoidance of deterioration of the parts that would occur due to current leakage from exposed areas, in which the force and heat of flash or backfire are efficiently consumed to minimize the possibility of rupture or shattering that might otherwise ensue and in which there is inherent safeguard to the user against likelihood of injury in the remote event that such rupture or shattering should nevertheless occur.

A feature of the invention is the inclusion of a section of insulating flexible hose in the length of the oxygen conduit, preferably in the mid-section thereof, and which serves electrically to insulate the gas-control valve at one end of the conduit from the current-carrying head mounted upon the other end of said conduit, without taking structural stresses of the torch, the handle being a rigid insulating tube encompassing said oxygen conduit, affixed to the head and supporting the structural parts of the conduit.

Another feature is the use of a removable flash or backfire cartridge mounted in a corresponding well in the head to the rear of the tubular electrode fixed in the front of the head, the oxygen conduit delivering through the lateral wall of said well and preferably having a further flash arrestor in the form of wire mesh in its head end, there being desirably a vent within the lower part of the handle for release of expanding gas that has burst through the oxygen conduit in the event of rupture of the latter.

Another feature is the bonding of the free end of the cable into the heel of the head beyond the well, the insulating coating of said cable extending clear to the head, with the cable pref-

2

erably parallel and adjacent to the oxygen conduit.

Another feature is a rigid insulating protective jacket for the torch head, which jacket has a slot straddling the cable and the mounting end of the oxygen conduit and being closed by an insulating plate through holes in which the cable and the conduit pass, said plate being held in position by a nut about the conduit and upon which the insulating handle tube is also mounted.

In the accompanying drawings in which is shown one of various possible embodiments of the several features of the invention,

Fig. 1 is a view of the cutting torch in longitudinal cross section,

Fig. 2 is a transverse sectional view taken on line 2-2 of Fig. 1,

Fig. 3 is a transverse sectional view taken on line 3-3 of Fig. 1,

Fig. 4 is a perspective view of the jacket member for the head,

Fig. 5 is a fragmentary transverse sectional view showing the axial portion of Fig. 3 on a larger scale, and

Fig. 6 is a transverse sectional view on line 6-6 of Fig. 1.

Referring now to the drawings, the cutting torch includes a metal head 10, preferably cylindrical, which has an axial cavity opening at the front of the head, in the forward end of which is removably mounted the conventional tubular electrode 11 and in the rear end of which cavity there is preferably disposed a replaceable flash arrestor cartridge 12. Mounted in the head 10, and extending preferably at right angles thereto, is the outlet 13 of an oxygen conduit 14, which is generally of metal parts, but the median portion of the length of which is a section of flexible insulating hose 15 which protects from electric potential the control valve 16 mounted on the rear end of the oxygen conduit. The length of the oxygen conduit between the valve 16 and the head 10 is protected by a rigid insulating tube 17 which encompasses the same and serves as a handle. The handle tube 17 is affixed at its forward end at the head 10 and serves also as a support for the rear end of the flexible conduit 15. The cable 18 is bare only at that short part 19 at the end thereof which extends transversely through the heel of the head, as shown.

A rigid insulating jacket 20 closely encases and protects the rear of the head 10 and an insulating sleeve 21 similarly protects the forward end of the head as well as the tubular electrode clamping appurtenances.

Now follows a more detailed description of the preferred specific construction of electric cutting torch more generally described above.

The cylindrical head 10 has a well 22 therein closed at its bottom or dead end 23 into which is threaded as at 24 the filler slotted head 25 of the removable flash arrestor cartridge 12. The cartridge includes a sleeve 26 perforated at 27 and spaced closely, preferably about .025 inch from the wall of the well 22. In this cartridge there is removably retained metal wire, preferably in the form of a roll 28 of fine wire mesh screen which extends lengthwise in the direction of, rather than across the path of oxygen flow.

The roll of metal screening fills sleeve 26 and extends beyond the inner end of the sleeve sufficiently, completely to fill the dead end 23 of well 22 when in position, as best shown at 23'.

The tubular electrode 11 is affixed in the head by suitable means, in the particular embodiment shown by a one-piece collet 29 encompassing the base of the electrode and seated against the correspondingly beveled forward edge 30 of the torch head 10. The collet nut 31 threaded upon the head grips the beveled face 32 of the collet to press it about the tubular electrode for effective electrical contact to electrode 11 and secure mechanical hold. Preferably a flexible insulating washer 33 intervening between the head of the cartridge and the base of the collet prevents leak of oxygen from its course into the tubular electrode.

The oxygen conduit includes a nipple 13 screwed into the head 10, preferably at right angles thereto to feed into the middle of the well 22. In a corresponding depression in the outlet end of said nipple are preferably lodged one or more wire mesh disks 28'. The mid-section of the oxygen conduit is a length of flexible insulating hose 15, which has conventional hose ferrules 34 at its ends that clamp the hose upon the hose gland 35. The upper hose gland 35 is connected to the inner end of the nipple 13 by the union nut 36. A similar union nut 37 connects the lower hose gland 35 to a flanged nipple 38 upon which is mounted by means of a third union nut 39 the conventional gas-control valve 16, to the lower end of which is connected the lead (not shown) from the oxygen tank (not shown). The valve 16 has a forwardly extending operating and control lever 18' which extends forward, lengthwise of tube 17.

The bore transversely through the heel of the head that lodges the bare end 19 of the cable 18 is beyond the dead end 23 of the well 22. The cable is bonded in place preferably by soldering from the upper face of the head. The insulating jacket 18' about the cable may thus be kept in place clear to the face of the head, as shown, without damage to the insulating jacket under the heat of soldering.

The metal head 10 is protected by a rigid insulating cylindrical jacket 20 slipped over the heel end thereof and preferably covering the major part of the length as well as the heel end of the head. This jacket is flattened as at 40 at one side thereof and is formed with a slot 41 through the flat. The end of the slot straddles the insulated cable 18, 18' and the sides of said slot straddle the nipple 13. Preferably, insulating compound 42 is poured in place to fill the slot about the nipple and cable sheath. An insulating cover plate 43 through corresponding apertures 44 and 45 in which the cable jacket 18' and the nipple 13 respectively extend, is drawn up-

ward to seat against flat 40 on the jacket. The plate 43 is preferably of a width equal to the outside diameter of tube 17 as shown and is clamped in place by a nut 46 threaded upon the nipple 13.

Upon the nut 46 is threaded the rigid insulating handle tube 17 which thereby also presses against the cover plate 43. Tube 17 is of bore somewhat larger than the main length of the oxygen conduit 14 and is thus spaced therefrom, but the flange 38' of the flanged nipple 38 is rigidly supported within the rear part of the handle tube 17 to which it is affixed by means of a screw 47. To the rigid handle assembly, the valve 16 is affixed by means of the union nut 39 which rigidly mounts the valve upon the flanged nipple 38.

The forward end of the metal head 10 within its collet nut 31 thereon is protected by the insulating sleeve 21 which is telescoped thereover and has an intumed flange 21' protecting and covering the outer surface of the collet clamping shoulder 31' on the nut. The sleeve 21 is preferably fluted as shown in Fig. 2, for convenience of grip and is formed as a unitary piece with the collet nut 31 by countersunk metal dowel pins 48, the outer part of the bores accommodating the same being filled with dielectric plugs 49. A flexible washer 50 about the head 10 in taking the thrust of the sleeve 21 against the edge of jacket 20, completes the insulation of the head.

The flange 38' on the flanged nipple 38 preferably has a longitudinal notch 51 in its periphery, preferably at the side thereof away from the diver's body, which serves as a vent, in manner to be more fully described below.

It will be seen that all of the metal parts of the torch other than the cutting electrode end are completely encased, the oxygen conduit 14 in the handle tube 17, the cable 18 in its sheath 18', and the head 10 in the jacket 20 and insulating sleeve 21. Accordingly, the diver may touch all parts of the head and handle as well as the cable throughout the operation and without the slightest danger of shock, the protection being very much more reliable than that attainable with the use of adhesive insulating tape or adhesively applied dielectric sheeting. There is no danger that the diver will burn a hole in his gear or in the work or otherwise suffer from accidental contact that might occur because of poor visibility, slipping or other causes.

The handle tube 17 is not the oxygen-conveying element but encompasses and protects the same and rigidly sustains the lower nipple end 38 thereof which in turn rigidly mounts the valve 16. The handle tube 17, being attached to the head takes the structural stresses in use of the torch, and no structural stresses are taken by the flexible element 15 of the conduit.

In operation the diver grasps the handle 17, applies the electrode to the surface to be cut, while pressing the valve lever 18' inward with the same hand to control the feed of oxygen through conduit 14 and cartridge 12 to and through the hollow electrode 11. As he draws the tip of the electrode away from the metal, an arc is struck which generates the heat for melting the metal. The molten metal is attacked by the oxygen and the resultant oxide slag is blown away by the pressure of the oxygen stream.

The equipment is substantially proof against damage from the flash or backfire that might occur by the entry into the torch of a speck of incandescent molten metal which, were it to mix with the oxygen in the conduit, might burn with

explosive force and seriously injure the equipment as well as the diver. The heat generated by the combustion initiated by such incandescent particle would be rapidly absorbed in the flash arrestor cartridge 12 and particularly by the wire mesh filler 28 therein which in its cooling function acts on the principle of a Davey miner's safety lamp. The wire mesh 28 extending the entire length of the wall and bottoming against the dead end 23, substantially precludes incipient combustion in the dead end. Any pressure evolved in the incipient backfire would be further greatly reduced by the reflection of the expanding gas from the dead end 23 of the well, the recoil of the flash from the dead end creating a braking and snubbing effect. Both the heat and force resulting from the combustion of incandescent particles would be further reduced and dissipated in passing through the orifices 27 and in circulating through the very narrow passage in the well 22 surrounding the sleeve 26. By the time the mixture has reached the top of the nipple 13, the heat and force thereof will have been spent. However, any residual heat or force will be further reduced and completely dissipated upon entering the nipple 13 by further cooling in flowing past the wire mesh screens 28'. It is highly improbable that there would be sufficient pressure left in the backfiring stream to burst the flexible insulating hose 15 which would expand and yield under such strain. But in the remote event that such hose should burst, the hand of the operator would nevertheless be protected by the rigid insulating handle tube 17 which encompasses the hose. The pressure due to the expanding gas released by the hose bursting under such unusual circumstance would be relieved by blowing through the venting port 51 in a direction away from and without injury to the operator's hand or body and without exertion of undue pressure upon the insulating handle.

Were the wire mesh of the flash arrestor in the head to extend across, rather than along the direction of the flash back, it would be flattened out, displaced and probably ruptured if it received the full impact of the flash.

The insulated sleeve 21-31 can easily be unscrewed for removal and replacement of the electrode 11 and for removal and cleaning or replacement of the flash arrestor cartridge 12. Moreover, upon the simple removal of screw 47, the handle sleeve 17 may be readily unscrewed from nut 46 and the flexible hose section 15 could be conveniently replaced. For the dismantling set forth, only a small wrench and a small screwdriver are required. With these same tools and without resort to a vise, the torch can be readily reassembled, and in such reassembly, all parts are readily brought into alignment in the desired plane. In assembly, the valve lever 16' can be aligned to suit the diver's convenience so that it may be operated by the fingers or the thumb of either hand, depending on requirements.

As many changes could be made in the above construction, and many apparently widely different embodiments of this invention could be made without departing from the scope of the claims, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. An electric cutting torch, comprising an

electrode mounting metal head, an electric cable connected thereto, a gas conduit also affixed thereto and having an insulating section of flexible tubing, a rigid insulating handle encompassing, supporting and spaced laterally of said insulating section of said conduit and affixed to said head, and a gas-control valve beyond said handle and insulated from said metal head by said insulating section of the conduit.

2. An electric cutting torch, comprising a metal head, means for mounting a tubular electrode thereon, a cable connected to said head, a gas conduit affixed at one end in said head having a yieldable insulating section therein, a rigid insulating handle encompassing said insulating section of the conduit and secured in fixed relation to said head for supporting the latter and secured to said conduit independently of said insulating section whereby the latter is in non-supporting relation to said head, and a valve for said conduit mounted near the outer end of said handle and insulated from said head by said insulating section.

3. An electric cutting torch, comprising a metal head, means for mounting a tubular electrode thereon, a cable extending at right angles to said head and having an end extending thereinto and bonded thereto, a gas conduit affixed at one end in said head and extending parallel to said cable, said conduit having a metal section near said head, a second metal section spaced therefrom, and a flexible insulating coupling hose connecting said metal sections, a rigid insulating handle encompassing said conduit, and secured in fixed relation to said head and also to said metal sections of the conduit whereby to provide a support for said head and to support said conduit with said flexible hose in non-supporting relation to said head and a gas valve mounted near the outer end of said handle and insulated from said head by said flexible coupling.

4. An electric cutting torch, comprising a metal head having a gas passage therein, means for mounting a tubular electrode on said head in line with said passage, a cable extending at right angles to said head and having an end extending thereinto and bonded thereto, a gas conduit affixed at one end in said head, positioned near and extending parallel to said cable and having an insulating portion of yieldable material, a rigid insulating handle encompassing said conduit and affixed to said head, and a gas valve mounted near the outer end of said handle and having an operating lever extending lengthwise of said handle in overlapping relation thereto.

5. An electric cutting torch, comprising a tubular head having means for mounting a tubular electrode thereon, a cable extending at right angles to said head and having an end extending thereinto and bonded thereto, a gas conduit extending parallel to said cable and having a metal section affixed at one end in said head, a second metal section spaced therefrom and an insulating coupling hose connecting said metal sections, a rigid insulating handle encompassing said conduit and affixed to said head, a gas valve mounted near the outer end of said handle and having an operating lever extending lengthwise of said handle, said torch having flash arrestor means therein intervening between said electrode and said insulating coupling hose.

6. An electric cutting torch, comprising a tubular head having means for mounting a tubu-

lar electrode thereon, a cable extending at right angles to said head and having an end extending thereinto and bonded thereto, a gas conduit extending parallel to said cable and having a metal section affixed at one end in said head, a second metal section spaced therefrom, and an insulating coupling hose connecting said metal sections, a rigid insulating handle affixed to said head and encompassing said conduit, a gas valve mounted near the outer end of said handle and having an operating lever extending lengthwise of said handle, said head having a removable flash arrestor cartridge therein.

7. In an electric cutting torch which comprises a metal head having means for mounting a tubular electrode thereon, said head having a gas passage for supplying gas to the electrode, a flash arrestor cartridge in said head, the torch head having an axial well therein accommodating said removable flash arrestor cartridge and in which said cartridge has an end threaded into said well and a unitary perforated sleeve extension spaced from the wall of said well, said cartridge having metal wire accommodated therein.

8. In an electric cutting torch of the type including a metal head having means for mounting a tubular electrode thereon, an electric cable affixed to said head, a gas conduit communicating with a bore in said head and a control valve therefor; the combination in which the head has a removable flash arrestor cartridge therein, said cartridge being coaxial with the tubular electrode and being accommodated in a corresponding well axially of said head, said cartridge including a perforated open ended sleeve lodged in said well and spaced from the lateral wall thereof and having a roll of metal wire mesh substantially filling the same.

9. The combination recited in claim 8, in which the roll of metal wire mesh protrudes beyond the open end sleeve and bottoms against the dead end of said well.

10. The combination recited in claim 8, in which the gas conduit has an inlet nipple affixed to said head and communicating with the well that accommodates the removable flash arrestor cartridge and in which one or more wire mesh disks are lodged in the end of the nipple adjacent said well.

11. An electric cutting torch, comprising a metal head, a cable affixed at one end in said head and extending at an angle thereto, an insulating sheath about that part of the length of the cable at the exterior of said head, a gas conduit parallel to said cable, comprising a nipple affixed to said head, said conduit being largely of metal but including an intermediate length of insulating flexible hose, a rigid insulating tube affixed to said head, encompassing and spaced from said conduit for the major part of the length thereof and rigidly supporting the lower end of said conduit, and a gas-control valve assembly connected to said lower end of the conduit.

12. An electric cutting torch, comprising a metal head having an axial bore extending partly through the length thereof, a removable flash arrestor cartridge lodged in the inner end of said bore, a tubular electrode removably clamped in the outer end of said bore in alignment with said cartridge, an electric cable extending at an angle to said head and affixed thereto at a part beyond the end of said bore, a gas conduit extending at an angle to said head and having a gas inlet nipple affixed in said head and communicating with said cartridge-carrying well at a region be-

tween the ends of the latter, said gas conduit including an insulating flexible hose coupled to said inlet nipple, and a flanged nipple connected to the other end of said hose, a gas-control valve assembly connected to said flanged nipple, and a rigid insulating handle sleeve encompassing the length of the gas conduit between the valve and the head.

13. An electric cutting torch, comprising a metal head, a cable affixed at one end in said head and extending at an angle thereto, an insulating sheath about that part of the length of the cable at the exterior of said head, a gas conduit parallel to said cable, comprising a nipple affixed to said head, said conduit being largely of metal but including an intermediate length of insulating flexible hose, a rigid insulating tube about said conduit, a gas-control valve affixed to said conduit beyond said tube and having a control lever extending lengthwise of said tube, a rigid insulating jacket encompassing the rear portion of said head and having lateral openings for said nipple and for said cable, insulating means associated with said jacket and encompassing the exposed part of said nipple, said head having a mount at its forward end for a tubular electrode, and an insulating sleeve encompassing and shielding the forward end of said head.

14. The combination recited in claim 13, in which a collet is mounted in the forward end of said head for clamping a tubular electrode, in which a nut threaded upon said head tightens the collet, in which said insulating sleeve rigidly encompasses said nut, and in which an insulating washer encircling said head is compressed between said sleeve and said jacket.

15. The combination recited in claim 13, in which the head has an axial well therein mounting a flash arrestor cartridge removably threaded therein, said cartridge having a perforated wall spaced from the wall of said well, and a wire mesh roll enclosed therein.

16. An electric cutting torch, comprising a rigid insulating handle, a gas conduit through said handle, those portions of said conduit other than the mid-section thereof being of metal and the mid-section thereof being of insulating flexible hose, said conduit including a nipple, a torch head threaded upon said nipple and extending at right angles to said handle, an electric cable soldered at its extremity into a corresponding aperture in said head, said cable extending parallel and adjacent to said handle, an insulating jacket encasing the rear part of said head and protecting said nipple, a tubular electrode protruding from the forward end of said head, a collet encompassing said electrode, a nut threaded upon the forward end of said head and tightening said collet, an insulating rigid protective sleeve encompassing the side and forward end of said nut, dowel pins locking said sleeve to said nut, and insulating means protecting said pins.

17. An electric cutting torch, comprising a cylindrical metal head having an axial bore through the forward end thereof, a gas conduit extending at an angle to said head and communicating with said bore, said conduit including a nipple affixed to said head, an insulating jacket about the rear portion of said head, said jacket having a slot at one side thereof straddling said nipple, an insulating cover plate having an aperture there-through for said nipple, a nut about said nipple clamping said insulating plate in place, and a rigid insulating handle tube threaded upon said nut and encompassing said gas conduit.

18. The combination recited in claim 17, in which insulating compound about said nipple is interposed between the head and the cover plate.

19. An electric cutting torch, comprising a metal head having an axial bore therein extending for the major part of the length thereof, a cable extending at right angles to said head and bonded in a transverse bore beyond said longitudinal bore, a gas conduit parallel to said cable and having a nipple and threaded into said head and communicating with said longitudinal bore, a rigid cylindrical insulating jacket housing the rear portion of the head, said jacket having a slot at one side thereof straddling the nipple and the cable, a cover plate having openings through which the nipple and the cable extend, and a rigid insulating tube encompassing said gas conduit, engaging said cover plate at one end, affixed at said end upon said nipple and extending concentrically with and supporting said conduit near the other end thereof, a tubular electrode mounted in the forward end of the longitudinal bore of the head, metal means clamping said electrode in place, and an insulating protective sleeve encompassing the forward end of said head and said clamping means.

20. An electric cutting torch, comprising a tubular metal head having a longitudinal bore therein, means for securing a tubular electrode in the outer part of said bore, a gas conduit at right angles to said head affixed thereto at one end in communication with said bore, a gas control valve affixed at the outer end of said conduit, said conduit having end sections of metal and a median section of insulating flexible hose, a rigid insulating handle tube encompassing and protecting said conduit, said tube being rigidly affixed at the head and concentrically with and about the corresponding portion of said gas conduit and having rigidly mounted therein and near the rear end thereof the corresponding portion of said conduit, the rear mount of said conduit having a vent therethrough.

21. In an electric cutting torch, a torch head, a gas control valve and a gas conduit intervening between said head and said valve, said conduit comprising a nipple affixed in said head, a length of insulating flexible hose having ferrules on the ends thereof, a union nut affixing one end of said hose to said nipple, a union nut upon the other end of the hose, a flanged nipple held in place at one end thereof by said union nut, a valve mounted upon the other end of said flanged nipple, a rigid insulating tube surrounding said conduit and mounted at one end thereof with respect to said nipple, the other end thereof embracing and supporting the flange of said flanged nipple, said flanged nipple having a rearwardly extending vent through the flange thereof.

22. An electric cutting torch, comprising a cylindrical metal head, a longitudinal axial cavity therein, a tubular electrode mounted in the forward part of said cavity, a removable flash arrestor cartridge mounted in the rear part of said cavity, a gas conduit including a nipple affixed laterally in said head and communicating with said cartridge, metal screen in one end of said nipple, an insulating jacket about said head having a slot therein straddling said nipple, an insulating cover plate having an opening accommodating said nipple, and facing said slot, a nut threaded upon said nipple and clamping said cover plate in position, said gas conduit including a flanged nipple spaced from said nipple, an insulating flexible hose constituting the intermediate part of the length of said conduit, union nuts join-

ing opposite ends of said hose to the nipple and the flanged nipple respectively, a rigid insulating handle tube threaded at one end upon said nut and substantially abutting said cover plate and supporting near its other end the flange of the flanged nipple, said handle tube being fixed to said flange, and a vent extending through said flange.

23. An electric cutting torch comprising a cylindrical metal head, an electric cable connected to said head and extending at right angles thereto, a gas conduit having a nipple at one end mounted in said head and having a flexible insulating mid-section, a rigid insulating handle sleeve encompassing said conduit and affixed rigidly about said nipple at the head end thereof, said handle tube constituting a rigid support for the lower end of said conduit, an insulating cup-shaped jacket flattened at one side and longitudinally slotted at said flat, telescoped over the heel end of said head with the slot embracing the cable and the nipple, insulating composition filling said slot and an insulating plate having apertures for said cable and said nipple interposed between the handle tube and said flat and seated thereagainst, and a sleeve having an insulated exterior threaded upon the forward end of said head and an insulating washer encompassing said head and maintained under compression between said jacket and said sleeve.

24. An electric torch including a metal head, a gas conduit affixed to and extending laterally from said head, said head having an axial cavity including a well at the inner end thereof having a dead end, a removable flash arrestor cartridge mounted in said well and including a perforated sleeve of diameter slightly less than that of said well, a wire mesh roll filling said sleeve, and a tubular electrode removably affixed in the forward end of said cavity.

25. In an electric cutting torch comprising a metal head having means for mounting a tubular electrode therein and provided with a gas passage leading to the interior of said tubular electrode for supplying oxygen thereto, means in said oxygen-supply passage for dissipating the heat of burning metal particles which might enter said head through the electrode, in the cutting operation of the torch, said means comprising heat absorbing and dissipating fluid-pervious material disposed in and extending longitudinally of said passage.

26. In an electric cutting torch which is provided with a longitudinal metal head adapted to hold a tubular electrode and having an internal longitudinal passage for gas supplied to the work through the electrode for supplying oxygen thereto, means in said oxygen-supply passage for dissipating the heat of burning metal particles which might enter said head through the electrode, in the cutting operation of the torch, said means comprising a roll of metallic screening disposed in said passage and extending longitudinally thereof with the longitudinal axis of said roll disposed longitudinally of said passage.

27. In an electric cutting torch which is provided with a longitudinal metal head adapted to hold a tubular electrode and having an internal longitudinal passage for gas supplied to the work through the electrode, means in said passage for cooling hot metal particles which might enter said head through the electrode, in the cutting operation of the torch, said means comprising a cartridge removably disposed in said passage longitudinally thereof and having a perforate pe-

ripheral wall spaced laterally from the inner peripheral wall of said passage and containing heat-absorbing fluid-pervious material comprising a roll of metallic screening disposed in said passage and extending longitudinally thereof with the longitudinal axis of said roll disposed longitudinally of said passage.

28. An electric cutting torch comprising a metal head, means for mounting a tubular electrode thereon, a gas conduit connected to said head for supplying gas to the electrode, said conduit having a yieldable insulating section therein, and a rigid insulating handle connected to said head as a support therefor, said handle surrounding said yieldable section of the conduit in laterally spaced relation thereto and secured to a part of said conduit for supporting the latter, said head being supported by said handle inde-

pendently of said yieldable section of said conduit.

CHARLES KANDEL.

REFERENCES CITED

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

UNITED STATES PATENTS

10	Number	Name	Date
	1,609,859	Bond	Dec. 7, 1926
	1,687,081	Chapman	Oct. 9, 1928
	1,927,135	Sammons	Sept. 19, 1933
	2,284,648	Foreman	June 2, 1942
15	1,037,979	Perkins	Sept. 10, 1912

FOREIGN PATENTS

Number	Country	Date
236,098	British	July 2, 1925