J. F. WILLIAMS.

BLOWPIPE.

APPLICATION FILED MAY 28, 1909.

942,690. Patented Dec. 7, 1909.

2 SHEETS—SHEET 1.

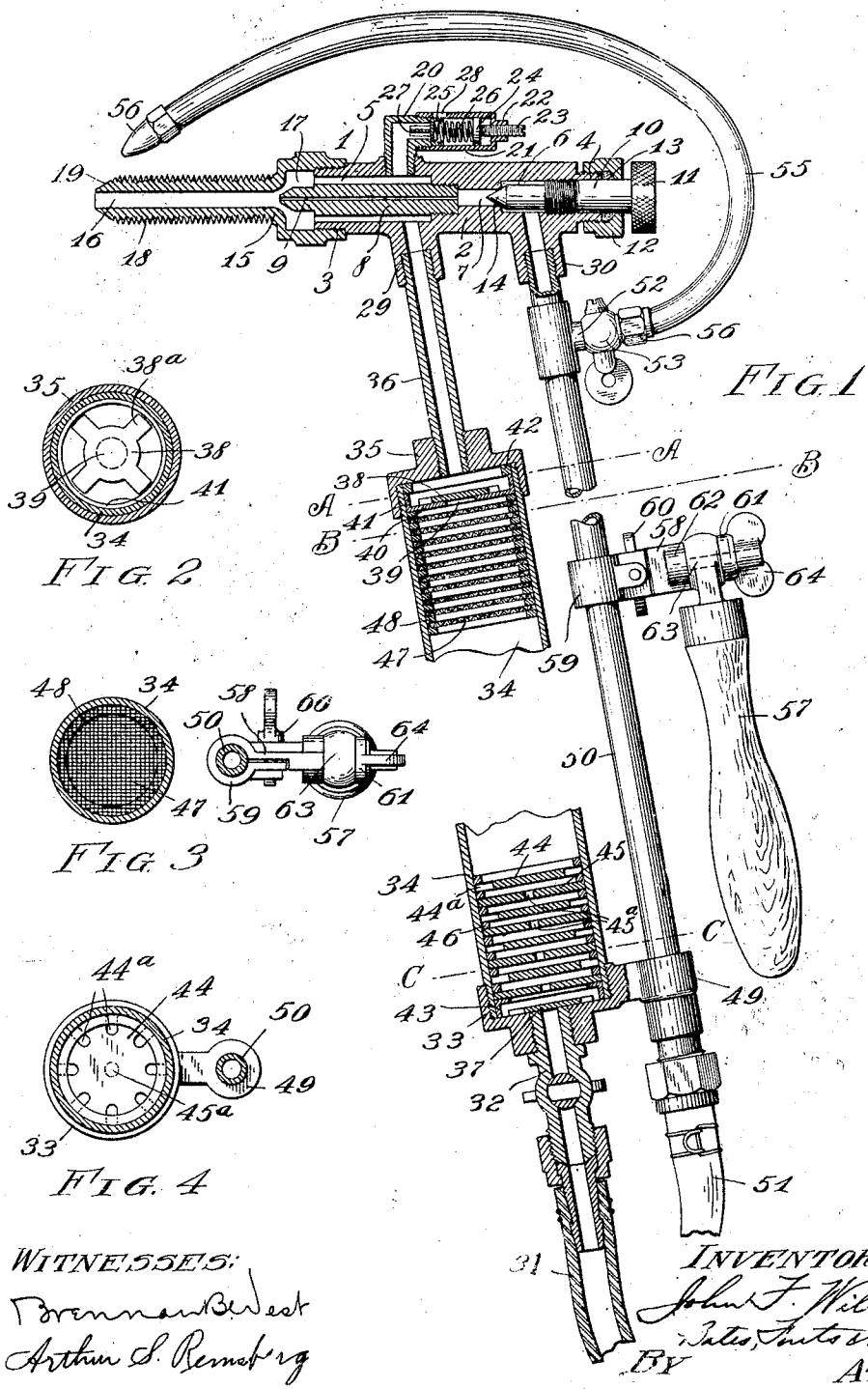

FIG. 1

FIG. 2

FIG. 3

FIG. 4

WITNESSES:

Brennan & West

Arthur S. Remsberg

INVENTOR,

John F. Williams

by Bates, Coates & Hull

ATTYS.

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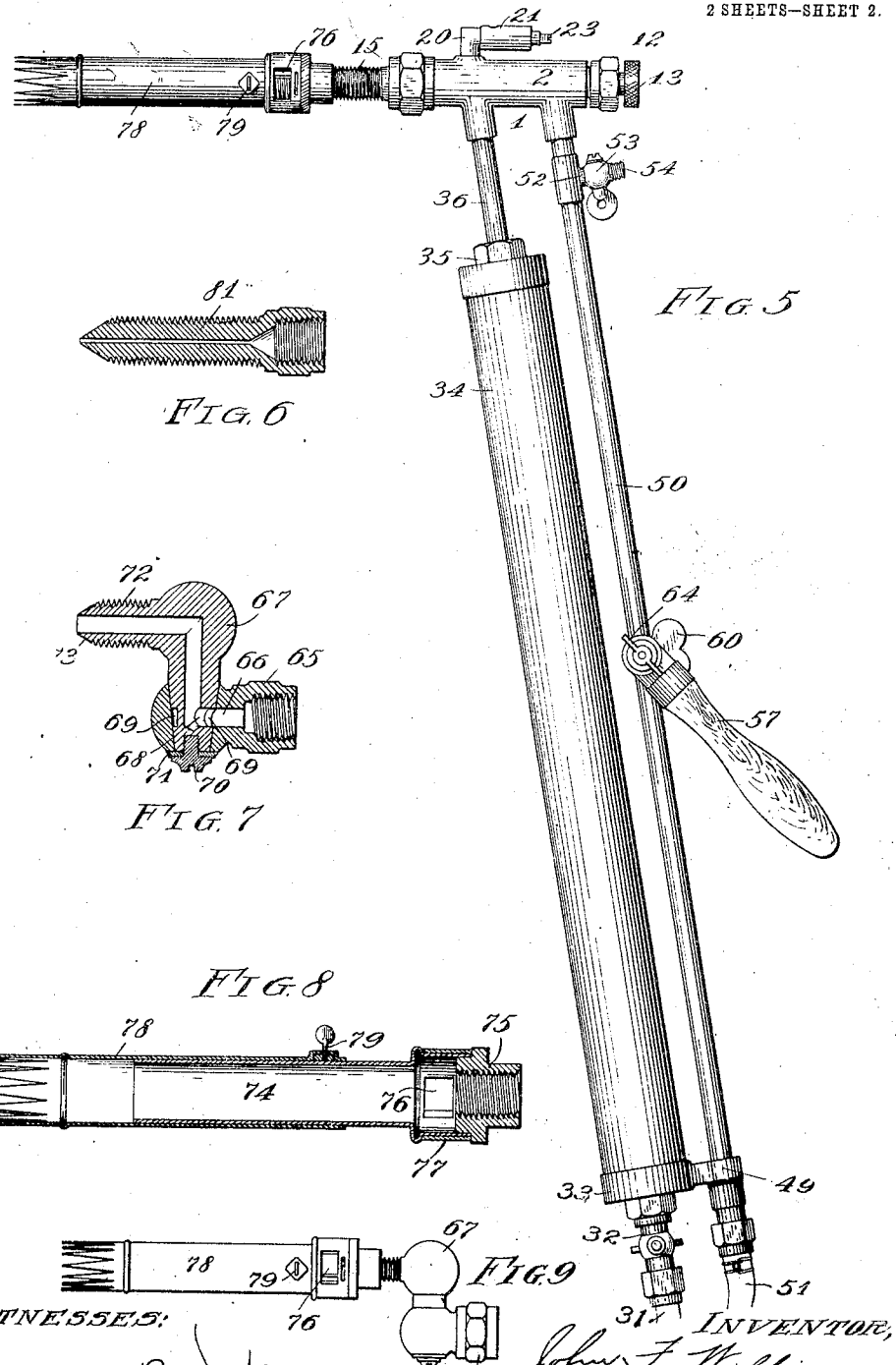

FIG. 5

FIG. 6

FIG. 7

FIG. 8

FIG 9

WITNESSES:

Brennan B. West.

Arthur S. Remberg

INVENTOR,

John F. Williams

BY Bates, Souts & Hull.

ATTYS.

UNITED STATES PATENT OFFICE.

JOHN F. WILLIAMS, OF SANDUSKY, OHIO.

BLOWPIPE.

942,690. Specification of Letters Patent. Patented Dec. 7, 1909.

Application filed May 28, 1909. Serial No. 498,822.

To all whom it may concern:

Be it known that I, JOHN F. WILLIAMS, a citizen of the United States, residing at Sandusky, in the county of Lake and State of Ohio, have invented a certain new and useful Improvement in Blowpipes, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

This invention relates to blow pipes, and especially pipes which are designed for the burning of acetylene.

Objects of my invention are to provide a pipe of this kind which shall be extremely safe, convenient of operation, and which, while combining the factors of safety and convenience, shall be light in weight and capable of a wider range of application.

Generally speaking, the invention may be defined as consisting of the combinations of elements embodied in the claims hereto annexed and illustrated in the drawings forming part hereof, wherein—

Figure 1 represents a view, partly in longitudinal section and partly in elevation, of a blow pipe constructed in accordance with my invention, showing the connections for supplying fuel thereto; Figs. 2, 3 and 4 are sectional details corresponding respectively to the lines A—A, B—B and C—C of Fig. 1; Fig. 5 represents an elevation of the pipe shown in Fig. 1, the oxygen branch pipe being omitted and a special form of tip being shown as applied thereto; Figs. 6, 7 and 8 represent longitudinal sectional views through special tips which may be employed with my pipe; and Fig. 9 is a similar view illustrating the manner in which the tip shown in Fig. 7 may be combined with the other forms of tips.

Describing the parts by reference characters, 1 represents the blow pipe generally, the same comprising a hollow body or casing 2 which is generally cylindrical in shape and is provided with an externally threaded front end 3 and an externally threaded rear end 4. The front of the casing 2 is provided with an internal chamber 5 and the rear end with a chamber 6, said chambers being connected by a relatively reduced bore 7, the front end of which is internally threaded for the reception of the rear end of a nozzle 8. This nozzle is provided with a restricted bore 9. The rear end of chamber 6 is provided with a thread for the reception of a corresponding external thread on a valve stem 10. This stem extends through the rear of the casing 2 and is there provided with a milled head 11. A gland nut 12 is threaded onto the rear end of the casing 2 and is provided with a chamber for packing 13. The front end of the stem 10 is reduced to provide an annular space thereabout and the extreme front end of the stem is tapered, as shown at 14, to provide a needle valve coöperating with the inlet end of the bore 7.

15 denotes a tip which is provided with a bore 16 communicating with a chamber 17, the chambered end being provided with an internal thread by means of which the tip is screwed onto the front of the casing 2. The front end of the nozzle 9 projects across the chamber 17 and into the flaring inlet end of the bore 16. The outer surface of the tip is provided with a screw thread 18. This thread is deep, whereby it serves the double purpose of affording a connection for additional tips and means for cooling, by radiation, the tip 15. The front or discharge end of the tip 15 is beveled, as shown at 19, to enable it to form a tight or union connection with other tips.

The casing 2 is provided with a connection 20 which is threaded into the upper portion thereof and communicates with the chamber 5. This connection is preferably a short, angular pipe section, one branch of which extends substantially parallel with the casing 2 and is provided with a threaded end for the reception of the correspondingly threaded end of the sleeve 21. This sleeve is provided at its opposite end with an internally threaded projection 22 for a threaded stem 23, said stem carrying within the sleeve or casing a plunger 24.

25 denotes a valve which is normally held to its seat on the outer end of the connection 20 by means of a spring 26 interposed between said valve and the plunger 24. The valve 25 has a guide 27 projecting into the connection 20 and a flange which receives the end of the spring 26 and normally covers an opening 28 in the wall of the casing 21.

The construction described comprises a safety blow off valve for the blow pipe, the pressure at which the valve will be unseated by internal pressure being determined by the

adjustment of the stem 23 and the compression of the spring 26.

On its under side, the casing 2 is provided with the threaded projections 29 and 30 for the reception of the acetylene and oxygen supply conduits respectively. The conduit by means of which acetylene is supplied through the pipe comprises a flexible pipe 31, a valved connection 32 which is threaded into a base 33, said base having threaded thereinto the casing 34. The upper end of this casing is threaded into a reduced member 35 which in turn is connected to the projection 29 by means of a pipe section 36.

Within the casing 34 there is located means which will normally prevent the propagation of flame and the passage of a mixture of gas and oxygen thereinto. The means for preventing such passage of flame and mixture comprises two series of members extending across the casing and check valves located at opposite ends of said casing. At the lower end of the casing is located the check valve 37. This check valve is identical in construction with the check valve 38 at the upper end of the casing and which is shown more particularly in Fig. 2. Each check valve is provided with a solid or imperforate center adapted to cover and close the passageway therebeneath. The check valve 37 is adapted to close the passageway through the connection 32 and check valve 38 in like manner to cover and close the aperture 39 through a plate 40 therebeneath. The plate 40 has an upstanding flange 41 forming a guide for the arms 38^a of the valve 38. Above said flange, there is located a washer 42, which forms a stop for the outer ends of the arms, whereby a free passage will be provided around the central portion of the check valve 38 to the pipe section 36.

43 denotes a washer having a depending skirt or flange which forms a guide for the outer ends of the arms of the check valve 37 in the same manner that the flange 41 guides the arms of the check valve 38. The inwardly projecting portion of 43 forms a stop for the check valve 37, leaving a space around the body of said valve for the flow of gas.

In the lower portion of the casing 34 and above the check valve 37 there is located a series of baffle plates 44 and 45. The baffle plates 44 are each provided with peripheral notches 44^a and the baffle plates 45 each with a central aperture 45^a and the plates 44 and 45 are so arranged that the gas flowing through the casing is spread outwardly by one of said baffle plates and caused to converge to the central orifice in the next baffle plate, this action being repeated throughout the series of plates. The plates are separated by means of washers 46. The construction and arrangement of plates provides a tortuous path for the gas through the casing 34 and minimizes the danger of propagating flame through said casing.

In the upper portion of the casing there is arranged a series of transverse disks 47 of foraminated material, such as wire gauze; said disks being separated by washers 48. These disks provide a restricted tortuous passageway for the gas through the upper part of the casing and also minimize the danger of the propagation of flame through the casing.

The base member 33 is provided with a lateral projection having a guide 49 for the supply pipe 50. This pipe is provided for the purpose of supplying oxygen to the chamber 6, being connected at its upper end to the projection 30. The pipe 50 is connected at its lower end with a flexible supply pipe 51. At its upper end it is provided with a lateral branch 52 having a valve 53 therein. This branch is provided with a threaded end 54 for use in connection with a branch pipe for the purpose of supplying oxygen to the blow pipe flame when it is desired to produce a highly concentrated flame, such as is known in the art as a "cutting flame." This branch pipe is shown at 55 and is connected to the lateral branch 52 by means of a union 56. The pipe 55 curves around the blow pipe proper and is provided with a nozzle 56 which discharges the oxygen into the gases and flame at the outlet end of the pipe.

On the pipe 50 there is mounted a handle 57. This handle is carried by a bracket 58. This bracket is provided with a split sleeve 59 which extends around the pipe 50 and is clamped to said pipe by means of a bolt having a wing nut 60. The handle 57 is pivotally connected to the bracket by means of lugs 61 and 62 and a bolt 63 extending through the lug 61, threaded into the other lug 62 and provided with a wing nut 64. By slacking upon the wing nut 60, the handle may be adjusted longitudinally of the pipe 50 and may be rotated thereon to place the handle in any desired position with respect to said pipe, while the rotary connection between the handle and its bracket enables the handle itself to be set at any angle with respect to said bracket. This adjustment provides an extremely convenient means for operating the blow pipe in various conditions of use.

As previously stated, the tip 15 is threaded. In Fig. 9 I have shown a combination of tips that may be employed therewith for the purpose of convenience of operation and for the production of a special flame. One of these tips comprises an internally threaded connection 65, said connection being adapted to be threaded onto the end of the tip 15. This connection is provided with a

bore 66 communicating with a tapered chamber. In this chamber there is swiveled the lower end of an angle pipe 67, said pipe having a port 68 communicating with an annular channel 69 in the wall thereof and said channel communicating with the port 66. By this construction, communication is afforded between the bore 66 and the interior of the pipe 67 in any position which the latter may asume with respect to the former. The angle pipe is drawn to its seat by means of a screw 70 extending through a washer 71 and threaded into the lower end of the angle pipe, the washer bearing on the lower end of the fitting 65. The outer end of the pipe 67 is threaded similarly to the tip 15 as shown at 72, and is provided with a tapered end 73 in the same manner as the corresponding end of the former tip, so that it may form a connection for other tips, such for instance as the tip applied thereto in Fig. 9. This tip is constructed as a Bunsen tube 74 having at one end a threaded connection 75 by means of which it may be applied either to the threaded end 72 of the tip comprising the angle pipe 67 or may be applied directly to tip 15, as shown in Fig. 5. This Bunsen tube is provided immediately beyond the connection 75 with air ports 76 which are controlled by a valve sleeve 77. The Bunsen tube is preferably made adjustable in length by means of an extensible member 78 telescopically fitted thereon and secured in place by means of a set screw 79. The outer end of the Bunsen tube is of peculiar formation, such formation being secured by providing the outer end of the extension 78 with prongs shown as V-shaped points 80. The Bunsen attachment admits air to the acetylene or the mixture of acetylene and oxygen issuing from the tips 15 or 67, whereby the acetylene may be burned either with air alone or a mixture of oxygen and air. The points 80 protect the flame and in operation become red hot, whereby they ignite the gases issuing from the tube in case the flame should become accidentally extinguished. The adjustability of the tube by means of the member 78 controls the character and length of the flame.

In Fig. 6 there is shown a form of tip 81 which may be applied to either the tips 15 or 67 when a small flame is desired.

In operation, acetylene flows through the conduit 34 and the transverse baffles arranged therein into the chamber 5. Oxygen is admitted by means of pipe 50 and valve 11 into the bore 7 and is discharged through bore 8 into the tip 15, where it mingles with the acetylene. Should the tip 15 become obstructed, the accumulation of pressure would cause the mixture of oxygen and gas to pass backwardly into the casing 34, under the relatively high pressure of the oxygen, but for the fact that this action is ordinarily prevented by the check valve 38. This check valve closes communication between the casing and the blow pipes, and propagation of flame through the casing will be ordinarily prevented. When the pressure accumulates to a point at which the valve 25 is set, this valve opens and the gases escape through port 28. I consider the provision of the safety valve and of the check valve to be of great importance. Should the outlet become so obstructed that flame cannot be propagated therethrough into the interior of the pipe, there is still danger that the heat may ignite and explode the compressed mixture therein and that the mixture, backing up into the acetylene conduit may explode and cause great damage there. This action however will be prevented by my construction. Should for any reason the check valve 38 fail to operate, the check valve 37 at the opposite end of the casing will effectually prevent a mixture of acetylene and oxygen or oxygen alone from passing therebeyond into the apertures.

The use of the branch pipe 55 with its valve 53 enable me to obtain a cutting flame with an oxy-acetylene blow pipe without the necessity for two oxygen tanks to accommodate the varying pressures required in the blow pipe and in the branch pipe. I am enabled to conduct through pipe 55 and valve 53 oxygen at the maximum pressure within the tank while, by use of the valve 11, I am enabled to reduce the pressure of the oxygen to such a point as will make it most efficient for mixture with acetylene in the blow pipe. The tip 67 renders the pipe particularly convement for working in corners and for directing the flame to various out-of-the-way places, and is useful either as a single tip or combined with other tips. The manner of connecting the handle to the pipe enables the latter to be very conveniently manipulated, and this result is facilitated by the use of the swivel tip.

Having thus described my invention, what I claim is:

1. The combination, with a blow pipe casing, of a conduit for supplying gas therethrough, and a series of transverse members in said conduit, said members being spaced apart and being provided with apertures forming a restricted passageway for the gas through the conduit.

2. The combination of a blow pipe having a conduit for supplying gas therethrough, and two series of transverse members in said blow pipe, the members of one series being formed of foraminous material and the members of the other series being provided alternately with centrally arranged and externally arranged apertures providing a tortuous passageway for the gas through the conduit.

3. The combination of a blow pipe having

a conduit for supplying gas therethrough, and a series of spaced transversely arranged members of foraminous material in said conduit forming a restricted passageway for gas therethrough.

4. The combination of a blow pipe, a conduit for supplying gas therethrough, and a series of transverse partitions in said conduit, said partitions being provided alternately with a centrally arranged and an externally arranged passageway, providing a restricted, tortuous passageway for gas through the conduit.

5. The combination of a blow pipe and means for supplying gas therethrough, said means comprising a conduit having means providing a restricted passageway for gas therethrough, and a check valve arranged to close the discharge end of the conduit.

6. The combination of a blow pipe, a conduit for supplying gas therethrough, means forming a restricted passageway for gas through said conduit, and a pair of check valves located at opposite ends of said conduit.

7. The combination of a blow pipe, means for supplying gas therethrough, said means comprising a conduit having at its outlet end a centrally arranged discharge port, a disk having a central body arranged to close said port and a passageway located outside of the central body portion, and means for centering said disk.

8. The combination of a blow pipe and a conduit for supplying gas therethrough, said conduit having at the discharge end thereof a disk provided with a central aperture and a peripheral flange extending along said conduit, a check valve controlling the aperture in said disk and comprising a disk having a central body adapted to close said aperture and a passageway exterior to said central body, said valve having means engaging said flange, and an inwardly projecting member beyond said flange and adapted to engage the peripheral portion of the check valve to limit the movement of the same away from the aperture in the first-mentioned disk.

9. The combination of a blow pipe, a conduit for supplying gas therethrough, said conduit having at each end thereof a disk, one of said disks having a flange projecting toward the outlet end of the conduit and the other having a flange projecting toward the inlet end of the conduit, the disk which is adjacent to the outlet end being provided with a central aperture, and a disk valve at each end of said conduit, each of said valves having a central body portion and a passageway external to said central body portion and each valve having means engaging a flange whereby said valves are centered.

10. A blow pipe comprising a casing having means for supplying gases thereto, and a relief valve carried by said casing and adapted to open when the pressure in the casing reaches a certain predetermined degree.

11. A blow pipe comprising a casing having means for supplying gases thereto, a relief valve carried by said casing and adapted to be opened by the pressure in the casing and means whereby the pressure at which said valve opens may be varied.

12. A blow pipe comprising a casing having a mixing chamber for gases therein, and a pressure-relief valve communicating with said chamber and adapted to open when the pressure exceeds a predetermined limit.

13. A blow pipe comprising a casing, means for supplying gases thereto, a pipe projecting from said casing, said pipe having an outwardly opening valve therein, a spring tending to seat said valve, and means for adjusting the tension of said spring.

14. The combination of a blow pipe, a conduit for supplying gas thereto, said conduit having means forming a restricted passageway for gas therethrough, a check valve at the outlet end of said conduit, and a pressure-relief valve communicating with the blow pipe casing.

15. The combination of a blow pipe, a conduit for supplying gas thereto, said conduit having a check valve arranged to be seated by pressure created within the blow pipe, and a pressure-relief valve for said pipe arranged to be opened by pressure within the same.

16. The combination of a blow pipe casing, a conduit for supplying gas thereto, said conduit having means forming a restricted passageway for the gas therethrough, a checkvalve at each end of said conduit, and a pressure relief valve for said casing adapted to be opened by pressure within said casing.

17. In a blow pipe, the combination of a casing, means for supplying gases thereto, and a tip for said casing, said tip comprising two members, and a swivel connection between said members.

18. In a blow pipe, the combination of a casing having means for supplying gases thereto, and a tip for said casing, said tip comprising a pair of rotatably connected members, one of said members being provided with an internal thread for application to the blow pipe and the other member having a swiveled connection with the former member, each of said members being provided with a bore, and means for preserving communication between said bores.

19. A blow pipe comprising a casing, means for supplying gases thereto, and a tip for said blow pipe, said tip having at one end a threaded connection for application to the pipe and a tube projecting from said connection and having a valve-controlled

aperture adjacent to said connection, and means for varying the length of said tube.

20. A blow pipe comprising a casing, means for supplying gases thereto, and a tip for said blow pipe, said tip having at one end a threaded connection for application to the pipe and a tube projecting from said connection and having a valve controlled aperture adjacent to said connection, said tube comprising two telescoping members and means for securing said members together.

21. A blow pipe comprising a casing having means for supplying gases thereto and a tip, said tip having at one end a threaded connection and having adjacent said connection a valve-controlled aperture and a tube projecting beyond the valve-controlled aperture, said tube having its outer end provided with prongs.

22. The combination of a blow pipe casing, a pipe for supplying gas thereto, and a handle mounted on said pipe and longitudinally adjustable thereon.

23. The combination of a blow pipe casing, a pipe for supplying gas to said casing, a handle rotatably mounted on said pipe, and means for securing said handle rigidly to said pipe.

24. The combination of a blow pipe casing, a pipe for supplying a gas thereto, a bracket adjustable longitudinally and rotarily with respect to said pipe, and a handle rotarily adjustable on said bracket.

25. A blow pipe comprising a casing having means for supplying gases thereto and a tip, said tip having a tube the outer end of which is notched or serrated.

26. The combination of a blow pipe having a conduit for supplying gas therethrough, and a series of uniformly spaced transverse members of foraminous material in said conduit forming a restricted passageway for gas therethrough.

27. The combination of a blow pipe having a conduit for supplying gas therethrough, a series of transversely extending members of foraminous material in said conduit, forming a restricted passageway for gas therethrough, and washers interposed between said members.

28. A blow pipe comprising a casing having means for supplying gases therethrough and a tip, said tip having at one end a connection for application to said casing and having adjacent said connection an aperture, and a tube projecting beyond the said aperture.

In testimony whereof, I hereunto affix my signature in the presence of two witnesses.

JOHN F. WILLIAMS.

Witnesses:
J. B. HULL,
BRENNAN B. WEST.