R. W. MAGNA & L. G. W. CARPENTER.

BLOWPIPE.

APPLICATION FILED AUG. 17, 1909.

969,487.

Patented Sept. 6, 1910.

2 SHEETS—SHEET 1.

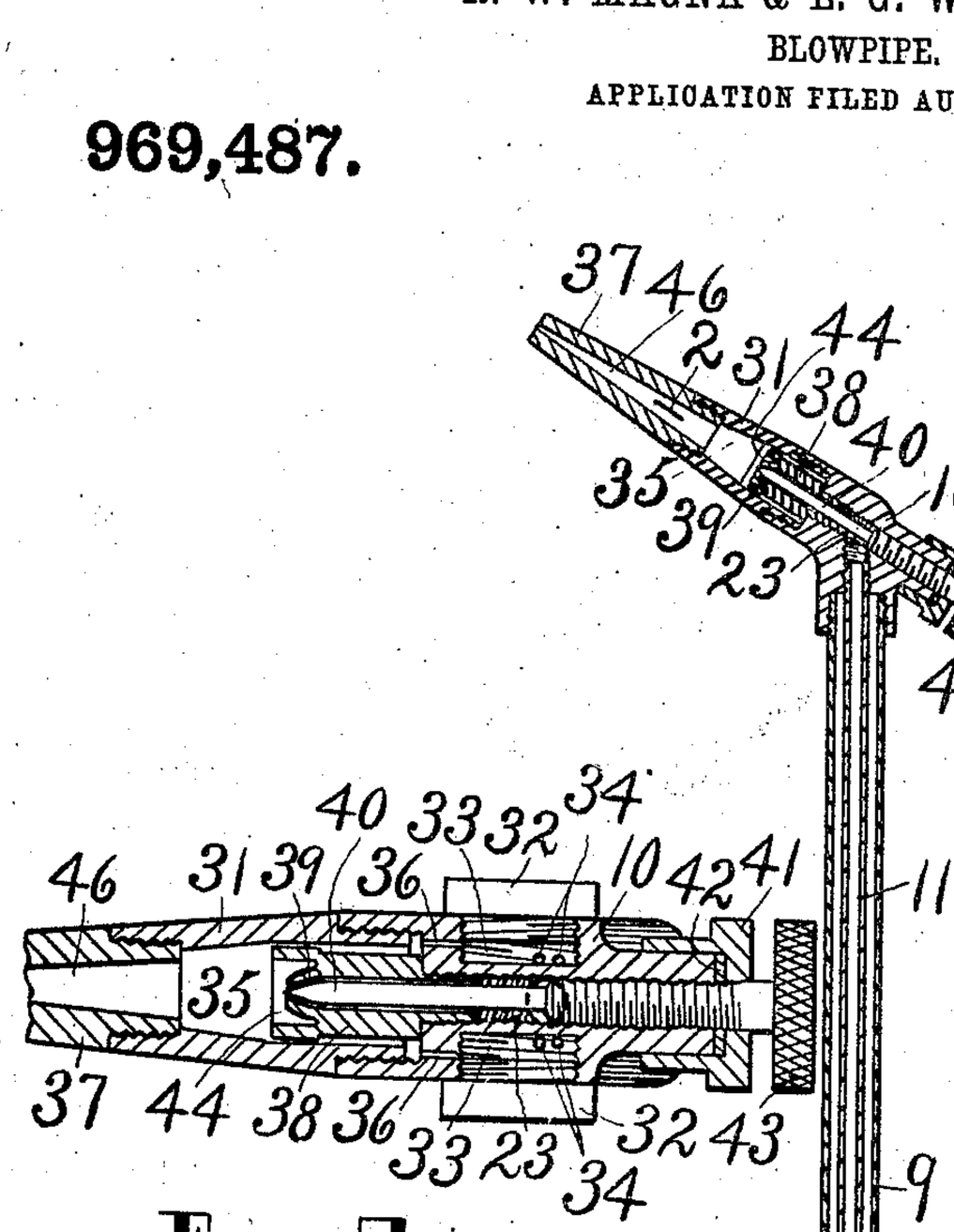

FIG. 2.

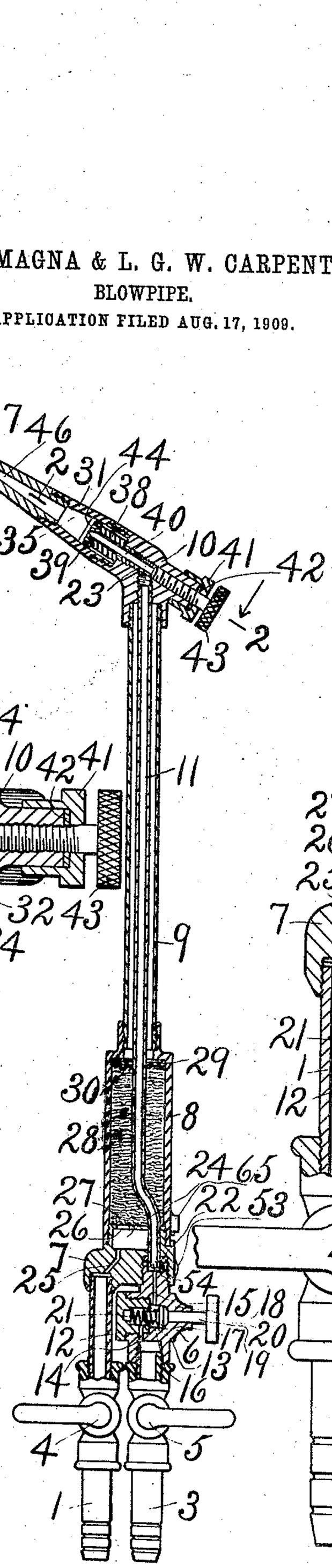

FIG. 1.

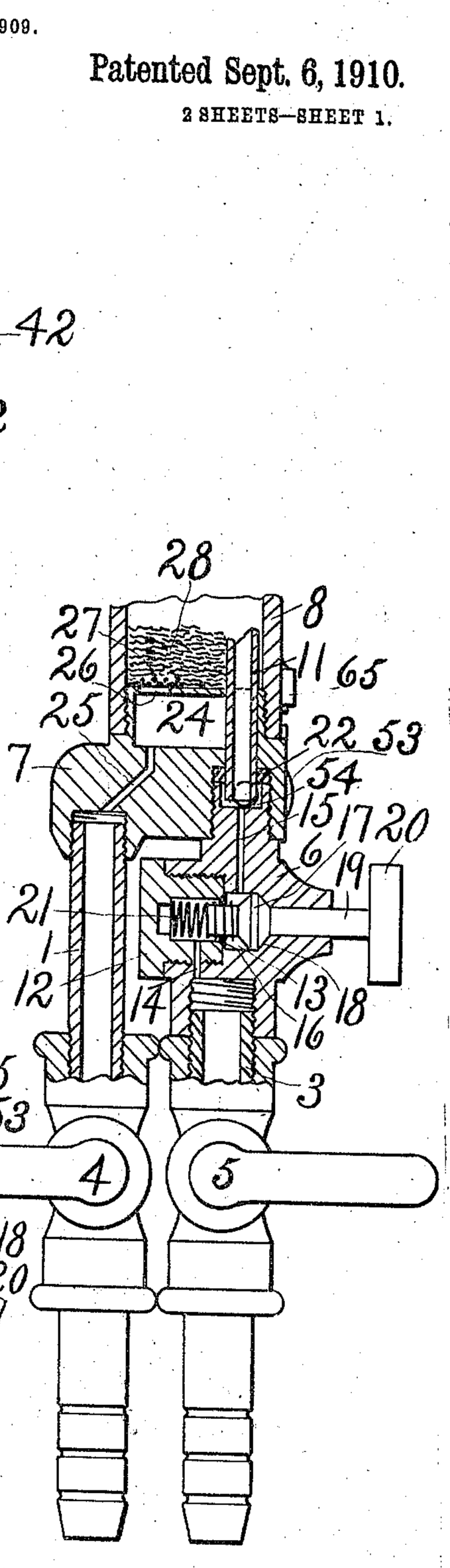

FIG. 3.

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INVENTORS:

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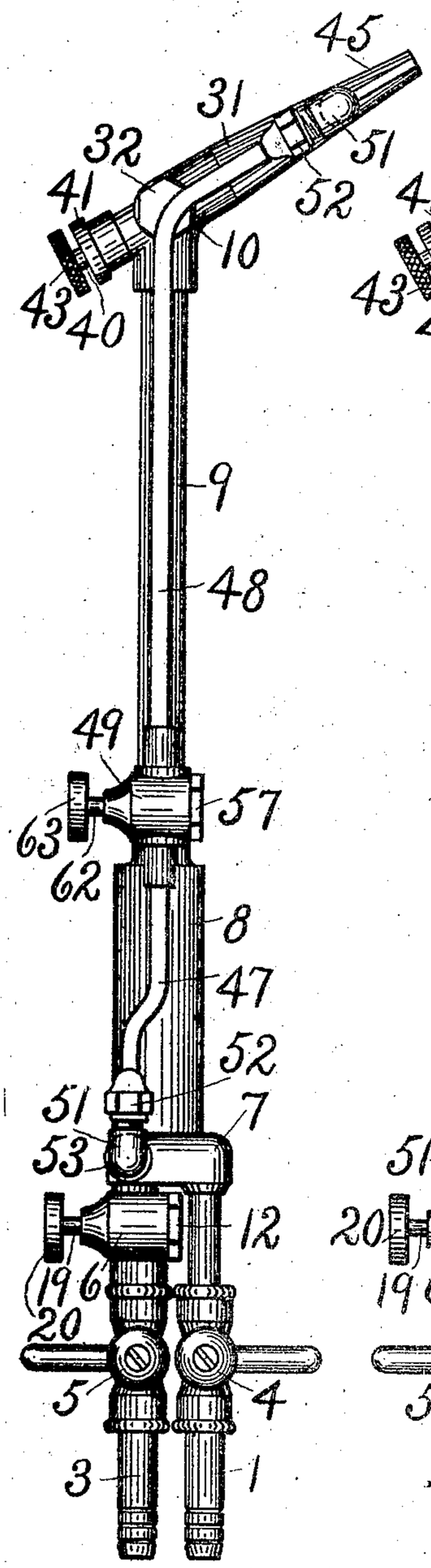

FIG. 4.

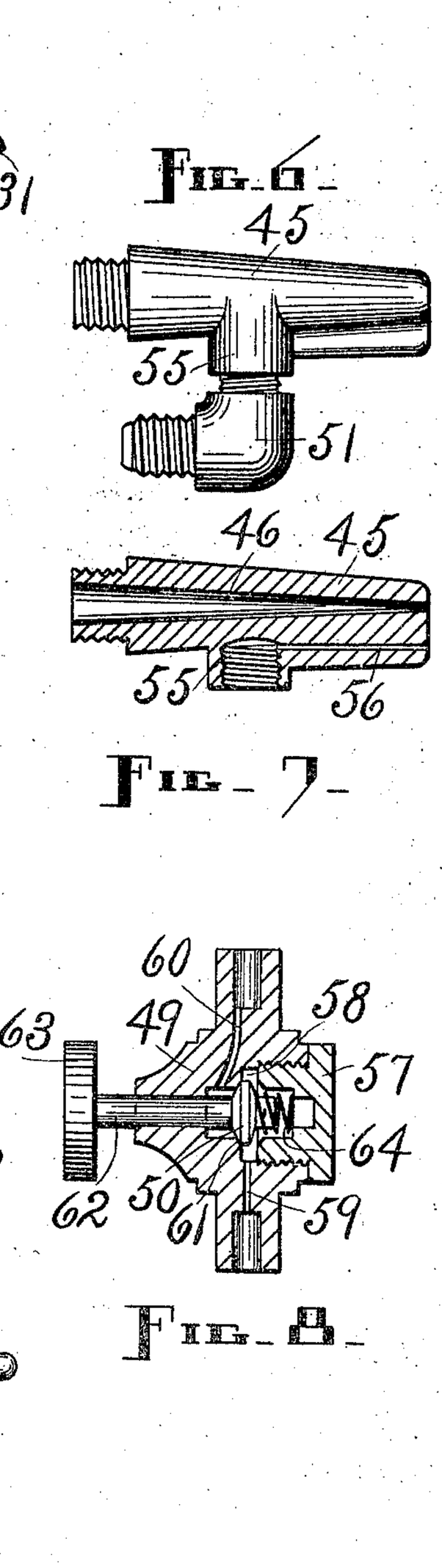

FIG. 5.

FIG. 6.

FIG. 7.

FIG. 8.

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UNITED STATES PATENT OFFICE.

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BLOWPIPE.

969,487. Specification of Letters Patent. Patented Sept. 6, 1910.

Application filed August 17, 1909. Serial No. 513,231.

To all whom it may concern:

Be it known that we, RUSSELL W. MAGNA, residing at Holyoke, in the county of Hampden and State of Massachusetts, and LOUIS G. W. CARPENTER, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, both citizens of the United States of America, have jointly invented a new and useful Blowpipe, of which the following is a specification.

Our invention relates to improvements in burners of the blow-pipe variety which are adapted to mix and burn a combustible gas and a gas that supports combustion, oxygen and acetylene gases being those usually employed; and said invention consists of a peculiarly constructed mixer and burner mounted on two tubular members one within the other, together with a valve for the instantaneous control of the oxygen, and such auxiliary and subsidiary parts and members as may be needed to render the device complete, including a so-called cutting attachment which is provided with a valve, all as hereinafter set forth.

The objects of our invention are, first, to provide a simple and compact oxy-acetylene blow-pipe in which and with which combustion of said gases is obtained at a temperature sufficiently high for all practical purposes, that is to say, these gases when burned with this burner or blow-pipe produce a flame of such intense heating capacity or great fervency that the device can be employed in the same way and to equal if not greater advantage as are other devices of this type, for soldering, brazing, welding, cutting, and otherwise operating and acting upon various kinds of metal; second, to produce such a blow-pipe which possesses a wide range of capacity, whereby the same is enabled to meet the demands made upon it in the diversified uses to which it may be put in the various arts in which it may be employed; third, to produce a blow-pipe that will operate successfully with all required sizes of flames, so that it is not necessary to provide a number of blow-pipes for different kinds of work; fourth, to afford means to take care of "flash-backs" whenever they occur in this blow-pipe so that they are rendered entirely harmless; fifth, to furnish means for regulating and controlling the gases which pass through said blow-pipe so as to make the latter practicable and efficient in all particulars, and, sixth, to provide a blow-pipe that can easily be kept in order. We attain these objects by the means illustrated in the accompanying drawings, in which—

Figure 1 is a central longitudinal section through the major portion of a blow-pipe which embodies a practical form of our invention; Fig. 2, an enlarged section taken on lines 2—2, looking in the direction of the arrow, in Fig. 1; Fig. 3, a partial section and elevation of the lower portion of the device, as shown in the first view, enlarged; Fig. 4, a side elevation of said blow-pipe and the cutting attachment; Fig. 5, a similar elevation without said attachment; Fig. 6, an enlarged top plan of the cutting-attachment nozzle; Fig. 7, an enlarged longitudinal section through such nozzle, the elbow being omitted, and, Fig. 8, an enlarged section of the cutting-attachment valve-casing, with the valve in place.

Similar figures refer to similar parts throughout the several views.

Starting with parallel twin conduits 1 and 3, the former for acetylene and the latter for oxygen, which are in practice connected by suitable pipes (not shown) with adequate sources of gas supply, and which are common to other types of oxy-acetylene blow-pipes, and noting in passing that said conduits are respectively provided with valves 4 and 5 of ordinary construction, it will be observed that a valve-casing 6 is mounted on the conduit 3, a base piece or union 7 mounted on said valve-casing and said conduit 1, a cylindrical sheath or casing 8 mounted on said union, a tube 9 mounted on said casing or connected with the upper terminal thereof, and a head 10 mounted on said tube. There is also a tube 11 which extends from the valve-casing 6 to the head 10, through the intervening parts and members including the casing 8 and the tube 9. All of the parts thus far described are de-

tachable one from another, and so also are nearly all of the others, consequently the device can be taken apart readily, and as readily put together again, which is a very valuable feature since it is thus possible and practicable to keep the device clean and in proper repair.

The valve-casing 6 consists partly of a screw-plug 12, and in the casing thus formed is a chamber 13 from which a passage 14 leads into open connection with the upper end of the conduit 3 and a second passage 15 leads into open connection with the lower end of the tube 11, with a valve-seat 16 between such passages. A double-faced valve 17 in the chamber 13 is adapted to close either the valve-seat 16 or a valve-seat 18 in said chamber on the opposite side of the passage 15 from said seat 16. The valve 17 has a stem 19 slidingly mounted in the valve-casing 6 and provided on its outer end with a knob or button 20 for convenience in operating said stem and valve. A spring 21, in the chamber 13 between the inner face of the valve 17 and the opposite end of said chamber, normally retains said valve in contact with the seat 18. Practically the only object of the valve-seat 18 and the coacting or associated part of the valve 17 is to afford a tight joint around the valve-stem 19, when said valve is normally disposed or open, and thus avoid a stuffing-box or other packing for said stem.

When the valve-stem 19 with its valve is forced inward against the resiliency of the spring 21 until said valve comes to rest on the valve-seat 16, the oxygen from the conduit 3 is completely shut off, none being able to pass from that part of the chamber 13 into which the passage 14 opens into that part of said chamber from which the passage 15 leads, but as soon as said valve-stem is released said spring opens said valve and so clears the way for the free flow of the gas.

The lower terminal of the tube 11 extends through the union 7 into an opening or recess made in the upper end of the valve-casing 6 to receive it, and a tight joint between said tube at this point and said union and valve-casing is obtained by means of packing 22. The upper terminal of the tube 11 extends into and opens into a central chamber 23 in the head 10.

A chamber 24 is provided in the upper part of the union 7, within the casing 9, and a passage 25 leads from the vicinity of the upper end of the conduit 1, with which said passage is in open connection, to said chamber into which it opens at the top. The chamber 24 communicates with the interior of the casing 8 through an opening 26 covered by wire-gauze 27. In the present instance, the tube 11 passes through the chamber 24 as well as other parts of the union 7. Within the casing 8 is a loose filling 28 of asbestos or other material which is capable of preventing or rather of nullifying the effects of back firing so that no harm is done thereby. By furnishing a comparatively large area of filled space intermediate of the gas-inlet conduits and the burner proper, room is afforded for the expansion of the gases when there is a flash-back and ample provision made for completely extinguishing the flame and preventing fire from getting into the gas passages below the casing 8. The wire-gauze 27 prevents the filling 28 from getting into the chamber 24 and so clogging the passage 25, and a perforated disk 29 having wire-gauze 30 secured to the under side thereof and situated in the top of the casing 8 performs a similar service for the tube 9; these foraminous members together with said filling also strain the acetylene gas and remove all impurities from it.

The head 10 may be constructed in any suitable manner, there being in this case, in addition to the head proper, an extension 31 at the front end and two plugs 32 at the sides. As just intimated, however, the method of constructing the head is not important so far as our invention is concerned, provided said head be adequate for our purpose. Within the head is the chamber 23, which consists of a straight passage having a downwardly-extending branch into which the tube 11 opens, two chambers 33 at the sides, into which the tube 9 opens through vertical passages 34, and a mixing-chamber 35 into which said chambers 33 open through passages 36, the major portion of said chamber 35 being in the extension 31. The head and its parts, with the exception of the depending portion into which the tubes 9 and 11 are screwed, are preferably arranged obliquely substantially as shown. Either an ordinary nozzle 37 or a cutting nozzle 45 is screwed into the front end of the extension 31, in each of which is a passage 46 constructed at the outer end or tip where the mixture is ignited. Nozzles having different sized orifices at their tips are employed for different kinds of work which require flames of different sizes.

An injector nozzle 38, having a valve-seat 39 for a needle-valve 40, is screwed into the front end of the chamber 23. The needle-valve 40 is in threaded engagement with the sides of the chamber 23 back of the nozzle 38, a tight joint between the head 10 and said needle-valve being formed by means of a cap 41 and packing 42. The needle-valve 40 is operated by a knob 43 on the outer end of the same in the usual manner. The passage through the nozzle 38 opens through the valve-seat 39 into an

annular recess 44 in the front end of said nozzle.

The cutting attachment, which is used when the blow-pipe is employed for cutting purposes, comprises, in addition to the nozzle 45, pipes 47 and 48, a valve-casing 49 and valve 50, two elbows 51, and two coupling nuts 52. The union 7 is provided on one side with a nipple 53 which opens at 54, Figs. 1 and 3, into the oxygen passage 15 is said union, for the lower elbow 51, and the noz e 45 is provided with a nipple 55 for the upper elbow 51. There is a passage 56, Fig. 7, which is parallel with the passage 46 in the nozzle 45. The passage 56 opens at its inner end into the nipple 55, and at its outer end through the tip of the nozzle 45 like the passage 46 in said nozzle. Adjacent ends of the tubes 47 and 48 are connected by the valve-casing 49. The valve-casing 49 is very similar to the valve casing 6: It consists in part of a screw-plug 57, has a chamber 58 therein and two passages 59 and 60 leading in opposite directions from said chamber to the adjacent ends of the tubes 47 and 48, and is provided with a valve-seat 61 between the inner ends of such passages for the valve 50. The valve 50 has a stem 62 slidingly mounted in the valve-casing 49 and provided on its outer end with a knob or button 63. The valve 50 is held normally on its seat 61 by a spring 64.

When the valve-stem 62 is forced inward against the resiliency of the spring 64, and the valve 50 thus removed from the valve-seat 61, the oxygen from the union 7 has a clear passage to the passage 56, in the nozzle 45, by way of the tube 47, passage 59, chamber 58, passage 60, tube 48, and connections, but as soon as said valve-stem is released said spring closes said valve again and shuts off the flow of oxygen to said passage 56, since none can now pass from that part of said chamber into which the passage 59 opens into that part of said chamber from which the passage 60 leads. See Fig. 8. The opening and closing of the valve 50 does not appreciably affect the flow of oxygen through the tube 11.

The coupling-nuts 52 afford ready means for connecting the tubes 47 and 48, with the valve-casing 49, to and disconnecting them from the union 7 and the nozzle 45, and the latter can be as readily removed from the extension 31 and attached thereto as can the nozzle 37. A screw-cap 65 is used to close the outer end of the nipple 53 when the cutting attachment is not in place.

In practice, assuming that the cutting-attachment is not needed and has been disconnected, the proper sized nozzle 37 is selected and attached to the extension 31, the needle-valve 40 is adjusted to regulate the oxygen and permit only the right amount of this gas to flow into the mixing-chamber 35, and the valves 4 and 5 are opened. The acetylene gas now flows from the conduit 1, through the passage 25, chamber 24, opening 26, casing 8, tube 9, passages 34, chambers 33, and passages 36 into the mixing-chamber 35; and the oxygen gas flows from the conduit 3, through the passage 14, chamber 13, passage 15, tube 11, chamber 23, and injector nozzle 38 into said mixing-chamber. From the mixing-chamber the mixture passes out through the nozzle 37 and being ignited at the tip of said nozzle as it issues therefrom burns with great fervency and impinging force. The blow-pipe is now used to apply its flame in the usual manner. The gases are, of course, under pressure.

When the blow-pipe is to be used for cutting purposes, the attachment hereinbefore described is connected to the rest of the device in the manner explained, the nozzle 45 being substituted for the nozzle 37, and the additional jet of oxygen gas obtained for the flame produced from the mixture of the two gases which escape through the passage 46, when the valve 50 is opened, such jet escaping through the passage 56. The gases supplied by this double nozzle in this way are exceedingly effective, when in a state of combustion, for cutting metal of any reasonable thickness in a most efficient manner. The valve 50 insures perfect control and automatically shuts off the auxiliary oxygen supply. Usually, for the sake of convenience, we prefer to disconnect the cutting attachment, when the device is not to be used for cutting purposes.

In the event that a flash-back occurs the valve 17 is immediately pressed onto the seat 16 and the oxygen thus cut off. When the back fire has exhausted itself in the casing 8, the valve 17 is released and opened by the spring 21 and the flow of oxygen permitted to continue.

At the completion of the work the valves 4 and 5 are closed, combustion ceases, and the device is laid aside until required again.

By employing a needle-valve in our construction the necessity of providing a number of injector nozzles is avoided.

The mixing of the gases in the chamber 35 takes place in much the same way as in similar devices, although the intermingling of the gases is more thorough and the combination more efficient owing to the presence of the recess 44 and the general construction of the head and its equipment.

It is quite obvious that various changes in shape, size, and construction of some or all of the parts of the device herein illustrated and described may be made without departing from the nature of our invention.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. A blow-pipe comprising a chambered head, two gas conduits provided with valves, members arranged to form passageways for gas, one of such passageways being within the other for a greater portion of its length and both of such passageways opening at one end into said head and at the other end into said conduits respectively, a normally-open emergency valve arranged in one of the passageways between the valve in the conduit with which this particular passageway is connected and the head, and a valve arranged in the head to control the flow of gas from the inner passageway.

2. A blow-pipe comprising suitable gas conduits, consisting in part of a valve-casing having offset passages and an intermediate valve-seat therein, tubular members connected with one of said conduits and forming a passageway for the gas therefrom, a tubular member within such passageway and connected with the other of said conduits, a spring-pressed valve normally held off of said seat to permit communication between said offset passages, but adapted when forced on to said seat to interrupt such communication and cut off the flow of gas to said last-mentioned tubular member, a chambered head mounted on said outer and inner tubular members, and a valve in the head to regulate the flow of gas from said inner tubular member.

3. A blow-pipe comprising a chambered head, two gas conduits, members arranged to form a passageway for gas which passageway opens at one end into said head and at the other end into one of said conduits, a loose filling in a portion of such passageway to form a flash-back compartment, and a tube within said passageway which tube also opens at one end into said head but at the opposite end into the other of said conduits.

4. The combination, in a blow-pipe, of two gas conduits provided with valves, a valve-casing mounted on one of such conduits, a union mounted on said valve-casing and the other of said conduits, tubular members mounted on said union and connecting through the latter with the conduit upon which the union is directly mounted, a tube in said tubular members and connecting through the valve casing with the conduit upon which said casing is mounted, a valve in the casing adapted to close the passageway from said tube to the conduit below, means to retain said valve normally open so as to leave such passageway free, and a chambered head mounted on said tubular members.

5. A blow-pipe comprising a chambered head, two gas conduits, members arranged to form a passageway for gas which passageway opens at one end into said head and at the other end into one of said conduits, one of said tubular members constituting a casing and having a loose filling therein with foraminous members at the ends to form a flash-back compartment and to serve as a strainer for the gas which passes through the same, and a tube within said passageway which tube also opens at one end into said head but at the opposite end into the other of said conduits.

6. A blow-pipe comprising a chambered head, two gas conduits, members arranged to form a passageway for gas which passageway opens at one end into said head and at the other end into one of said conduits, a tube within such passageway which tube also opens at one end into said head but at the opposite end into the other of said conduits, a nozzle connected with the head and having a passage which opens at its inner end into the head and a second passage which opens at its inner end outside of the head, and outside members arranged to form a passageway for gas leading from one of the gas conduits to the outside opening in said nozzle back of the tip.

7. A blow-pipe comprising a chambered head, two gas conduits, members arranged to form a passageway for gas which passageway opens at one end into said head and at the other end into one of said conduits, a tube within such passageway which tube also opens at one end into said head but at the opposite end into the other of said conduits, a nozzle connected with the head and having a passage which opens at its inner end into the head and a second passage which opens at its inner end outside of the head, outside members arranged to form a passageway for gas leading from one of the gas conduits to the outside opening in the nozzle back of the tip, and a valve in said last-mentioned passageway.

8. A blow-pipe comprising a chambered head, two gas conduits, members arranged to form a passageway for gas which passageway opens at one end into said head and at the other end into one of said conduits, a tube within such passageway which tube also opens at one end into said head but at the opposite end into the other of said conduits, a detachable nozzle for the head, such nozzle having a passage to open at its inner end into the head and a second passage which opens at its inner end through one side of the nozzle, and outside detachable members arranged to form a passageway for gas to lead from one of said gas conduits to the side opening in said nozzle.

9. The combination, in a blow-pipe, of a chambered head, two gas conduits, members arranged to form a passageway for gas which passageway opens at one end into

said head and at the other end into one of said conduits, a tube within such passageway which tube also opens at one end into said head but at the opposite end into the other of said conduits, a nozzle connected with the head and having a passage which opens at its inner end into the head and a second passage which opens at its inner end outside of the head, outside members arranged to form a passageway for gas leading from one of the gas conduits to the outside opening in said nozzle back of the tip, a valve in said last-mentioned passageway, and means to retain said valve normally in its closed position.

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