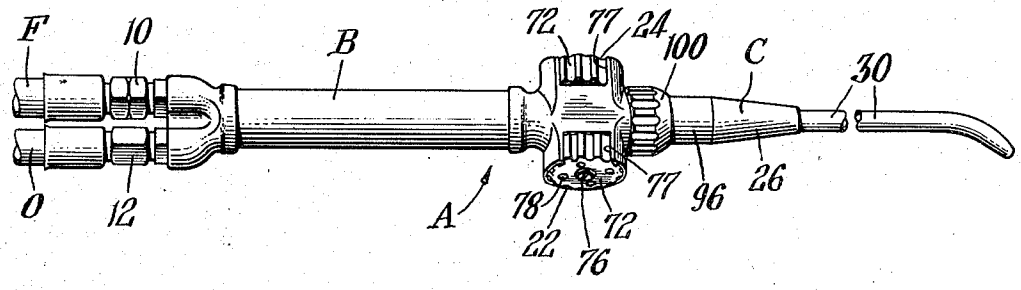
Aug. 15, 1950 W. J. JACOBSSON ET AL 2,518,895

HAND BLOWPIPE

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Fig. 1.



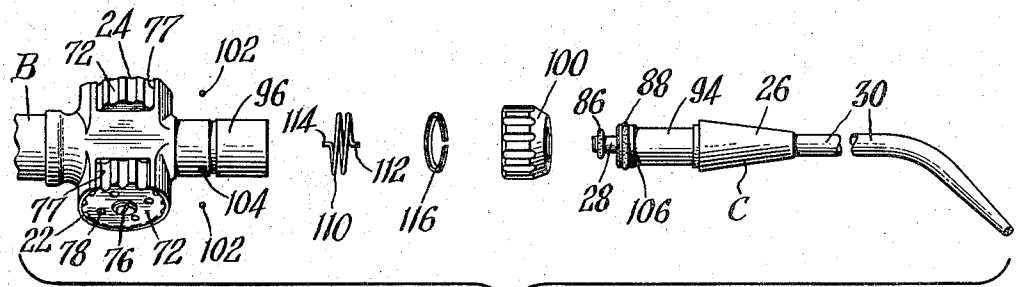


Fig. 2.

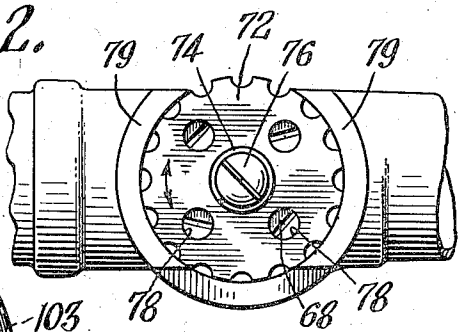
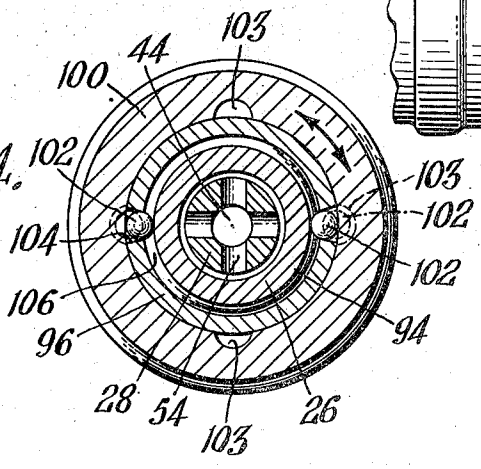


Fig. 6.

Fig. 4.



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Fig. 3.

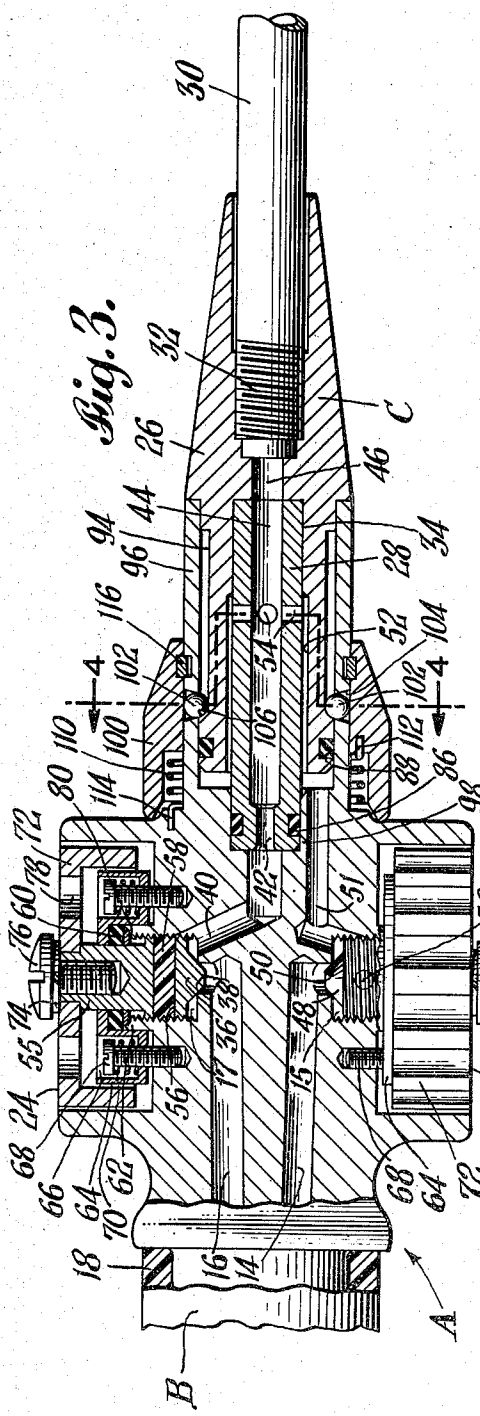
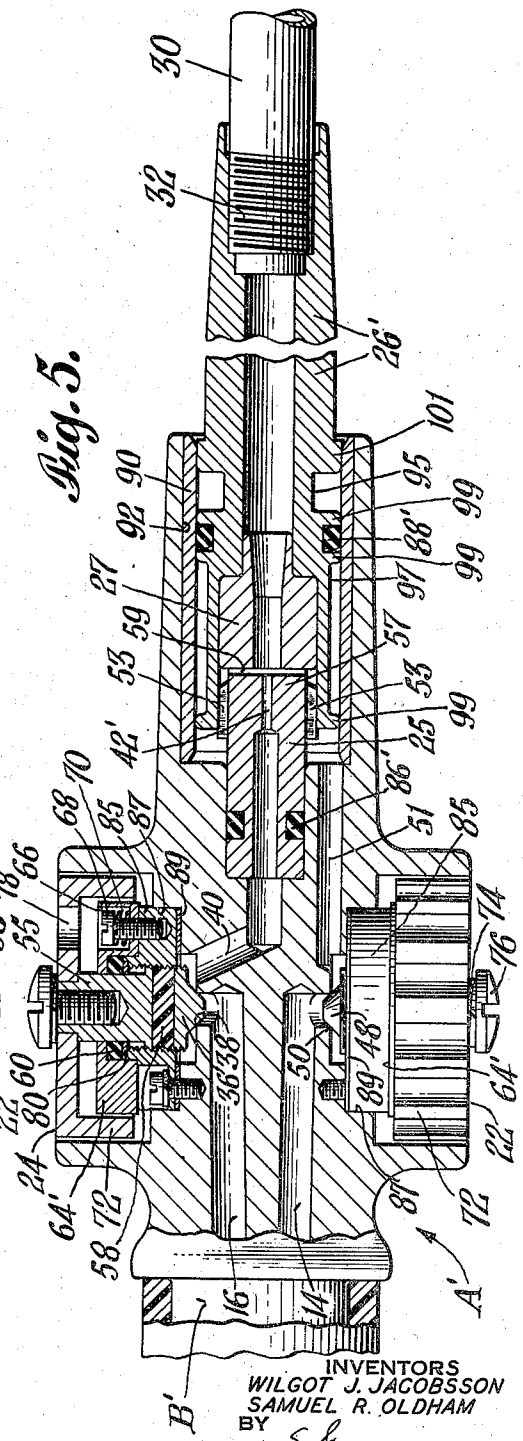


Fig. 5.



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HAND BLOWPIPE

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12 Claims. (Cl. 158—27.4)

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This invention relates to relatively small, lightweight, medium-pressure, manual type oxy-fuel gas blowpipes which are provided with a plurality of interchangeable heads of different sizes, so that the same handle can be used for a wide variety of flame utilizing operations including welding.

In such blowpipes one problem, especially in the case of oxy-acetylene blowpipes, is overheating of the handle due to heat transmitted from the tip. Another problem is holding and selectively adjusting the gas valves of the blowpipes with one hand. Still another problem involves the time and effort of quickly changing heads readily and adjusting a selected head rotationally on the handle while work is in progress. Such problems are very difficult to solve in "aircraft" type hand blowpipes, for example, because the latter are very small in size compared to conventional blowpipes.

The main objects of the invention are to provide a blowpipe of this type which is relatively cool to hold in use, and in which the oxygen and fuel gas valves may be easily and accurately adjusted with a finger of the hand holding the blowpipe. Another object is to provide an improved slip-fit lock connection between the handle and head.

These objects are attained by a blowpipe having a handle provided with gas inlets at the rear and novel adjustable gas valves at the front thereof. The valves are on a common centerline extending transversely of the handle, and are located very close together on the front of the handle so that either valve can be opened or closed by a finger of the operator's hand which grips the handle in a normal and natural position. This permits regulation of gas flows by one hand while welding for example. A novel push-in type self-sealing joint connects the head to the handle without making use of screw threads of any type. Thus, substantially instantaneous attachment or detachment of the head with the handle is possible. Novel means are also provided for securely locking the head axially in working position on the handle, while the head may be angularly adjusted on the handle, as desired. An efficient heat dam and hand grip effectively retard the flow of heat from the head to the hand holding the blowpipe.

Referring to the drawings:

Fig. 1 is a perspective view of a hand welding oxy-acetylene blowpipe exemplifying the invention;

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Fig. 2 is an exploded view of the stem locking mechanism;

Fig. 3 is an enlarged fragmentary view mainly in longitudinal section of such blowpipe;

Fig. 4 is an enlarged cross-sectional view taken on line 4—4 of Fig. 3;

Fig. 5 is a view similar to Fig. 3 of a head-handle modification; and

Fig. 6 is a fragmentary view in side elevation of a modified handle.

As shown in Fig. 1 of the drawing, the hand blowpipe A comprises a handle B and a head C. The handle B is provided with a fuel gas inlet connection 10 and an oxygen inlet connection 12. These connections are adapted to couple the gas inlets in the handle to suitable fuel gas and oxygen supply hoses F and O, respectively. The handle B has longitudinal oxygen and fuel gas passages 14 and 16 communicating at the rear of the handle with the respective gas supply hoses F and O, and in the front of the handle with gas valve wells or recesses 15 and 17, Fig. 3. The handle is covered by a grip 18 of soft material, such as molded rubber, which may be slip-fit over the handle or molded-in-place on the handle. Suitable plastic material may be used instead of rubber for the grip which may also be of the wrapped type-cord or tape. Located in the front of the handle B are novel gas valves 22 and 24.

The head C includes a stem 26 provided with an oxy-fuel gas mixer 28 and a nozzle or tip 30. The tip 30 is threaded at 32 into the stem 26; while the gas mixer 28 is press-fitted into the stem at 34. The head C is readily interchangeable in the handle B with other heads adapted to produce larger or smaller oxy-fuel gas flames, by virtue of a novel joint which is described in detail below.

In operation, Fig. 3, oxygen is fed into the blowpipe A through the oxygen gas passage 14, in the handle B, which leads to the oxygen valve 22. In a similar manner fuel gas such as acetylene enters the fuel gas passage 16 to the valve 24. When valve stem 36 is moved off its seat 38 in the handle B acetylene flows past the stem 36 and into gas passage 40 from which it flows into axial metering orifice 42 of the mixer 28 which is pressed into the stem 26, and out through enlarged passage 44, then through passage 46 in the stem 26 and finally through the tip 30.

When valve stem 48 is moved off its seat 50 in the handle B, oxygen flows past stem 48 into gas passage 51 through a longitudinally-extending annular passage 52 between the mixer 28 and stem 26. This annular passage 52 is of such

length and width as to give good flashback resistance and proportioned to suit the maximum gas consumption of the blowpipe. The acetylene metering orifice **42** in mixer **28** is proportioned to accommodate the capacity of the head C at predetermined acetylene pressures. Oxygen passes inwardly through radial holes **54** in the mixer **28** at right angles to its longitudinal axis, and, mixing with the acetylene flowing through the central passage **44**, passes into the stem passage **46**, and out through the tip **30**.

The valves are located in the wells **15**, **17** in diametrically opposite sides of the front of the handle and are much shorter than needle valves of the usual type and are "in-line" valves. Only a small valve lift is required to produce full flow. Although both valve stems are threaded to the handle B, each has a transverse hole **56** drilled through the threaded section, into which is pressed a length of plastic rod to form a friction plug **58** which is of length equal to the outside diameter of the thread. A thread is formed on this plastic material which completely fills the thread grooves by screwing the valve stem into the threaded section of the handle. Thus, backlash is eliminated and sufficient friction is introduced to maintain the stem in fixed position at any desired adjustment of the valve.

A plastic material in the form of a solid ring **60**, not split, and of round, square, or rectangular cross-section, surrounds the shank portion of each valve stem and is clamped down against flange **62** by a compression cup **64**. The compression cup is provided with suitable sockets **66** to accommodate compression cup screws **68**. A coil spring **70** is located beneath each screw head which can be tightened to increase the load on the packing ring **60** to obtain sealing or a desired increase in the amount of friction on the valve stem. If necessary or desirable, the screws **68** can be tightened so that the springs **70** go solid to obtain added loading.

A valve wheel **72**, located in, and comprising at least a partial closure for the well **17**, is secured over the end of the valve stem **55**, which is provided with two lateral flats, and held in place on the stem by a lock washer **74**, and a screw **76** threaded into a suitable socket in the stem. The valve wheel **72** contains holes **78** each of which can be alined with a corresponding compression cup screw **68** by rotation of the valve wheel so that clearance for a screwdriver through the wheel-closure **72** is obtained for tightening the compression cup screws and thereby adjusting the packing load without dismantling the valve assembly. The handle is shaped so that an opening **77** is provided in the top of the handle for the projection of a segment of the periphery of each wheel **72**.

As shown in Fig. 6, in an alternative arrangement, the handle may be provided with arcuate flanges **79** adjacent the front and rear segments of wheels **72**, in which case the upper and lower segments of the wheels are exposed for convenient manipulation, while the wheels are protected by the flanges.

The valve wheel **72** is suitably corrugated on its circumference and is wide enough to minimize side thrust on the thread when the wheel is turned. Each valve can be manipulated by finger tip pressure, closing when turned in a forward direction and opening when turned toward the rear of the blowpipe. To prevent the upper thread of the valve stem from digging into the packing material, a small metal washer **80** acting as a stop is placed under the packing ring **60**.

The heads C are of the gasket-sealed, push-in type with round, square, or rectangular ring gaskets. The sealing ring **86**, Fig. 3, for the mixer, seals between the oxygen and fuel gas passages, while mixer sealing ring **88** seals to the atmosphere.

The tips **30** are of one-piece, swaged-and-bent pipe. To reduce heat conduction to the blowpipe handle, the mixer **26** is provided with an elongated annular area-restricting groove **94** which reduces the cross-section of the tube at this zone. Thus, heat engendered in the tip **30** can only flow into the handle B through the areas of the narrow surfaces which contact the portion **96** and through the mixer area contiguous with the portion **98** of the handle B. In effect, then, there is provided an efficient "heat dam" which minimizes contact area between the mixer and handle in order to reduce heat transmission. The mixer is also preferably composed of material of low heat conductivity.

Even though the friction of the sealing rings **86**, **88** is sufficient in most cases to prevent the head C from blowing out of the handle if a flashback occurs, positive locking means is provided for securing the head C in place on the handle B. The lock comprises a rotatable collar **100** fitting over the front end portion **96** of the blowpipe handle B with one or more small movable members such as steel balls **102** located in mating holes **104** in such portion **96**, engaging an annular shoulder **106** on the stem, and normally prevented from moving out of the locking position by the collar. When the latter is rotated, however, the movable members **102** are allowed to move into internal longitudinal grooves **103**, Fig. 4, in the collar so that the interference between them and stem **26** is eliminated and the head C can be removed axially from the handle B.

A coiled torque spring **110** is located in the rear end of the collar **100**, one end being inserted at **112** in a hole in the collar and the other at **114** in a hole in the body of the handle B. The spring **110** functions to always return the collar **100** to a locking position. To prevent removal of the collar **100**, the latter is held in longitudinal place by a split expanding spring ring **116** which engages mating grooves in the handle portion **96** and collar **100**, so that once assembled the collar cannot be removed from the handle. The lock also functions as a guard against improper insertion of the head C, since the collar **100** must be turned to the head unlocking position before the head C can be properly inserted in the socket portion **96**.

Referring to Fig. 5, the handle B' of the modified blowpipe A' is generally cylindrical, and the oxygen and fuel gas passages **14** and **16** are similar to those of Figs. 1–3. Oxygen is fed into the blowpipe through oxygen gas passage **14**, in the handle, which leads to the oxygen valve **22**. In a similar manner fuel gas such as acetylene enters through the fuel gas gas passage **16** to the valve **24**. When the valve stem **36** is moved off its seat **38** fuel gas flows into gas passage **40** from where it flows into a mixer nozzle **25** which is press-fit into a mixer tube **26'**, and out through a throat section **27**, which is held in place in the mixer tube **26'** by the nozzle **25**, then through mixer tube **26'** and the welding tip **30** which is screwed into the mixer tube.

When valve stem **48** is moved off its seat **50**, oxygen flows into gas passage **51** and through a

plurality of longitudinal clearance slots **53** in the periphery of the front portion **57** of the mixer nozzle **25**. These slots **53** are of such length and section as to give good flashback resistance and are proportioned to suit the maximum consumption of the particular size of the blowpipe. The fuel gas metering orifice **42'** in nozzle **25** is proportioned to accommodate the capacity of individual heads at predetermined fuel gas pressures. Oxygen gas then passes through a slot **59** in the nose of the mixer nozzle at right angles to its longitudinal axis, and, mixing with the fuel gas flowing through the center of the nozzle, passes into the throat section **27** which is held in place by nozzle **25**, and out through mixer tube **26'** and the welding tip **30**.

The plastic ring **60** of the valve is clamped down against the handle body by a compression cup **64'** consisting of a solid mass with suitable drillings **66** to accommodate the compression cup screws **68**.

In case the body B' is composed of a soft material such as aluminum, the body thread for the stem is made in a separate piece **85** and inserted in the valve cavity **87** with a sealing gasket **89** underneath. This improves the wear qualities and makes provision for a replaceable thread unit. If the body is of a harder material, this thread section may be introduced in the material itself, as in Fig. 3, thus simplifying the construction and eliminating the gasket **89**.

The sealing ring **86'** for the mixer nozzle seals between the oxygen and fuel gas, while mixer tube sealing ring **88'** seals the gases to the atmosphere. When the body B' is of aluminum a wear-resistant sleeve **90** is inserted into the front body cavity **92** to prevent collapse of the soft material.

To reduce heat conduction to the blowpipe handle B', the mixer tube **26'** is provided with two contact area-restricting grooves **95** and **97** which reduce the cross-section of the tube at these zones. Thus, heat engendered in the tip can only flow into the handle through the area of the three narrow annular fins **99** which contact the sleeve **92**, and through the mixer tube area **101** contiguous with the front portion of the sleeve. In effect, then, there is provided an efficient "heat dam" which reduces contact area between the mixer tube and handle and prevents heat transmission to the latter.

What is claimed is:

1. A hand blowpipe having a handle provided with a laterally opening gas valve well, a needle valve having a short stem threaded to the handle, and a finger wheel connected to said stem, the axis of rotation of said wheel and stem coinciding with that of said well, and the external diameter of said wheel being only slightly smaller than the internal diameter of said well and providing a lateral closure for such well, the handle having an opening through which a segment of said finger wheel projects for manual operation, the valve and wheel thus being substantially protected from damage and inadvertent operation.

2. A hand blowpipe having a handle provided with a socket in the front end thereof, a head comprising an oxy-fuel gas mixer and a tip for the blowpipe, the gas inlet portion of said head being disposed within such socket, and means including a plurality of plastic rings connecting and hermetically sealing the handle and head within said socket for telescopic insertion and removal thereof, said rings frictionally engaging tubular walls of said socket so as to hold

the head and socket together in any adjusted position and providing gas-tight seals regardless of the longitudinal position of the gas inlet portion within said socket.

3. A hand blowpipe having a handle provided with a socket in the front end thereof, a push-in head cooperatively associated with such socket, and locking means on the handle for releasably securing the head to the handle, comprising an annular shoulder on the head, at least one radially movable detent in the handle adapted to engage said shoulder when the head is in place in the socket, a collar rotatably mounted on the front portion of the handle and having an internal cam-surface cooperating with said detent for locking the latter in engagement with such shoulder when the collar is turned in one direction, and a coiled spring connected between said collar and the handle and urging the collar to turn in such direction, but permitting the collar to be turned in the opposite direction when it is desired to remove the head from the handle.

4. A hand blowpipe having a handle provided with a rotatably adjustable push-in head, and means for axially locking the head on the handle comprising a collar rotatably associated with such handle, and spring means resiliently urging said collar to turn towards head-locking position on the handle, so that the head is angularly adjustable with respect to the handle.

5. An oxy-fuel gas hand blowpipe having a handle containing diametrically opposed laterally opening valve recesses near the front thereof, valves reversely threaded in such recesses for opening movement when rotated about a common axis in the same direction, and valve wheels connected to said stems so that the wheels are close to directly opposite sides of the handle and may be adjusted as desired with the thumb of the hand gripping the handle to open or close the selected valve without reversal of direction of rotation thereof due to the opposed location of the wheels.

6. A blowpipe comprising a longitudinal handle member having a laterally opening well provided with an inner portion of smaller diameter than the outer portion of the well, such inner portion having an annular flange projecting into such outer portion, the bottom of such inner portion having a central gas inlet and a lateral gas outlet, a valve having a stem threaded to said member in the inner portion of said well, said stem having a valve seat cooperating with said gas inlet to control the flow of gas to the outlet when the valve stem is rotated, said stem having a transverse hole containing a friction plug composed of plastic material the length of which is such that the opposite ends of the plug are also self-threaded in such inner portion of the well, eliminating backlash and providing sufficient friction to maintain the stem in adjusted position, said stem having a shank of reduced diameter, a gas tight packing surrounding said shank and engaging said annular flange, and a hollow finger wheel secured to the outer end of said shank, said wheel having a maximum diameter slightly smaller than that of such outer portion of the well, the wheel being protectively located within such outer portion of the well, and said member having an opening exposing a segment of the periphery of said wheel for manual operation.

7. In a gas torch, the combination with handle and head members one of which has a socket in which a male portion of the other member is detachably telescoped and rotatably adjustable

in such socket, of combined gas sealing and retaining means disposed between said members within such socket comprising a pair of axially spaced rings composed of resilient plastic material disposed in suitable annular grooves in one of said members and adapted to engage and be compressed by the other member when such male portion is inserted in such socket, forming gas-tight seals and at the same time frictionally retaining such male portion in adjusted place in such socket, said members having an annular gas distributing passage located between said rings, one of said members having a gas inlet passage leading to said annular gas distributing passage, and the other member having a gas outlet passage leading from said annular gas distributing passage.

8. In a gas torch, as defined by claim 7, means retarding the flow of heat from the head to the handle, comprising an axially elongated annular space in such socket between said members which is bounded by relatively narrow annular metal-to-metal contacts between said members, said space being axially spaced from said gas distributing chamber and located on one side of said sealing means, said contacts acting to positively prevent the head from tilting in the handle but permitting the head to be axially and circumferentially positioned with respect to the handle.

9. In a gas torch, as defined by claim 8, means latching the head axially in place with respect to the handle, comprising a collar carried by said handle, and means on the inside of said collar engaging an annular part of the head so that the head can be turned with respect to the handle when the head is latched on the handle.

10. A hand blowpipe having a handle provided with longitudinal oxygen and fuel gas passages for conducting oxygen and fuel gas from inlets at the rear end of the handle to oxygen and fuel gas outlets in the front end thereof, said handle having axially alined laterally opening oxygen and fuel gas valve wells in diametrically opposite sides near the front end of the handle, and oxygen and fuel gas valves disposed within such wells for controlling the flow of oxygen and fuel gas through such passages, said valves comprising finger wheels located in and providing lateral closures for the wells in the handle, said wells having side openings therein exposing segments of the wheels for convenient selective operation by a digit of the operator's hand gripping the handle, while the wheels and valves are substantially protected from damage and inadvertent operation.

11. A hand blowpipe having a handle provided with a longitudinal gas passage, and a laterally opening well near the front end of the handle, and a valve disposed in such well for controlling the flow of gas through the passage, said valve comprising a rotatable finger wheel located within and providing a lateral closure for the well in the handle, said well having a side opening exposing a segment of the periphery of the wheel for convenient operation by the thumb of the operator's hand gripping the handle, while the valve and wheel are substantially protected from damage and inadvertent operation.

12. An oxy-fuel gas hand blowpipe as defined by claim 5, in which said handle has arcuate flanges concentric with said recesses adjacent segments of the valve wheels, which flanges protect the wheels from damage and inadvertent operation.

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