N. GOODYEAR.

GAS BLOWPIPE.

APPLICATION FILED AUG. 7, 1909.

985,159. **Patented Feb. 28, 1911.**

Fig. 1

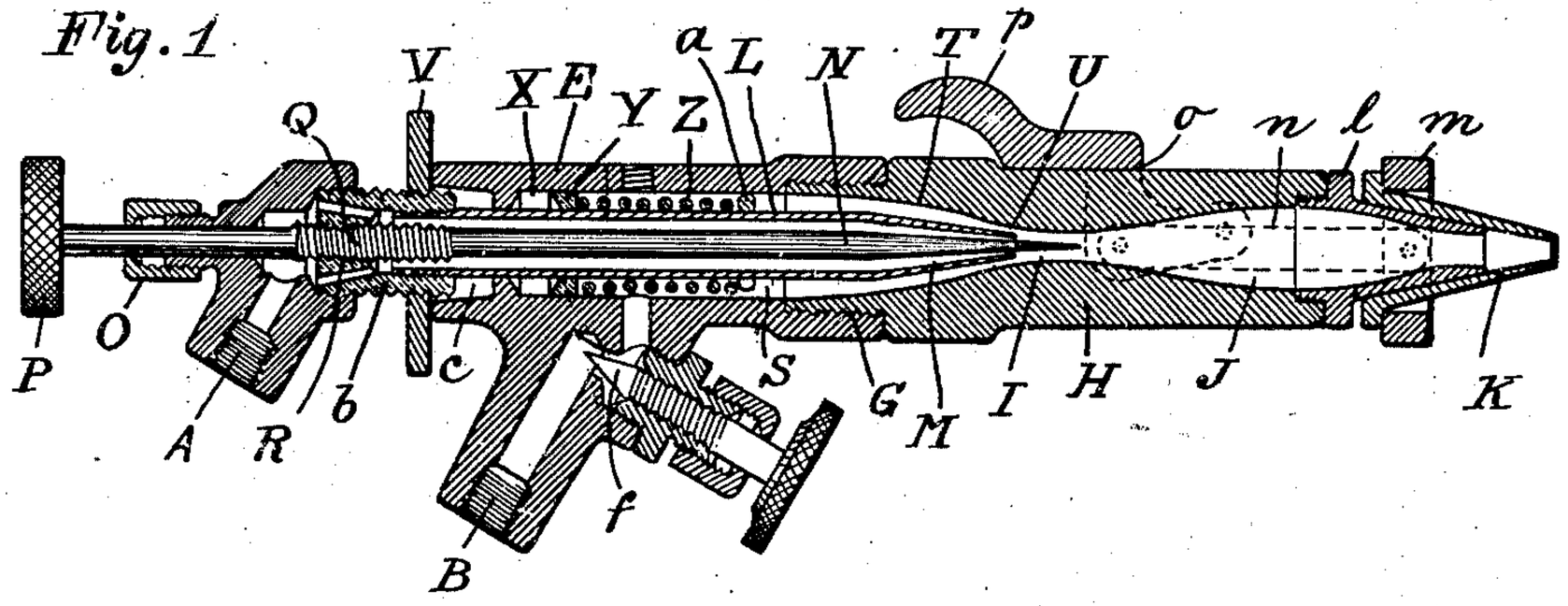


Fig. 2

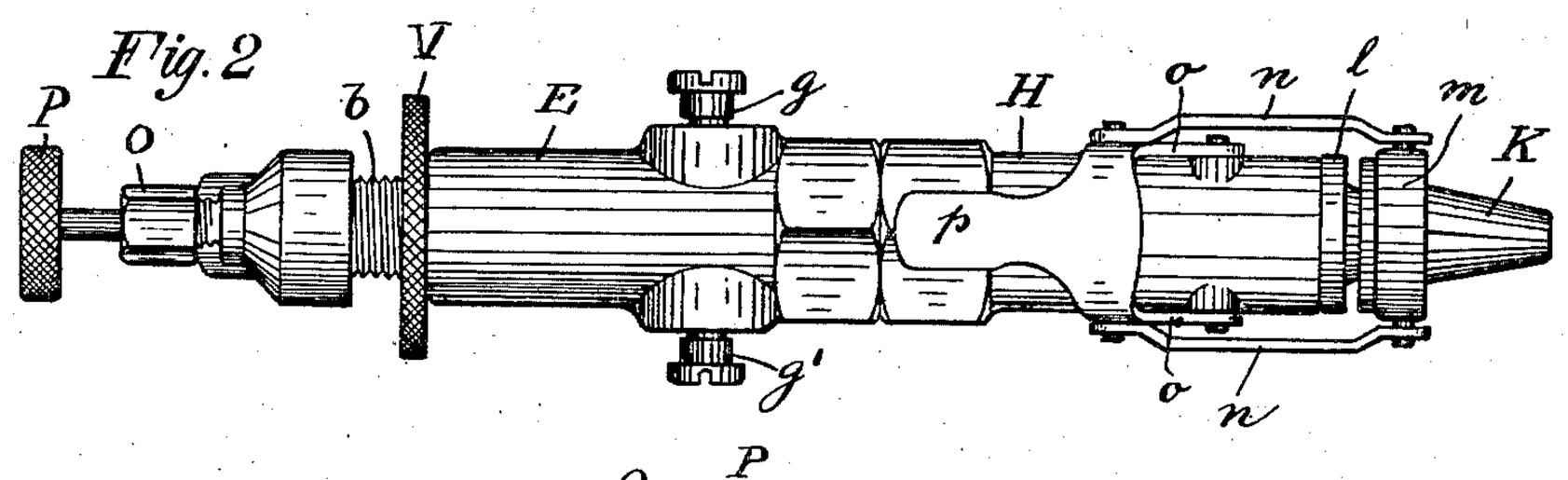


Fig. 3

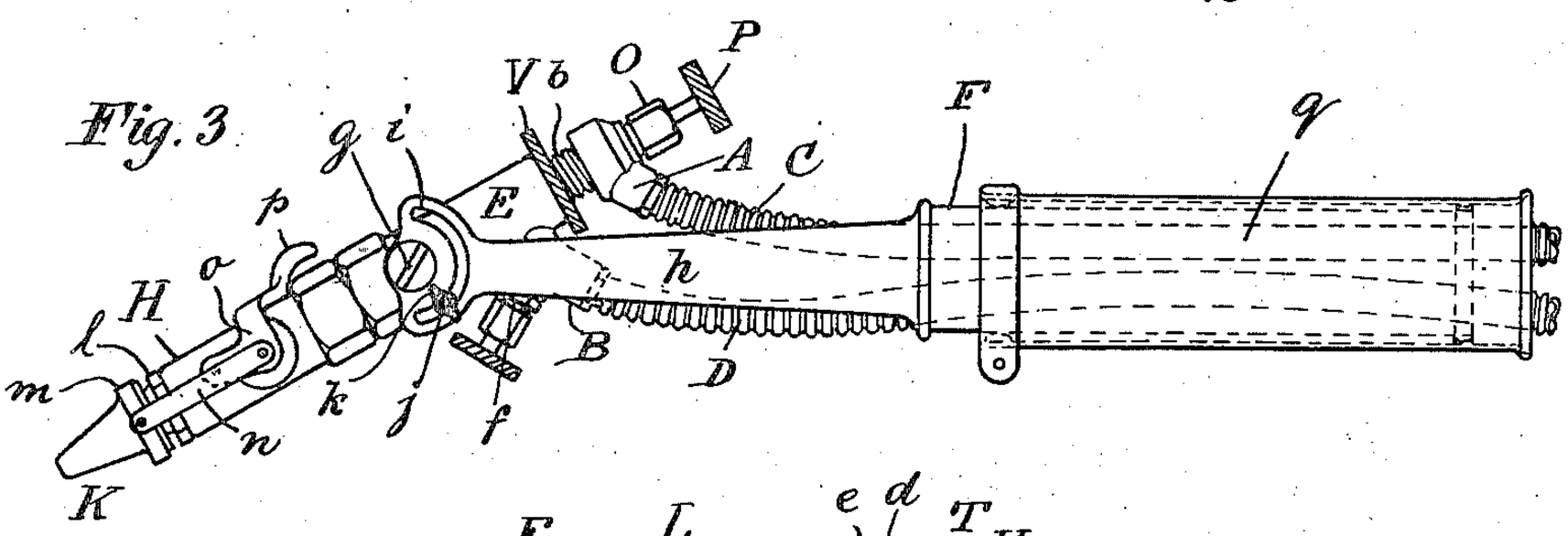
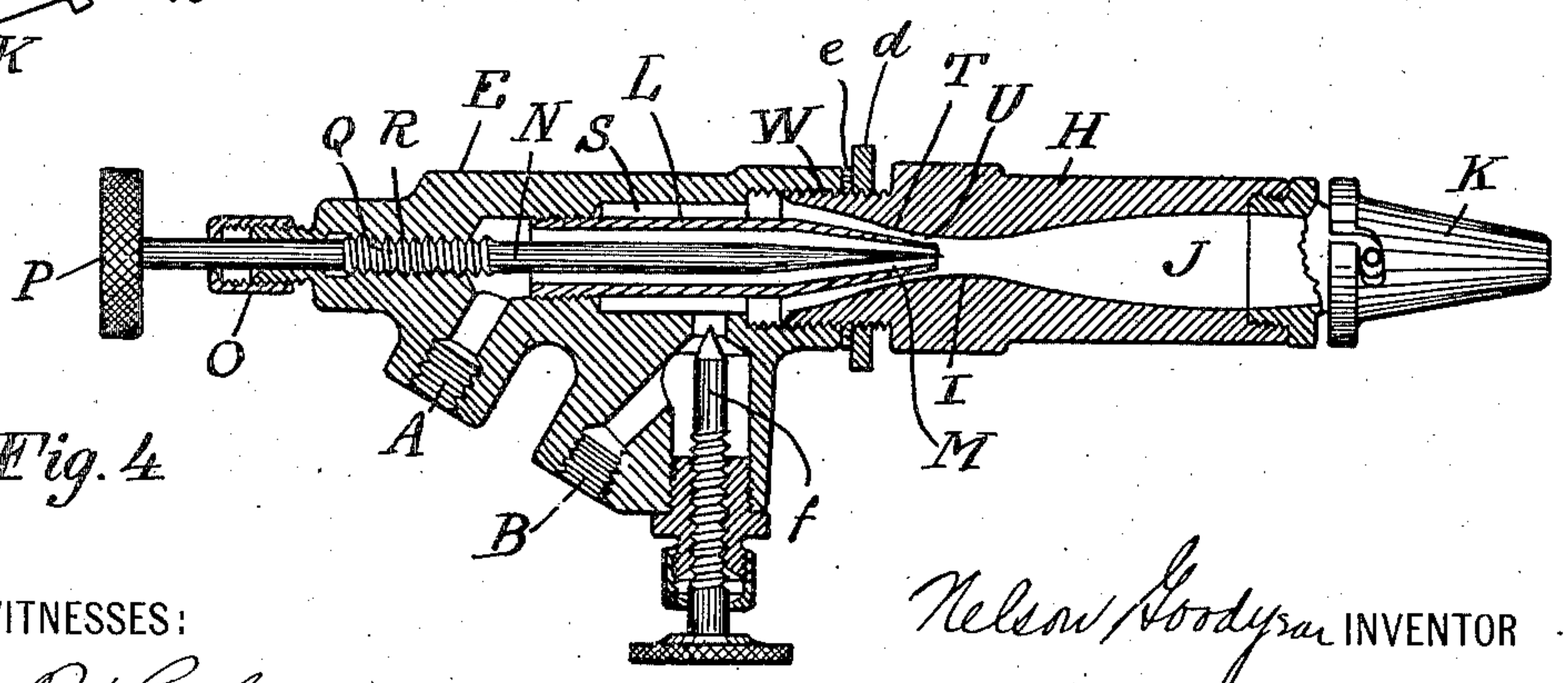


Fig. 4



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GAS-BLOWPIPE.

985,159. Specification of Letters Patent. Patented Feb. 28, 1911.

Application filed August 7, 1909. Serial No. 511,822.

To all whom it may concern:

Be it known that I, NELSON GOODYEAR, a citizen of the United States, and a resident of the city, county, and State of New York, have invented certain new and useful Improvements in Gas-Blowpipes, of which the following is a specification accompanied by drawings.

This invention relates more particularly to the head or nozzle portion of blow pipes, in which two gases such as acetylene and oxygen are burned, and means for easily controlling the mixture of the gases used before they issue from the outer orifice of the nozzle.

The invention also relates to the improved means for adapting a blow pipe of a given size to use different nozzles of various sizes and forms, doing away with the necessity for having separate blow pipes for each size or shape of flame that is required for use in brazing or autogenous welding operations.

Referring to the drawings, Figure 1 is a longitudinal cross sectional view through one form of the invention; Fig. 2 is a top plan view of Fig. 1; Fig. 3 is a side elevation of the parts shown in Figs. 1 and 2 mounted in a suitable handle; and Fig. 4 is a longitudinal cross sectional view of another form embodying certain features of the invention.

Referring to Fig. 1, A is the inlet for one of the gases used and B is the inlet for the other. It is preferable that the gas which is under the higher pressure should enter at A, as for example when oxygen and acetylene are used it is customary to have the oxygen under a higher pressure than the acetylene and in such a case A would be the oxygen inlet.

The gas is led to the inlets A and B by suitable gas pipe connections or conduits as shown at C and D in Fig. 3, which may be of flexible metallic tubing, so as to permit an adjustment of the head E of the blow pipe at various angles with reference to the handle F. Referring again to the various figures, the head E is adapted to receive and support by means of the screw thread G a piece H embodying a throat I and a mixing chamber J. The piece H is in turn adapted to support the outer nozzle K from which the gas is burned.

In such blow pipes as herein described it is of great importance to have the gases thoroughly mixed in a suitable chamber as shown at J before the issue from the nozzle K. Otherwise imperfect combustion would result and also there would be danger of oxidation of the metal against which the flame impinges. The object of the blow pipe herein described is to heat or fuse the metal operated on with a neutral or reducing flame avoiding in most cases any tendency to oxidation. In order to attain the proper mixture of the two gases, the one which is under the higher pressure enters through the inlet A through the passages clearly shown in the drawings to the nipple L, which has a converging orifice M projecting well into the throat I which constitutes the entrance to the mixing chamber J. The converging orifice M is provided with a needle valve N, which passes through a stuffing box O, so that the needle valve may be controlled readily by means of the knurled head P, a portion of the needle valve being provided with a screw thread Q which engages in a corresponding thread R in some portion of the blow pipe rigidly fixed in relation to the nipple L. The gas which is under the lower pressure enters through the inlet B and passes through the various passages clearly shown to the space S around the nipple L and enters the throat I through the annular space between the outwardly tapered end of the nipple L, and converging wall T formed in the piece H which leads into the throat I. It is desirable to have one of the gases enter the mixing chamber J through the throat I at a greater velocity than the other gas, in order that eddies may be formed in the mixing gases and effectually mingle them into a homogeneous mixture before they leave the orifice in the nozzle K.

It is usual in blow pipes for the purposes herein described and which have interchangeable nozzles corresponding to the nozzle K of various sizes, to be provided with mixing chambers of greater or less efficiency and also with separate inlets to the mixing chamber for the two gases corresponding to the outlet orifice of the nipple L and to the annular orifice U and in such blow pipes it is necessary or desirable that the orifices corresponding to the outlet orifice of the nipple L and the orifice U be interchangeable also, so that they may correspond in proper proportion with the orifice in the in-

terchangeable nozzle, corresponding with the nozzle K. This is accomplished by having not only the outer nozzle interchangeable, but by having separate detachable nozzles or orifices corresponding to the outlet of the nipple N or by having the piece H of various sizes, each carrying its mixing chamber, outer nozzle and inlet nozzle corresponding to the outlet of the nipple L. In the former case the operator has the inconvenience of changing several small parts, which not only takes some little time but error is likely to be made in getting the proper corresponding sizes right. In the latter case there is the difficulty of joining in one operation, in a gas tight manner, the connections for both gases. In the devices herein shown it is only necessary to change the outer orifice K and then adjust the size of the outlet orifice of the nipple L by means of the needle valve N and if desired, by varying the size of the annular orifice U by changing the relative adjustment between the outer conical portion M of the nipple L with relation to the converging wall T leading to the throat I. This may be accomplished in Figs. 1, 2 and 3 by means of the adjusting wheel V or in the form shown in Fig. 4 by the back or forward movement of the piece H as provided by the thread W,

In the form shown in Figs. 1 and 2 the nipple L is adapted to slide back and forth through the head E which is provided with a stuffing box X, the gland Y of which is pressed by the spring Z. The spring Z is interposed between the gland Y and the collar *a* which is securely fastened to the nipple L, so that the spring Z tends to push the nipple L forward into the throat I and at the same time compress the packing in the stuffing box X. The nipple L is screwed into an externally threaded piece *b* which is free to move in a hollow *c* in the head E. The external thread of the piece *b* engages in the thread in the wheel V so that by turning the wheel V the nipple L may be moved backward or forward against or with the spring Z, thus varying the orifice U.

In the form shown in Fig. 4 adjusting thread W is provided with lock nuts *d* and washer *e* for the purpose of preventing an escape of gas through the thread W and for the purpose of locking the relative adjustment between the nipple L and the piece H to vary the orifice U. In practice it has been found unnecessary to change the orifices for both gases where they enter the throat I when changing the outer nozzle K. It is only desirable to change the orifice carrying the gas which is under the higher pressure. The other may be left open wide enough at all times to supply the largest sized nozzle K employed. It will therefore be understood that if desired the needle valve N may be opened up wide provided the lower pressure of gas is admitted at the inlet A and the high pressure of gas at the inlet B, in which case the adjustment could be made between the nipple L in the piece H, although it is preferable to control the high pressure of gas by the needle valve N allowing the orifice U to be fixed. The purpose of the valve *f* which may or may not be in the needle valve is to control the flow of gas entering at the inlet B.

In certain other blow pipes which have been designed for use in connection with acetylene and air, the valves for the two gases have been arranged axially in a manner somewhat similar to that shown in the accompanying drawings but with the important difference that the needle valve admitting the high pressure gas does not have its variable orifice at the point of discharge into the throat of the mixing chamber. The advantage of having the high pressure gas discharge orifice close to the entrance of the mixing chamber, is for the purpose of deriving the full benefit of the velocity which is greatest at the point of restriction of the valve. It will be noticed in the accompanying drawings that the orifices delivering the two gases into the throat I or entrance to the mixing chamber are tapered in a very gradual way for the delivery end of the blow pipe so that the current of the gases is as nearly as may be along an axial line, so that the momentum of the gases which travel at considerable velocities tends to carry them forward into the mixing chamber and obviates any tendency to back up or obstruct the flow of the other gas as would be more or less the case were the entrances to the throat I not nearly coincident in direction with the axis of the blow pipe.

In a blow pipe like that herein shown the head E is mounted on trunnion screws *g*, *g'* which are carried in a fork *h* branching from a cylindrical handle F, one of the branches of the fork H is provided with a circular slot *i* through which a pin *j* travels, the pin *j* being threaded where it passes through the slot *i* and adapted to carry a thumb nut *k* for the purpose of fixing the head of the blow pipe at any desired angle with reference to the handle F. In order that the head may be movable with reference to the handle without breaking the gas connection, the latter are made flexible either in the sense of being flexible hose as shown in the drawing at C, D, or they may be made by swing joints in the trunnions similar to swing joints in ordinary gas brackets, in which case the gases would be brought to the trunnions by making the two arms of the fork *h* tubular. This adjustable feature of the head of the blow pipe is of great convenience and there are so many ways for accomplishing the desired end that it seems unnecessary to show

them since the method of using flexible hose connections adequately establishes the invention in this particular.

In Figs. 1, 2 and 3 the outer nozzle K is shown adapted to be clamped against the piece *l* by means of a ring *m* and toggle joint *n*, *o* the part *o* having a thumb piece *p* for convenience in manipulation. The nozzles K fit with the ground joint over the outer conical portion of the piece *l*. Any discrepancy in the exact interchangeability of the nozzles K being compensated by the spring in the links *n* of the toggle *n*, *o*. Referring to Fig. 3 *q* is an extension piece for the handle F which is tubular and telescopes over the handle F so that the handle as a whole may be varied in length to suit conditions on varying classes of work.

It will be understood that the embodiment of the invention herein shown is only one of many which may be devised and I do not limit my claims to the particular structure or arrangement of parts herein described.

I claim and desire to obtain by Letters Patent the following:

1. In a gas blow pipe the combination of a chambered head having gas inlet orifices, a nipple and needle valve therein, a throat piece connected to said head and provided with a contracted portion, and a mixing chamber, the point of conflux of the gases being in said contracted portion, and means for removably connecting a nozzle to said throat piece comprising a piece *l* having a conical surface, and means for clamping the nozzle against the piece *l*.

2. A gas blow pipe having a nipple for one of the gases, a needle valve for controlling the nipple, a mixing chamber and a throat, gas connections for the other gas leading to said throat, and means for adjusting the said nipple longitudinally including a spring acting thereon in one direction.

3. A gas blow pipe having a nipple for one of the gases, a needle valve for controlling the nipple, a mixing chamber and a throat, gas connections for the other gas leading to said throat, and means for adjusting the said nipple longitudinally including a spring acting thereon in one direction and a stuffing box around said nipple upon which the said spring acts compressively.

4. A gas blow pipe having a nipple for one of the gases, a needle valve for controlling the nipple, a mixing chamber and a throat, gas connections for the other gas leading to said throat, and means for adjusting the said nipple longitudinally including a spring acting thereon in one direction and a screw mechanism for moving it in opposition to said spring.

5. A gas blow pipe having a mixing chamber, gas inlet connections, and means for regulating the volume of gases, a nozzle, and means for securing nozzles interchangeably to the blow pipe comprising a ring for receiving and holding the nozzle, a seat or surface fitted to receive the nozzle, and a toggle joint connection for drawing the ring and nozzle against the said surface.

6. A gas blow pipe having a head, a gas mixing chamber, a nozzle, inlets for the gases to be mixed a handle having a fork and pivotal connections between the said head and the fork, gas connections extending from the handle to the said inlets.

7. A gas blow pipe having a head, a gas mixing chamber, a nozzle, inlets for the gases to be mixed a handle having a fork and pivotal connections between the said head and the fork and means for securing the pivotal connection at various positions of adjustment.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses, August 3rd 1909.

NELSON GOODYEAR.

Witnesses:
E. VAN ZANDT,
E. P. LA GAY.