No. 850,581. PATENTED APR. 16, 1907.

G. W. HOPKINS.

BLOWPIPE.

APPLICATION FILED SEPT. 28, 1906.

Fig. 1.

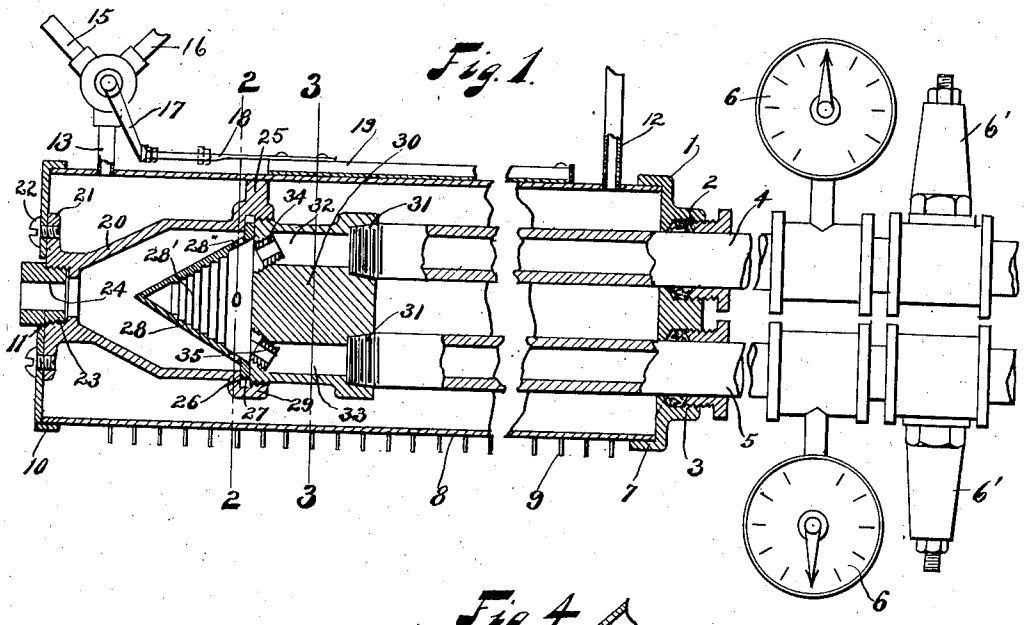


Fig. 4.

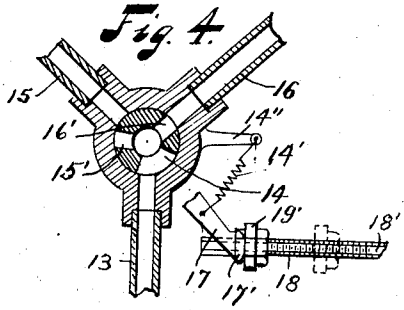


Fig. 2.

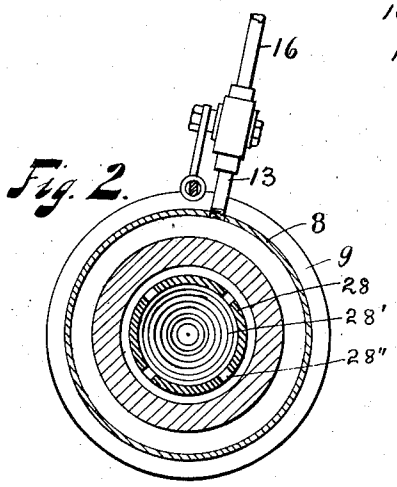
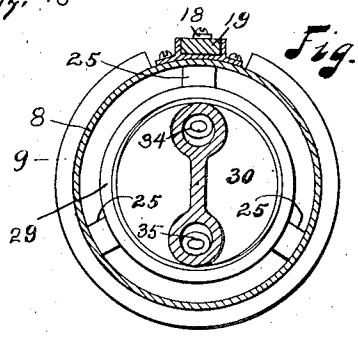


Fig. 3.



Witnesses:

Edw. Lindmueller

V. L. Fisher.

Inventor:

George W. Hopkins.

By B. W. Brockett

His Attorney.

UNITED STATES PATENT OFFICE.

GEORGE W. HOPKINS, OF CLEVELAND, OHIO.

BLOWPIPE.

No. 850,581. Specification of Letters Patent. Patented April 16, 1907.

Application filed September 28, 1906. Serial No. 336,623.

To all whom it may concern:

Be it known that I, GEORGE W. HOPKINS, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Blowpipes, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

It has been found in practice generally that in order to produce perfect combustion in an acetylene-burner it is necessary that the mixture should be heated or cool, as the case may be, to bring the temperature of such mixture to a point where a deposit of carbon on the parts is prevented and complete combustion is brought about and then to maintain such temperature throughout the entire operation.

It has been found in the use of acetylene gas that it decomposes at a comparatively low temperature—600° Fahrenheit, for example—and blowpipe-burners, used for welding, are required to stand a temperature in the vicinity of 3,000° Fahrenheit. In fact, it has been found in practice that blowpipe-burners of ordinary construction which are not provided with some cooling means decompose and change the nature of the acetylene gas, prevent proper combustion, and produce a deposit of carbon within the blowpipe or burner due to such decomposition and lack of proper combustion.

It is the object of this invention, therefore, to provide a burner for blowpipes and the like for use with the acetylene gas and which is provided with suitable means for retaining the temperature of the gas and of the parts of the burner at a point such that decomposition and depositing of carbon is rendered impossible.

It is also a part of this invention to arrange in conjunction with any burner for use with any gas suitable means for supplying a hot or cold medium to produce a proper combustion.

More specifically, the invention contemplates the use of suitable air and gas pipes which coöperate with a mixer and burner-tube to produce the required flame, together with a jacket, preferably a water-jacket, adapted to receive hot or cold water for affecting the parts to bring about the proper temperature for such parts in producing the combustion required.

Still more specifically, I employ a gas-pipe and air-pipe connected to a mixer adapted to supply the mingled air and gas to a burner-tube and in connection with such parts a water-jacket provided with means for suppling hot or cold water automatically thereto to retain such parts at required temperature for proper combustion.

Invent on further resides in the mixer, in the mechanism for supplying hot and cold water to the jacket, and to a thermostatic controlling device for regulating such water-supplying mechanism, whereby the heat of the blowpipe automatically regulates the water supplied to the jacket—that is, if the gas used in the blowpipe decomposes at a low temperature the thermostat may be set to regulate the water-supplying mechanism to deliver cold water to the jacket and retain the required temperature for proper combustion, while, on the other hand, if the gas used requires a high temperature for proper combustion then the thermostat may be set to automatically supply hot and cold water to the jacket to bring about the required temperature for this gas also.

The invention may be further briefly summarized as consisting in the construction and combination of parts hereinafter set forth in the following description, drawings, and claims.

Referring to the drawings, Figure 1 is a top plan view, partially broken away, showing all of the parts in their relationship with respect to each other. Fig. 2 is a section upon the line 2 2 of Fig. 1 looking to the left. Fig. 3 is a section upon the line 3 3 looking to the left, and Fig. 4 is a detailed sectional view of a three-way valve for controlling the water-supply.

In carrying out my invention any preferred form and construction of blowpipe and water-jacket may be employed; but I have shown one form in the drawings which meets the requirements with great efficiency, and in such embodiment 1 represents a head which is provided with stuffing-boxes 2 and 3 for receiving the air-admission pipe 4 and the gas-admission pipe 5, each of which is provided with a suitable gage 6 and valve 6′. The head 1 is provided with a flange 7, adapted to receive a jacket 8, provided with cooling-flanges 9 and having at its forward end another head 10, which closes the jacket at its forward end. This head 10 is provided with an opening 11, through which the

burner projects. The jacket is further provided with a water-outlet 12 and with a water-inlet 13, connected to a three-way valve 14, provided with a cold-water inlet 15 and a hot-water inlet 16. An operating-lever 17 is arranged for this valve, and it is preferably held in the position shown in Figs. 1 and 4 by a spring 14', secured to a bracket 14''. This lever 17 is provided with a swiveled block 17', having an opening for receiving an arm 18, connected to a bar 19, of gutta-percha or other suitable material which is capable of serving as a thermostatic device. A nut 19' on the threaded end of the arm 18 is adapted to engage the swiveled block 17' and shift the valve-lever 17 against the tension of its spring. This bar 19 is secured to the jacket 8 at its rear end. From the arrangement of parts connected to the operating-lever 17 and the valve 14 it will be seen that any change in the temperature of the water-jacket and its parts will bring about a shifting of the valve 14 and will cause such valve to admit hot or cold water, as the case may be.

In normal position the valve 14 is set to deliver through the port 16' hot water, and upon the expansion of the bar 19 the valve 14 will shut off this hot water and admit cold water through the port 15' to the jacket, in which case the parts within the same will be kept at a low temperature. If it is desirable to raise the point at which the cold water comes, then the nut 19' is shifted on the arm 18, so that the thermostatic bar 19 will have a greater movement before it operates the valve 14.

Within the water-jacket 8 and secured to the forward end thereof is a burner-tube 20, having a flange 21, provided with threaded openings for receiving screws 22, passing through openings in the head 10. This tube 20 has a threaded opening 23 for receiving a burner-nozzle 24 of any preferred size and construction. This tube is further provided with projections 25 for engagement with the inner wall of the water-jacket to hold the tube in place and also with an annular shoulder 26 at the rear end thereof for receiving the flange 27 of a hollow mixing-cone 28 and with a threaded cylindrical part 29 for receiving a member 30, provided with openings 31 for receiving the air and gas pipes 4 and 5 and with suitable ports 32 and 33, communicating, respectively, with nozzles 34 and 35. These nozzles 34 and 35 are preferably arranged in a manner such that they will project their streams toward each other and within the mixing-cone 28.

The mixing-cone 28 is arranged internally with annular ridges 28' for the purpose of baffling and mixing the air and gas and with ports 28'', which permit the mixture to flow into the burner-tube 20.

It has been found in practice that the arrangement of a mixing-cone with annular ridges such as described, together with air and gas nozzles which project their streams toward each other, furnishes a mixture of gas and air which is highly efficient for complete combusiton and that the varying pressures in the gas and the air have less tendency to affect such perfect combustion.

When the device is used with acetylene, a sufficient quantity of such gas and air is admitted to the mixer to produce the flame required at the burner, and when the radiation of the heat from such flame and also the heat produced by the heating up of the parts due to the heat radiated from the work raises the temperature of the burner and of the parts to an extent such that the gas is decomposed or to a point where the gas is about to decompose the thermostatic bar 19, which has been previously set, operates the valve 14 to let in cold water in sufficient quantity to prevent the temperature from rising or it lowers the temperature to a point where decomposition is impossible. This continues automatically during the entire operation of the device, and it has been found in actual practice that the parts do not clog or carbonize in any way and that perfect combustion is brought about at all times.

When gases are used which would give better combustion if the mixture were heated in the initial starting or, in fact, even after the device is under way, then the nut 19' is adjusted so that the temperature of the parts is raised by permitting the hot water to flow into the jacket until the thermostat has shifted the valve or until the point in temperature for perfect combustion of this particular gas being used has been reached.

The arm 18 may have a flat side 18' for graduation for guidance in adjusting the nut 19'.

Having described my invention, I claim—

1. In an acetylene-burner, in combination, means for supplying a mixture of gases to said burner, and means for cooling such mixture to prevent the decomposition of the acetylene gas.

2. In an acetylene-burner, in combination, means for supplying a mixture of gases to said burner and a water-jacket for cooling such mixture to prevent decomposition of the acetylene gas.

3. In an acetylene-blowpipe, in combination, a burner, means for supplying a mixture of gases to said burner, and means for cooling the same to prevent decomposition of the gas.

4. In an acetylene-blowpipe, in combination, a burner, means for supplying a mixture of gases to said burner, and a jacket for varying the temperature thereof to prevent decomposition of the gas.

5. In an acetylene-burner, in combination, means for supplying a mixture of gases to said burner, and a jacket adapted to be sup-

plied with a medium for preventing a rise in the temperature of the parts of said burner above the point of decomposition.

6. In an acetylene-burner, in combination, means for supplying a mixture of gases to said burner, and a water-jacket for retaining the temperature of the parts of said burner below the point of decomposition of the acetylene gas.

7. In an acetylene-burner, in combination, means for supplying a mixture of gases to said burner, and means for automatically supplying a medium for retaining the temperature of the mixture and of the parts of said burner below the point of decomposition of the acetylene gas.

8. In an acetylene-burner, in combination, means for supplying a mixture of gases to said burner, and means for retaining the parts of said burner at substantially a fixed temperature irrespective of the effect of the heat radiating from the flame produced by said burner.

9. In a burner, in combination, means for supplying a mixture of gases thereto, a water-jacket for said burner, and means for supplying hot and cold water to said jacket.

10. In an acetylene-burner, in combination, a burner, a mixer for said burner, means for supplying air and gas to said mixer, a water-jacket surrounding said parts, and means for supplying water to said jacket.

11. In an acetylene-burner, in combination, a burner-tube, a mixer for said tube, means for supplying air and gas to said mixer, a water-jacket for said parts, means for supplying water to said jacket, and means controlled by the temperature about said parts for regulating the flow of water to said jacket.

12. In an acetylene-burner, in combination, a burner-tube, a mixer mounted within the same, means for supplying air and gas to said mixer, a water-jacket surrounding said burner-tube, means for supplying water to said jacket, a water-supply pipe, a valve controlling said supply, and a thermostat for controlling said valve.

13. In a blowpipe, in combination, a burner-tube, a mixer carried thereby, a gas-supply, an air-supply, a jacket inclosing all of said parts, a water-supply pipe, a valve in said pipe, an operating device for said valve, and a thermostatic bar for operating said valve, whereby the expansion of said bar will shift said valve to admit water to said jacket.

14. In a blowpipe, in combination, a burner-tube, a hollow mixing-cone carried by said burner-tube, said cone being provided with openings for the exit of the mixture and being closed at the apex, a gas-inlet nozzle, and an air-inlet nozzle, said nozzles being adapted to project their streams into said mixing-cone.

15. In a blowpipe, in combination, a burner-tube, a hollow mixing-cone mounted therein and having its apex closed and extending toward the discharge end of said burner-tube, a member provided with a gas-admission nozzle and an air-admission nozzle, both of which project their streams toward a common point within said mixing-cone, and means for supplying air and gas to said air and gas nozzles.

16. In an acetylene-burner, in combination, a burner-tube, a hollow mixing-cone having its apex toward the opening in said burner-tube and provided internally with annular ridges and with discharge-openings near the base thereof, an air-nozzle, a gas-nozzle, said nozzles being adapted to project their streams into said mixing-cone toward the apex thereof, and means for supplying air and gas to said nozzles.

17. In an acetylene-burner, in combination, a burner-tube having an annular shoulder, a mixing-cone abutting against said shoulder and provided with internal annular ridges and discharge-openings near the base thereof, a member secured in said burner-tube and holding said mixing-cone in place, said member being provided with a gas-nozzle and an air-nozzle, both of which are adapted to project their streams within said cone and toward the apex thereof, and means for supplying air and gas to said nozzles.

18. In an acetylene-burner, in combination, a burner-tube having a burner mounted therein at one end, a hollow mixing-cone secured at the other end and having its apex toward said burner, said mixing-cone being provided internally with annular ridges and near its base with discharge-openings, a member secured in said burner-tube and holding said cone in place, a gas-nozzle carried by said member, an air-nozzle carried by said member, said nozzles being adapted to converge their streams within said hollow cone, an air-supply pipe for said member, and a gas-supply pipe for said member.

19. In an acetylene-blowpipe, in combination, a burner-tube, a conical-shaped mixer mounted in said burner-tube and having internal annular ridges and also having discharge-openings near the base thereof said mixer being hollow and closed at the apex, air and gas nozzles adapted to converge their streams within said mixer, means for supplying air and gas to said nozzles, a water-jacket for said parts, and means for supplying water to said jacket.

20. In an acetylene-blowpipe, in combination, a burner, means for supplying a mixture of gases to said burner, a water-jacket for said burner, and cooling-ribs mounted upon said jacket.

21. In a blowpipe, in combination, a burner-tube provided with an annular shoulder, a hollow mixing-cone having its apex toward the opening in said burner-tube and

provided internally with annular ridges and at its base with discharge-openings, a member secured in said burner-tube for holding said mixing-cone in place, a gas-nozzle carried by said member, an air-nozzle carried by said member, pipes secured in said member for supplying air and gas to their respective nozzles, a jacket-head secured to said burner-tube, another jacket-head provided with stuffing-boxes about said air and gas pipes, a jacket mounted between said head, and means for supplying water to said jacket.

22. In a blowpipe, in combination, a burner, pipes for supplying air and gas to said burner, and a jacket surrounding said burner and said pipes and having a sliding connection between it and said pipes to permit expansion and contraction of said jacket.

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

GEORGE W. HOPKINS.

Witnesses:

V. L. FISHER,

B. W. BROCKETT.