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G. CLEMENTS.

GAS FURNACE AND BLOWTORCH.

APPLICATION FILED DEC. 29, 1921.

1,431,633. Patented Oct. 10, 1922.

Fig. 1.

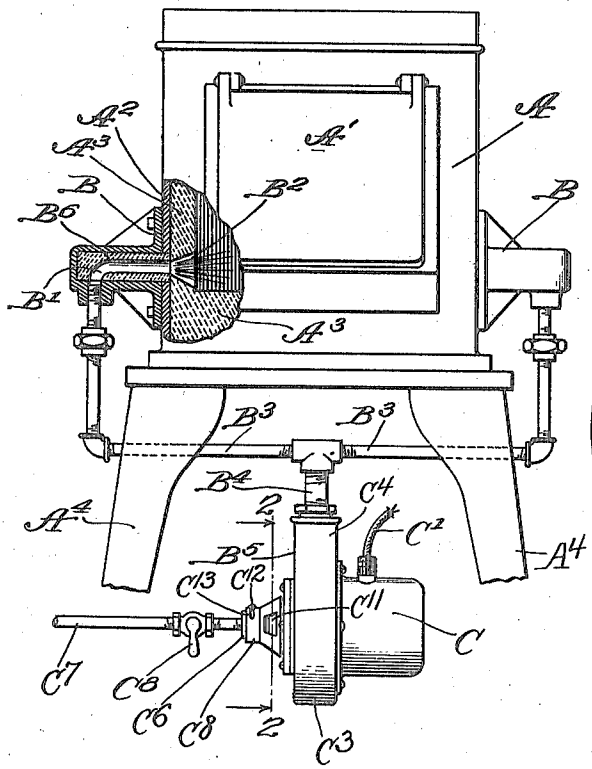


Fig. 2.

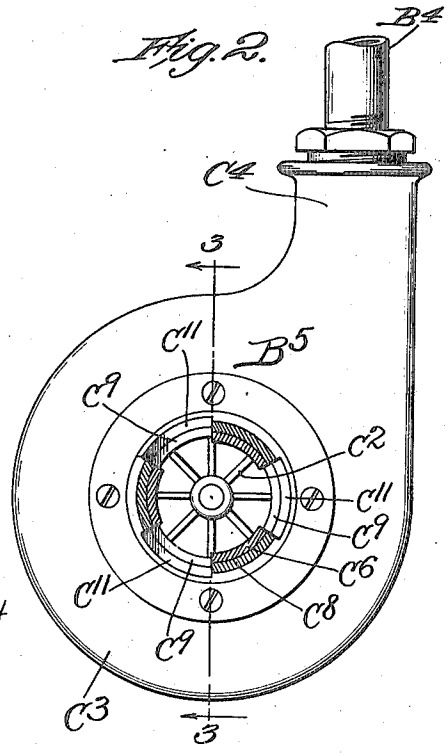


Fig. 3.

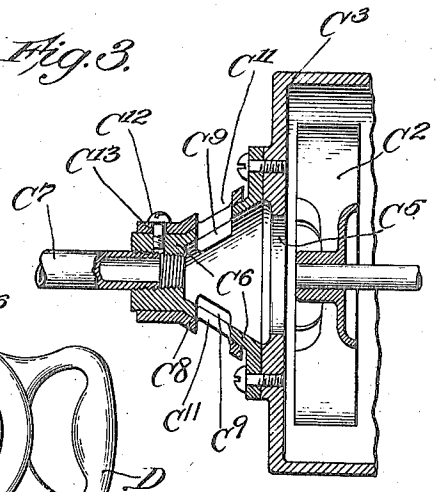
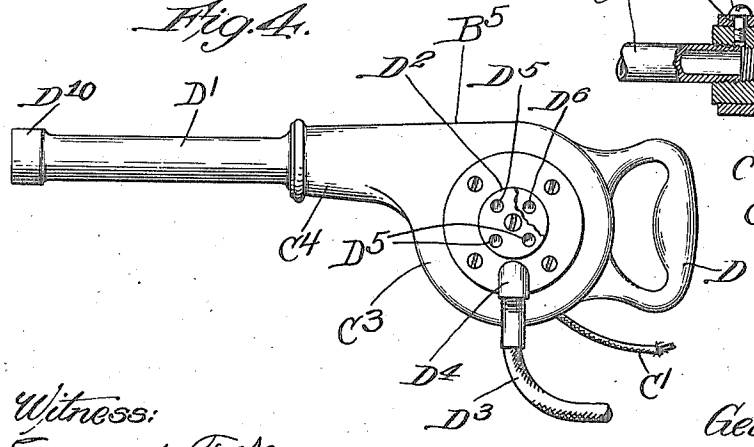


Fig. 4.



Witness:
Edward T. Wray

Inventor:
George Clements.
By Porter & Carter.
Attorneys.

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UNITED STATES PATENT OFFICE.

GEORGE CLEMENTS, OF CHICAGO, ILLINOIS.

GAS FURNACE AND BLOWTORCH.

Application filed December 29, 1921. Serial No. 525,765.

To all whom it may concern:

Be it known that I, GEORGE CLEMENTS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Gas Furnaces and Blowtorches, of which the following is a specification.

My invention relates to improvements in gas furnaces and torches. It has for one object to provide a gas furnace or torch which will be electrically operated and wherein the gas and air will be commingled before combustion and wherein positive means are employed for discharging the gas and the air simultaneously into the furnace or from the torch so as to get a controlled and positive burning action.

My invention is illustrated more or less diagrammatically in the accompanying drawings, wherein—

Figure 1 is a side elevation or part section of the furnace;

Figure 2 is a section on an enlarged scale on the line 2—2 of Fig. 1;

Figure 3 is a section along the line 3—3 of Fig. 2;

Figure 4 is a side elevation of a gas torch showing slight modifications.

Like parts are indicated by like characters throughout the drawings.

A is a furnace having a swinging door A^1, an outer casing A^2, a lining A^3. A^4 is a supporting frame or stand upon which the furnace rests.

B, B are nozzle blocks bolted to either side of the casing. They contain discharge pipes B^1, discharging into the furnace through openings B^2 in the lining. B^3, B^3 are two branches of a gas and air pipe system fed from the discharge pipe B^4 which lead from a combined blower and mixer B^5. B^6 is a refractory lining contained within the nozzle block B and surrounding a pipe B^1.

The combined blower and mixer comprises a housing C containing an electric motor, power for which is supplied through the conduit C^1. This electric motor drives a fan C^2 in a fan casing C^3, the fan casing having a discharge throat C^4 communicating with the pipe B^4. The fan casing C^3 is provided with suction port C^5 closed by a conical valve block C^6. C^7 is the gas pipe discharging into the block C^6 at its apex and is adapted to be controlled by a hand-operated valve C^8. The conical block C^6 has a series of ports C^9, the opening of which is adapted to be controlled by rotating the conical port at C^{11}. C^{12} is a set screw engaging a slot C^{13} whereby the movement of the valve cup may be limited between the open and closed positions.

In the modified form of torch shown in Fig. 4 a handle D is applied to the casing B^5 and a burner pipe D^1 is substituted for the pipe B^4. A perforated valve plate D^2 is substituted for the mixer C^6 and the gas pipe, which in this case is a flexible hose, D^3 comes in a direction perpendicular to the axis of the fan through the sleeve D^4 to discharge into the housing at a point near the center of rotation. The plate D^2 is perforated as at D^5 and rotation of the plate moving the perforations D^5 into and out of register with perforations D^6 in the casing cap is relied upon to control the flow of air.

It will be evident that while I have shown in my drawings an operative device, still many changes might be made both in size, shape and arrangement of parts without departing materially from the spirit of my invention and I wish therefore that my drawings be regarded as in a sense diagrammatic.

The use and operation of my invention is as follows:

When the furnace is to be started the current is turned on and the motor draws air in through the ports in the valve block and forces it through the two branches of the piping into the furnace on opposite sides. The gas valve will be opened, and since there is a low pressure at the center of the fan gas will be sucked out of the gas pipe and mixed with the air as it passes through the fan chamber and thus a very high and complete degree of commingling and mixing of gas and air will be obtained. This mixed gas and air will be discharged into the furnace where it can be ignited and combustion can take place immediately owing to the fact that the mixing will have been entirely completed before the combustion zone has been reached.

The adjustment provided for blowing off the gas and the air separately makes is possible to regulate the flame and regulate the proportions of the mixture, so that the operator has complete control of all the conditions controlling combustion. The fact that the gas is positively drawn into the fan chamber in exactly the same manner as the

air makes it possible to get radical increased temperatures and to get a positive control of the amount of gas far beyond the limitations imposed by the normally low pressure in a gas main. Because the air and gas are mixed before they reach the furnace combustion takes place immediately and therefore the pipes B^1 terminate short of the combustion zone, so that there is no danger of burning out of the piping, and the passages through which the gases enter the combustion zone are thus passages lined with refractory material.

In the modified form shown in Fig. 4, the operation is exactly the same except that here we have a hand torch instead of a furnace, and in this case the burner D^1 is provided with the refractory tip D^{10}. The mixing and control of gas and air are the same in practice though slightly different in detail.

I claim:—

1. A gas mixing and burning apparatus which comprises a combustion chamber, a fan, a fan chamber and motor means for rotating the fan at high speed, a restricted connection between the fan chamber and the combustion chamber, a gas supply pipe adapted to deliver gas directly into the fan chamber, an air opening in the side of the fan chamber adjacent the point of entry of the gas, said openings adapted to admit the entire supply of gas and air for the finished mixture, the connection between the fan chamber and the combustion chamber forming a closed system for the transmission of the completed gas and air mixture.

2. The process of gas mixture and combustion which consists in delivering the entire gas supply directly to a mechanically agitated mixing zone, in delivering the entire supply of air to the same zone, in their mechanical mixture and in delivering the mixture thus completed, without further admixture and at high speed, to the zone of combustion.

Signed at Chicago, county of Cook and State of Illinois, this 19th day of December 1921.

GEORGE CLEMENTS.