To all whom it may concern:

Be it known that I, EDWARD H. SCHWARTZ, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Hot-Air-Generating Gas-Burners, of which the following is a specification.

My invention relates to improvements in portable burners of the type in which gas and air are mixed to constitute the fuel element and the flames of such mixture is further fed by suitable volumes of fresh air which is heated before it is fed to the burner proper.

My invention is suitable for use as a heater, as a burner for hot-water heaters, as a portable stove for cooking purposes, and as a burner for japanning-ovens, baking-ovens, and various other like uses.

The object of my invention is to produce a device of the class indicated which shall be simple, strong, inexpensive, and capable of producing an intensely hot flame. These and such other objects as may hereafter appear are accomplished by the devices illustrated in the accompanying drawings, in which—

Figure 1 is a vertical central section of one embodiment of my invention. Fig. 2 is a horizontal section on the line 2 2 of Fig. 1. Fig. 3 is a detail; and Figs. 4 and 5 are an elevation and a plan view, respectively.

Like letters of reference indicate the same parts in the several figures of the drawings.

Referring by letter to the accompanying drawings, A is a base, perforated or otherwise formed so as to admit of a free flow of air thereunder.

B is the main casing of my device, which rests upon the base A and is perforated at its bottom, the perforation through the bottom of the casing B preferably registering with a like perforation through the top of the base A. The casing B is also perforated with a plurality of perforations 6 adjacent to its lower end for the admission of air.

Mounted within the casing B is the burner proper, C, in the form of a hollow-walled shell inclosing a chamber D of a substantially spherical form, open at its top to the atmosphere and connecting at its bottom by a passage E with the central perforations through the bottom of the casing B and the top of the base A. The space between the walls of the shell C constitutes a fuel-chamber F, which is closed except for the burner-openings G, which open inwardly from the upper edge of the shell C and which, as shown, are in the form of slits, but which obviously may be in the form of other shaped openings, and except also for a port communicating with the fuel-conduit H. The fuel-conduit H communicates with an air-port I, through which air is admitted, and with a gas-supply pipe J, which is controlled by a valve or cock K. It will be noted that the inner face of the casing B curves toward the burner edge of the shell C and that the outer and inner faces of the shell C curve in a similar direction.

In the drawings I have for convenience shown a perforated top or cover L, which may conveniently be used and supported by a circular horizontal flange M, which extends from the top of the casing B. It is only intended that this top piece L be used when the burner 75 is used as a heater, in which event the top piece L simply serves to prevent direct contact with the flames coming through the burner-openings G.

In operation gas is fed through the gas-supply pipe J into the fuel-conduit H and is preferably fed through a restricted nozzle, such as J, which projects a jet of gas through the gas-conduit H and induces a current of air into the gas-conduit H through the air-ports I, thereby forming the fuel mixture, which is fed into the fuel-chamber F and is discharged through the burner-openings G. The fuel mixture issuing from the burner-openings G being lighted the shell C becomes quickly and highly heated, as does also the casing B, but in less degree. The effect of this is that the air within the chamber D in the casing B is quickly expanded and brought to a high temperature. Fresh air rushing in through the air-port E is immediately heated and expanded within the chamber D, is forced out of the top of the chamber D, and is thereby fed in a highly-heated condition to the converging jets of flame which project from...
the burner openings G. The walls of the chamber D being spherical the feeding of heated air out of the chamber D to the jets of flame does not even tend to disturb their convergence, and so the highly-heated air is fed into a vortex of flame. At the same time air drawn in through the air-ports 6 in the casing B is heated upon the exterior of the shell C, follows around the outer surface of the heated shell D, and is fed in its heated condition toward the center of combustion, the curved walls of the casing B and shell D serving to direct this supply of heated air to the central point of combustion. I have found from actual demonstration that the result of thus feeding heated air to the jets of flame projecting from the burner-openings G is to perform combustion by supplying the fuel mixture issuing from the burner G with additional quantities of oxygen which have been previously brought to a high temperature and by promoting a thorough admixture of all the fuel elements so brought together, with the result that the flame produced is of a distinctly green color immediately adjacent to the burner and blends into a zone of blue flame, thus evidencing that I attain a perfect combustion of a fuel mixture which contains a very high number of heat units, the green flame being about the hottest flame known and the blue flame being second only to the green flame in intensity. As a further evidence of the perfect combustion so produced it will be found that no smoke or other products of combustion escape from the burner and there is no evidence of gas above the burner while the burner is in operation.

While I have shown my invention embodied in what I consider a convenient, durable, and desirable form, it will be understood that there may be many variations in detail which will suggest themselves under varying conditions without departing from the spirit of my invention.

I claim—

1. A burner, comprising a fuel-chamber surrounding a substantially closed hot-air chamber, said hot-air chamber being provided with walls which converge upwardly to a re-stricted discharge-port, and being also provided with a restricted inlet-port, said fuel-chamber being provided with a plurality of burner-openings arranged to discharge adjacent to said discharge-port.

2. A burner comprising the combination with a substantially closed casing provided with converging walls leading to an opening in the top of said casing, of a hollow shell enclosed within said casing, means for supplying air to the space between said casing and said shell, said shell being provided with double walls forming a fuel-chamber therebetween, and said shell surrounding an air-chamber, means for supplying air to said last-named air-chamber, and means for supplying a fuel mixture to said fuel-chamber, said shell being also provided with a plurality of burner-openings extending out of said fuel-chamber.

3. In a device of the class described, the combination with a casing of generally spherical form and provided with air-ports adjacent to its base of a double-walled shell of substantially spherical form mounted within said casing, a space between the walls of said shell constituting a fuel-chamber, said shell surrounding a substantially spherical hot-air chamber opening at its top through said shell and said shell being provided at its upper edge with a series of burner-openings communicating with said fuel-chamber, said shell being provided also with a passage of smaller diameter than said hot-air chamber for admitting air to said hot-air chamber, and means for conducting a fuel mixture to said fuel-chamber.

4. In a device of the class described, the combination with a casing of substantially spherical form but opening at its top and provided adjacent to its base with ports for the admission of air to its interior, of a double-walled shell of substantially spherical form but open at its top, mounted within said casing so as to provide a hot-air chamber between said shell and said casing and communicating directly with said air-ports, said shell enclosing said hot-air chamber which opens through the top thereof, said shell being provided with an air-port for supplying air to the base of said hot-air chamber and with a plurality of converging burner-openings which extend through the upper edge of said shell into the space between the double walls of said shell, which space constitutes a fuel-chamber, a conduit leading to said fuel-chamber, and means for supplying a fuel element to said conduit, said conduit being provided with a port for the admission of air therein, substantially as described.

5. The combination with a substantially closed casing provided with air-ports adjacent to its base and with an opening at its top, of a double-walled shell mounted within said casing, the space between the walls of said shell constituting a fuel-chamber, said shell surrounding a hot-air chamber opening at its top through said shell, and said shell being provided near its upper edge with a series of burner-openings communicating with said fuel-chamber, said shell being provided also with a passage of smaller diameter than said hot-air chamber for admitting air to said hot-air chamber, and means for conducting said fuel mixture to said fuel-chamber.

EDWARD H. SCHWARTZ.

Witnesses:
M. E. SHELDS,
G. Y. DANKWARD.