(No Model.)

D. McDONALD.

STOVE FOR BURNING GAS.

No. 525,665. Patented Sept. 4, 1894.

Fig. 1.

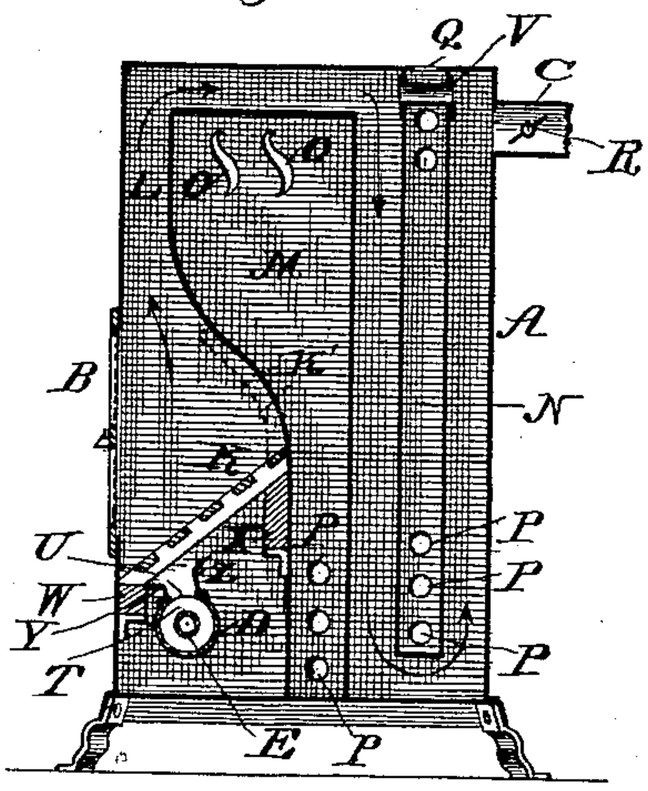


Fig. 2.

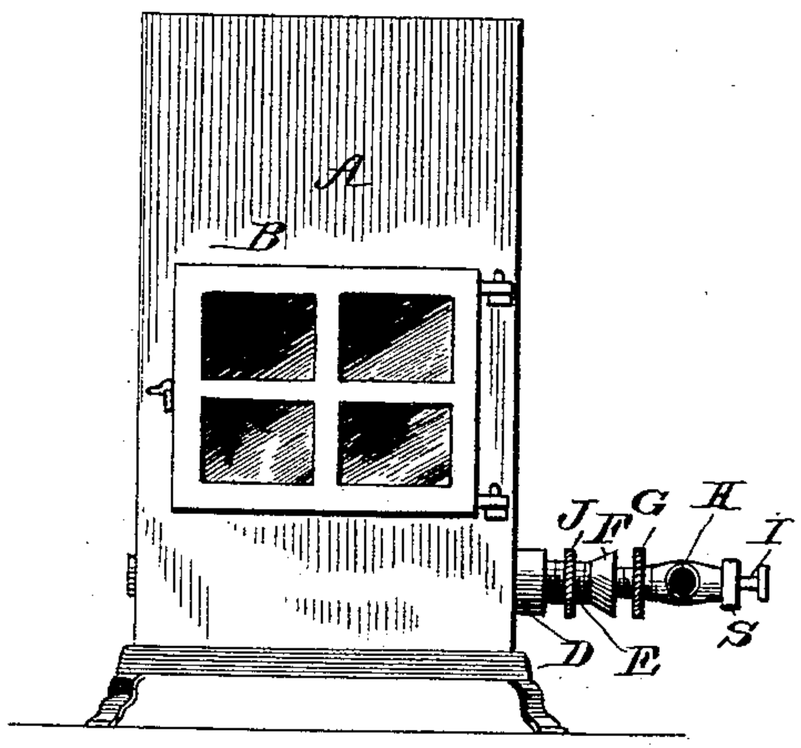


Fig. 3.

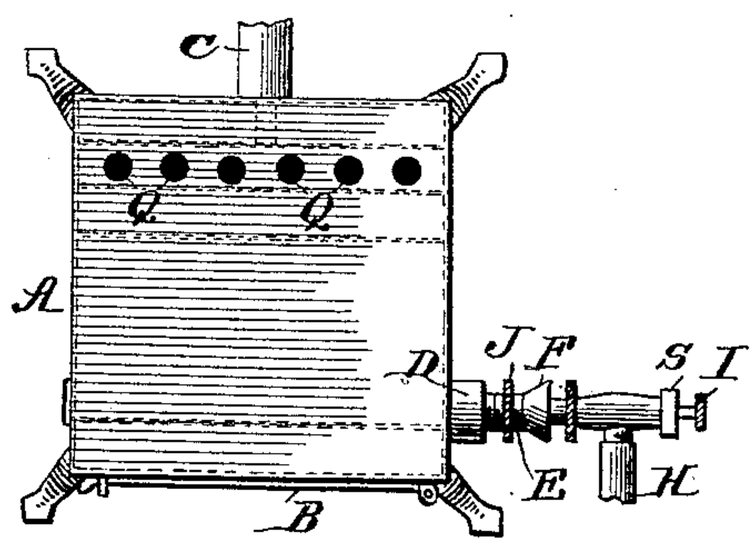


Fig. 5.

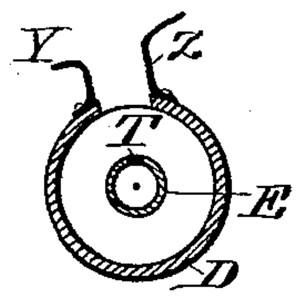
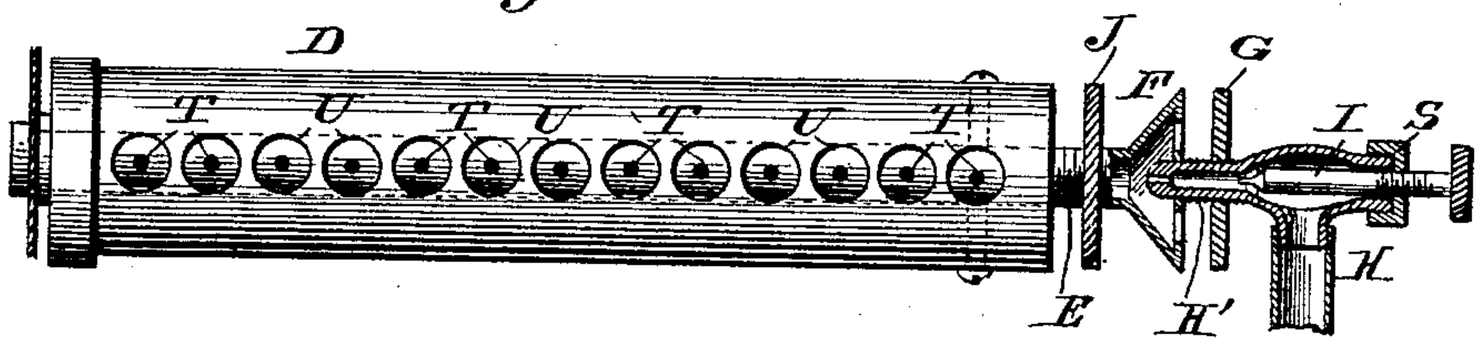


Fig. 4.



WITNESSES:
Fred G. Dieterich
Edw. W. Byrn.

INVENTOR
Donald McDonald
BY Munn & Co
ATTORNEYS.

UNITED STATES PATENT OFFICE.

DONALD McDONALD, OF LOUISVILLE, KENTUCKY.

STOVE FOR BURNING GAS.

SPECIFICATION forming part of Letters Patent No. 525,665, dated September 4, 1894.

Application filed March 5, 1894. Serial No. 502,394. (No model.)

To all whom it may concern:

Be it known that I, DONALD McDONALD, a citizen of the United States, residing at Louisville, in the county of Jefferson and State of Kentucky, have invented a certain new and useful Improvement in Stoves for Burning Gas and other Inflammable Vapors, of which improvement the following is a specification, reference being had to the accompanying drawings, on which like letters indicate like parts.

Figure 1 is a vertical transverse section of the stove as I construct it; Fig. 2 a front elevation; Fig. 3 a top view, and Figs. 4 and 5 are respectively an enlarged plan view and cross section of the burner.

In all gas stoves, as at present constructed, gas is introduced either pure or mixed with air by means of a pipe and is allowed to escape through small openings in said pipe and burn inside of the stove. If the stove is closed this plan occasions very bad combustion, for the reason that it is impossible to give the gas exactly the right amount of air with which to burn. If the stove is open, better combustion is secured, but a very much larger amount of air than is necessary is drawn in, and is either carried up the chimney, occasioning a large waste of heat, or it is sent out into the room laden with carbonic acid, water, and other products of combustion, and in this way renders the atmosphere unfit for breathing. Both of these difficulties are obviated in my improvement by burning the gas in a perfectly air tight chamber, allowing it only so much air as is necessary to perfectly burn it, and giving it this air at exactly the right point for its proper combustion, and then carrying off all of the products of combustion up the chimney, after being first cooled down, and in this way heating the air of the room. All this is accomplished in detail as follows:

A is an air tight box of metal plate having a door at B preferably filled with glass or mica to afford a view of the fire.

C is a pipe connecting with the chimney for carrying off the products of combustion, the draft being controlled by the damper R.

D is a burner for introducing the gas and air into the stove.

E is a smaller pipe running inside of the larger pipe D and is perforated at frequent intervals with holes T, T, T. Opposite each of these small holes there is a larger hole U drilled through the outside burner D.

Gas is introduced through the pipe H, the supply being controlled by the needle valve I. This gas acting like an injector draws air in with it into the pipe E through the funnel shaped mixer F, the amount of air so drawn in being controlled by means of the disk G which is mounted upon a screw threaded portion H′ of the gas inlet pipe, and which disk can be either screwed up against the face of the mixer F to cut off air from pipe E, or screwed farther away from it in order to admit more air. This device forms a species of Bunsen burners. The amount of air drawn in through the large pipe D is controlled in a similar manner by the disk J which screws back and forth on an exterior screw thread of the pipe E.

K is a platform of fire brick, cast iron, or other refractory material, intended to be heated red hot by the flame issuing from the holes U in the burner D. This platform is sustained in inclined position, with its front end the lowest, upon slabs or tile of fire brick W and X supported on the front and back of the combustion chamber. These fire brick slabs also protect the metal of the stove from the direct action of the flame.

L is a circuitous passage intended to carry the products of combustion from the fire to the flue C, the said passageway being formed by the air chambers M and N. These air chambers run the full width of the stove, air being taken into both of them through the holes P, P, P, and discharged from M through the openings O, O in the sides near the top, and from N through similar openings in the side of the stove near the top and other openings Q in the top of the stove.

V is a small passageway forming a direct draft through the top of the air chamber N, intended to allow sufficient of the hot products of combustion to reach the chimney C direct in order to start the draft.

Y and Z are shields placed on both sides of the openings in the burner D, so as to prevent the cooler air in the stove from chilling the burning gases until combustion is complete and thus concentrating and intensifying the blast. With reference to these shields Y and

Z, I would state that in a tight casing for the stove the space in the lower part of it becomes more or less saturated with nitrogen and carbonic acid gas and these dead gases, which are more or less chilled, would be drawn in and become mixed with the air and gas, but for these shields, and thus interfere with the combustion and produce an injurious effect upon the heating capacity of the burner.

My invention it will be perceived is designed to provide a burner which will cause a complete combustion in a closed chamber, or in an atmosphere which is not relied upon for supporting combustion, and to that end I have two admixtures of air with the gas at two different points. First an admixture of gas from nozzle H′ with air in funnel F which is regulated by a disk G screwing on nozzle H and closing against the openings in funnel F, and secondly a further admixture of air at the concentric openings T and U which additional supply of air is drawn in through the open end of outer tube D and is regulated by the disk J screwing on to the neck of the funnel F and closing against the outer end of the outer tube. This double admixture I find to be necessary in order to give a complete combustion and the best heating effect in what is generally known as an air tight stove.

The operation of the device is as follows: The opening H having been connected to a gas pipe, gas is turned into the burner by opening the valve I. The gas then flows through the pipe E carrying with it a large quantity of air, but not sufficient for its complete combustion. The mixed gas and air then issues from the holes T, T, T, and, a light having been applied, the diluted gas burns fiercely with the additional air which flows out of the holes U, U, which are drilled in the pipe D. The platform K is placed sufficiently high above the burner D to allow the combustion to be almost complete before the flames strike this platform. The platform K is made very open so that the fire can pass through it at all points and is made as far as possible to resemble the top of a red hot anthracite fire. If the flame is too tender and disposed to blow out, the regulators G and J are screwed up closer so as to give it less air, or the draft can be regulated by turning the damper R and in this way the quantity of air drawn in through the burner D may be regulated. The platform K having been heated red hot and the proper amount of air and gas having been admitted, the most perfect combustion will ensue, and the products of combustion will be carried through the flue L, on their journey heating up the walls of the air chambers M and N. Cold air from the room is continually flowing through these air chambers, and in this way the room is heated without allowing any of the products of combustion to escape into it.

If it is desired to heat a room quickly, and the situation is such that the products of combustion are not objectionable, the door B can be opened and the damper can be closed and the stove will then act in the same way that the ordinary gas stove acts.

In some cases it may be desirable to dispense with the platform K, and I may so use the stove. In such cases the curved side of the air chamber M should be covered with mineral wool, asbestos, or other non-conductor of heat, to prevent the metal from being warped and burned, as indicated in dotted lines at K′.

I am aware that a compound burner composed of concentric air and gas pipes with registering outlets is not broadly new, and I do not claim this feature alone.

What I claim as new, and wish to cover by Letters Patent, is—

1. The combination with an outer air tight casing A; of a burner D consisting of an outer perforated air tube with adjustable draft disk J, and a perforated gas pipe E, the perforations being opposite to each other and so arranged that each jet of mixed air and gas is surrounded by a zone of pure air sufficient for its complete combustion, and a feed nozzle and regulating disk G for mixing some air with the gas before it issues from the pipe E substantially as and for the purpose described.

2. The combination, with the air tight casing; of the burner herein described, consisting of two tubes arranged one within the other and both having perforations registering with each other, the outer tube having a draft regulator for regulating the amount of pure air fed in between the two tubes, and the inner tube having a gas and air mixing device with a regulator for determining the amount of air mixed with pure gas within the inner tube substantially as and for the purpose described.

3. The combination with the outer perforated tube; of an inner tube having registering perforations and an external screw thread with a draft disk J turning thereon and adapted to close the end of the outer tube, and a Bunsen burner arranged concentrically to the inner tube.

4. The combination with a gas stove having an air tight outer casing; of a burner composed of two concentric tubes with registering perforations, and shields Y Z running longitudinally along the row of perforations on each side to separate the burning air and gas from the dead atmosphere of nitrogen and carbonic acid gas in the lower part of said air tight casing substantially as and for the purpose described.

DONALD McDONALD.

Witnesses:
F. HEWITT WELLER,
ALONZO RAWSON.