(No Model.) 2 Sheets—Sheet 1.

A. & A. G. TUERK.

GAS STOVE.

No. 303,343. Patented Aug. 12, 1884.

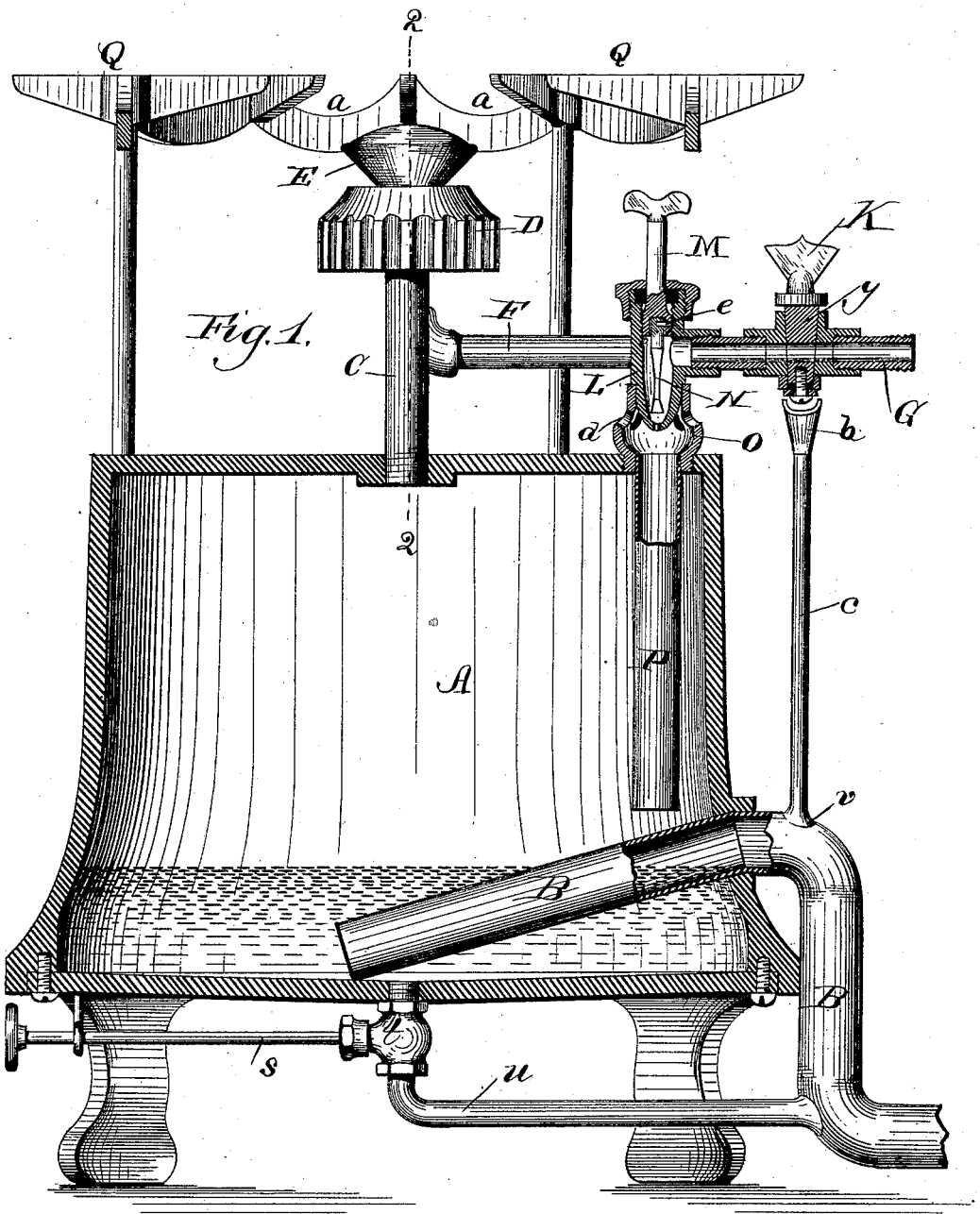

Fig. 1.

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Fig. 2.

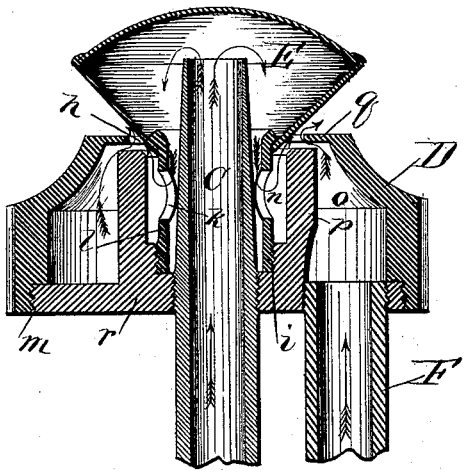


Fig. 3.

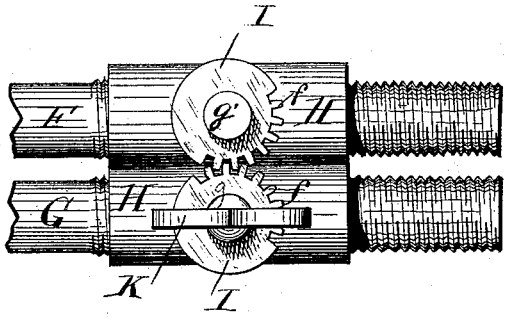
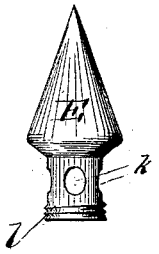


Fig. 4.



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UNITED STATES PATENT OFFICE.

ALBERT TUERK AND ADOLPH G. TUERK, OF CHICAGO, ILLINOIS.

GAS-STOVE.

SPECIFICATION forming part of Letters Patent No. 303,343, dated August 12, 1884.

Application filed September 14, 1883. (No model.)

To all whom it may concern:

Be it known that we, ALBERT TUERK and ADOLPH G. TUERK, citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Gas-Stoves; and we hereby declare the following to be a full, clear, and exact description of the same.

While our invention relates particularly to stoves for burning gas, some of the features, especially that for producing a draft of air to the burner through the agency of a stream of water, as hereinafter described, may be used with advantage in stoves for burning hydrocarbons generally. A general idea of our device and the principle upon which it operates may be derived from the following outline: A holder capable of containing water, and having an overflow not far from its bottom, is provided with a tube extending upward from its top, and leading into an air-chamber of thin metal. Around the base of the air-chamber, and extending below it, is a hollow metal collar containing an annular passage for the gas, and also an annular passage for air communicating with the interior of the air-chamber, and both leading to a common annular outlet around the base of the air-chamber. Air is forced into the holder by means of a suitable appliance, (for example, by that shown in the drawings, in which a stream of water operates on the general principles of the Giffard injector, though the device employed is of novel construction,) and passes by way of the outlet-tube at the top into the air-reservoir, and thence into the air-passage in the collar below, and out through the annular escape at the top of the collar. Simultaneously gas under pressure is admitted into the annular gas-passage in the collar, whence it escapes with the air at the common outlet. The commingled air and gas being ignited at the annular escape superheat the air within the air-chamber, greatly intensifying the flame and producing almost perfect combustion.

Our invention consists in the general combination and certain sub-combinations above outlined; also, in the device by means of which we produce the draft of air, whether used in the association named above or for any analogous purpose; and, furthermore, in various details of construction and combinations of parts hereinafter set forth.

In the drawings, Figure 1 is a vertical section of our gas-stove, leaving certain parts in elevation; Fig. 2, a central vertical section of the collar, air-heating reservoir, and attendant parts, taken on the line 2 2 of Fig. 1; Fig. 3, a plan view, enlarged, of a part of the air and gas inlet pipes, with mechanism for operating the regulating-valves simultaneously; and Fig. 4, a side view of a modified form of an air-heating reservoir.

A is the main reservoir, capable of holding water, formed of metal, and mounted on legs. This reservoir is provided with an overflow in the form of a pipe, B, extending from the vicinity of the bottom of the reservoir upward to an opening in the side a short distance above the bottom, and thence extending downward to any suitable wasteway. To prevent this overflow from acting as a siphon, and thus draining the water from the reservoir below the normal overflow-level, we provide it with an air-inlet outside the reservoir, as shown at *v*. At the bottom of the reservoir is a discharge-pipe, *u*, communicating with the overflow-pipe B, and having a valve, *t*, with a suitable operating-rod, *s*, whereby the water in the reservoir may be drained off at will.

C is a vertical pipe leading out from the top of the reservoir A at the center, and D is a hollow metal collar screwed down over the pipe C at such a point that the pipe extends some distance above it. The collar is screwed to the pipe by means of its base *r* only, the opening in the top *q* of the collar having a diameter considerably greater than that of the pipe. Cast upon the bottom is an annular partition, *p*, extending nearly to the top *q* of the collar, and dividing the interior, when the collar is in position upon the pipe C, into two annular chambers, *o* and *n*. We prefer to cast the top and sides of the collar in one piece, and the bottom *r* and partition *p* in another piece, and screw the two together, as shown at *m*.

E is an air-heating reservoir, provided with a downward tubular extension, *l*, having an

internal diameter greater than the external diameter of the pipe C, over which it passes as a sleeve, and provided with outlet-orifices *k* at intervals for the passage of air from the interior of the air-heating reservoir into the annular chamber *n*. The lower end of the sleeve *l* is screw-threaded externally, and is screwed into a seat formed at the base of the partition *p*, as shown at *i*. When in position, the tube C passes up through the sleeve *l* and extends for a considerable distance into the air-heating reservoir, as shown in Fig. 2. The air-heating reservoir sets within the opening in the top of the collar, and is of such diameter as nearly to fill it, leaving only an annular passage, *h*, around it. The lower part of the air-heating reservoir should preferably always flare outward; but the form of the upper part may be varied to suit the uses to which the device is applied. Two forms are represented in the drawings. That shown in Figs. 1 and 2, in which the sides flare outward all the way up, is the form most suitable for cooking purposes, since it serves to spread the flame laterally. The form shown in Fig. 4—namely, flaring outward for a short distance above the base and then conical—serves to concentrate the flame to a focus, and is used for purposes analogous to those of a blow-pipe.

F is a pipe leading from any gas-supply into the annular chamber *o* within the collar, and G is a pipe leading from a hydrant or from any other water-supply adapted to yield a pressure to a point over the top of the reservoir A. For a suitable distance before reaching this point the pipes F and G may run parallel with each other, as represented in Fig. 3, to admit of their being provided with regulating-valves operated by mechanism which permits them to be turned simultaneously by a single key. To effect this a double-coupling collar, H, is cast in one piece and provided with two valves, *g* and *g'*—one regulating the flow through the gas-pipe and the other regulating the flow through the water-pipe. On the stem of each valve, outside the coupling, is a disk, I, provided on its periphery with cogs *f*, extending about half-way around. The cogs for the two disks mesh together, as shown, whereby the turning of one disk also turns the other. One of the valves is provided with a key, K, to permit it to be turned. By forming the cogs only part way around the disks, as shown, they operate also as stops, limiting the distance to which the valves may be turned either way. The extent of arc covered by the cogs, therefore, will depend upon the degree of variation which it is desirable to give to the valve. The disks *g* and *g'* may, however, be wholly omitted, and the valves in the pipes F and G be operated by separate keys with equal advantage. The water-pipe G at its terminus enters the side of a vertical nozzle, L, over the reservoir A, and discharging downward. Within this nozzle, and preferably connected to an adjusting-screw, M, whereby it may be raised or lowered, is a rod, N, extending lengthwise of the nozzle nearly to the discharge-orifice. The rod at its lower end must have a diameter greater than that of the discharge-orifice of the nozzle; but above its lower end it may be made slender, as shown, thus giving ample room to the entering water. It is advisable to have it hung to the adjusting-screw M in such a manner as to permit it to vibrate within narrow limits, in order that it may readily adjust itself in line with the orifice of the nozzle; and this result may be conveniently effected by having the upper end of the rod enter loosely into a socket in the lower end of the adjusting-screw M, and be hung therein by means of a pin, *e*. The lower end of the nozzle L enters a metal bulb, O, screwed into an opening in the top of the reservoir A, and provided with a series of apertures, *d*, in line laterally with the discharge-orifice of the nozzle for the ingress of air. A pipe, P, extends from the bulb O down for a considerable distance within the reservoir A.

The effect of the above construction is somewhat peculiar. If the rod N were omitted, the water would flow in a solid stream from the orifice of the nozzle, and the draft of air produced by it through the openings *d* would be insignificant. By the use of the rods, however, the water emerges from the orifice in the form of a spray, and produces an effect in all respects analogous to that of a jet of steam in a Giffard injector—that is to say, it creates a powerful draft of air through the pipe P into the reservoir A. Thus, when the stove is in operation, a strong blast of heated air is created at the annular escape *h*. The water which enters the reservoir is prevented by the overflow from rising above a given level, while the position of the pipe B within the reservoir prevents the escape of air after a small quantity of water has entered. As there is liable to be more or less drip through the valve *g*, we avail ourselves of the vent *v* in the overflow-pipe B to conduct the same away by carrying a pipe, C, upward from the said vent to a point a little below the valve and flaring it there, as shown at *b*, whereby it collects the drip and carries it down to the waste. Q is the support for the vessel containing the substance to be heated, comprising a casting of radial ribs connected together and mounted upon vertical rods extending upward from the reservoir A. We prefer to hollow out the tops of the connections, as shown at *a*, to afford free passage to the flame under the bottom of the superimposed vessel.

It is obvious that the burner above described may be used with advantage in connection with air-forcing appliances other than the one described, or only with the natural draft created by the air-heating reservoir and flame. We prefer, however, to employ throughout the construction represented in the drawings, and above described.

What we claim as new, and desire to secure by Letters Patent, is—

1. The combination of an air-pipe, C, a hol-

low collar, D, surrounding the said pipe, and provided with an annular partition, *p*, extending nearly to the top of the collar, and dividing the interior, when the collar is in place upon the pipe, into two annular chambers, *o* and *n*, said collar having an opening in its top greater than the exterior diameter of the pipe C, and air-reservoir E, fitting over the pipe C and supported in position with its base entering but not closing the opening in the top of the collar, leaving an annular escape, *h*, and having its interior in open communication with the annular chamber *n* in the collar D, whereby gas admitted through a suitable pipe into the annular chamber *o* and air admitted through the pipe C into the reservoir E commingle at the escape-opening *h*, and when ignited superheat the air within the reservoir E, substantially as described.

2. The combination of the air-pipe C, hollow collar D, secured thereto, and provided with the interior annular partition, *p*, extending nearly to its top, and provided also with an opening in its top of greater diameter than the tube C, air-heating reservoir E, having the sleeve *l*, provided with openings *k*, and setting within the collar and over the tube C, and secured in place therein, and the gas-pipe F, substantially as described.

3. The combination of the air-pipe C, collar D, having the annular partition *p*, air-heating reservoir E, placed over the top of the pipe C, and supported within the top opening of the collar D, gas-pipe F, and mechanism for creating a forced current of air through the pipe C, substantially as described.

4. The combination of the air-pipe C, collar D, having the annular partition *p*, air-heating reservoir E, placed over the top of the pipe C, and supported within the top opening of the collar D, gas-pipe F, main reservoir A, and mechanism for forcing air into the reservoir A, substantially as described.

5. The air-injecting device, comprising, in combination, the nozzle L, having an opening in its side to receive a water-pipe, G, rod N, broader at its lower end than the orifice of the nozzle, and placed longitudinally within the nozzle, and bulb O, having openings for the admission of air, substantially as described.

6. The combination of the nozzle L, having an opening in its side to receive a water-pipe, vibrating rod N, suspended longitudinally within the nozzle, whereby it may adjust itself in line with the discharge-orifice of the nozzle, and having a diameter at its lower end greater than that of the discharge-orifice of the nozzle, and the bulb O, having openings for the admission of air, substantially as described.

7. The combination of the nozzle L, having an opening in its side to receive a water-pipe, adjusting-screw M, entering the top of the nozzle, vibrating rod N, suspended to the lower end of the adjusting-screw, and bulb O, having openings for the admission of air, substantially as described, and for the purpose set forth.

8. In combination with the reservoir A and overflow-pipe B, and with the pipe G, conveying water into the reservoir, and valve *g* in the pipe G, the vertical pipe C, leading from the interior of the pipe B to a point a little below the valve *g*, and made flaring at its upper end, all as shown, whereby it serves to catch and carry off the drip from the valve, and also as an air-vent for the pipe B, as set forth.

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In presence of—
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WILLIAM H. DYRENFORTH.