M. A. CUSHING.

Magazine Heating Stove.

No. 166,072. Patented July 27, 1875.

Fig. 1.

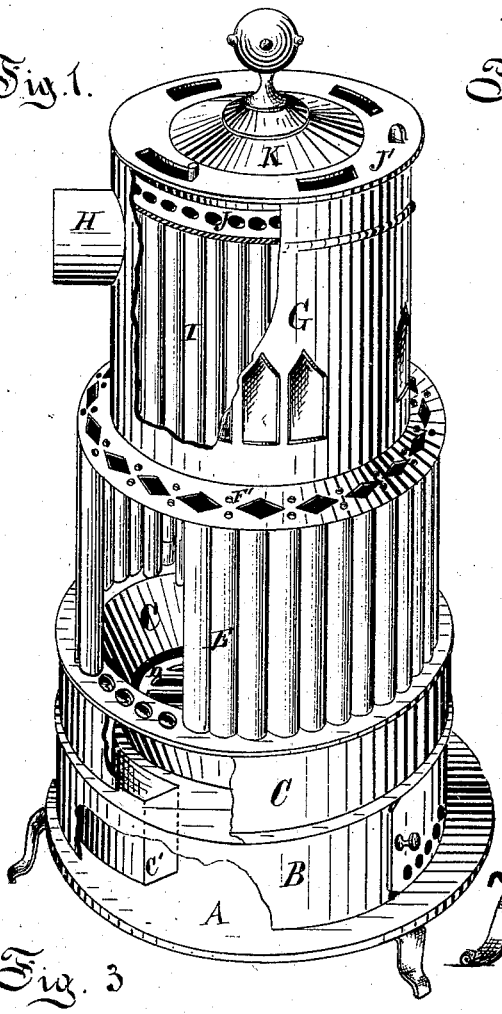


Fig. 2.

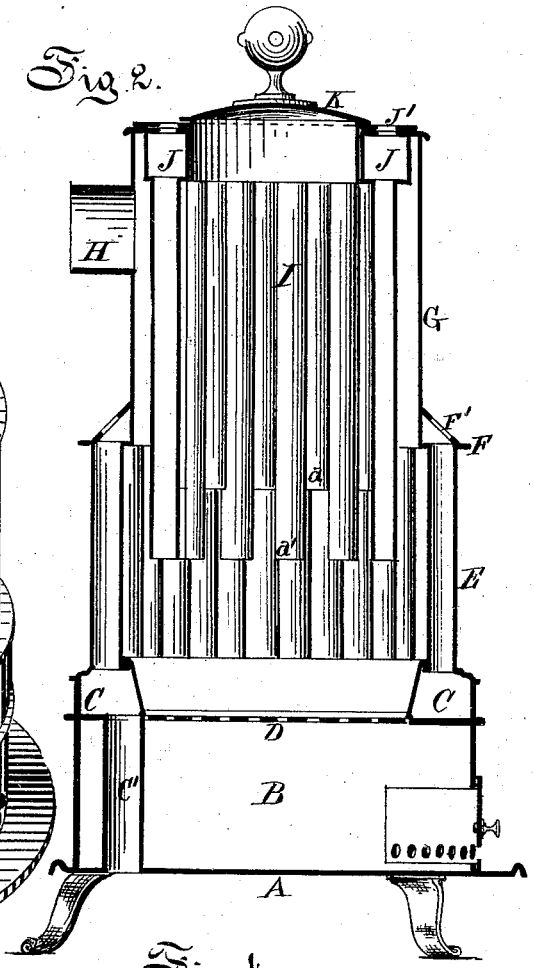


Fig. 3

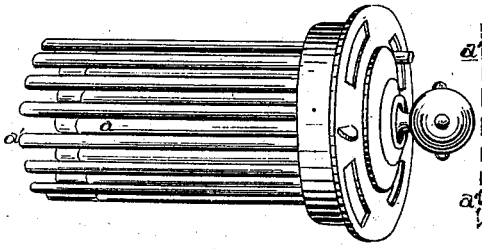
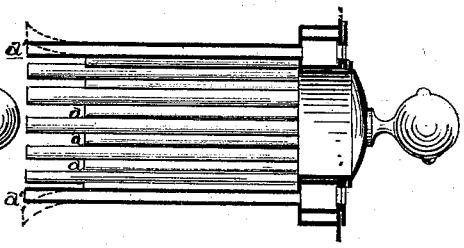


Fig. 4.



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UNITED STATES PATENT OFFICE.

MARK A. CUSHING, OF AURORA, ILLINOIS.

IMPROVEMENT IN MAGAZINE HEATING-STOVES.

Specification forming part of Letters Patent No. **166,072**, dated July 27, 1875; application filed March 23, 1875.

To all whom it may concern:

Be it known that I, MARK A. CUSHING, of Aurora, in the county of Kane and State of Illinois, have invented an Improvement in Heating-Stoves, of which the following is a specification:

The nature of my invention relates to an improvement in heating-stoves of that class which are provided with reservoirs or magazines for containing a reserve-supply of fuel; my object being to so construct such a stove as to secure perfect combustion of the fuel and its gases, whereby I am enabled to successfully burn in the same stove either anthracite or bituminous coals. The invention consists, principally, in a cylindrical magazine built up of tubes, suspended in the top of a stove, for delivering air into the stove in a heated state at the proper point and at the proper temperature, to mingle with the gases of combustion to promote their ignition; also, in combination with the said tubulous magazine, a register for regulating the volume of air to be admitted to the tubes, and to be delivered by them in the stove.

The remaining feature of my invention consists in fire-pot built up of tubes whose lower ends rest upon and communicate with an annular air-chamber at or near the plane of the grate, with which chamber communicates a cold-air duct, passing down through the ash-pit, whereby the heated tubes are continuously supplied with air, which is heated in its passage through them, said parts being combined and arranged substantially as hereinafter described.

Figure 1 is a perspective view of a heating-stove embodying my improvements, with portions broken away to show them. Fig. 2 is a vertical section of the same. Fig. 3 is a perspective view of the magazine removed from the stove. Fig. 4 is a vertical section of the same.

In the drawing, A represents the base-plate, on which is erected a circular ash-pit section, B, on which rests the bottom ring of an annular air-chamber, C, about two inches high. The outer wall of this chamber is cylindrical, while its inner wall is made to flare inwardly, or is contracted at the bottom, to cause the fuel to bridge above the grate D, which is hung or supported at or near the plane of the bottom of said air-chamber, which forms the bottom part of the fire-pot E.

The body of the fire-pot is built up of cast-iron tubes, E, resting on the top ring of the air-chamber, each tube communicating therewith by a hole in the ring-plate. The top ends of said tubes are received in sockets formed in the under surface of a ring, F, resting thereon, and perforated above each tube.

G is the magazine-section resting on the top of the ring F near its inner periphery, so as to leave the tube-openings on the outside, which may be partially concealed by a perforated annular flange-plate, F′, laid in the angle of the magazine-section with the plate F. C′ is a segment-shaped duct leading from the air-chamber down through the ash-pit through an opening in the base-plate, to convey cold air to the former, taking it either from the apartment near the floor or from an air-duct communicating with the external atmosphere.

The incandescent mass of fuel on the grate lies in contact with the walls of the tubes which compose the fire-pot, and consequently heat them in their entire circumference from top to bottom.

The air flowing into the air-chamber is rapidly drawn up into the tubes, rarified, and discharged at a higher temperature above them, thereby creating a rapid circulation of air in the apartment by the current of cooler air flowing to the air-duct, and the heated currents discharged from the tops of the tubes.

This constant circulation of air through the tubes has a tendency to equalize the temperature in the apartment, while it will also be seen that the air is also raised in temperature by contact with the exterior walls of the tubes and other hot surfaces, as with an ordinary stove.

The non-combustible gases and smoke have at outlet at the pipe-collar H, in which a damper may be placed to check the progress of the combustion.

I is a magazine, built up of small tubes of wrought or cast metal, but preferably of the former. In the present case the upper ends of all said tubes communicate with an annular air-chamber, J, from which they are pendent, and which air-chamber forms a part of

the top of the stove, of which K is the cover. The top of the air-chamber is perforated at intervals, and is provided with an annular register, J′, which may be rotated to regulate or shut off the influent air-currents.

It is evident that the air-chamber can be dispensed with by securing the ends of the tubes directly to a top ring fitted with an air-register over the openings for the pipes.

One-half of the magazine-tubes *a* extend down below the top of the tubulous fire-pot, and the alternate ones *a′* hang down still farther into the fire-pot.

The tubulous magazine, presenting, as it does, a very large area of surface to the action of the heated currents ascending about it, must necessarily heat the down-flowing currents of fresh air, and to such a degree that they will and do mingle with the gases evolved from the fuel at the proper temperature to allow of their immediate ignition and combustion.

Anthracite and some varieties of bituminous coals require a less volume of oxygen to secure the ignition of their gases, wherefore the register J′ should be sometimes partially closed, to regulate the volume of air admitted to the combustion-chamber to the requirements of the fuel used.

It is well-known to all who have attempted to burn bituminous coals in magazine-stoves, that such coals swell in the coking process at the mouth of the magazine, and choke it; that at that point most varieties of such coal liquefy or run, and adhere to the walls of the magazine. For this reason I shorten every second tube, so as to cause it to deliver its air at a point above the end of the magazine proper, so as to consume any fuel that may from either of the above-named causes lodge there. The lower ends of the longer tubes may also be advantageously bent to flare outwardly, as shown in dotted lines, in a stove especially intended for bituminous coals.

What I claim as my invention is—

1. In a magazine heating-stove, the magazine inclosed in and built up of contiguous tubes, open at their upper ends to the surrounding air, and at their lower ends to the combustion-chamber, substantially as described.

2. In a heating-stove, a magazine built up of pendent tubes, combined with an annular air-register at the top, substantially as described.

3. In a heating-stove, a tubulous magazine, pendent from and in combination with an annular air-chamber, provided with an air-register, substantially as described.

4. In a heating-stove, a tubulous magazine, built up of alternate long and short tubes, combined and arranged substantially as and for the purpose set forth.

5. In a heating-stove, a fire-pot, built up of and entirely surrounded by contiguous tubes, open at their top to the surrounding air, and at their bottom to an air-flue extending through the ash-pit and base-plate, said tubes and air-flue combined and arranged substantially as described.

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