J. R. WALLS.

HOT-AIR FURNACE.

No. 183,728. Patented Oct. 24, 1876.

Fig. 1

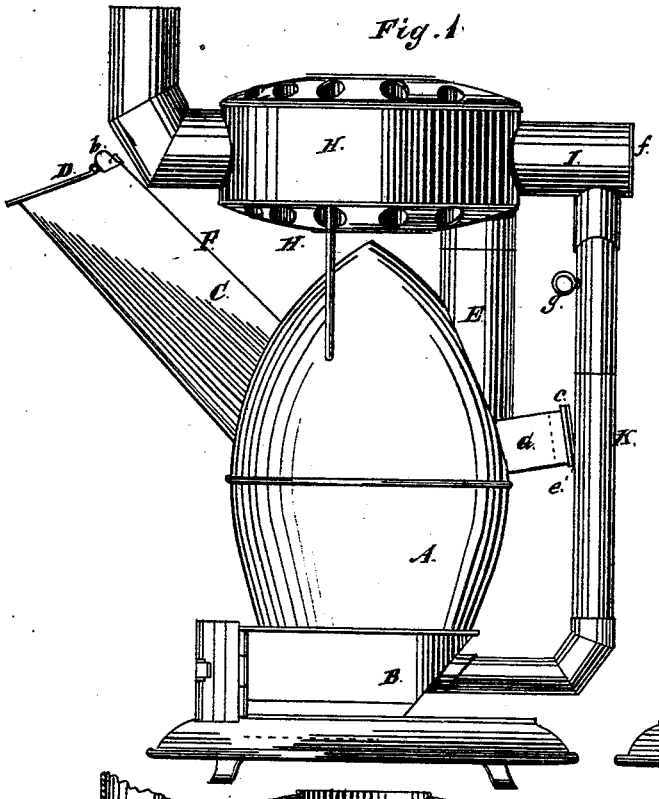


Fig. 2.

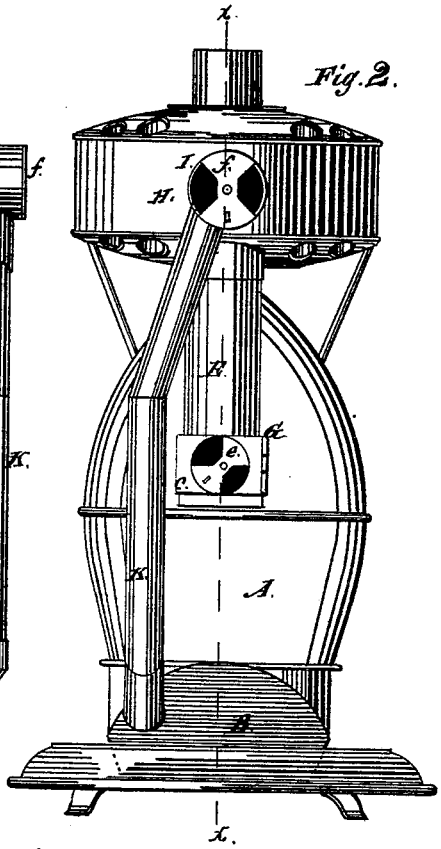
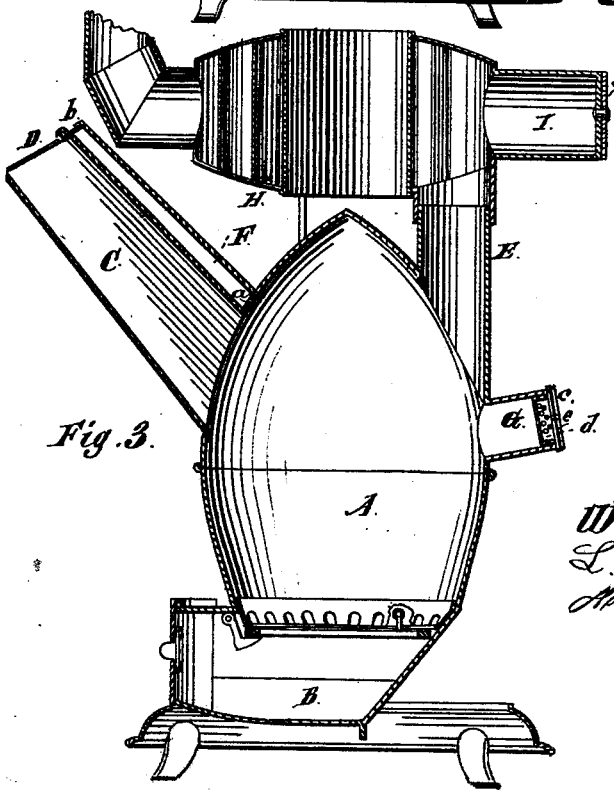


Fig. 3.



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JAMES R. WALLS, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN HOT-AIR FURNACES.

Specification forming part of Letters Patent No. **183,728**, dated October 24, 1876; application filed March 6, 1876.

To all whom it may concern:

Be it known that I, JAMES R. WALLS, of Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Coal Furnaces and Stoves, which is fully described in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 represents a side elevation of the stove; Fig. 2, a rear elevation of the same; and Fig. 3, a sectional view taken on the line *x x*, Fig. 2.

The object of my invention is to secure a stove for burning soft or bituminous coal which shall possess the advantages of a reservoir or magazine stove, but, at the same time, my improved stove may be used with coal of any kind.

The invention consists in the peculiar construction and arrangement of the "fire-pot," fuel-magazine, and exit-flue, whereby a large unobstructed combustion-chamber is obtained, and also in combinations of various devices, as will be hereinafter fully set forth.

In the drawings, A represents the main body or fire-pot of the stove, provided with a grate at its lower end, below which is located the ash-pit B. At one side of this portion of the stove is located an inclined reservoir or magazine, C, which opens directly into the fire-pot A and serves as a feeder thereto, being provided with a door, D, at its upper end, through which the fuel is fed into the stove. On the side of the stove opposite to the magazine C is located the smoke-pipe E, the opening into which is very nearly on a level with that of the magazine. Above the magazine C an air-flue, F, is constructed, at the lower end of which is a perforated plate, *a*, and the upper end of which is protected and regulated by a damper or slide, *b*.

In the body of the stove, just below the stove-pipe E, is a stoking door or opening, G, which is also opposite to the discharge of the mouth of the magazine. This stoking-opening is provided with a suitable door, *c*, upon the inside of which is a perforated plate, *d*, and upon the outer face of which is a suitable slide or damper, *e*. Upon the outlet-flue or smoke-pipe E is placed a heating-drum, H, which is of ordinary construction, and need not be described more specifically here. This drum is provided at its back with a short pipe, I, situated just above the exit-flue E, and opening directly into the drum. Its outer end is provided with a valve or damper, *f*, of any suitable construction. A dust-pipe, K, extends from the ash-pit B to the back pipe I, as seen in Figs. 1 and 2. This dust-pipe is provided with an ordinary damper, *g*, and performs the usual functions of this device.

The inclined magazine C gradually increases in size from its upper end to its lower or delivery end. This feature of construction is necessary for soft coal, but is not indispensable if hard coal is used. The door D of the upper end of the magazine may be provided with a door or slide, if desired, for the purpose of admitting air to the fire-pot through the receiver or magazine.

In a stove constructed as described above I secure several valuable results. Heretofore magazines or feeding-reservoirs for stoves and furnaces have been located centrally to the body of the stove, and supplied either from the top or front. When thus arranged the magazine is constantly exposed to intense heat, and therefore, after a time, destroyed. Furthermore, the use of soft or bituminous coal with the magazine so located is absolutely impossible, as the fuel soon cokes around the bottom of the magazine, thereby preventing the free delivery of fuel to the fire, and causing the generation of gases, which sometimes leads to explosion.

In my stove, as the magazine is outside of the body of the stove, it is not exposed to great heat, and, being larger at its lower end, it accommodates the expansion of the soft coal at the point where it is delivered into the fire-pot. As the coal passes into the fire-pot from the magazine, its tendency is to pass over to the opposite side of the stove, where the outlet-flue is located, and thus an unobstructed combustion-chamber is furnished, which permits a large surface of the fuel to become ignited, and the combustion proceeds very much as in an open fire.

The flue F permits a sufficient supply of air to be admitted directly to the surface of the burning coal. This supply is regulated by the slide *b* at the upper end of the flue.

An additional supply of air may be obtained by opening the damper in the door D, and also in the door *c* of the stoking-opening. The latter opening also permits the introduction of a poker to break up the fuel, if there is any tendency to coke, which may be the case in rare instances. Usually, however, the free space between the delivery end of the magazine and the opening of the exit-flue will be sufficiently large for the combustion of the coal and gases without any trouble from coking. As the magazine is inclined and located at one side of the fire-pot, the fuel is not forced into the combustion-chamber so rapidly as to choke the fire with a mass of unburned coal, but a regular and even supply will be kept up, and all the advantages of a magazine-stove thus secured. As the dust-pipe K leads from the ash-pit to the back pipe I, instead of the exit-flue proper, there is no danger of clogging up the latter with dust and ashes.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination of the free combustion-chamber, external magazine C, and exit-flue E, the two latter arranged on opposite sides of the chamber, and opening directly into it at the sides thereof, some distance below the top, and on nearly the same level, substantially as and for the purpose set forth.

2. The combination of the external magazine C and external air-flue F, opening directly into the combustion-chamber, constructed and arranged substantially as described.

3. The combination of the external magazine C, external draft-flue F, perforated plate *a*, and slide or damper *b*, substantially as and for the purpose described.

4. The combination of the fire-pot A and stoking-door G, arranged opposite the opening of the fuel-magazine, and provided with a register draft-door, *c*, and perforated plate *d*, substantially as and for the purpose set forth.

5. The combination of the ash-pit B, dust-pipe K, back pipe I, drum H, and exit-flue, all arranged substantially as described, and for the purpose set forth.

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