2 Sheets—Sheet 1.

W. W. BALDWIN.

Magazine-Stove.

No. 205,232. **Patented June 25, 1878.**

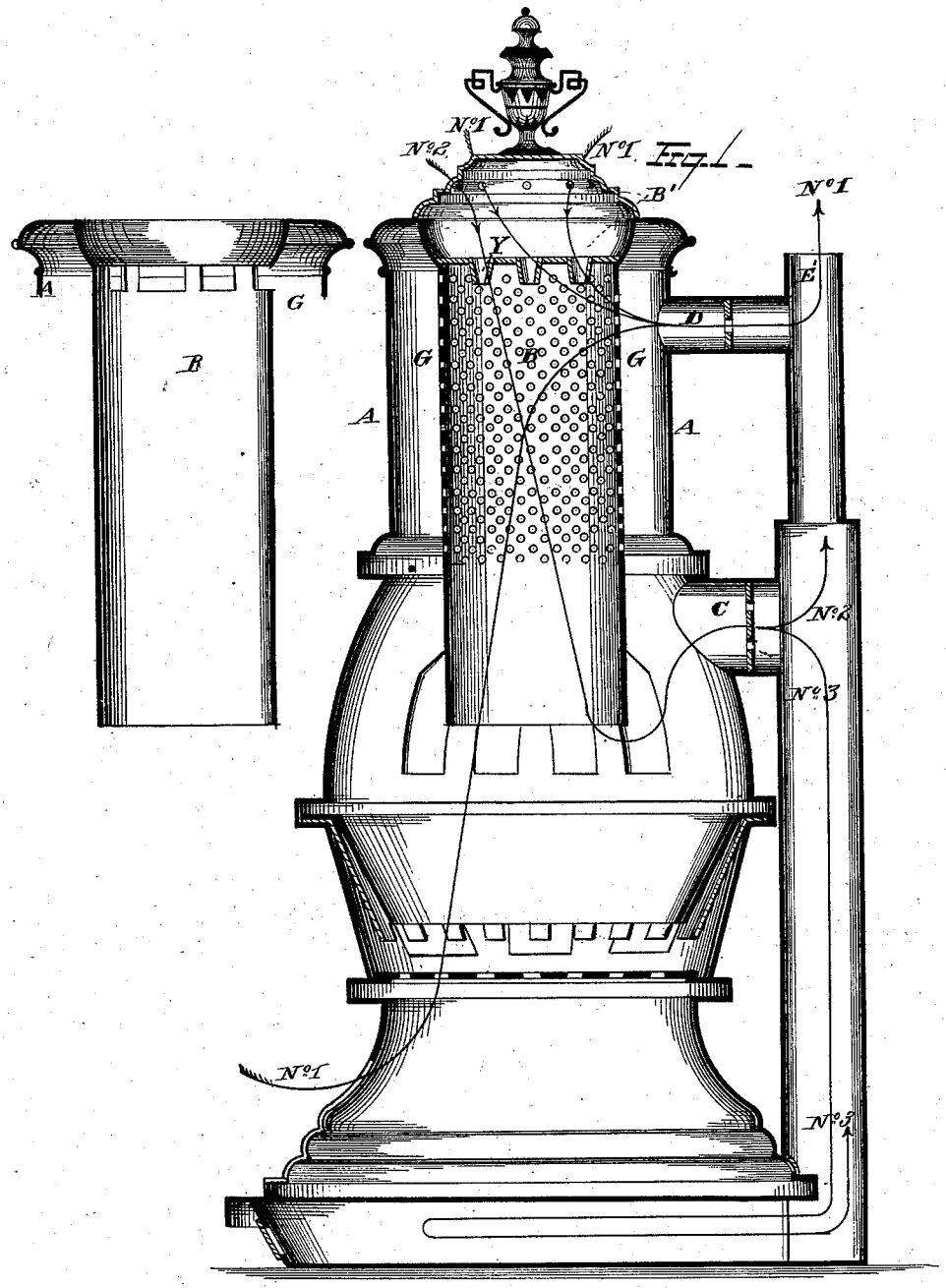


Fig. 1.

WITNESSES

E. F. Nottingham

A. M. Bright.

INVENTOR

W. W. Baldwin

By Leggetts & Leggett,

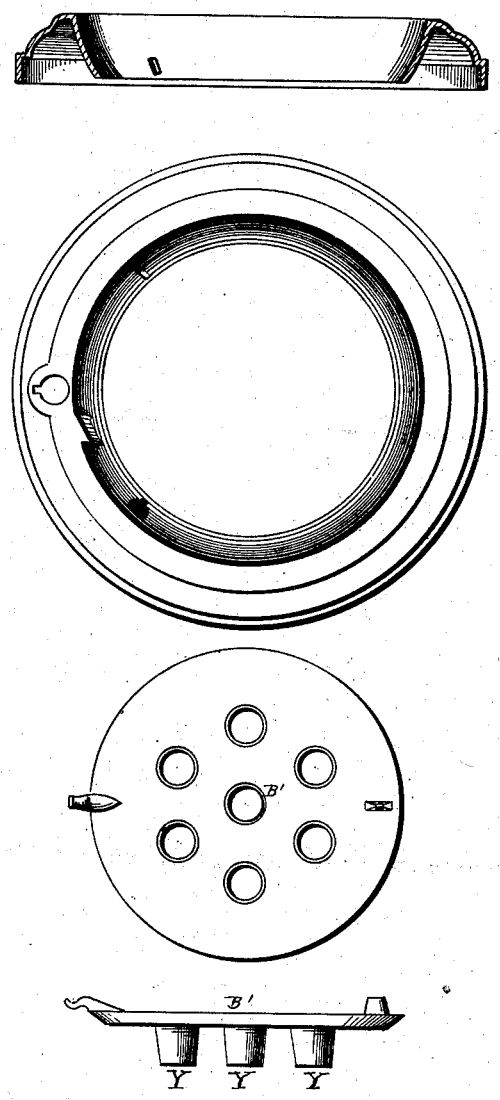
ATTORNEYS.

2 Sheets—Sheet 2.

W. W. BALDWIN.
Magazine-Stove.

No. 205,232. Patented June 25, 1878.

Fig. 2.



WITNESSES
C. F. Nottingham
A. M. Bright

INVENTOR
W. W. Baldwin.
By Leggett & Leggett.
ATTORNEYS

UNITED STATES PATENT OFFICE.

WILLIAM W. BALDWIN, OF CLEVELAND, OHIO.

IMPROVEMENT IN MAGAZINE-STOVES.

Specification forming part of Letters Patent No. **205,232**, dated June 25, 1878; application filed May 15, 1878.

To all whom it may concern:

Be it known that I, WILLIAM W. BALDWIN, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Stoves; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to an improvement in stoves designed for heating purposes, and more especially to that class known as "base-burners or magazine-stoves."

In the drawings, Figure 1 is a longitudinal vertical section of a stove embodying my invention. Fig. 2 is a detached view of the cover.

Said invention consists in the following parts and combinations, as hereinafter specified and claimed, wherein A A is the outer shell or casing of the stove, shaped and fashioned in any suitable or desired manner. Within the upper section of the case A is suspended the fuel-reservoir B. B′ is a register or ventilator, preferably located in the shell of the stove above the reservoir, through which air may pass and communicate directly with the interior of reservoir.

Below the mouth of the fuel-reservoir is the fire-pot and combustion-chamber arranged and constructed in any suitable manner. The fuel-magazine is of a diameter considerably smaller than the casing A. Therefore, when these two elements are combined and united, as herein shown, the air-space G is formed between the inside of the casing A and the outside of the fuel-magazine B, and the perforations of the fuel-magazine lead from the interior of said magazine to the air-space G; or a space may be left at the top of the magazine by which air can enter the air-space G. Besides the air-register B′, the ornamental crown or portable top piece is ventilated or provided with air-passages for the admission of air from above down through the register or ventilator B′ into the fuel-reservoir. There is not necessarily any register or opening in the casing A.

C is a short cross-flue or open space, (which may be provided with a suitable damper for the purpose of diminishing or changing the direction of current,) through which the products of combustion may pass directly from the combustion-chamber into exit-flue E′, substantially as shown in the drawing. D, a cross-flue, is located higher up, leading from the shell A to exit-flue E′, and connecting upper portion of air-space G with the exit-flue E′, and may be provided with a damper, preferably foraminated for the purpose of diminishing the current of air which may pass through said cross-flue.

The stove may be constructed in such a manner that a current of heated air shall be caused to pass downward into the base-section F, circulate around and heat that part, and then return and escape through the exit-flue E′.

Heretofore, in the construction of what is known as a "base-burning stove," much difficulty has been experienced in preventing the gases arising from the process of combustion from escaping into the room where the stove is located; and, when soft or bituminous coal is used as a fuel, in preventing gases from rising to top of stove and there remaining and cooling, which is very objectionable. These objections more particularly apply to stoves having what are known as "revertible or base flues," by which means products of combustion for the purpose of heating the base of the stove are forced to pass around or under the base of stove before being enabled to reach the flue. With this plan of construction, when a low state of combustion is attained, it often occurs that the draft of the chimney is not sufficient to cause the entire product of combustion to pass down and around the circuitous route of the base-flues. Therefore a portion of the same in the form of smoke or gas arises to the top of the fuel-reservoir and into the space surrounding the same through the joints of the stove and cover of the same.

This my said invention is especially designed to prevent and overcome the difficulties and objections before described, which it accomplishes by affording a free and unobstructed outlet, available at all times for the escape directly into the main outlet of the stove of any gases or other products of combustion which may, on account of a low state of combustion or in-

sufficiency of draft of chimney, arise to the top of the stove or into the space surrounding the fuel-reservoir.

Other serious difficulties have also been encountered in the construction of stoves of this class, and more especially when soft or bituminous coal is used as a fuel—viz., the tendency toward burning out or melting or destroying the material parts, such as the magazine or feed-mouth, which tendency has been caused by a forced delivery of a current or currents of air (air being necessary to effect a combustion of the gases) into the combustion-chamber or lower part of magazine, such delivery being effected through air-spaces having closed walls, connecting with the external air through a register, and terminating at or in close proximity to such internal parts, creating an intense heat, to the destructive influence of which the parts soon yield and become worthless.

By means of this my invention this difficulty is obviated by a free admission and distribution of air-currents, varying as the state of combustion may demand, and also a free and unobstructed circulation of air-current in the air-space around the fuel-reservoir, and a free escape of all air admitted in excess of the actual amount demanded and attracted by combustion, in this manner avoiding all forced delivery of air at certain defined points in the combustion-chamber or fuel-reservoir.

It is well established that coal, especially of a bituminous nature, contained in a reservoir suspended over a combustion-chamber, will, when the heated air and gases are allowed to ascend and commingle with the same, become ignited or formed into a mass which will not descend freely into the combustion-chamber. To prevent this, it is necessary to overcome the natural tendency of heated air and gases to rise by producing a downward current through the reservoir. Still it is well known that if a current of air passes through a body of fuel contained in a magazine having closed walls, and discharges into a combustion-chamber or upon fuel in a state of combustion at the lower end of such magazine, it will, on account of the entire current admitted being forced to pass directly through the fuel, stimulate combustion among the fuel in said magazine, and that such combustion will rise against such current until it reaches the top of the magazine, or point where said current is admitted to the magazine. This fact has heretofore been a serious objection to admitting a current of air to a body of fuel contained in a magazine, but in this my said invention this objection is entirely overcome and the benefits of a downward current obtained without retaining the injurious effects of the same.

The operation of my stove is as follows: When there is no fire in the stove a current of air, in reaching the chimney, will take the course marked out by arrows No. 1; but when a fire is kindled on the grate and combustion going on in the fire-chamber, said combustion, requiring oxygen for its support, causes the air to move past and away from the more direct outlets, as shown by arrows No. 1, and cause the currents to take substantially such a course as indicated by the arrows No. 2 or 3, according to the position of the base draft-damper. The air admitted through the register or ventilator B^1, or any other opening in the shell of the stove at or near the top, communicating directly to the fuel-magazine, being drawn by reason of said combustion in the fire-chamber, passes downward in a free diffusive and enforced manner to the fire in said chamber, partially through the coal in the fuel-reservoir, but not in a quantity sufficient to stimulate combustion therein, thus preventing the gases and heated air from passing upward into the fuel in said magazine, or into any space which might exist at the top of the stove above the coal. The effect of heated air and gases passing upward would be to cause the coal to ignite, or to expand and form into a more or less compact mass, that would not descend freely into the combustion-chamber. Moreover, should said heated air and gases be allowed to pass upward, as just mentioned, they would, upon reaching the top of the stove, if allowed to remain, become cool and condense, forming coal-tar, which would fill up the perforations in the fuel-magazine. The gases and tar would also ooze out through the joints of the stove and become obnoxious. Such gases also would escape into the room when the cover to the top of the fuel-magazine B^1 was removed for the purpose of supplying fuel.

All this escape of gases is effectually prevented by the current of air drawn downward by the combustion in the fire-pot below. Said combustion creates a downward current through the air-space G, and prevents the current passing through the grate from below, together with the products of combustion from passing upward through the said space G and reaching the exit-flue by that channel.

If the amount of combustion is small, and not sufficient to draw the air entirely from the top downward past the opening in the cross-flue D, under which circumstance there would not be a sufficient degree of heat in the combustion-chamber to consume the gases, then the air will pass outward through the cross-flue D, and the gases and products of combustion reach the same outlet by passing upward through the magazine and through the air-space G, and, joining the current of external air, be prevented from rising to the top of the stove and escaping into the room, but will escape through the flue D.

When there is an active combustion in the fire-chamber the products of combustion, in reaching the chimney, will, according to the arrangement of the dampers, either pass upward through the flue E′ directly from the flue C, or first down and around the base F,

and, returning, escape into flue E′, and, proceeding up said flue E′, will pass the flue D, the draft through the flue E′ being sufficient in amount to occupy the full capacity of said flue, thus strongly tending to obstruct the passage of any currents through the cross-flue D, and prevent them reaching the flue E, which currents, being thus obstructed from taking a direct outlet through said flue D, are induced to take a downward course in escaping, and are hence discharged from the combustion-chamber direct through the flue C′, thus preventing an upward current through the fuel or air space.

When the combustion becomes less, this tendency of the up-current through the flue E′, to prevent and obstruct a current through the cross-flue D, is correspondingly reduced.

If the combustion is so greatly decreased as not to require or act so as to draw the air admitted through the register B′, then the obstruction caused by the upward current through the flue E′ is removed, or practically so, and allows free passage of air and draft through the flue D, which draft carries with it any gases or products of combustion which may arise from below, owing to the low state of combustion, and, passing the same out through the flue D, prevents any escape of gases into the room or the collection of a body of gas in the top of the stove or magazine.

Should the upward current through the fuel-magazine, prevailing during low combustion, as described, have the effect of increasing said combustion in that direction, as might be the case, then this increased combustion would operate to automatically change the course of said currents to the direction heretofore specified as obtaining during a state of more active combustion. This operation would prevent any considerable combustion upward in the magazine.

This system of the automatic change of draft and direction of draft-currents by the different stages and degrees of combustion constitutes one of the leading characteristics of this my invention.

It will be seen that the top or crown of the stove is ventilated, and that the lid covering the top of the fuel-magazine has several perforations, from each of which project downward the conical thimbles Y. These thimbles are in shape substantially resembling the frustum of a cone; but they may be in any shape, so that they present a tapering or diminishing opening downward into the magazine. By this peculiar construction I have found that gases which might collect in the upper region of the fuel-magazine will not tend to escape through the thimbles against the stronger current that is passing downwardly at a time when such gases would accumulate.

It will be observed that the invention herein described is somewhat on the plan of construction shown in Letters Patent No. 163,422, granted to me May 18, 1875, which latter has a main smoke-flue provided with upper and lower cross-flues, a perforated fuel-reservoir, and an air-register. Prior to my invention there have also been magazine-stoves made with perforated crowns, which conducted air into the fuel-reservoir.

What I claim is—

1. In a magazine heating-stove, the combination, with a main smoke-flue provided with the described upper and lower cross-flues, of a perforated fuel-reservoir, having a lid or top provided with air-openings, and a perforated stove-crown, substantially as set forth.

2. In a magazine heating-stove, the combination, with the main smoke-flue provided with upper and lower cross-flues connecting therewith, as described, of a perforated fuel-reservoir, having a lid or top which is provided with the inverted conical tubes depending through openings therein, and the perforated stove-crown, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM W. BALDWIN.

Witnesses:

JNO. CROWELL, Jr.,

L. L. LEGGETT.