J. B. CROWLEY & A. E. CHAMBERLAIN.

Cooking-Stove.

No. 166,594. Patented Aug. 10, 1875.

Fig. 1

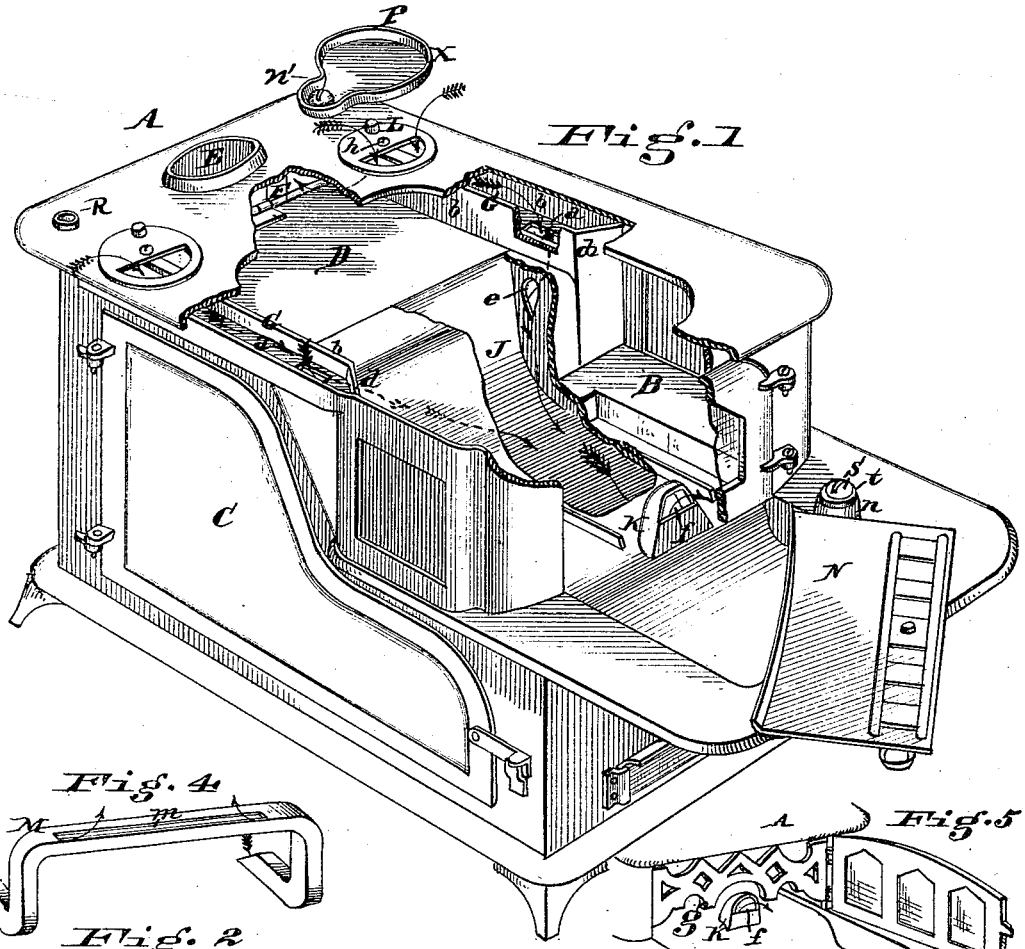


Fig. 4

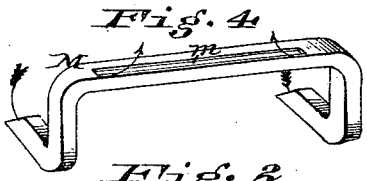


Fig. 5

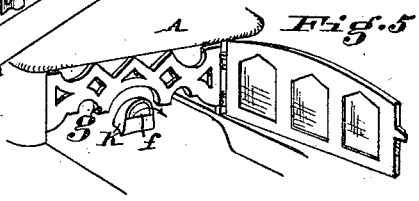


Fig. 2

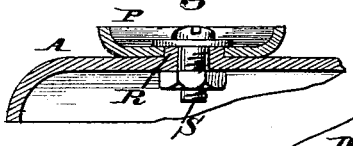
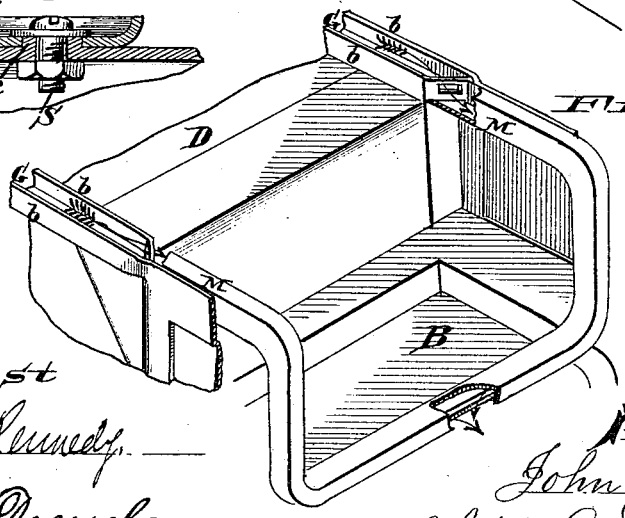


Fig. 3



Attest

D. P. Kennedy

O. A. Dressel

Inventors

John B. Crowley and

Addis E. Chamberlain,

by Wm. Hubbell Fisher, their atty

UNITED STATES PATENT OFFICE.

JOHN B. CROWLEY AND ADDIS E. CHAMBERLAIN, OF CINCINNATI, OHIO.

IMPROVEMENT IN COOKING-STOVES.

Specification forming part of Letters Patent No. **166,594**, dated August 10, 1875; application filed June 26, 1875.

To all whom it may concern:

Be it known that we, JOHN B. CROWLEY and ADDIS E. CHAMBERLAIN, residents of the city of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Cooking-Stoves, of which the following is a specification:

Our invention, in general, consists, first, in a novel arrangement of the flues, whereby air is fed to the burning fuel in the fire-chamber of a cooking-stove, whereby the air, cold at its entrance into the said flue, is heated before reaching the fire by the heated surfaces it is brought into contact with, and reaches the fire-chamber in a heated condition, thereby aiding the combustion of the fuel and securing economy in the consumption of the latter.

Another advantage and purpose of the said arrangement of flues is, that the hot air is fed to the fire-chamber in such a manner that a mica front is admissible. Such a front is not obtainable by the improvements of like nature heretofore by us made.

This general arrangement is, in part, varied to suit the special and peculiar construction necessary for cooking-stoves burning coal, and for cooking-stoves burning wood. Cooking-stoves burning wood are preferably constructed without a fire-box, which requires all the length it is possible for it to have. The said induction-flues for conveying the air to the fire are, therefore, so arranged as that they do not detract from the length of the fire-chamber. This arrangement is a part of our invention. Cooking-stoves burning coal have a fire-box, which latter includes the grate, side linings, and fire-plate at rear. The said induction-flues conveying the air aforementioned to the fire are, therefore, so arranged as that they accommodate themselves to the fire-box. This arrangement is also a part of our invention.

Such is our arrangement of said induction-flues that in stoves burning coal or wood opportunity is afforded for a mica front, and at the same time all cold air is prevented from passing around the oven. Both of these last-named results are important advantages.

Another part of our invention consists in the employment of a register or registers, and in the combination of the same with the induction-flue aforementioned, in such a manner that the registers shall be capable of regulating the supply of air through the said induction-flue to the fire, and also of turning a portion of the said cold air entering through said register into the chimney, and the other part of said cold air into the said induction-flues leading to the fire, and be also capable of shutting off all supply of air to the fire, and supplying the chimney directly from the register with cold air for the purpose of dampening the fire.

Finally, a portion of our invention consists in a new and useful mode of connecting to the stove the hearth-plate, lid-holder, urns, or such other parts of a stove as it is customary or desirable to attach to the stove so as to swing on a pivot.

The advantages of this new method of connection are, that the lid-holder, or the like, swings on a pivot, which is not the bolt, and is so arranged on the pivot with reference to the bolt that there is no friction between the lid-holder and the bolt, and the swinging or rotation of the lid-holder on its pivot does not unscrew the bolt in the nut which secures it in place.

In the accompanying drawing making part of this specification, and to which reference is hereby made, Figure 1 is a perspective view of a cooking-stove for burning wood constructed according to our invention, a portion of the top and front being broken away to show the arrangement of said induction-flues, which latter is the subject of a portion of our invention. Fig. 2 is a central vertical section of a stove-top lid-holder and the connection between the same, this connection also being of our invention. Fig. 3 represents the fire-box and such additional part of a cooking-stove for burning coal as exhibits our arrangement of induction-flues, so far as said arrangement differs from the arrangement of flues in a wood-burning cooking-stove. Fig. 4 represents a view of the under side of that part of the induction-flue in a coal-burning stove which finally conveys the air to the fire-chamber.

Fig. 5 represents the door containing mica windows, and the plate preferably employed to guard the windows from destruction by fire.

The stove A (represented in Fig. 1) is a stove adapted for burning wood, and provided with a fire-chamber, B, of the usual construction, and with an oven whose general configuration is indicated by the oven-door C. The fire-chamber opens directly into the smoke-flue D, which is preferably flat and broad, as shown in drawing. The smoke-flue opens directly into the exit-pipe E, the opening between the said flue and pipe being regulated by means of a damper, F. Near the rear edge of the stove, at each side of the latter, and directly under the top of the stove, extends a flue, G, preferably of about an inch in depth and about three inches wide. The bottom *a* and sides *b* of the flue are cast with the sides of the stove, while the top is preferably formed by the top of the stove. The rear end of this flue communicates with the external air through an opening in the top of the stove, controlled by a suitable register or damper. The register preferred is the one designated by L, (shown in Fig. 1,) which will be more fully described hereafter. The flue G extends forward directly beneath the top of the stove till it reaches the front end of the partition *d*, which forms the front of the oven, and it then descends vertically a short distance, and passes horizontally toward the middle of the stove through an aperture, *e*, into one broad, flat flue, J, immediately in front of the partition *d*, and, thence passing under the bottom of the fire-chamber B, communicates with flue K, which latter passes up at the front end of the fire-chamber. *g* is a plate placed across the front of the fire-chamber to protect the mica windows from injury by the fuel. The register L, Fig. 1, is circular, and has a semicircular opening. It is pivoted on a central pivot, *h*, the latter being fixed in the top of the inner side *b* of the flue G.

The mode in which those parts of the stove which are the subject of our invention operate is as follows, viz: Register L is so turned as to allow the external air to pass into flue G and none into flue D. The air passes through register L down into flue G; thence along the same to opening *e*, through which latter it passes, as shown by the arrows, into flue J; thence through the latter flue to flue K, through which it passes to opening *f*. Passing through opening *f* and spreading out, it enters the fire-chamber, and feeds the combustion of the fuel.

The smoke and heated products of combustion pass directly and rapidly into flue D, and when the damper F is closed they divide and pass down the usual flues at each side of the exit-flue, and after passing down behind and around the oven, and imparting their heat to the same, pass into the bottom of the exit-flue, and thence pass off from the stove.

In stoves of the common construction the fire-chamber is supplied with cold air through an opening through the front of the chamber communicating directly with the external air. In such a case much of the air thus entering was not warmed by the fire, and, passing through the flue D and down the latter—the oven—cooled down the latter, thereby wasting much of the heat.

This loss of heat is obviated by our improved arrangements, whereby no cold air is allowed to enter the fire-chamber; but the only air admitted to the fire is supplied through the flues G, and is heated by contact with the heated surfaces of the stove adjacent to the flues G J K before reaching the fire.

The heating thus of all the air admitted to the stove accomplishes two purposes. First, it aids in the combustion of the fuel and the volatile products of combustion, as much of the latter will only ignite at a high degree of temperature. In this way the heated air saves fuel. Secondly, no cold air can reach the oven, and all waste of heat from this source is prevented.

When desired to dampen the fire by cutting off the supply of air, this can be done by turning the register so that its semicircular opening is partially over flue G and partially over flue D, in which case part of the air passes into flue G and part into flue D; or, to cut off all air from the fire-chamber, the register is to be turned so that the opening therein shall communicate only with flue D. This will rapidly dampen the fire, and, in conjunction with damper F, entirely prevent every draft through the fire-chamber.

When the stove burns coal instead of wood, the construction of the induction-flues is varied as follows: Flue G remains unchanged; but its front end (see Fig. 3) opens, not into opening *e*, but into flue M, which passes along under the top of the stove to the inner side of the front of the same; thence it descends vertically to the grate, and thence along the front lower corner of the fire-chamber. That part which lies at the lower front corner is provided in its under side with a slit, *m*. (See Fig. 4.)

The operation of the air is substantially the same as in the wood-burning stove afore described. The air enters flue G through register L, thence through flue G into flue M, through which latter flue it passes, and finds egress through the slit *m* into the fire-chamber.

With the above-mentioned changes there is no difference, so far as the construction and operation of our improvements are concerned, between the wood-burning and the coal-burning stoves.

It may be well to remark that there is, preferably, a register and flue, G, on each side of the stove, while there is, preferably, but one flue, J, with which they communicate in the wood-burning stove. In the coal-burning stove there is, preferably, a register and flue, G, and also a flue, M, on each side of the stove, the flues M being preferably connected at their

bottom, so as to form a continuous line of flue across the front lower corner of the stove, and so as to have one common slit, *m*.

It now remains to describe the last part of our invention, which consists in a new mode of connecting those parts of a stove which it is customary to so unite to the latter as that the said part or parts shall swing—as, for example, urns, lid-holders, and swinging hearth-plates. The connection is shown in Fig. 1, the hearth-plate N and the lid-holder P being attached to the stove by the said connection. Upon the top of the stove is cast or affixed a hollow nipple, R. The holder or other article to be swung has a hole in the part *n*, which enters into the connection of a proper size to inclose this, and to rotate easily around the nipple. Over the part *n* is placed a washer, *t*. A bolt, S, passes through the washer-nipple and that part of flange of the stove to which the holder or hearth, &c., is attached. The head of the bolt rests upon the washer, and the washer upon the top of the nipple. A nut screwed upon the lower end of the bolt prevents the bolt from riding up out of place, and aids in securing the connection in its proper position without friction upon the bolt.

The advantages of the employment of the hollow nipple and washer in combination with the lid-holder, nut, and bolt are, that the bolt cannot possibly become unscrewed by the constant swinging of the plate-holder or the like, and thus all the parts of the connection are permanently preserved in position, and the vexations arising from the unscrewing of the bolt and the falling of the hearth-plate, lid-holder, &c., and the loss of nut and bolt, are obviated.

The construction of the lid-holder itself, cast in one piece, is also a feature of our invention.

The bottom of the lid-holder is provided with an arm, *n'*, and this neck is bored to receive the nipple. Now, the most cheap and expeditious method of manufacturing the lid-holder and arm *n'* is to cast them in one piece.

It will be well to remark that the bottom of the lid-holder is provided at its edge with a flange, X, extending upward in a direction sufficiently vertical to act as a guard to prevent the lid or lids placed on the lid-holder from slipping off the bottom of the same. Now, if the arm *n'* were simply a continuation of the bottom of the lid-holder, and were not strengthened, it would not be sufficiently strong to sustain the lid-holder when laden with lids. We provide against this difficulty by continuing the flange X of the lid-holder around the arm *n'*; that is, the flange X encircles the edge of the lid-holder and arm. The exterior side of the flange inclines outward as it ascends sufficiently to permit one pattern in one piece to be used in casting the lid-holder proper and the arm and flange together in one piece, as the pattern of one piece can be readily drawn from the sand.

It is evident on inspection that the flange X and lid-holder bottom and arm *n'*, cast together in one piece, as described, produce a very new and useful article of manufacture.

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

1. In a cooking-stove, the combination of the flues G J K, arranged substantially as described.

2. In a cooking-stove, the combination of the flues G N, arranged substantially as and for the purposes specified.

3. The register or registers, in combination with the induction and exit flues, and constructed to regulate the supply of air for combustion by turning a part or all into the induction-flues, or shutting off all supply from the fire, and turning currents of cold air into the escape-flue of stove, to entirely check the draft, substantially as described.

4. A nipple cast or attached to a flat surface, passing entirely through the handle or portion of the article to be swung, to a washer resting on the head of said nipple, and held in place by bolt and nut, substantially as described.

5. A lid-holder with a perforated neck or arm to receive the nipple and bolt, with a flange encircling its entire edge, and connected to the pivot-bolt at a point on the bottom of the lid-holder inside said flange, in combination with the nipple-bolt and washer, substantially as and for the purposes set forth.

JOHN B. CROWLEY.
ADDIS E. CHAMBERLAIN.

Attest:
D. P. KENNEDY,
H. H. TEEL.