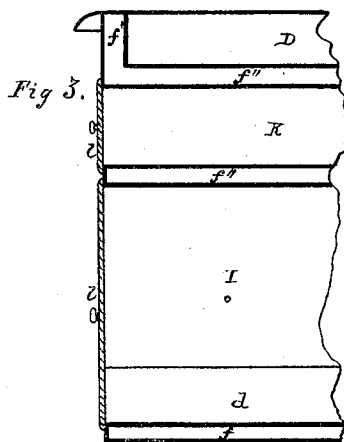
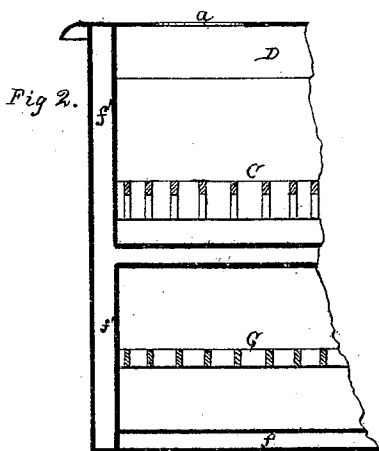
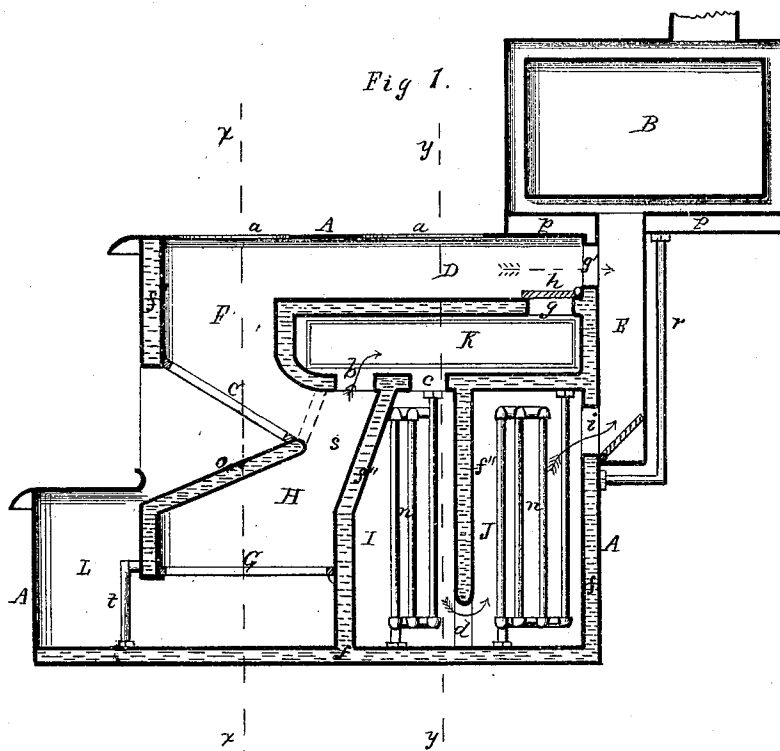


E. BACKUS.

Combined Cooking-Stove and Steam-Heaters.

No. 132,129.

Patented Oct. 15, 1872.



Witnesses:

*P. A. Loughborough*  
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*Att'y*

# UNITED STATES PATENT OFFICE.

EDWARD BACKUS, OF ROCHESTER, NEW YORK.

## IMPROVEMENT IN COMBINED COOKING-STOVES AND STEAM-HEATERS.

Specification forming part of Letters Patent No. 132,129, dated October 15, 1872.

*To all whom it may concern:*

Be it known that I, EDWARD BACKUS, of Rochester, in the county of Monroe and State of New York, have invented a certain Improved Combined Cooking-Stove and Steam-Heater, of which the following is a specification:

My invention consists more especially in the combination of a cooking-stove with a steam heating apparatus in such a manner that the devices may be used for either purpose independently or both simultaneously; and it furthermore consists in a peculiar construction and arrangement of the grates, fire-chambers, and other parts of the apparatus, whereby the fire may be increased or diminished, the heat utilized, and the whole made convenient and economical.

Figure 1 is a vertical longitudinal section of my invention. Fig. 2 is a transverse section at the dotted line *x* in Fig. 1. Fig. 3 is a similar section at the dotted line *y*.

A in the drawing represents the outer case of my apparatus, which is similar in form to an ordinary cooking-stove. B is an elevated oven, around which the smoke passes from the flue E in its passage to the chimney. C is a fire-grate, fixed in an inclined position in the base of the fire-pot F, and D is a fire-chamber under the griddle-holes *a* of the stove, through which the products of combustion pass to the flue E. G is another grate, placed in a horizontal position at the base of the fire-pot H, and arranged to be shaken or dumped in the ordinary manner. A passage, *s*, from one fire-pot to the other allows coals to drop or to be introduced from F to H. I, J, and K are fire-chambers, into which the products of combustion from either or both the grates may pass, and said chambers communicate with each other by means of passages *b*, *c*, and *d*, and finally with the flue E at *i*, Fig. 1. A passage, *g*, is also provided from the chamber K to D, which may be covered with a damper, *h*, and said damper is arranged to turn upon pivots in such a manner as to either close the passage *g*, or to shut off communication from D to E by closing the passage *g'*, but never both at the same time, as will be seen by reference to Fig. 1. The fire-pots F and H are inclosed by double walls, between which are the water-spaces *f'* and *f''*, and the fire-chambers I, J,

and K are also nearly surrounded by such water-spaces and the water bottom and back *f*, as indicated in Fig. 1. These water-spaces communicate with each other at suitable points, and steam is generated in them, which rises into the steam-chamber *p* under the oven, from whence it is conveyed away to be used for heating purposes. It may be found desirable, also, to locate nests of water-tubes *n* in the chambers I J K, which have suitable connections, at top and bottom, with the water-spaces, thus adding largely to the heating-surface; and in order to gain ready access to these tubes, and also to the chambers, for the purpose of cleaning, doors *l*, Fig. 3, are provided, opening into the chambers from one or both sides of the heater, the water-spaces not extending over this portion of it.

It will be seen that, owing to the inclination of the grate C, coals will fall down into the fire-pot H, and the ashes therefrom will pass down the inclined water-leg *o* into the ash-pan L, into which ashes from G also drop. The fire-box F thus becomes a reservoir or feeder for the grate G, and a fire kindled upon the grate C will gradually pass down into the fire-box H, fresh coal being fed into the fire-box F meantime, so as to continue both fires. The object of this arrangement is to increase the capacity of the fire, the upper one being used for cooking, the products of combustion passing through D to E, and the lower one heating the water in generating steam, the products of combustion passing through the chambers I, J, and K, and parting with their heat upon the surfaces therein exposed.

My invention operates as follows: Fire having been built upon the grate C, which soon communicates with G, as described, and the damper *h* turned to close the passage *g*, the products of combustion from the grate C pass through the chamber D, heating the vessels in the griddle-holes *a*, and from thence to the oven and chimney. The flame and smoke of the lower fire likewise pass through the passages *b*, *c*, and *d*, and chambers I, J, and K, as indicated by the arrows in Fig. 1, generating steam for heating purposes. When no cooking is to be done, the damper *h* is turned up, closing the passage *g'* and opening *g*, by means of which the heat of both fires is directed through the chambers I, J, and K. On

the other hand, when it is desirable to throw all the heat into the chamber D the damper *i* may be closed, directing all the products of combustion upward through D and *g*.

During the warm season of the year, when the heater is not wanted, an extra section of grate may be placed across the passage *s*, as indicated in dotted lines, the damper *i* closed, and the upper fire only used, the spaces becoming simply a hot-water reservoir.

In the practical construction of my apparatus the water-spaces *f'* and *o* at the sides of the furnaces do not connect with the water-bottom *f*, as will be seen by reference to Fig. 2, and I therefore connect them together by the pipe or pipes *t* in the ash-pan L. A circulation of the water is thus induced from the water-bottom through these pipes into the water-spaces around the fire-boxes and combustion-chambers, and down the water-back; and to further increase this circulation I attach a pipe, *r*, to the steam-space *p*, and to the water back or bottom *f*.

In practice I find that the water in the bot-

tom *f* acquires and retains nearly the temperature of that in the upper portions of the apparatus—a result not possible except by creating a thorough circulation.

What I claim as my invention is—

1. The inclined grate C and horizontal grate G, arranged to act separately or together, substantially as and for the purposes set forth.

2. A combined cooking-stove and steam-heater, embracing in its construction the fire-pots F and H, arranged as described, and the combustion-chambers I, J, and K, all partly or wholly surrounded by the water-spaces *f*, *f'*, and *f''*, and operating substantially in the manner set forth.

3. A combined cooking-stove and steam-heater, embracing in its construction the fire-pots F and H, combustion-chambers I J K, damper *k*, and rear flue E, operating substantially in the manner described.

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Witnesses:

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