B. MORISON.

Stove.

No. 43,328. Patented June 28, 1864.

Fig. 1.

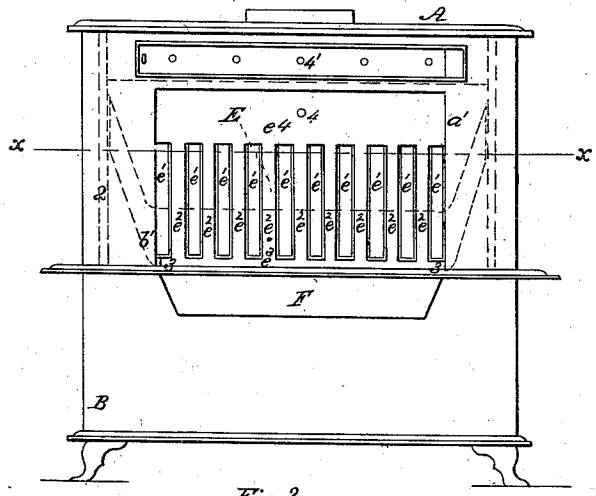


Fig. 2.

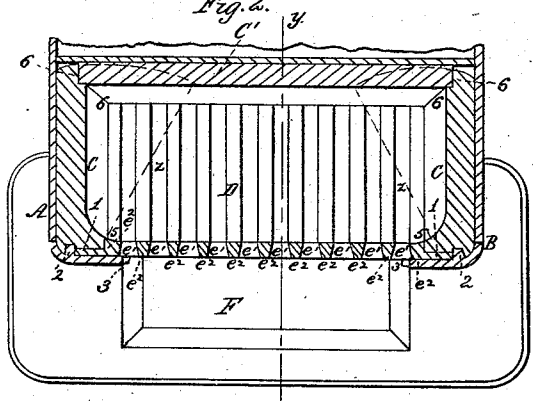


Fig. 3.

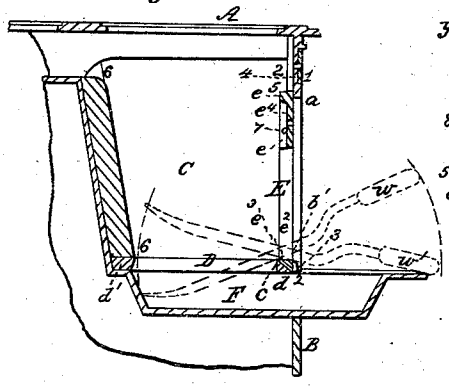
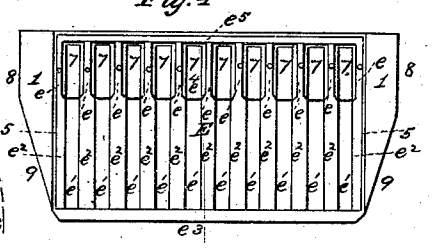


Fig. 4



Witnesses:

James A. Lipe

B. F. Shubrick

Inventor:

Benj. Morison

N. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

BENJAMIN MORISON, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN STOVES.

Specification forming part of Letters Patent No. **43,328**, dated June 28, 1864; antedated June 21, 1864.

To all whom it may concern:

Be it known that I, BENJAMIN MORISON, of the city of Philadelphia, in the State of Pennsylvania, have invented a new and useful Improvement in Stoves; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a front view of a common cooking-stove having the said improvement applied thereto; Fig. 2, a sectional plan view of Fig. 1 below the line *x*; Fig. 3, a vertical section of Fig. 2, in the line *y*; and Fig. 4, a view of the inner side of the front grate, like letters and numerals of reference indicating the same parts when in the different figures.

My improvement relates, generally, to the fire-boxes of those coal-stoves which have open-front grates, and especially to such of these as are intended for culinary purposes. Notwithstanding the great variety in this class of stoves and the numerous useful improvements in the construction and arrangement of their fire boxes and grates, there has not hitherto been any appropriate practical arrangement or construction produced for removing stones and clinkers from every part of the bottom portion of the grate upon which they may be found lodged without removing from the fire-box the whole of the fuel; and even in this latter operation in a cooking-stove the shallowness required in the ash-pit, on account of its occupying part of the oven, prevents a "falling grate" from affording a sufficient opening for discharging with the requisite facility all the contents of the fire-box. The grates in general use in cooking-stoves are also made each to present on its fuel side a broad even surface above its grated or open part, the bars of the grate being extended upward thereon, so as to form "vertical ribs" exclusively on the front or outer side of the same; and hence this upper portion, being comparatively thin, soon becomes burned through or warped so badly as to render necessary the substitution of an entirely new grate. There is also another objectionable defect incident to the form of grates usually adopted in cooking-stoves, especially to those called "basket-grates," in that they do not afford any bearings or points of support for the hand-poker while the latter is being used to separate the ashes from the incandescent fuel, and consequently the usual "raking" motion of the poker must be resorted to for the purpose, which is not only a tardy and disagreeable operation at best, and especially a difficult one when stones or clinkers have accumulated upon the bottom of the grate, but its effect is also to shake down the upper portions of the coal into a more compact condition, and in so far to obstruct the draft required. The usual modes of constructing and securing the lining-bricks of the fire-boxes of such stoves are also in some respects very defective and objectionable.

To remove, or, at least, to greatly diminish, these objectionable defects and difficulties, and especially to facilitate in the operation of removing the stones and clinkers from every part of the bottom of the grate without discharging the whole contents of the fire-box are the objects of my invention.

It consists in combining with the fire-box of a stove a stationary or fixed bottom grate and a vertically-sliding front grate, the said grates being constructed and arranged together in the fire box so as to operate substantially in the manner and for the purpose hereinafter described and specified.

My invention also consists in making the usual vertical "ribs" of the front portion of a coal-stove grate so that the same shall be exclusively on the inner or fire side of the grate, substantially as and for the purpose hereinafter described and specified.

My invention also consists in so sloping and rabbeting the inner or fire sides of the two side lining-bricks of the fire-box that the back lining thereof may as a single piece correspondingly sloped at its ends be readily carried backward beneath the top plate of the stove and between the side lining-bricks, and finally dropped or pushed down with its sloped ends in the said rabbets, and thus the whole be more firmly and durably secured in the fire-box, substantially as hereinafter described and specified.

In the drawings, A B indicate the outer plates of the stove; *c c c'*, the lining of the fire-box; D, the bottom grate; E the front grate,

and F the ash-box. The bottom grate, D, is cast in one piece, and so as to extend horizontally over the whole bottom area of the fire-box and rest flatly down upon the usual offsets formed in connecting the fire and ash boxes, as seen in Figs. 2 and 3, its bars being united together and sustained at their back ends by the crossing portion d', and at their front ends by the crossing portion d^2, as seen in Fig. 3. The front grate, E, is also cast in one piece, and presents at its outer side a flat, continuous surface, with the exception of two small studs, 3 3, and the through-slots e' e', which produce the intervening bars e^2 e^2, the latter being connected together at their lower ends by means of the resulting portion e^3, which forms the bottom edge of the grate E, as seen in the drawings. The inner or fire side of the said front grate, E, presents the broader faces or edges of the bars e^2, as heretofore, and these extend, respectively, upward from the crossing portion e^3 below to the tops of the slots e', at which points the said bars unite with the thin front portion, e^4, by short bevels from each side and continue upward as beveled ribs e^0 exclusively on its inner side into union with the top edge piece, e^5, as seen in Fig. 4. The thin portion e^4 extends beyond the right and left sides 5 5, respectively, of the grated portion, so as to form tongues or bearings 1 1, the side edges of which being made parallel to each other at 8 8, and sloped downward at 9 9, as seen in the same figure, for reasons which will hereinafter be stated. The inner side of the crossing portion e^3 is beveled to an angle of about forty-five degrees to its bottom edge, so as to fit accurately or closely against a correspondingly-beveled face, which is made on the front edge, d^2, of the bottom grate, D, when the said front grate, E, is placed so as to rest in its proper vertical position against the front plate of the stove in covering the opening a' b' of the said front plate, as seen in Fig. 1. When the grate E is in this position, its upper or top edge, e^5, reaches about half an inch, more or less, above the top of the said opening a' b', and consequently there is left a space above it of about two and a half or three and a half inches, (more or less,) through which the said grate is intended to be raised to produce the required opening below it. On the inner side of the front plate of the stove there are cast parallel to each other two vertical ribs, 2 2, and against the inner sides of these ribs the parallel edges 8 8 of the tongues 1 1 of the grate E slide, respectively, so as to present any undue lateral motion of the grate when the latter is being either raised or lowered, while at the same time the two studs 3 3, which are cast on the lower part of the face of the front grate, as before stated, slide, respectively, in like manner against the vertical boundary edges of the front opening, a' b', which the said grate covers, and thus, in connection with the parallel edges 8 8, keep the grate in the horizontal position required during its vertically-sliding motions, the front edges of the two side lining-bricks of the fire-box in which the grate is placed being recessed sufficiently to leave grooves between them and the front plate of the stove for the tongues 1 1 of the said grate E to be moved up and down therein without binding. It will therefore be readily seen that the said front grate, E, can be easily slid upward and downward in front of the fire as occasion may require, and that when it is up a sufficiently wide opening will be produced below it for removing either the stones and clinkers from every portion of the bottom grate, D, or the whole contents of the fire box, as occasion may require, and that as the said tongues 1 1 of the grate E are sloped down to the lower edge of the same any ashes which may become deposited in the grooves in which they slide cannot prevent the grate from falling into proper contact with the beveled front edge of the bottom grate, D.

Through the middle of the thin upper portion of the front grate, E, there is a small through-hole, 4, which, when the grate is raised up to its highest position, will correspond with a like hole, 4′, in the front plate of the stove, and it will be readily seen, therefore, that if a small iron pin be introduced into both holes when the same are thus brought opposite to each other the grate E will be sustained in the elevated position intended for allowing the removal of the contents of the fire-box.

The lining of the fire-box consists of two side pieces, C C, and one back piece, C′. The back piece, C′, is of a uniform thickness, and of sufficient width or height to make it reach up to the mouth of the main flue of the stove when in position as seen in Fig. 3. It is sloped at each end, so as to permit it to be passed backward beneath the top plate of the stove and dropped vertically into rabbets which are made in the two side pieces, as hereinafter described. The side lining-pieces, C C, are each formed or constructed so that their front edges shall nearly fill the whole width of the respective spaces which result between the two side plates of the stove and the two ribs or projecting edges 5 5 of the grate E, when the latter is in its proper vertical position in the fire-box, substantially as represented in Fig. 2, and so that while the respective backs of the said side pieces, C C, fit in close contact with the said side plates of the stove, and their bottom edges rest directly upon the upper side of the bottom grate, D, their front edges, being recessed or grooved for the purpose, shall catch behind or partly receive and be firmly held by the respective vertical ribs 2 2 which are cast on the front or opposite plate of the stove, substantially as represented in Fig. 2. The inner or fire sides of the said two side lining-pieces, C C, are each sloped regularly outward from bottom to top in rear of the parallel front edge, and also rabbeted at C C to the depth of half an inch, (more or less,) as represented in the same figure, for the purpose of permitting the

back lining-piece, C′—which is a single piece sloped at its ends, as before described—to be easily passed backward beneath the top plate of the stove and between the said side pieces, C C, and finally dropped into its proper position in the fire-box, with its said sloped ends in the said rabbets C C, the two side pieces having previously been respectively connected with the vertical ribs 2 2, and swung outward (as indicated by the dotted lines *z z* in the figure) into their proper places against the side plates of the stove. The back piece, C′, thus coming down upon the bottom grate, D, will entirely cover the solid crossing portion *d′* of the latter, and at the same time lock itself and the side pieces, C C, securely in their proper positions, while the whole together will keep the grate D firmly down in its proper horizontal position over the ash box F, and also leave the slots of the said bottom grate entirely clear to the back lining, as seen in Figs. 2 and 3.

This mode of constructing and securing the lining-bricks of the fire-box of a stove has superior advantages, in that it avoids the objectionable necessity of making the back lining either in two lengths, in order to get it into place, or (for the same purpose) the mode sometimes adopted of making square projections on the ends of the back piece to cross-like projections on the rear end of the side pieces, so as to produce cross-lapping joints, which said projections are very liable to break off in use, and thus permit the lining to fall inward, or, like the divided back plate just mentioned, to become displaced by ashes getting behind them.

The vertical ribs e^0 e^0, which extend across the thin portion e^4 of the grate E, produce intervening grooves 7 7 thereon, which allow continuous currents of air to pass upward from the slots e' e' (which are between the bars immediately below) to the upper surface of the fuel, and thus tend to prevent the overheating and consequent "burning away" and "warping" to which the upper parts of the open-front grates of the cooking-stoves in common use are subject, and the grate E, being a separate piece from the bottom grate, D, when it has from long use become defective, can be removed and a new one substituted without disturbing the bottom grate, D, which, from its position, is not subject to become highly heated and thus injured, and consequently about half the cost of a whole grate will be saved under the circumstances by the adoption of this part of my improvement; besides, the bottoms of the slots formed by the crossing portion e^3 of the front grate admirably serve as fulcra for the poker during the operation of separating the ashes from the incandescent fuel, and thus to avoid the objectionable raking process heretofore required.

The dotted lines W W′, Fig. 3, represent the form of an appropriate poker for the purpose, and also the manner in which it should be used. As will be seen, it is intended to be thrust obliquely downward between the bars of both grates until its point reaches the back end of the ash-box F, as indicated by W, and then the handle end to be pressed downward into the position indicated by W′, thus enabling the operator to clear the slots of the bottom grate entirely back to the lining to "lighten up" the fuel and to remove the ashes therefrom in the most perfect manner and with the greatest facility and ease.

Having had the herein-described improvement applied to a cooking-stove and used constantly during the whole of the last winter, and often subjected to a strong heat from hard anthracite coal, I find on examining the grates D and E used there is not the least indication of the usual burning away or warping to which the old forms of grates are subject under like circumstances, nor was there found any necessity during the whole winter for either discharging the whole contents of the fire-box or letting the fire "die out" in order to remove therefrom the frequently deposited stones and clinkers. The lining-bricks C C C′ never became displaced or broken during the whole time, and the facility afforded by the fulcra along the bottom of the grate E for the removal of the ashes from the incandescent coal by elevating the latter with an appropriate poker supported on the said fulcra, as described, demonstrated the superior utility of the same for the purpose.

Having thus fully described and set forth my improvement in stoves and pointed out its advantages, what I claim as new therein, of my invention, and desire to secure by Letters Patent, is—

1. The stationary bottom grate, D, and the vertically-sliding front grate, E, when the same are constructed and arranged together in combination with the fire-box of a stove, so as to operate substantially in the manner described and set forth, for the purposes specified.

2. Extending the grate-bars of the front portion of a stove-grate so that the said extensions, or their equivalents, shall form ribs e^0 exclusively on the inner or fire side of the thin upper portion e^4 of the same, substantially as described and set forth, for the purpose specified.

3. The mode herein described and set forth of constructing and securing the lining of the fire-box of a stove, the same consisting of the two side pieces, *c c*, each sloped and rabbeted, as described, and the single back piece, *c′*, having its two ends sloped to fit in the said rabbets of the side pieces, as described, the front ends of the said side pieces being retained in position by means of the vertical ribs 2 2, or their equivalents, substantially as described.

BENJ. MORISON.

Witnesses:
JAMES P. DIX,
B. F. SHATTUCK.