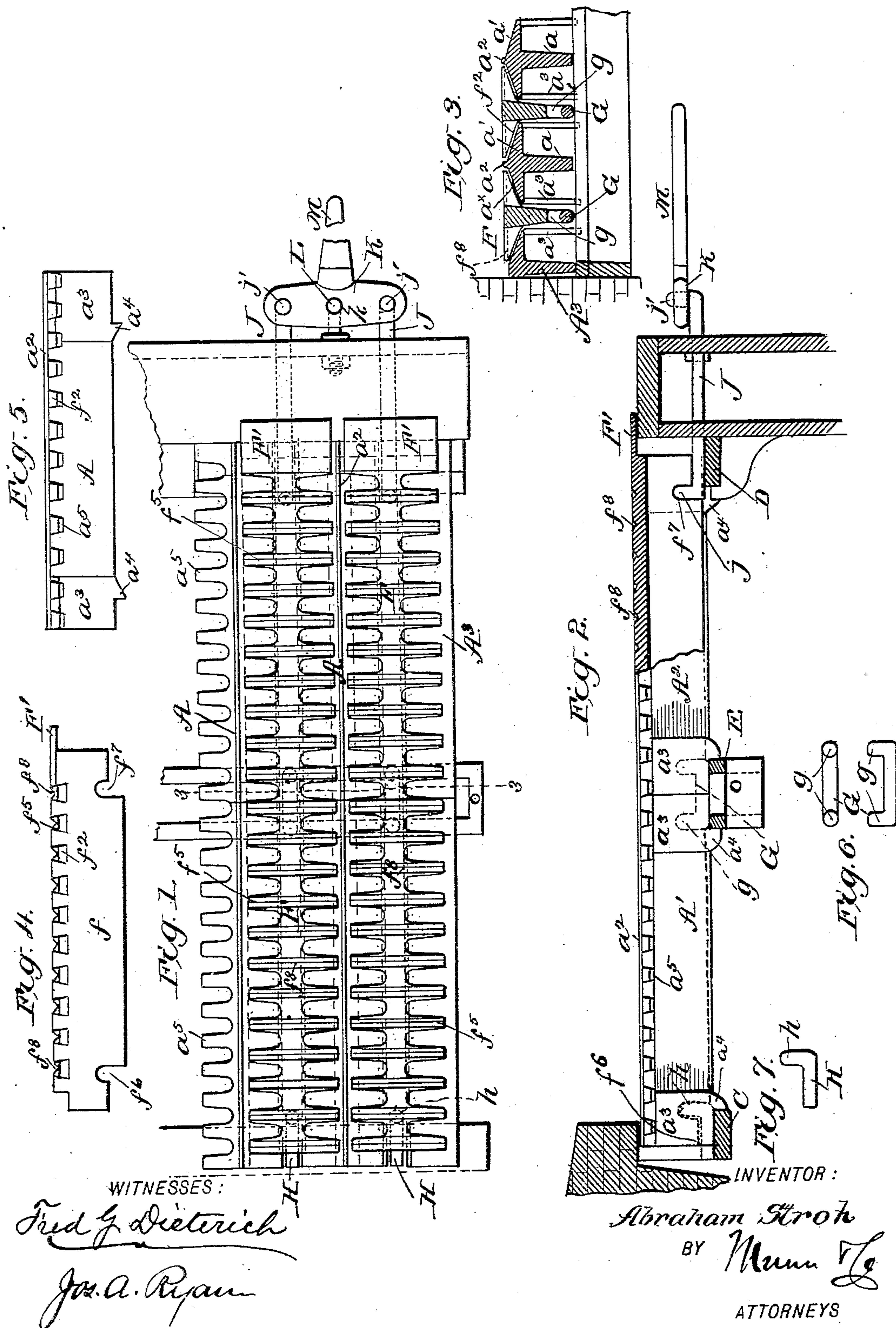


A. STROH.
FIRE GRATE.

Patented Sept. 5, 1893.



UNITED STATES PATENT OFFICE.

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FIRE-GRATE.

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To all whom it may concern:

Be it known that I, ABRAHAM STROH, residing at Freeland, in the county of Luzerne and State of Pennsylvania, have invented certain new and useful Improvements in Fire-Grates, of which the following is a specification.

My invention relates to fire grates for boilers and stoves of every style and it has for its object to provide a grate, simple, inexpensive and durable in its construction, positive in operation, and which will save both fuel and labor.

It has also for its object to provide a grate in which the grate openings can be set or varied so as to have any desired opening, as airspace, whereby the smallest or largest size coal or other fuel can be burned.

With other minor objects in view and which will be referred to hereinafter, the invention consists in the peculiar combination and novel arrangement of parts, all of which will be first described, and then pointed out in the claims, reference being had to the accompanying drawings in which—

Figure 1 is a plan view of a grate section constructed in accordance with my invention. Fig. 2 is a side elevation thereof partly in section. Fig. 3 is a transverse section on the line 3—3 Fig. 1. Fig. 4 is a detail side view of one of the rider bars. Fig. 5 is a similar view of one of the skids or stationary bars. Figs. 6—7 are detail views respectively of one of the connecting hooks and the sliding hook hereinafter referred to.

In the practical construction of my improved grate, such grate is formed with a series of sections independently operated, and each section comprises a pair of longitudinal grates which are held from movement, which I term "skids," and which in themselves may be formed of a single bar, or two or more members joined to make a single bar, as the length of the fire box may require; and a pair of longitudinally movable grate bars, formed each of a single member or two or more sections joined together, and which are held intermediate the "skids" or stationary bars, their upper portions resting and held to slide over the said skids, and such movable bars I term the "riders" or shaker bars, which are mounted and joined in such a manner

that they can be adjustably set on the "skids," and be capable of being moved in unison, but in reverse directions.

In the drawings I have shown one section of my improved grate, it being obvious that in practice the same is formed of a number of sections, according to the width of the fire box; and each section is formed alike, except the end sections, which have each an additional half fixed grate or "skid" bar.

A A indicate the stationary bars or skids which rest with their ends on the transverse bearing plates C, D, and centrally on the bearing frame E. Each bar A is formed of a central longitudinal shank a which extends the entire length of the bar, the upper end of which terminates in a top plate a' which projects laterally and has at its opposite ends downwardly extending ribs a^3 a^3 for a purpose presently explained. Upon the upper face of the bar A centrally thereof is a ridge or tongue a^2 , and from such tongue the said face is inclined downward in opposite directions as shown. While the bars A might be made of a single member extending from the front to the rear of the fire box, I prefer to form them of two members A' A^2 as shown in Fig 2, the inner or adjacent ends resting upon the central bearing bar E, and to brace such bars A' A^2 in position the end ribs a^3 have lugs a^4 which lap the bearing plates C, D, and E as shown.

A^3 indicates one of the end or half section skid bars.

F indicates the shaker portion of the grate which consists of a pair of longitudinal "rider bars" each of which consists of a central longitudinal shank f and a laterally extending top, the under face of which is inclined upward in opposite directions from the shank, as at f^2 , and such inclined portions fit over the inclined portions of the top of the stationary bars A.

It should be stated that the tops of both bars A and F are formed with the usual lateral grate fingers a^5 and f^5 which lap each other when the rider bar is set to provide for the largest air openings or grate slots. These bars F are also formed of two members and are each joined by a connecting hook G, the base of which seats on the central bearing E, while its ends have upturned hooks g which

seat and fit cut out portions f^6 in the bars F. The rear member of the rider bar has a cut out portion f^6 at its rear end to receive the hook end h of a sliding hook H which rests upon the rear bearing plate C, while the front end of the front members have also notched portions f^7 in which fit the inner hooked ends j of the shaker hooks J, which project through the front wall or frame I and have upturned hooks j' to receive the ends of the rocker or shaker lever K, the ends of which seat on the hooks j' , it being centrally apertured as at k to fit on the fulcrum hook L, a suitable socket portion being also provided to receive the detachable shaker bar M.

In practice the connecting hooks G, H and J are so arranged on the bearing plates C, D and E, that the inclined faces of the bars A and F will be held spaced apart about one-eighth of an inch, they being also so supported as to allow for a free and easy longitudinal movement of such bars F between and on the bars A.

It will be noticed by reference to Fig. 3, that the end ribs a^3 of the bars A are of such a length and depth as to project at each side of the connecting hooks G H J, they serving to hold such hooks in place, in addition to bracing the bar A as before stated.

While I prefer for cheapness and lightness to arrange the finger or ribs f^5 and a^5 at right angles on the skid bar, it is manifest they may project at any other angle desired.

The riders or rake bars F have transverse notches on their upper faces at points intermediate the fingers f^5 as shown at f^8 , for the purpose of admitting air over the top of the bar to keep it cool. To allow for a free reciprocal movement the front ends of the rider bars have guide portions F' which lap the front wall I as shown.

From the foregoing description taken in connection with the drawings, the operation and advantages of my invention will readily appear.

By constructing the grate bars in the manner shown and described the use of bolts and nuts can be entirely dispensed with. The ribs or fingers on each bar being of the same distance apart and width, the spaces between them will equal their width, so that when the grate bars are moved and the spaces fully open, there will be as much air space as there is iron, except in the center, where the fingers and shanks merge. When moved to a closed position, there will be air space enough to kindle and burn culm or coal dirt, and when the fire is well started, the grate can be opened full width of air space and nothing but the ashes will fall through. It will be readily understood that the two riders F are raked at same time and in reverse directions. By arranging the stationary and movable bars in the manner stated they will last much longer than when set side by side, and at the same time they form a very light and compact grate; the several parts can be

easily assembled, and any one portion renewed in case it should wear out before the others or become broken. Every piece of the grate is free to move loosely, so that there will be no crowding or straining. They will therefore last longer, and not be subject to breakage under ordinary usage.

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

1. In a grate, the combination with the end supports, and the stationary skid bars having top portions formed with lateral members, of rider bars held between the skid bars having top portions formed with lateral members, overlapping the lateral members of the stationary or skid bars, said riders held for longitudinal movement between such skid bars and means for moving such rider bars longitudinally, whereby to increase or diminish the air spaces between the lateral members of such skid rider bars, substantially as and for the purposes set forth.

2. An improved grate, formed in sections, each section comprising a series of stationary bars, each formed with a central ridge or tongue on its upper face and lateral downwardly inclined fingers, a series of movable bars, arranged intermediate the stationary bars formed with lateral fingers having upwardly inclined lateral fingers held to overlap the stationary fingers, their ends being disposed adjacent the central ridge on the stationary bars and means for reciprocating the said movable bars longitudinally as and for the purposes described.

3. In a grate, the combination with the end supports C and D and the bars A held stationary on the said supports, of the rider bars B having their top portion held to overlap the stationary bars A, and held for longitudinal movement on the said supports, and means for reciprocating such rider bars as and for the purposes described.

4. In a stove grate, the combination with the end supports, and the central support, of the skid bars formed of one or more sections, detachably held on such supports and from longitudinal and lateral movement, said skids having tops formed with lateral fingers having their upper face inclined downward and the intermediate or rider bars having their tops formed of lateral members inclined on their underface and held to overlap the members of the skid bars and means for reciprocating such rider bars, all arranged substantially as shown and described.

5. In a grate, the combination with the supports C D and E, and the skid bars A, arranged substantially as shown, of the rider bars B held intermediate the skid bars with their lateral fingers overlapping the top of the skid bars, said rider bars formed each of two members having seats or recesses in their under faces at their end, hook members fitting such recesses, held upon the supports C D and E and forming riding bearings for such rider

bars, and means for reciprocating such rider bars as and for the purposes described.

5 6. The combination with the supports C D, the skid bars A, formed each of a central longitudinal shank, lateral fingers f^5 at the top, and downwardly projecting guide flanges a^3 at their ends, of the rider bars B having detachable hook members at their ends, held on
10 the supports C D to form rider bearings, said hook members, held between the flanges a^3 of the bars A, and means for reciprocating the rider bars B all substantially as shown and described.

15 7. The combination with the supports C D and the skid bars A, A arranged substantially as shown, of the rider bars F held between the bars A to be reciprocated and adjusted longitudinally, said bars F having lateral fingers f^5 , and transverse notches between
20 such fingers, on the top face and means for

reciprocating such bars, all substantially as and for the purposes described.

8. An improved grate, consisting of the stationary bars A, detachably held on their supports, said bars having lateral downwardly inclined fingers a^5 , the rider bars F, formed in
25 pairs, and arranged intermediate the bars A, their top portions formed of lateral fingers f^5 having upwardly inclined under faces held to overlap the fingers a^5 , connecting hooks de-
30 tachably joined at their inner ends to the rider bars, their outer ends projected beyond the grate supporting frame, a rocking lever connecting such free ends and means for rocking such lever, all arranged substantially
35 as and for the purposes described.

ABRAHAM STROH.

Witnesses:

CHAS. ORION STROH,
JOSEPH NEUHORSER.