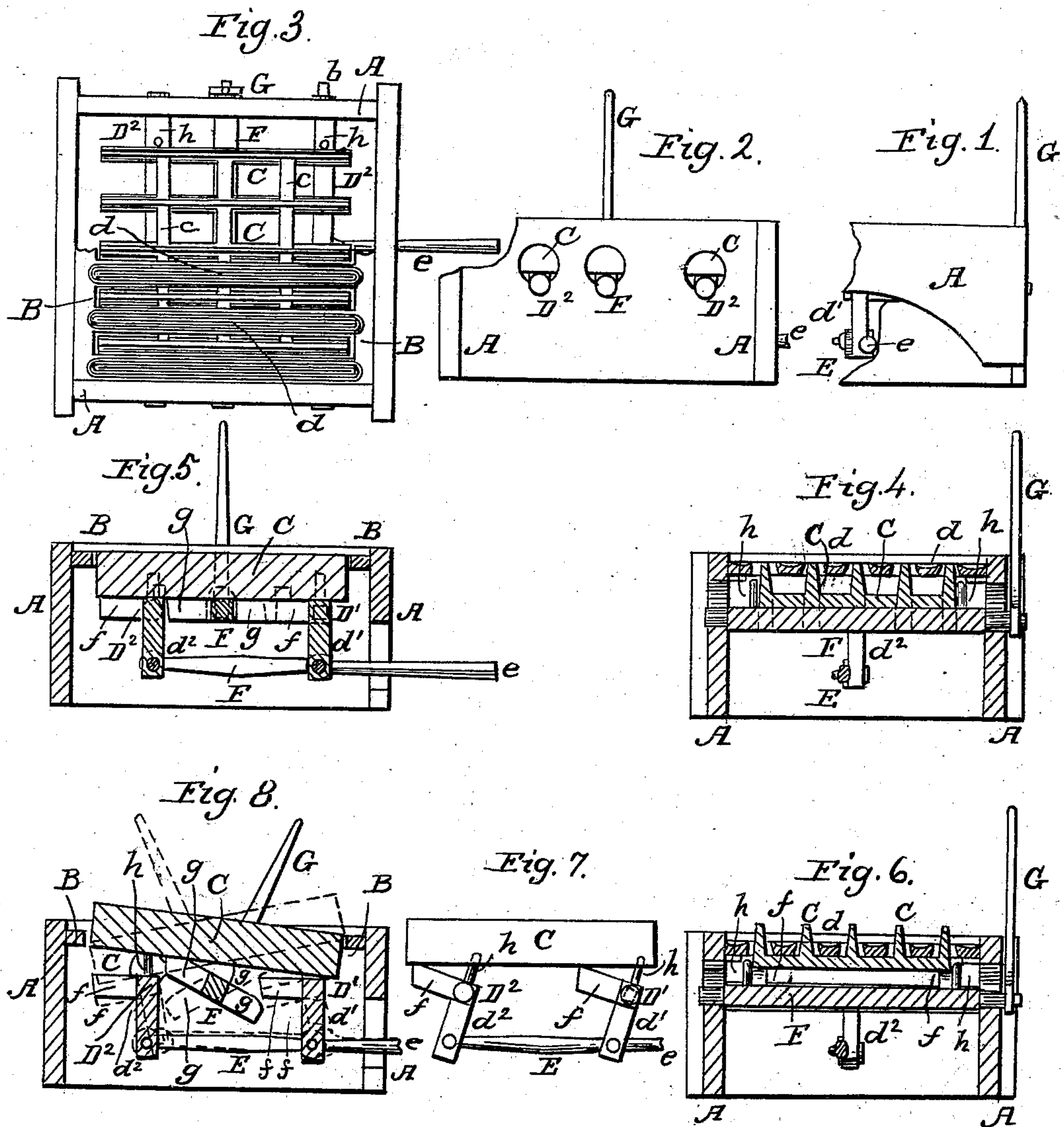


A. D. SPOOR.

Grate.

No. 8,043.

Patented April 15, 1851.



UNITED STATES PATENT OFFICE.

A. D. SPOOR, OF TROY, NEW YORK.

AGITATING GRATE-BAR.

Specification of Letters Patent No. 8,043, dated April 15, 1851.

To all whom it may concern:

Be it known that I, ABRAHAM D. SPOOR, of Troy, in the county of Rensselaer and State of New York, have invented new and useful improvements in Grates for Burning Coal and other Fuel, applicable to open or closed fireplaces of different descriptions, which improvements, in combination, 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, forming part of this specification, in which—

Figure 1 is a partial front or end elevation, the remaining portion being similar to the half or part shown. Fig. 2 is a side, or longitudinal elevation. Fig. 3 is a plan with half the top or stationary grate removed, in order to exhibit the working or lower parts. Fig. 4 is a transverse sectional elevation, representing the grate in a state of rest. Fig. 5 is a longitudinal vertical section, the parts positioned as in Fig. 4. Fig. 6 is a transverse vertical section, showing the operation of the movable grate in a perpendicular direction. Fig. 7 is a partial longitudinal elevation representing the manner in which the perpendicular motion of the lower grate is produced. Fig. 8 is a longitudinal vertical section, in which, the movable grate is shown subjected to a rocking motion.

The nature of my invention refers to the use of two separate grates, one of them being made stationary and the other made movable and consists in the application to the movable grate of two separate mechanical movements, viz, a rocking or vertical-vibratory motion as desired.

Similar letters of reference in the several figures refer to like parts.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

A, A, is the outside frame for holding the grate and may be made of any suitable shape.

B, B, is the upper or stationary grate, the bars of which *a, a*, are concave on their surface for retaining ashes to diminish the destructive effect of heat upon them, or they may be made of the ordinary or any other form.

The grate B, B, of which *a, a*, are the

bars, is firmly secured to or cast with the frame A A, the bars *a, a*, being made wide at the top and narrowed at the bottom.

C, C, are bars with strips *c, c*, forming the movable or lower grate, which rests loose so as to operate when required. The bars C, C, are the reverse of the bars in the stationary grate being wider at their bottom and narrow at their top. Also more vertical at their sides than *a, a*, and deeper. D¹, D², are shafts, having their bearings in the sides of the frame A, A. D¹, may be worked by a lever fitting on the part *b*, Fig. 3, or by an arm *d*¹, worked backward and forward by a handle or rod *e*.

E, is a connecting rod attaching *d*¹, to a similar arm *d*², fixed to, or welded with, the shaft D², the motion of these shafts is vibratory. *f, f*, are toes or lifters fixed to the shafts D¹, D², there being four of them, two on either shaft, and when the shafts D¹, D², are made to vibrate, the toes *f, f*, work the grate C, C, *c, c*, in a perpendicular or vertical direction.

F, is a middle rocking shaft similar to D¹, D², and vibrating by means of the handle G, which through toes *g*¹, *g*², two on either side of the shaft F, rocks the movable grate.

The several toes or lifters act against the under surface of the bars C, C. *h, h*, are guides or checks for obviating a lateral movement in the grate C, C, *c, c*, they are fitted to the shafts D¹, D².

The operation is as follows: The lower grate C, C, *c, c*, when in a state of rest, has its bars on a level at their top with the stationary bars *a, a*, as seen more particularly in Figs. 4 and 5. By moving the rod or handle *e*, horizontally inward motion is communicated to the arm *d*¹; by rod E, to *d*². Shafts D¹, D², and toes or lifters *f, f*, which when at their top stroke occupy the position shown in Figs. 6 and 7, moving the lower grate C, C, *c, c*, vertically upward and the mass of fuel resting on the several bars along with it. The same motion may be produced by working the shafts D¹ by a handle similar to G, fitted on the end *b*, of the shafts D¹, or the motion may be communicated by steam or other power by connecting the rod *e* to suitable reciprocating machinery which might be put in motion occasionally, thus causing the furnace to clear itself of ashes and burned matter and would prove itself of advantage in locom-

tive, marine or stationary boiler furnaces as well as in stoves and replaces generally. The rocking motion of the grate is produced as described, by the toes *g, g*, which being
 5 placed in opposite sides of the shaft *F*, lift the lower or movable grate to a sloping position, alternately reversing the slope as the handle *G*, is worked backward and forward and the shaft *F*, is made to vibrate, as shown
 10 in Fig. 8, by parts in full and lines in red, thus throwing the fuel, first from one side and then to the other and so breaking and shaking the mass of burning fuel as to clear the fire in the manner of a poker and screen
 15 combined.

The rocking motion, as described, is different from any previous similar action where a rocking motion has been used, inasmuch as the grate does not rock or vibrate from its center, but has its center of
 20 motion at either end alternately, the opposite ends of the bars *C, C*, describing the segment of a circle, thus clearing the center of the fire as effectually as the sides or ends, the movable grate *C, C, c, c*, is shown
 25 to rest on the toes *f, f, g, g*, and shafts *D¹, D²* *F*; and in the rocking motion just described its point of action or center of motion is alternately on *D¹*, and shaft *D²*,
 30 when the grate *C, C, c, c*, is required to act as a damper or extinguisher, the bars *C, C*, may be made thick enough or with projections at their bottom in the manner of a flange so as to close, or partly shut up, the
 35 spaces between the bars when the lower grate *C, C, c, c*, is raised to its vertical position shown in Fig. 6, thus checking or shutting out the admission of air. The bars
 40 *C, C*, being made more vertical on their sides than the bars *a, a*, in the stationary grate,

the spaces formed between the several bars are consequently broader at their bottom than at their top edges, so that any substance once entering the spaces, readily
 45 passes through. The lower grate is guided from lateral movement in either its vertical or rocking motions by the pins *h, h*, fixed to the shafts *D¹, D²*, between which the movable grate rests or works.

In the vertical movement, the mass of fuel
 50 resting on the bars being raised and shaken, and in the rocking action the fuel being tossed from one end to the other and so jostled as to separate the ash as required, and in both movements the bars of the lower
 55 grate penetrate the under surface of the mass of coal, as so many pokers with this advantage, that whether in motion or at rest, they remain within the spaces of the upper grate, retaining the fine coal that otherwise
 60 would drop through, thus fitting it for burning coal of the smallest as well as the largest size and adapting it to its manifold office of grate poker and screen.

I do not claim the employment of a movable grate formed by bars *C, C*, and strips
 65 *c, c*, the bars *C, C* working within the bars of the stationary grate, but

What I do claim as my invention and desire to secure by Letters Patent, is—
 70

The application to the movable grate of two separate mechanical movements whereby it may receive a rocking or a vertical vibratory motion at pleasure, the several
 75 parts constructed and operating substantially in the manner shown and described.

A. D. SPOOR.

Witnesses:

JOSEPH WILSON,
 G. ROBERTSON, Jr.