2 Sheets—Sheet 1.

D. RICHMOND.

Grate.

No. 222,077. Patented Nov. 25, 1879.

Fig. 1.

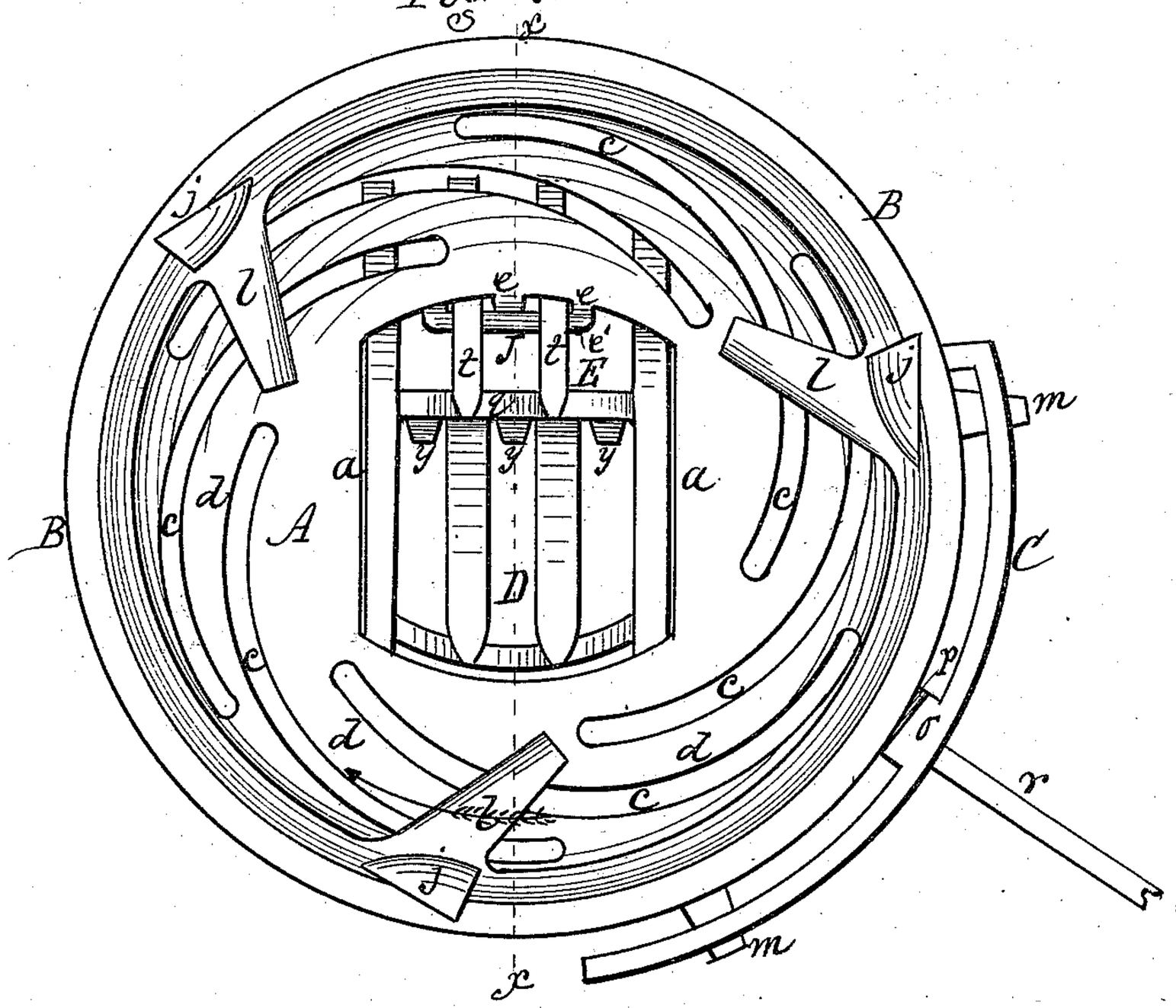
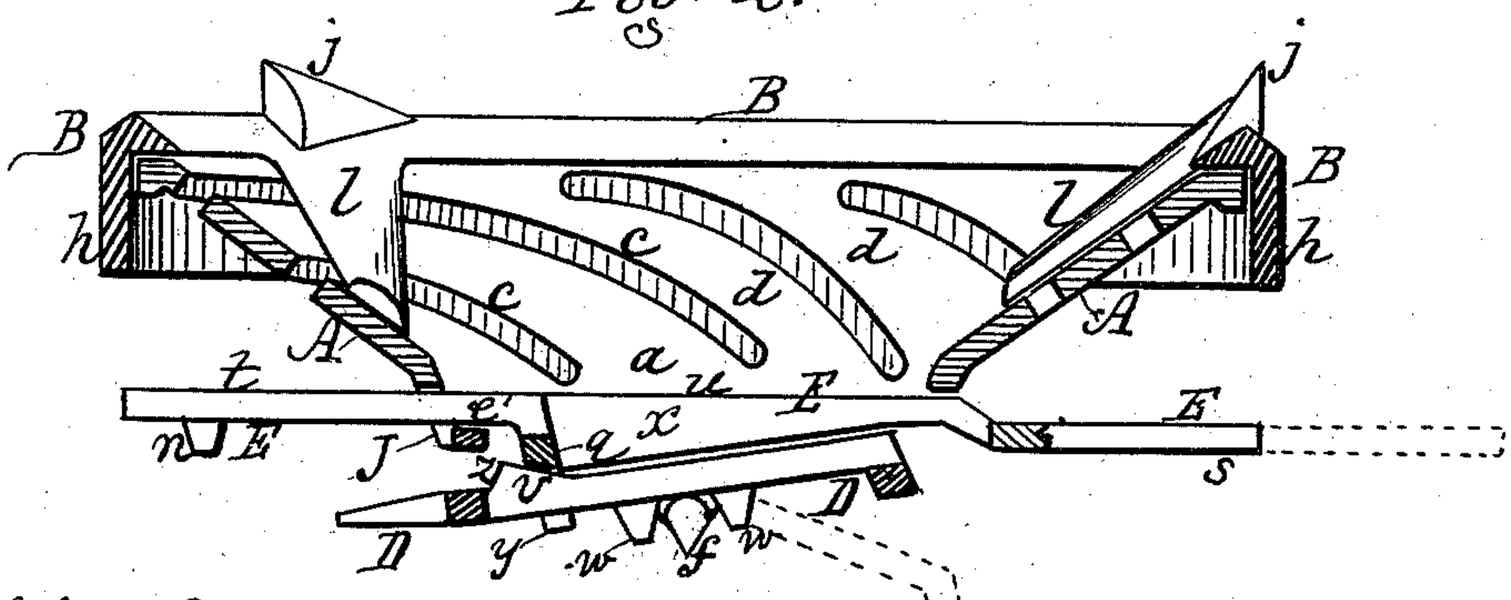


Fig. 2.



Attest.
J. B. West
John C. Burns.

Inventor.
Daniel Richmond.
per R. L. Osgood
Atty

2 Sheets—Sheet 2.

D. RICHMOND.

Grate.

No. 222,077. Patented Nov. 25, 1879.

Fig. 3.

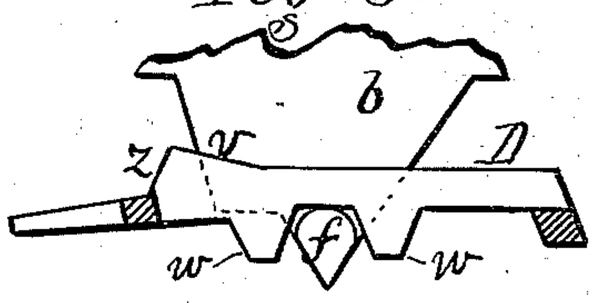


Fig. 4.

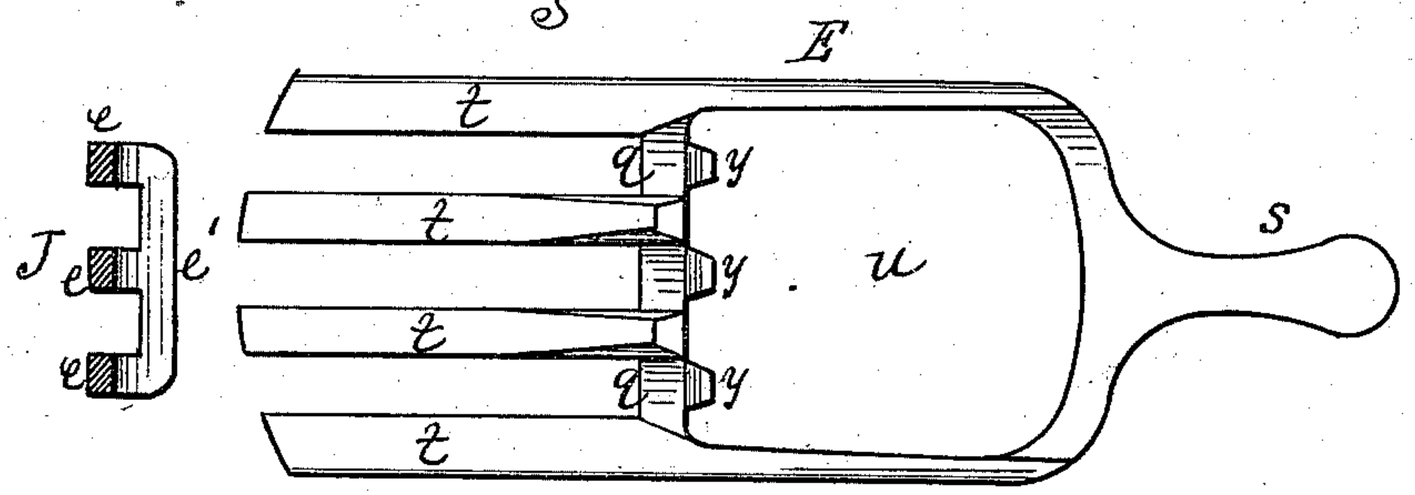


Fig. 5.

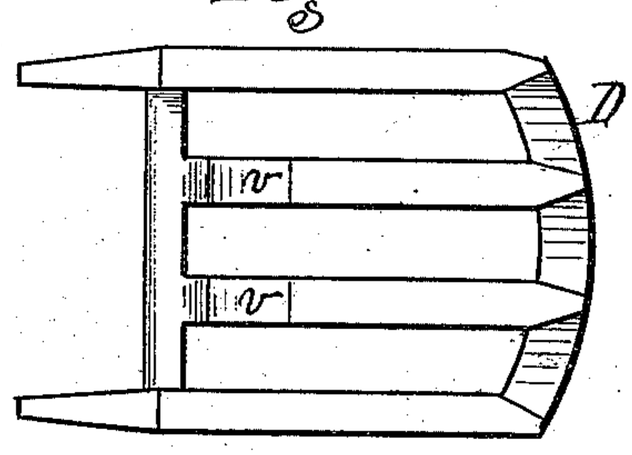


Fig. 6.

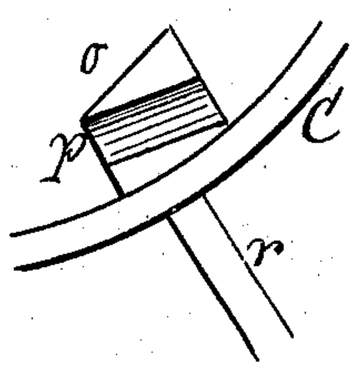
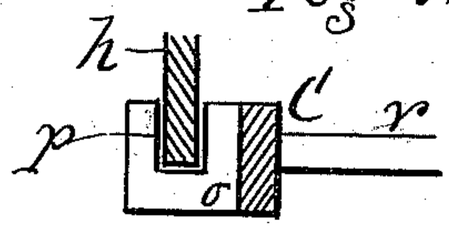


Fig. 7.



Attest.
J. B. West
Edw C. Bond.

Inventor.
Daniel Richmond
per R. L. Osgood
Atty.

UNITED STATES PATENT OFFICE.

DANIEL RICHMOND, OF ROCHESTER, NEW YORK.

IMPROVEMENT IN GRATES.

Specification forming part of Letters Patent No. **222,077**, dated November 25, 1879; application filed August 11, 1879.

To all whom it may concern:

Be it known that I, DANIEL RICHMOND, of the city of Rochester, county of Monroe, and State of New York, have invented a certain new and useful Improvement in Grates; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, in which—

Figure 1 is a plan of the grate. Fig. 2 is a section in line *x x*. Figs. 3, 4, 5, 6, and 7 are detail views.

My improvement relates to grates for stoves, furnaces, fire-places, &c.; and it consists in the construction and arrangement of parts hereinafter more fully described.

A represents the bottom or base portion of the grate, which is supported in the stove in any desired manner. It is of concave or dish form, and has an opening, *a*, in the center, leaving a clear space for the coal to fall on the auxiliary or sub grate below. Its outer edge forms a circular rim upon which rides the ring that rests below the fire-pot. In the inclined body of this base portion are formed a series of circulinear slots, *c c*, which are eccentric to the center of the grate, the said slots starting from near the outer edge and extending to near the edge of the opening *a*. The slots leave bars *d d* between them, thus producing a grated bottom to the base, which allows ashes to pass through.

On the bottom of the grate are cast two lugs, *b b*, having bearings *f f*, rounded at the top, and having angular sides which sustain the auxiliary or sub grate, as will presently be described. On the back lower edge of the base is also formed a hanger, J, consisting of vertical bars *e e*, and a horizontal connecting-bar, *e'*, which form guides to the rake, hereinafter described.

B is a ring, which rests loosely on top of the grate A, and beneath the fire-pot of the stove. It has a flange, *h*, which embraces the rim of the grate, by which it is kept in place when turned. If desired, this ring may have bars or fingers rising from its top, or the lower edge of the fire-pot may have such open bars or fingers, or the ring may be made plain, as shown. *l l* are inclined scrapers or wings on the inside of the ring, which rest over and conform to the surface of the grate A. As the ring is turned in the direction indicated by the arrow these scrapers move over the grate, stirring and lightening up the coal, working the same toward the center, and sifting the ashes through the slots *c c*. The eccentricity of these slots causes the coal to work toward the center, thereby concentrating it and preventing deadening of the fire at the outside of the grate.

C is a segment, which rests on bearings *m m* of the grate, and is provided with a handle, *r*, by which it is operated. In the center it has a clutch, *o*, with an inclined or eccentric slot, *p*, which embraces the flange *h* of the ring B. In the forward movement of the segment the clutch *o* clamps and binds upon the flange *h*, and causes the ring B to move forward with it; but in the back movement it releases from the flange, and enables a new hold to be obtained. By this means the ring B is turned in one direction only. The segment is constructed in this form to enable it to engage with the bottom of the ring B, and obviate the use of a pawl, engaging with grated bars of the ring, such as shown in my patent of August 28, 1877, as such pawl is sometimes liable to become obstructed with ashes and cinders.

D is the auxiliary or sub grate, and E the rake, which are located below the center opening, *a*, of the main grate. The sub-grate is provided with forks *w w*, which embrace the rounded bearings *f f* of the main grate, as shown in Fig. 3. By this means the sub-grate is free to rock and tilt either forward or backward. The grate-bars extend longitudinally, and on the top of their rear ends are inclines *v v*, as clearly shown in Figs. 2, 3, and 5. The side bars of the sub-grate also have shoulders *z z* in the rear, as shown in the same figures.

The rake E rests above the sub-grate and between it and the main grate. It is a straight frame, having an opening, *u*, in its front portion, and a series of grate-bars, *t t*, in its rear portion, the outer ends of which are open, as shown in the plan view, Fig. 4. The two center bars run through the hanger J of the main grate, between the vertical bars *e e* and over the top of the horizontal bar *e'*, by which means the rake is supported at the rear. At

the front of the rake is a handle, *s*, by which it is operated. At the front end of the bars *t t* is a cross-bar, *q*, and from this cross-bar a series of teeth, *y y*, project downward and rest between the bars of the sub-grate below. On the rear under side of the side bars are stops *n n*, as shown in Fig. 2, and these side bars are made angular or beveling, so as to be thickest or deepest at the rear, as shown at *x*, Fig. 2.

The operation is as follows: The valve E is capable of longitudinal movement forward and back, while the sub-grate simply rocks or tilts on its bearings. In its normal position the rake is thrown back, so that the opening *u* rests beneath the opening *a*, allowing the coal to fall directly upon the sub-grate. In this condition the cross-bar *q* strikes on top of the inclines *v v* of the sub-grate and tilts said sub-grate upward and backward, as shown by the full lines in Fig. 2. When it is desired to clear out the ashes and clinkers the rake is drawn forward, in which case the teeth *y y*, which rest between the bars of the sub-grate, act as pushers, and force off all the material lying in front of them. As the rake moves forward the sub-grate tilts forward and downward, as indicated by the dotted lines, Fig. 2, thereby opening a throat for the free escape of the ashes and clinker. At the same time the bars *t t* of the rake move under the opening *a* of the main grate and support the body of coal. When the full forward movement is obtained the stops *n n* of the rake strike the shoulders *z z* of the sub-grate and stay the action. The hanger J, in addition to serving as a support for the rake, acts as a stop to throw the ashes from the rake as it is moved back. When it is desired to remove large clinkers by a poker, or to dump the coal, the rake can be moved part way back, leaving sufficient throat in front for the purpose.

j j are lugs on top the ring B for moving the coal from the sides toward the center of the fire-pot and grate.

I do not claim, broadly, a handle for engaging with and operating the grate by a cramping movement, as I am aware the same is not new.

What I claim as new is—

1. In a grate, the combination of the grate A, the sub-grate D, and the rake E, arranged to operate in the manner and for the purpose specified.

2. In a grate, the combination of the sub-grate D and the rake E, the sub-grate being arranged to rock or tilt upon its bearings, and the rake being arranged to move forward and backward, and so operating, as described, that the forward and back action of the rake will tilt the sub-grate in opposite directions, as herein shown and described.

3. In combination with the rake E, provided with the bars *t t*, the hanger J on the bottom of the grate A, forming both a support for said rake and a stop for sweeping off the ashes in the backward movement of the same, as herein shown and described.

4. In combination with the sub-grate D, the teeth *y y*, on the rake E, projecting down and resting between the bars of the sub-grate, and serving to sweep the ashes from the sub-grate in the forward movement of the rake, as herein shown and described.

5. In combination with the main grate A, provided with the central opening, *a*, the rake E, constructed with the opening *u* in its front portion, and the bars *t t* in its rear portion so arranged, as herein described, that when the rake is pushed back the opening *u* will come beneath the opening *a* and allow the coal to fall on the sub-grate, and so that when it is drawn forward the bars *t t* will come beneath the opening *a* and support the body of coal, as herein set forth.

6. In combination with the ring B, provided with the downwardly-projecting flange *h*, the segment C, provided with the clutch *o* and angular slot *p*, engaging with said flange, as herein shown and described.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

DANIEL RICHMOND.

Witnesses:
R. F. OSGOOD,
R. E. WHITE.