2 Sheets--Sheet 1.

# J. C. WEIGHTMAN.

## Grate.

No. 159,871. Patented Feb. 16, 1875.

Fig 1

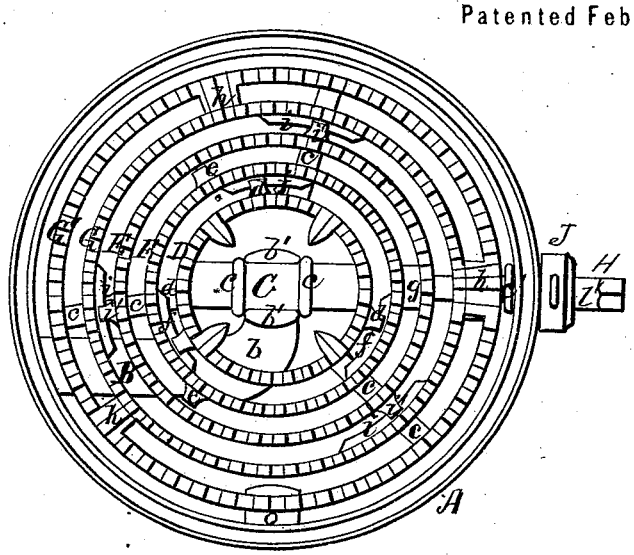



Fig 2

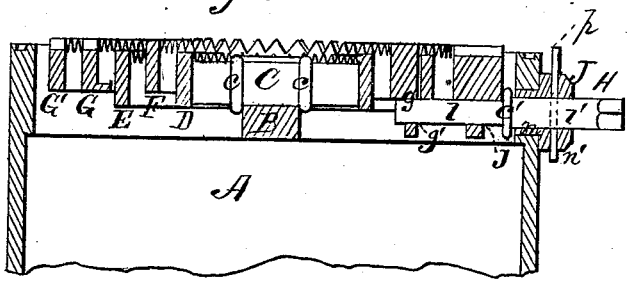
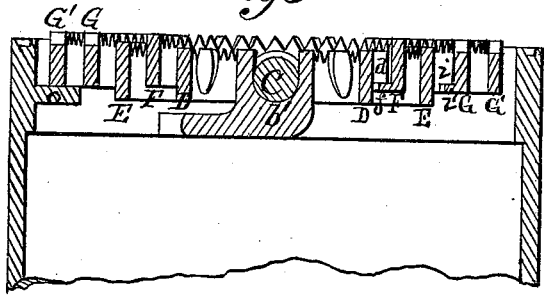



Fig 3



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2 Sheets--Sheet 2.

# J. C. WEIGHTMAN.

## Grate.

No. 159,871. Patented Feb. 16, 1875.

*Fig 4*

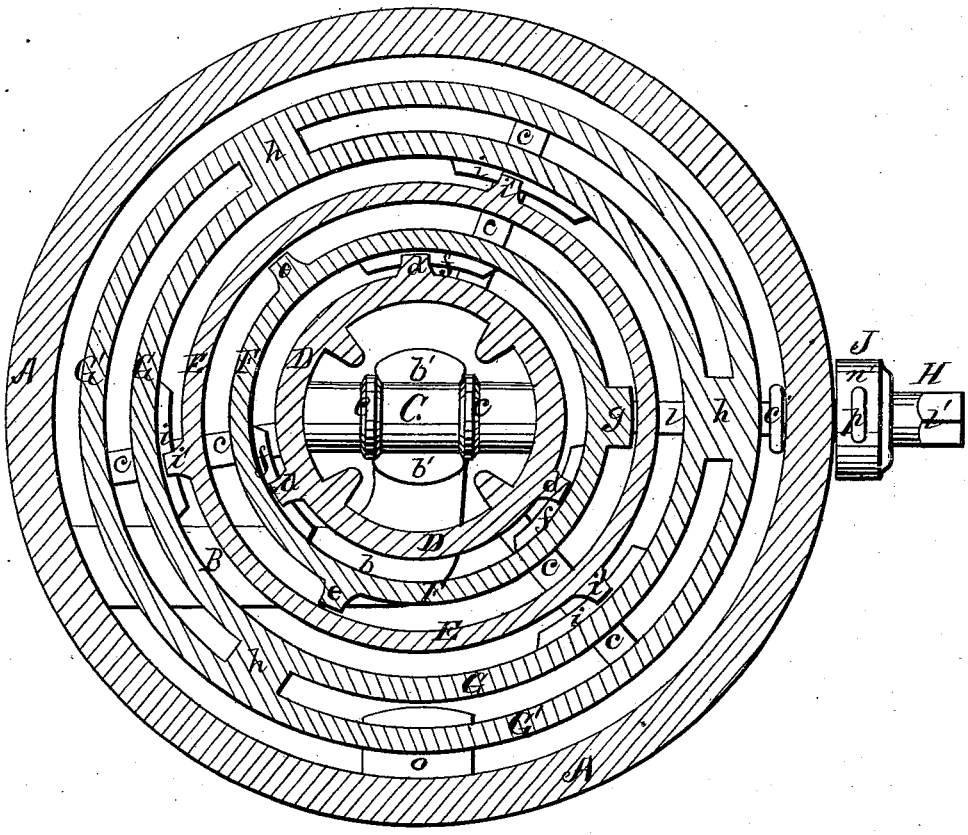
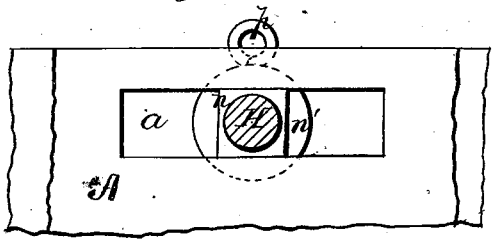



*Fig 5*

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# UNITED STATES PATENT OFFICE.

JAMES C. WEIGHTMAN, OF MALDEN, MASSACHUSETTS.

## IMPROVEMENT IN GRATES.

Specification forming part of Letters Patent No. **159,871**, dated February 16, 1875; application filed December 12, 1874.

*To all whom it may concern:*

Be it known that I, JAMES C. WEIGHTMAN, of Malden, in the county of Middlesex and State of Massachusetts, have invented a new and valuable Improvement in Grates; 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 annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawings is a representation of a top-plan view of my grate, and Figs. 2 and 3 are vertical sectional views of the same. Fig. 4 is a horizontal sectional view, and Fig. 5 is a detail view.

This invention has relation to grates for furnaces and stoves which are adapted to vibrate vertically for the purpose of dumping the contents of the same into an ash-pan, and which consist of a number of concentric circles having saw-toothed upper edges, some of which are immovable and others capable of rotation about their common center.

The nature of the invention consists in an arm extending out horizontally from the inner walls of the furnace and terminating in a vertical bifurcation, when it reaches the center of the said furnace, adapted to receive the diametrically-arranged axis of the immovable rings, whereby, when the grate is operated for the purpose of sifting out the ashes, the said rings are rigidly held against horizontal vibration, but will be allowed to vibrate vertically for the purpose of allowing the contents of the furnace to be dumped. It also consists in arranging the upper edges of the movable rings above those of the fixed rings, whereby the contents of the furnace are prevented from being carried by the grate bodily in the direction of the vibrations of the same, and while one part is carried in one direction another part will be held fixed, thereby causing an effectual shaking up and separation of the ashes and unconsumed coal. It furthermore consists in a detachable rectangular nut applied upon the outer projecting end of an actuating-rod attached to the grate and extending through a horizontal slot in the wall of the furnace-base, in which slot the above nut is adapted to be received, whereby the grate is held in a horizontal position, is capable of being operated for separating cinders from unconsumed coal, may be caused to vibrate vertically for dumping the contents of the furnace, and may be finally locked and held against such vibration when not desired, by means of a pin passing through registering-perforations in the nut and actuating-rod, all as will be hereinafter more fully explained.

In the annexed drawings, A designates the preferably cylindrical base of a furnace or stove having a slot, *a*, cut through its wall, near its its upper edge, for a purpose hereinafter made clear. B indicates a metallic arm extending out horizontally from the inner surface of the wall of base A at a suitable distance to one side of the vertical plane of the diameter passing through the center of the length of the slot *a*, as shown in Fig. 1, then bending inward at *b*, and terminating in an upward bifurcation, *b'*, having a semi-cylindrical lower end, as shown in Fig. 3. This bifurcation affords a bearing for a shaft, C, having collars *c* diametrically arranged in an interior ring, D, of which it forms a part, and with which, as well as with a second concentric ring, E, their connecting-bearers *c* and three or more radially-arranged lugs, *d*, at the upper edge of ring D, it is cast. Rings D and E are arranged at a sufficient distance apart to admit of the insertion between them of a third concentric ring, F, having projections *e* vertically arranged at suitable distances apart on its periphery, and with segmental lugs *f* projecting inwardly from the inner walls of the said ring, as shown in Fig. 1. It is also provided with a lug, *g*, extending downwardly from ring F, and terminating in a rectangular slot, *g'*, for a purpose hereinafter made clear. Ring F is placed in position between rings D E, and is locked therein by causing lugs *f* to be engaged under lugs *d* of ring D by means of a turn imparted to ring E, thereby preventing all upward displacement thereof. When thus placed *in situ* the lower edge of ring F rests upon bearers *c*, thereby preventing it from falling through, and lugs *d* of rings D, together with projections *e* of ring F, serve to hold the same in a position equidistant from the rings D and E, as shown. Bearers *c*, as shown in Fig. 1, project a certain

distance radially beyond ring E, and thereby afford supports for two other concentrically-arranged rings, G G′, suitably connected by parts *h*, and the former provided with segmental lugs *i*, arranged a suitable distance apart upon its inner lower edge. These lugs are adapted to be engaged under other lugs *i′* on the upper peripheral edge of ring E, and when thus engaged prevent the rings G G′ from upward displacement, the same being prevented from all other displacement other than rotary by lugs *i′* and bearers *c*. I designates a lug, arranged between rings G G′, extending downwardly below the lower edges of the same and terminating in a rectangular slot, *j*, the same being in the same horizontal plane with a similar slot, *g′*, in the lug *g*. Rings D, E, F, and G G′ constitute my improved grate, and their upper edges are serrated or saw-toothed, the teeth of the rings F and G G′ being above the horizontal upper edge of those of rings D and E.

When the grate above described is in place the shaft C will be in the bifurcation *b′* of arm B, and the said arm being unmovable it will hold the rings D and E in the same state of immovability; but the rings F and G G′ being capable of rotation are actuated by means of a shaking and dumping rod, H, having a rectangular end, *l*, adapted to be received within the slots *j* and *g′*. This rod extends outward a certain distance through slot *a* of base A, and terminates in a cylindrical part, *l′*, separated from part *l* by a collar, *c′*, which prevents the said rod from undue peneration into the said slots. The cylindrical end *l′* of rod H is adapted to receive upon it a nut, J, consisting of a rectangular part, *n*, and a preferably cylindrical part, *n′*, the former of which is of such dimensions as that it shall be received within slot *a* when the nut is passed over the rod. When the rod H is actuated forcibly to the right and left a corresponding rotary movement will be imparted to rings F and G G′, while rings D and E will be held immovable.

In the ordinary grate, of which the rings are cast in one piece, the whole body of coal and ashes are moved with the grate, which makes the clearing of the fire a difficult matter; while in my improved grate, some of the rings being stationary and the others movable, the contents of the furnace are held in place, while the movable rings thoroughly stir them up, thereby effecting a speedy separation of the ashes and good coal. This separation is the more perfect in that the teeth of the movable rings are above those of the stationary ones, and more effectually causes the comminution of clinkers and other hard incombustible matter in the furnace, whereby they are allowed to fall through the interstices of the grates into an ash-pan below.

With a view to preventing a casual vertical vibration of my grate, while the process of shaking out the ashes is in progress, I have devised the following simple device: The part *l* of rod H being engaged in slot *a*, as above described, a metal rod or pin, *p*, is passed through registering perforations in the cylindrical part of the nut and of the said rod H, whereby they are rigidly locked together. The rectangular part of nut, being in the slot *a*, the same is incapable of rotation, and the rod H, being locked to the said nut, is also deprived of its power of rotating; hence the grate will be effectually held against casually dumping the contents of the furnace.

By removing the pin *p* the grate may be allowed to discharge the contents of the furnace in the usual well-known manner.

In practice, I use a lug, *o*, projecting inwardly from from the base A, for the purpose of relieving lugs *g* and *f* of the strain of holding the grate in place.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination of the rings D E, held rigidly in place by the engagement of the axis or shaft C in the bifurcation *b′* of arm B, and the movable rings F, G, and G′, held against downward displacement relative to the fixed rings by bearers *c*, and guided in their vibration by means of the lugs *d i* resting upon the lugs *i f*, substantially as specified.

2. The combination of the stationary rings D and E and the movable rings F G G′, all being serrated or saw-toothed, and the serrations of the latter above the horizontal plane of the former, substantially as specified.

3. The combination, with the slot *a*, of the base A of a stove or furnace, and with the shaking and dumping rod H vibrating therein, of the detachable locking-nut J, having a rectangular end, *n*, substantially as and for the purpose set forth.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

JAMES C. WEIGHTMAN.

Witnesses:
JAMES F. PICKERING,
FRED. A. PICKERING.