(No Model.) 2 Sheets—Sheet 1.

J. W. WARNER & R. GALBRAITH.

GRATE.

No. 507,949. Patented Oct. 31, 1893.

Fig. 1.

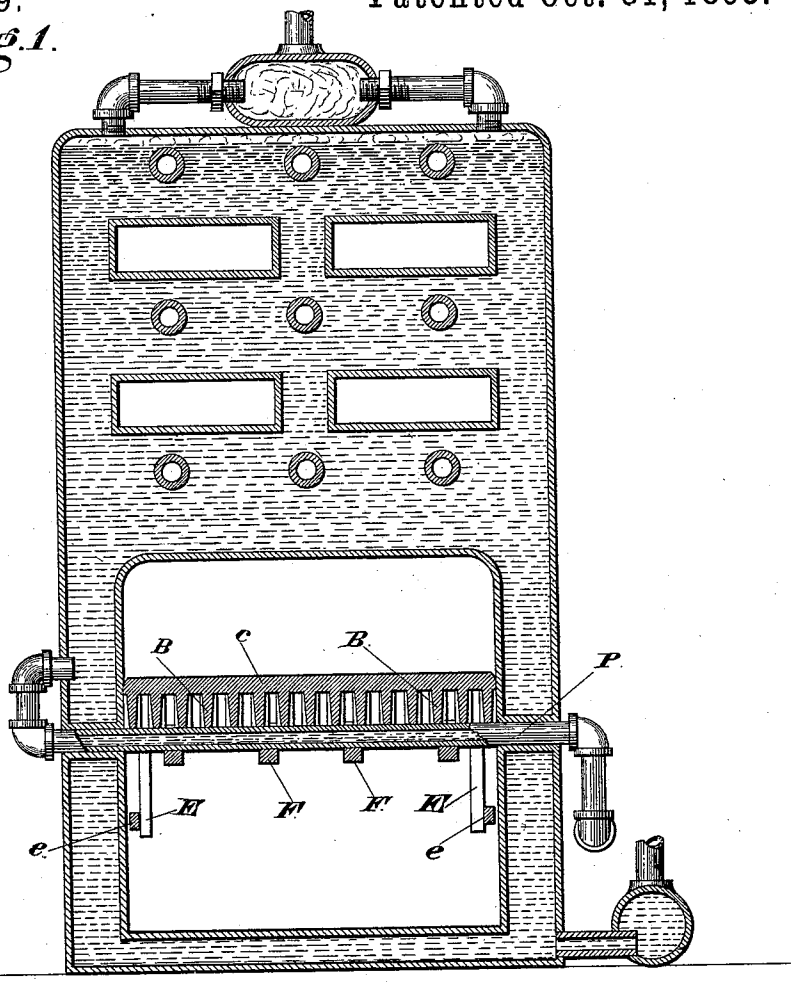
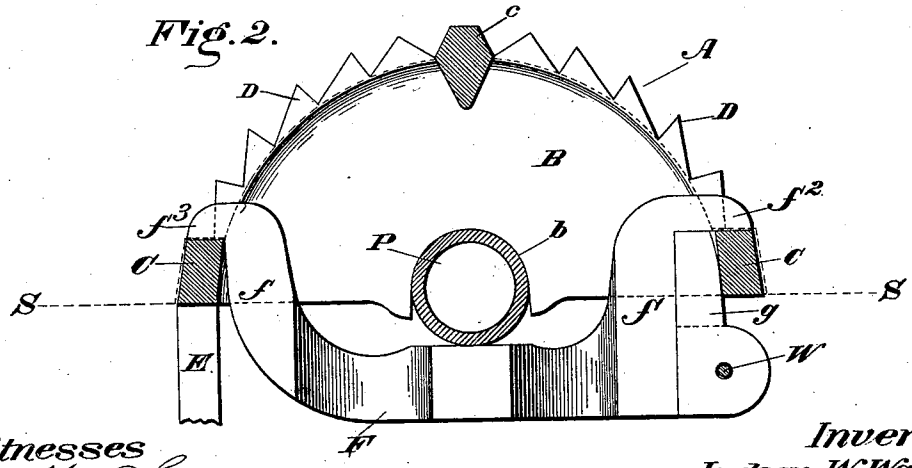


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

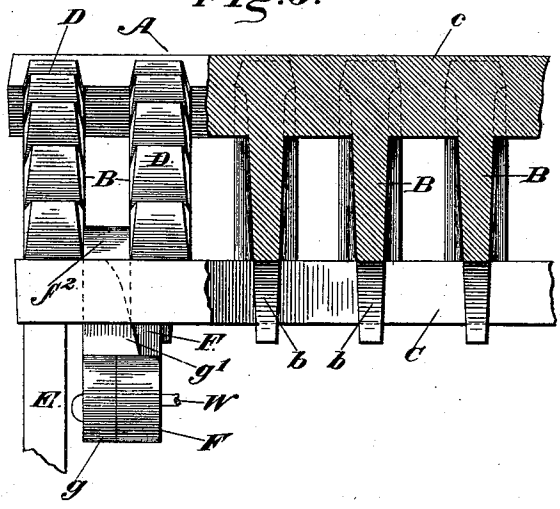
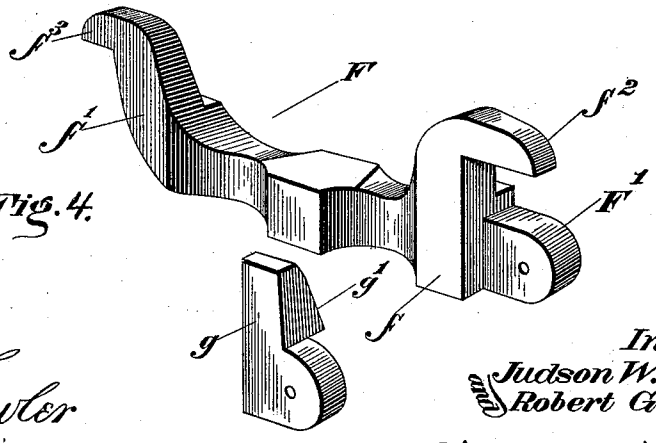


Fig. 4.



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UNITED STATES PATENT OFFICE.

JUDSON W. WARNER, OF ONEIDA, AND ROBERT GALBRAITH, OF LANSINGBURG, NEW YORK.

GRATE.

SPECIFICATION forming part of Letters Patent No. 507,949, dated October 31, 1893.

Application filed March 9, 1893. Serial No. 465,297. (No model.)

To all whom it may concern:

Be it known that we, JUDSON W. WARNER, of Oneida, Madison county, and ROBERT GALBRAITH, of Lansingburg, Rensselaer county, State of New York, have invented certain new and useful Improvements in Grates; and we do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification.

This invention is an improvement in sectional rocking grates for coal burning, and it is especially designed for use with boilers and furnaces, and its objects are, first, to detachably mount these sections on stationary supporting rods or pipes by novel means so that the sections can be rocked thereon independently thereof; second, to prevent excessive heating and warping of the grate sections by keeping their temperature down, not only by the free air passages through the sections, but by etsablishing a water circulation through the pipes upon which the sections are mounted thereby cooling the sections and utilizing their supports for heating water.

The invention therefore consists: first, in the novel construction of the sections; second, in the novel combination of rocking sections with underlying supporting rods or tubes; third, in the novel fastenings for securing the sections to the rods; fourth, in the novel combination of grate sections and supporting water circulating pipes, and fifth, in novel combinations and arrangements of parts all as hereinafter described and claimed.

Referring to the drawings by figures:—Figure 1 represents a section of a boiler furnace with our improved grate therein, showing clearly the water circulation through the pipe supporting the grate. Fig. 2 is a transverse sectional view through a grate section and support, showing the section fastening. Fig. 3 is a detail side view of a portion of a section. Fig. 4 is a detail view of a fastening.

A, A, represent the grate sections each constructed alike and consisting of a series of about semi-circular parallel disks B, B, each of which tapers from its periphery, or base of the teeth thereon, inward being narrowest at center where it has a circular notch *b* to fit upon a supporting rod or pipe P. The disks in a section are set so that the outer edges of adjoining disks are about a half inch apart, and they are connected at each side by longitudinal ribs C, C, and at top by a longitudinal rib *c* so that the grate sections are rigid. The upper edges of the disks are formed with upwardly pointed ratchet shaped teeth D, those on opposite sides of rib *c* pointing in opposite directions. The teeth, ribs and sections are draw-tapered so that the entire section can be readily molded from a pattern in green sand, the separating line of the parts of the mold in which the section would be cast being indicated by the lines S—S in Fig. 2. The upwardly pointing teeth cut the cinders as they rock upward, instead of cutting as they rock downward. The sections may be cast as long as the width of the fuel bed or fire box in which they are to be mounted. As shown in the drawings each section is supported on a horizontal pipe P which communicates at its opposite ends with the water space of the boiler in such manner as to cause the water to circulate therethrough. The section is set on the pipe and centered thereon by notches *b*. Each section is provided with one or more depending arms E which are pivotally connected to a bar *e* that may be extended outside the ash pit and connected to a lever or other suitable device so that the sections may be rocked on the pipes when it is desired to clean the grate. The water in the pipes by absorption and conduction keeps down the temperature of the grate sections and thus prolongs the period of their service. Air can circulate upwardly between adjoining sections and between the disks in each section only the upper edges of which are exposed directly to the heated fuel. The water in the pipes is of course warmed or heated by this service. Obviously the pipes could be replaced by solid bars, or air circulated through the pipes instead of water, but the water pipes we deem a valuable feature of the invention particularly where the grate is employed in connection with water and steam boilers.

In order to keep the sections on the bars, we employ, preferably, yokes F, F, which are roughly U-shaped being about as long as the

grate sections are wide. These yokes underlie the pipes and have their opposite ends f, f' upturned to enter between adjoining disks, and the extremities of their bends are bent horizontally outward again forming lips f^2, f^3, which rest upon the opposite ribs C, C, as shown in Fig. 2, when the yoke is properly adjusted. Lip f^2, is longer than lip f^3, so that the yoke can be moved longitudinally, sufficient to cause lip f^3 to disengage rib C and drop therefrom as indicated in dotted lines Fig. 2; the yoke can then be removed.

In order to prevent casual disengagement of the yoke from the section it is provided with a laterally perforated lug F' below lip f^2 and when the yoke is properly adjusted so as to lock the section on the pipe, a locking pin g is slipped up between the upturned portion f and the adjoining rib C, and prevents longitudinal disengaging movement of the yoke. The locking pin g has a latch head g' which catches over lug F' and supports the pin in position, but in order to insure pin g remaining in position it can be secured to lug F' by a wire W run through the perforations therein as indicated in Fig. 4. We do not confine ourselves to this particular means for locking the yokes to the sections, as others can be readily devised and will suggest themselves to mechanics.

The yokes allow the grate sections to be rocked as is necessary, but prevent their falling or rising off the pipes.

A yoke may be applied at each end of the grate section and at intermediate points if desired.

By this fastening the sections can be readily removed if injured, and replaced without removing the pipes, or other sections, making repairs less expensive and troublesome.

Having described our invention, what we claim as new, and desire to secure by Letters Patent thereon, is—

1. The herein described grate section consisting of the semi-circular disks, thinner at center than at their edges connected by integral longitudinal ribs at their upper and outer edges, and having upwardly pointed teeth on their upper edges, substantially as and for the purpose specified.

2. The herein described grate section consisting of semi-circular disks having central recesses b, upwardly pointed ratchet teeth on their upper edges, and central and side ribs rigidly connecting said disks, substantially as and for the purpose set forth.

3. The herein described grate section formed of semi-circular disks B having recesses b and teeth D, and the connecting ribs C, c, all cast integral, substantially as described.

4. The herein described grate section consisting of the semi-circular disks thinner at center than at their edges connected by longitudinal ribs at their upper and outer edges and toothed on such edges, in combination with a horizontal stationary support underlying and supporting said section, substantially as described.

5. The combination with a longitudinal horizontal support, of a rocking grate section mounted thereon, and consisting of semi-circular disks, having central recesses b, upwardly pointed ratchet teeth on their upper edges, and central and side ribs rigidly connecting said disks, substantially as described.

6. The herein described grate section formed of semi-circular disks B having recesses b and teeth D, and the connecting ribs C, c, all cast integral, in combination with a stationary longitudinal support underlying said section and in recesses b, substantially as specified.

7. The combination of a longitudinal support, a grate section thereon, and a yoke adapted to underlie the support having upturned ends adapted to engage the section, substantially as specified.

8. The combination with a supporting rod, a grate section thereon consisting of a series of parallel parts resting on the rod and connected by longitudinally arranged ribs at each side, with a yoke underlying the rod and having its ends detachably engaged with the opposite ribs, substantially as described.

9. The combination with a support, and detachable grate sections mounted thereon, of the herein described yoke for the purpose specified having upturned ends provided with lips on their extremities, one lip longer than the other and the locking pin connected to one end of the yoke, substantially as set forth.

10. The combination with a support and a grate section mounted thereon consisting of a series of partly circular disks having central recesses engaging the rod and rigidly connected by longitudinal ribs extending across the outer upper edges of the disks, of a detachable fastening device for loosely confining the section substantially as and for the purpose described.

In testimony that we claim the foregoing as our own we affix our signatures in presence of two witnesses.

JUDSON W. WARNER.
ROBERT GALBRAITH.

Witnesses as to signature of Judson W. Warner:

D. A. SCHUYLER,
HUGH PARKER.

Witnesses as to signature of Robert Galbraith:

GEORGE MCDONNELL,
MORRIS LEVY.