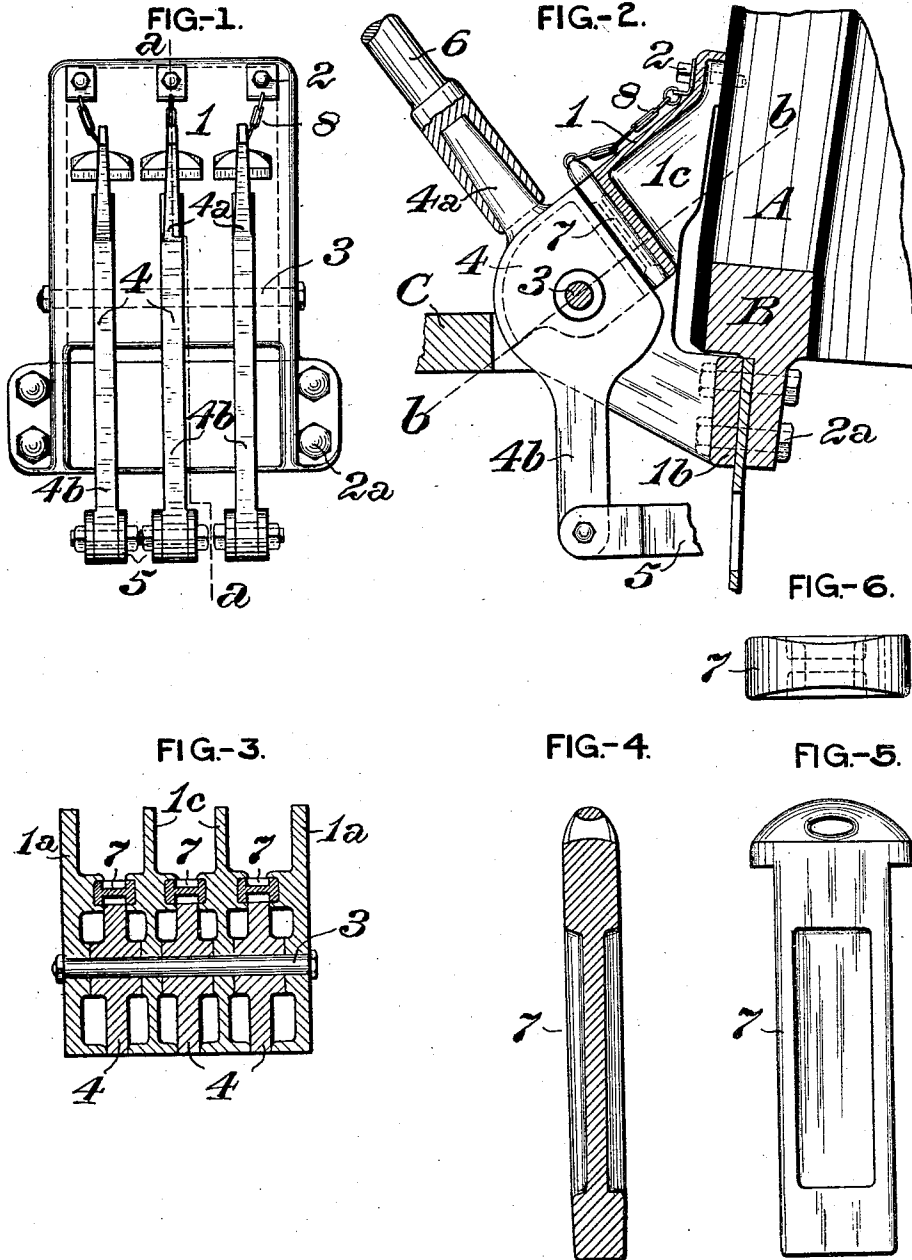


S. S. RIEGEL.
LOCOMOTIVE GRATE SHAKER.
APPLICATION FILED APR. 2, 1913.

1,065,725.

Patented June 24, 1913.

4 SHEETS-SHEET 1.



WITNESSES
Edward Wright.
S. R. Bell.

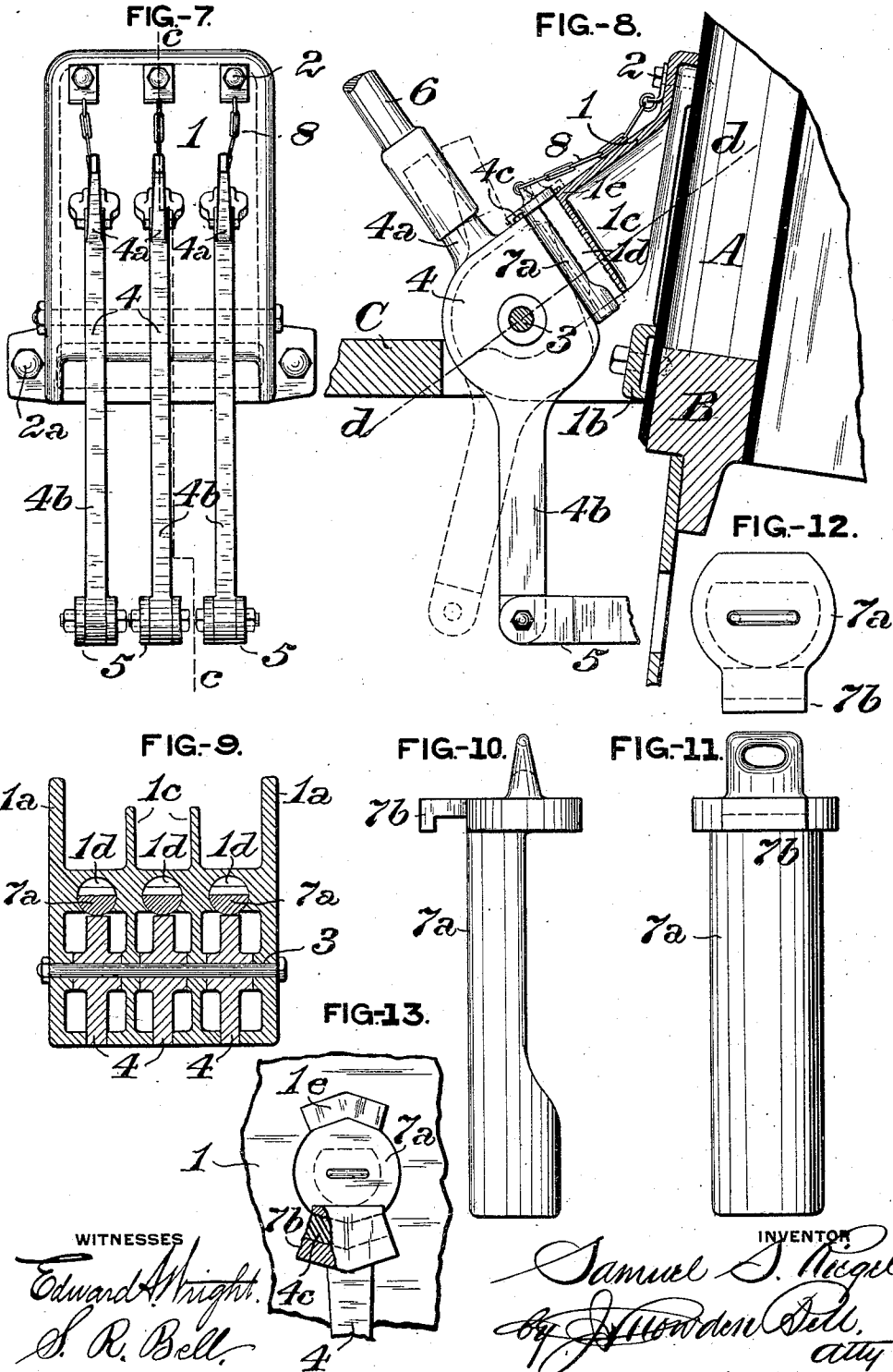
INVENTOR
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4 SHEETS—SHEET 3.

FIG-14.

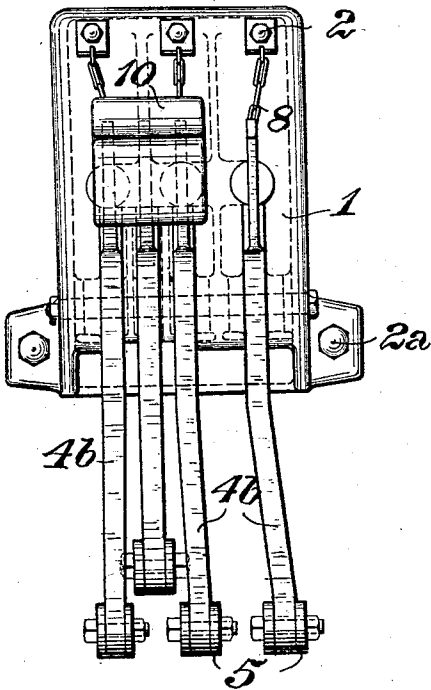


FIG-15.

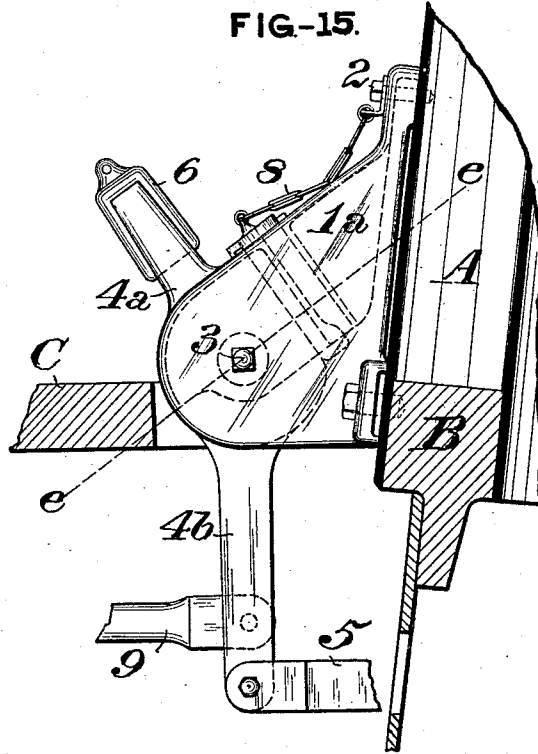


FIG-16.

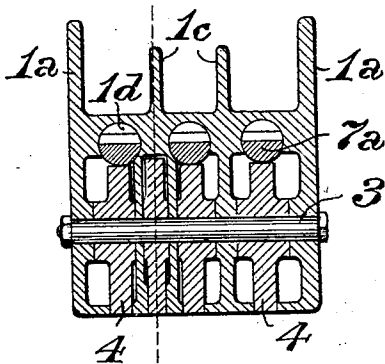
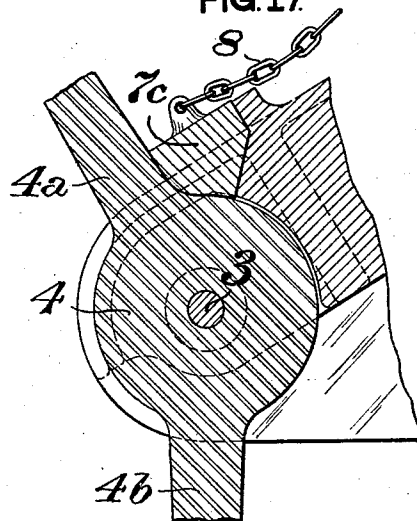


FIG-17.



WITNESSES
Edward Wright
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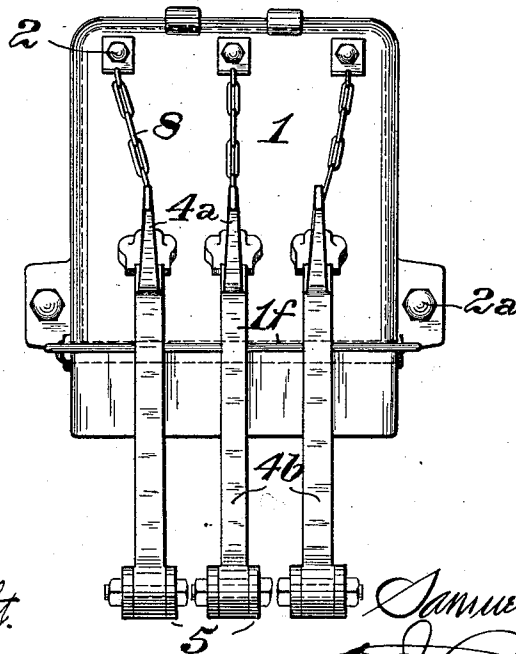
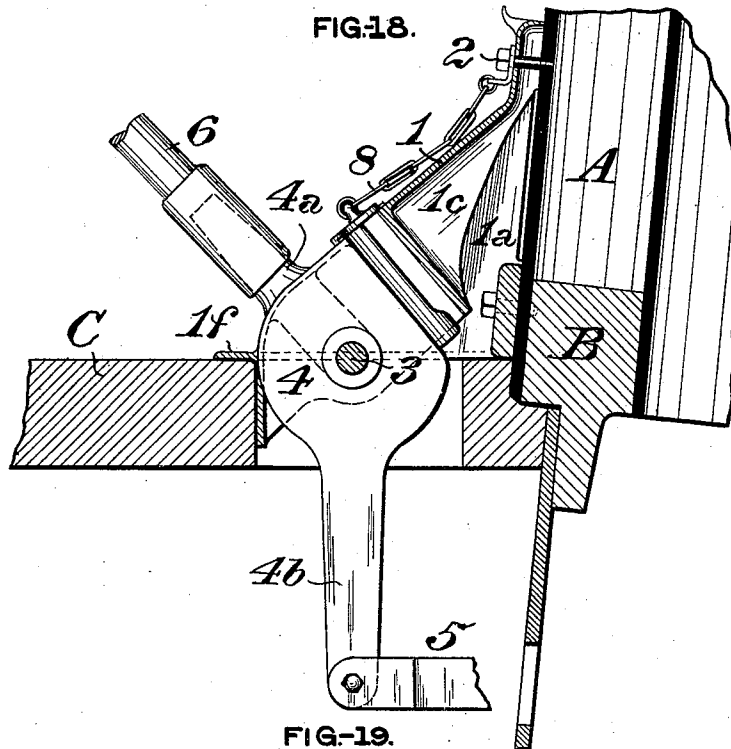
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4 SHEETS—SHEET 4.



WITNESSES

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UNITED STATES PATENT OFFICE.

SAMUEL S. RIEGEL, OF SCRANTON, PENNSYLVANIA.

LOCOMOTIVE-GRATE SHAKER.

1,065,725.

Specification of Letters Patent.

Patented June 24, 1913.

Application filed April 2, 1913. Serial No. 758,302.

To all whom it may concern:

Be it known that I, SAMUEL S. RIEGEL, of Scranton, in the county of Lackawanna and State of Pennsylvania, have invented a certain new and useful Improvement in Locomotive-Grate Shakers, of which improvement the following is a specification.

The object of my invention is to provide an appliance of simple, compact, and inexpensive construction, which will be adapted to support a plurality of grate shaking levers, in proper position relatively to a locomotive firebox, prevent the dropping of fuel adjacent thereto from the firing deck or platform, and embody means for locking the levers in position and regulating their traverse to different desired degrees.

The improvement claimed is hereinafter fully set forth.

In the accompanying drawings: Figure 1 is a rear view, in elevation, of a grate shaking appliance embodying my invention; Fig. 2, a vertical section through the same and through the rear water wall of a locomotive firebox to which it is attached, on the line *a a* of Fig. 1; Fig. 3, a transverse section, on the line *b b* of Fig. 2; Fig. 4, a vertical section through a locking bolt; Fig. 5, a rear view of the same; Fig. 6, a top view of the same; Fig. 7, a rear view, in elevation, illustrating a structural modification; Fig. 8, a vertical section through the same and through the rear water wall of a locomotive firebox to which it is attached, on the line *c c* of Fig. 7; Fig. 9, a transverse section, on the line *d d* of Fig. 8; Fig. 10, a side view of another form of locking bolt; Fig. 11, a rear view of the same; Fig. 12, a top view of the same; Fig. 13, a similar view, showing a modified form of locking lug; Fig. 14, a rear view, in elevation, of the appliance, illustrating the application of power operating connections; Fig. 15, a side view of the same; Fig. 16, a transverse section, on the line *e e* of Fig. 15; Fig. 17, a vertical section, on an enlarged scale, through a grate shaking lever, of modified form; Fig. 18, a vertical longitudinal section showing a modified form of lever support; and, Fig. 19, a rear view of the same.

Referring first to Figs. 1 to 6 inclusive, I provide a support which is in the form of a casing having an open front and bottom, and comprising a top plate, 1,

clined from its front; side plates, 1^a, extending downwardly from opposite sides of the top plate, a transverse bar, 1^b, connecting the side plates at their lower ends, and projecting outwardly in the form of bolting lugs, a short distance on each side therefrom; and a plurality of parallel vertical ribs, 1^c, depending from the top plate between the side plates. The support is adapted to be secured to the rear water wall, A, of a locomotive fire box, by bolts or rivets, 2, engaging the outer sheet thereof, and bolts, 2^a, passing through the lateral extensions of the lower transverse bar, 1^b, and through a downward extension of the mud ring, B, of the firebox, and when so secured, covers an opening in the firing deck or floor, C, through which the grate shaking levers, presently to be described, extend downwardly to connections with the grate bars of the firebox. The support thus performs the additional function of a coal apron, a common device which it replaces, for preventing the fuel from dropping off the firing deck in the operation of firing the locomotive.

A transversely extending fulcrum pin, 3, is fitted in the side plates and intermediate ribs of the support, and a plurality of grate shaking levers are journaled to oscillate, independently one of another, on the fulcrum pin. Each of the grate shaking levers comprises a hub or boss, 4, fitting freely in a vertical slot at the rear of the support, a rearwardly inclined arm, 4^a, extending upwardly therefrom, and a normally vertical arm, 4^b, extending downwardly therefrom. The hubs of the grate shaking levers are curved concentrically with the fulcrum pin on their rear sides for about one quarter of a circle and are flat on their tops which stand normally in line with the outer surface of the top plate of the support. By this construction, they close the recesses of the support in which they work, and, when stationary, present, with the top plate of the support, a substantially unbroken inclined surface, down which any fuel which may be dropped in firing, will fall to the firing deck and not drop through the latter. The lower arms, 4^b, of the levers, are coupled to the rear ends of links or connecting rods, 5, the forward portions of which are coupled to separate sets, respectively, of the grate bars, in the ordinary manner. The grate shaking levers are rocked by shaking

bars, 6, having sockets in their lower ends which engage the upper arms, 4^a, of the grate shaking levers.

The major portions of the forward sides of the hubs, 4, of the grate shaking levers are plane surfaces, which normally stand parallel with similar surfaces at the forward ends of the recesses in the support in which the levers are fitted. The grate shaking levers are held stationary, between periods of operation, by locking bolts, 7, filling the spaces between the plane front faces of the hubs, 4, and the adjacent ends of the recesses, and connected to the support, near its top, by chains, 8. By removing any one of the locking bolts, the corresponding grate shaking lever may be rocked on the fulcrum pin, independently of the other levers, to shake the set of grate bars to which its lower arm is connected, and, on the replacement of the locking bolt, the lever will be locked firmly against movement or displacement.

Figs. 7 to 13 inclusive, illustrate a structural modification in which the grate shaking levers are similarly supported and operated, but in which provision is made for permitting a limited degree of traverse of the levers, when desired, by adjusting the locking bolts. To this end, the locking bolts, in this case designated as 7^a, are made of substantially semi-cylindrical section, and are fitted in cylindrical sockets, 1^a, at the upper ends of the recesses of the support in which the grate shaker levers are located and each is provided, at its top, with a lug, 7^b, adapted, according to the position in which the locking bolt is located, to engage with a lug, 4^c, on the top of the adjacent grate shaking lever hub, 4, or a lug, 1^c, on the top of the support, 1, adjacent to the socket, 1^a. When engaged with the lug, 4^c, the grate shaking lever will be locked against any movement; when the bolt is turned half way around, and its lug engaged with the lug, 1^c, a limited range of movement of the lever will be permitted; and when the bolt is withdrawn from the socket, the lever may be rocked through its full range of traverse. As shown in Fig. 13, the lug, 7^b, of the locking bolt is made of double inclined form, and the lugs, 4^c, and 1^c, are of similar form, this construction being provided to prevent liability of the key bolt being bumped or jarred out when the grate bars are being shaken.

Figs. 14 to 16 inclusive show the appliance as adapted for either manual operation by a shaking bar, as in the instances before described, or by the application of power, effected through links or connecting rods, 9, coupled to the lower arms, 4^b, of the grate shaking levers, and to a motor of any suitable and preferred construction, as, for example, that set forth in the patent of A.

G. Elvin, No. 998,882, dated July 25, 1911. Two or more of the grate shaking levers may, if desired, be coincidently operated by the motor, by fitting detachable connecting caps, 10, on their upper arms, as shown in Figs. 14 and 15.

In the construction shown in Fig. 17, neither of the forms of locking bolts before described are applied, and in order to allow the grate shaking lever to be rocked, without necessitating an open space between it and the forward end of the recess of the support in which it is fitted, through which fuel might be dropped, the hub, 4, is curved, on its forward side, concentrically with the fulcrum pin, and the adjoining front end of the recess in the support is correspondingly curved, thereby maintaining a constant closure of the recess. The grate shaking lever may be locked in position by a locking block, 7^c, of substantially triangular section, fitting between an inclined face on the support and the upper arm of the grate shaking lever, and connected to the top of the support by a chain, 8, similarly to the locking bolt, 7, before described, the function of which will be performed by the locking block.

The support shown in Figs. 18 and 19 is, in its general features, similar to those heretofore set forth, but is of somewhat simpler construction, and may be more readily made in the foundry, as it does not require any undercoring. The middle portion of the transverse bar, 1^b, is, in this case, dispensed with, and the outer projections thereof, through which the lower connecting bolts pass are retained. A horizontal flange, 1^f, is formed at the lower end of the top plate of the support, said flange extending over and fitting on the top of the firing deck, C, thereby making a closure of the space between the rear sides of the hubs of the grate shaking levers and the opening in the deck. It will be obvious that, if preferred, the top plate may be extended downwardly through the opening in the deck, and the flange, 1^f, be secured to the bottom of the latter, instead of to the top, as shown.

The leading and characteristic feature of my invention, as herein set forth, is an integral structure which constitutes a support and inclosure for a plurality of grate shaking levers, a common fulcrum pin, and detachable means for independently locking the several grate levers, and which performs the further function of the ordinary coal apron, in preventing the loss of fuel from the firing deck through the opening therein for the passage of the levers. Various structural modifications of this feature may be made, within the ordinary skill of the constructor, without departure from the spirit of my invention, which I do not consider to be limited to the specific de-

tails of the embodiments thereof selected as exemplifying it.

I claim as my invention and desire to secure by Letters Patent:

5 1. A support for a plurality of grate shaking levers, comprising an inclined top plate having parallel recesses for the reception of grate shaking levers, and side plates extending downwardly therefrom and perforated for the insertion of a transverse fulcrum pin.

2. A support for a plurality of grate shaking levers, comprising an inclined top plate having parallel recesses for the reception of grate shaking levers, side plates extending downwardly therefrom, and ribs depending from the top plate between the recesses, said side plates and ribs being perforated for the insertion of a transverse fulcrum pin.

3. A support for a plurality of grate shaking levers, comprising an inclined top plate having parallel recesses for the reception of grate shaking levers, side plates extending downwardly therefrom and perforated for the insertion of a fulcrum pin, and bolting lugs projecting from the lower ends of the side plates.

4. A support for a plurality of grate shaking levers, comprising an inclined top plate having parallel recesses for the reception of grate shaking levers, side plates extending downwardly therefrom and perforated for the insertion of a fulcrum pin. bolting lugs projecting from the lower ends of the side plates, and a transverse flange extending across the lower end of the top plate and adapted to fit against a firing deck.

5. In a grate shaking appliance, the combination of a support adapted to be secured at its front to a firebox and comprising a top plate inclined downwardly from its front and provided with a plurality of parallel recesses separated by interposed ribs, side plates extending downwardly from the top plate, a plurality of grate shaking levers, each located in one of the recesses, and a fulcrum pin passing freely through said levers and fixed in the support.

6. In a grate shaking appliance, the combination of a support adapted to be secured at its front to a firebox and comprising a top plate inclined downwardly from its front and provided with a plurality of parallel recesses separated by interposed ribs, side plates extending downwardly from the top plate, a plurality of grate shaking levers, each located in one of the recesses, a fulcrum pin passing freely through said levers and fixed in the support, and means for independently locking the grate shaking levers on the fulcrum pin.

7. In a grate shaking appliance, the combination of a support adapted to be secured at its front to a firebox and comprising a top plate inclined downwardly from its front and provided with a plurality of parallel recesses separated by interposed ribs, side plates extending downwardly from the top plate, a plurality of grate shaking levers, each located in one of the recesses, a fulcrum pin passing freely through said levers and fixed in the support, and removable locking members interposed between the grate shaking levers and the support.

8. In a grate shaking appliance, the combination of a support adapted to be secured at its front to a firebox and comprising a top plate inclined downwardly from its front and provided with a plurality of parallel recesses separated by interposed ribs, side plates extending downwardly from the top plate, a plurality of grate shaking levers, each located in one of the recesses, a fulcrum pin passing freely through said levers and fixed in a support, and removable locking bolts interposed between plane faces on the grate shaking levers and the adjacent ends of the recesses in which they are located.

9. In a grate shaking appliance, the combination of a support adapted to be secured at its front to a firebox and comprising a top plate inclined downwardly from its front and provided with a plurality of parallel recesses separated by interposed ribs, side plates extending downwardly, from the top plate, a plurality of grate shaking levers, each located in one of the recesses, a fulcrum pin passing freely through said levers and fixed in a support, and removable locking bolts, of segmental section, fitting cylindrical sockets at one end of the recesses in which the grate shaking levers are located.

10. In a grate shaking appliance, the combination of a support adapted to be secured at its front to a firebox and having a top plate inclined downwardly from its front and provided with a plurality of parallel recesses, a transverse fulcrum pin fixed in said support, and a plurality of grate shaking levers fitting in said support and journaled on said fulcrum pin, said levers having hubs, portions of which are peripherally curved concentrically with said pins, so as to intercept the passage of fuel through any substantial portion of the transverse area of the recesses, and upper and lower arms fixed on said hubs.

SAMUEL S. RIEGEL.

Witnesses:

THOMAS C. JAY,
JOHN F. MURRAY.