

GRATE.

906,641.

Fig. 1.

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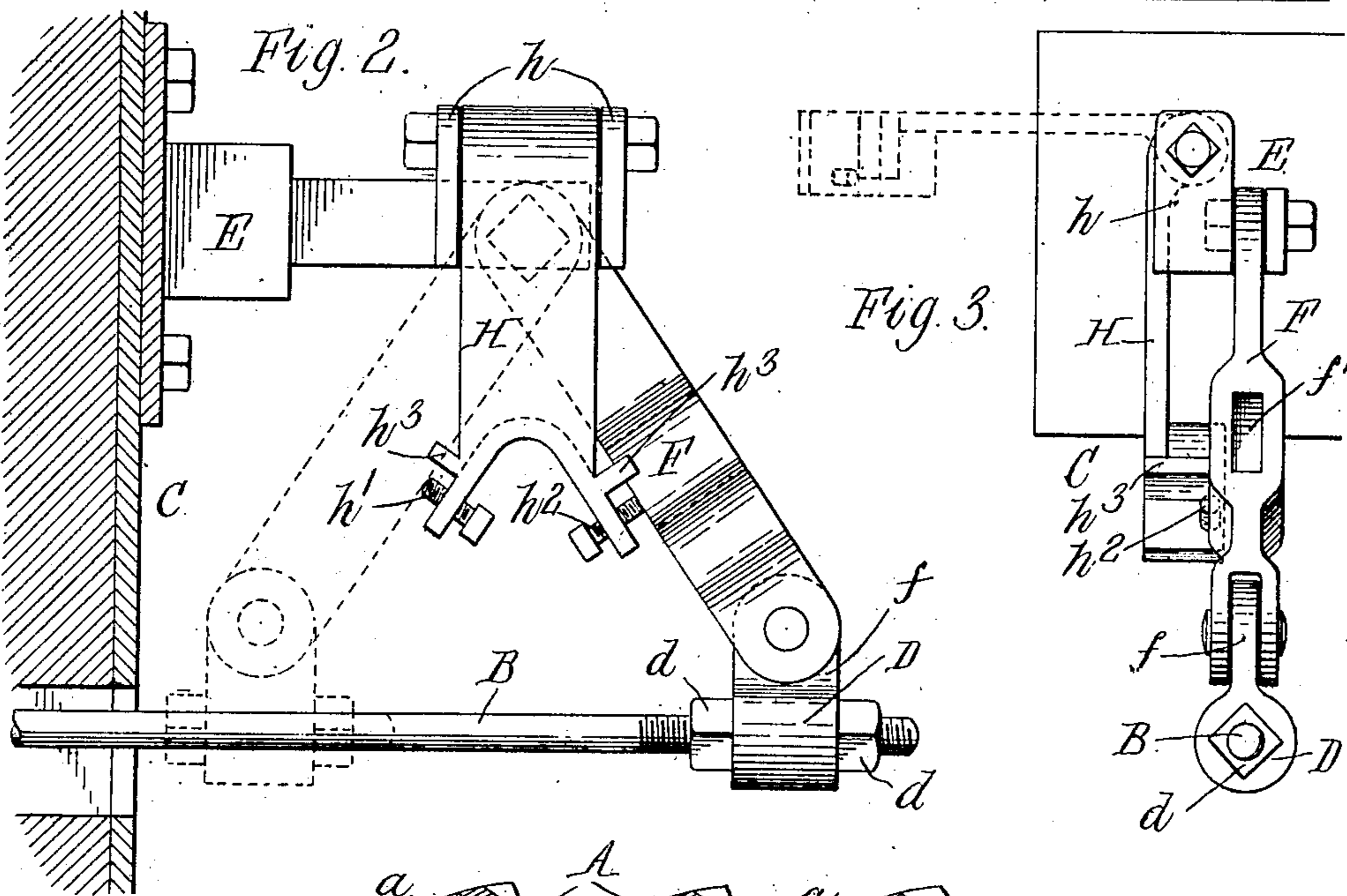
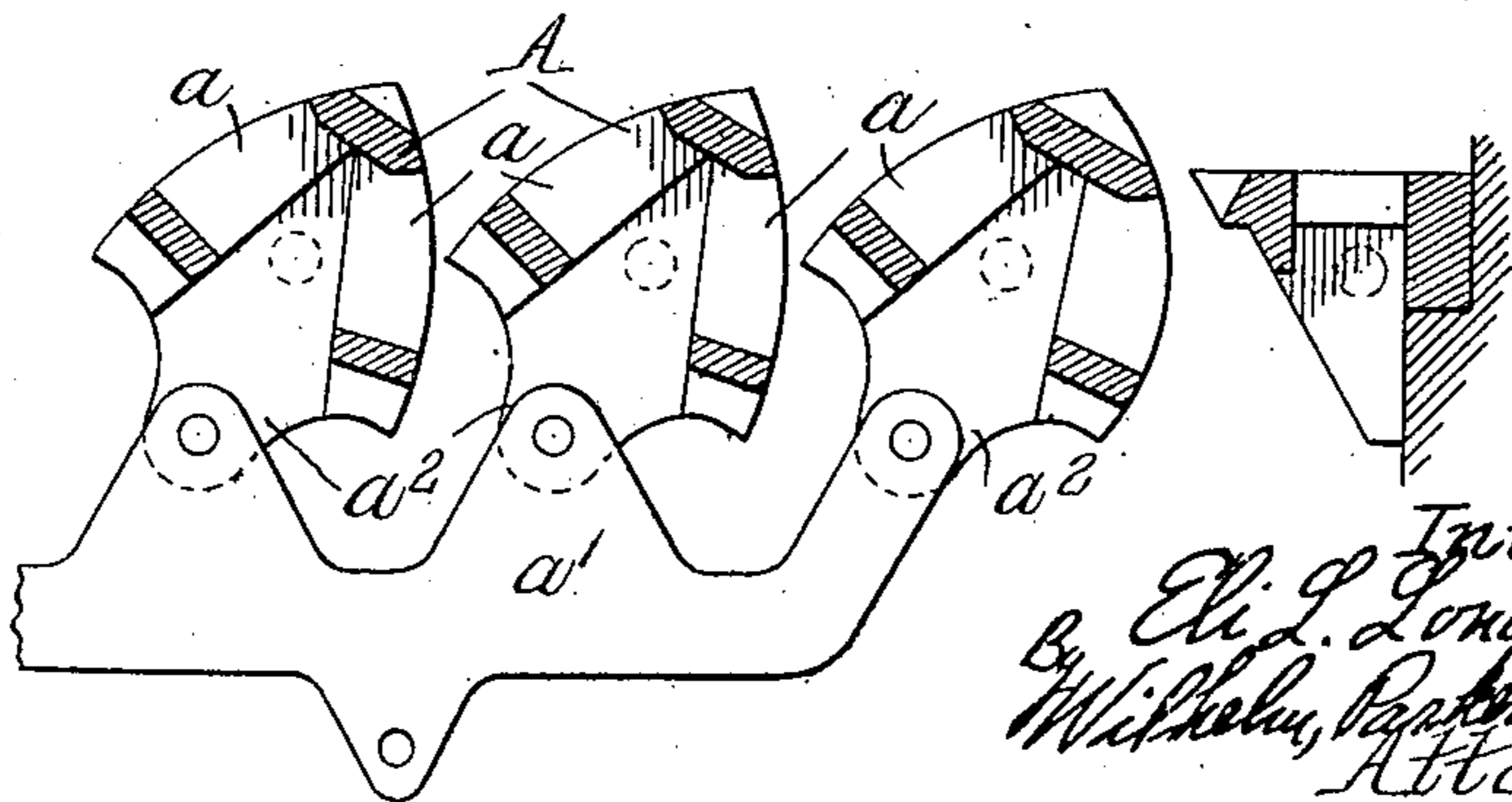


Fig. 2.

Fig. 3.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

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## GRATE.

No. 906,641.

Specification of Letters Patent.

Patented Dec. 15, 1908.

Application filed February 27, 1908. Serial No. 417,997.

*To all whom it may concern:*

Be it known that I, ELI L. LONG, a citizen of the United States, residing at Cheektowaga, in the county of Erie and State of New York, have invented a new and useful Improvement in Grates, of which the following is a specification.

This invention relates more particularly to improvements in grates of the kind shown and described in Letters Patent No. 501,623, granted to me July 18, 1893, in which each grate is composed of a plurality of inverted V-shaped grate bars mounted on trunnions at their ends and connected together so that they can be rocked back and forth to dump the ashes and bring either set of faces into horizontal position to form the upper or supporting surface of the grate.

The object of this invention is to provide an easily operated device of simple construction for locking the shifting bar which operates the grate bars so that the latter may be held firmly in either of their alternate positions and, to make the same adjustable for regulating and correcting the position of the grate bars when necessary.

A further object of the invention is to so construct the grate bars that in rocking the same from one position to the other, the space or clearance between adjacent bars will remain substantially uniform in all positions assumed by the bars, thus preventing any unnecessary dumping of the fuel during the shifting operation.

In the accompanying drawings; Figure 1 is a fragmentary elevation, partly in section, of an alternating dumping grate embodying the invention. Fig. 2 is a side elevation, on an enlarged scale, of the locking means for the shifting bar. Fig. 3 is an end elevation of the same. Fig. 4 is a sectional elevation of the grate bars showing the same when midway between their alternate rest positions.

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

A represents grate bars of inverted V-shape having oppositely-extending fuel-supporting faces  $a$  provided with suitable openings for the passage of air and ashes through the same. These bars are mounted on end trunnions secured in the sides of the furnace on which they can be turned or rocked to bring either of their faces  $a$  into position to form the surface or bed of the grate. The several bars of each grate or grate section are connected together by a bar or link  $a'$  which is

pivotally secured to lugs  $a^2$  on the under side of the bars. An operating or shifting rod B is pivotally connected at its inner end to the link  $a'$  and extends through the front wall C of the furnace and is provided at its outer or front end with a sleeve D which is adjustably held in position thereon by lock nuts  $d$  screwed on a threaded part of said rod at opposite ends of said sleeve.

A bracket E is bolted or otherwise suitably secured to the front wall C of the furnace above the shifting rod B, and has pivoted thereto a swinging arm F which extends downwardly therefrom and is suitably pivoted at its lower end to a lug  $f$  on the sleeve D. This arm F supports the outer end of the shifting rod, and the rod is reciprocated by swinging the arm back and forth by suitable means. The supporting arm F preferably has a socket  $f'$  adapted to receive the lower end of a removable hand lever G by means of which the arm F is swung to operate the shifting rod B for changing the grate bars from one position to the other.

The following means are employed for locking the shifting rod to hold the grate bars in either of their two operative positions: A latch H is suitably hinged at one end between vertical lugs  $h$  on the bracket E adjacent to the pivot for the swinging arm F, in such a manner that it can swing in a direction at right angles to the plane of movement of the swinging arm. The latch H is provided at opposite sides of its free end with lugs or projections furnished with adjustable screw stops  $h'$  and  $h^2$  which, when this latch is in its lowest position, extend into the path of movement of the swinging arm F. When the shifting rod B is in its outer position, as shown in Fig. 2, the swinging arm F rests on the screw stop  $h^2$  and is locked against inward movement, and when the shifting rod is in its inner position, as shown in dotted lines in Fig. 2, the swinging arm rests on the other screw stop  $h'$  and is locked against outward movement. The lugs  $h$ , between which the latch is pivoted, relieve the latch pivot from the strain to which it would otherwise be subjected by the pressure of the swinging arm on the free end of the latch. The latch is also preferably provided at opposite sides of its free end with lugs  $h^3$ , one of which is adapted to strike the swinging arm in either position thereof to prevent the stop lugs of the latch from moving beneath the swinging arm far enough to interfere with the inser-

tion of the hand lever into the socket of the swinging arm. To release the supporting arm F for moving the same to shift the rod B from one position to the other, it is only  
 5 necessary to swing the latch H upwardly to bring its stop lugs out of the path of movement of the supporting arm. By providing an adjustable connection between the supporting arm and the shifting rod, and adjustable  
 10 screw stops on the latch, the inner and outer locked positions of the shift rod may be so regulated that the faces of the grate bars in either alternate position will always lie in their proper operative position and any  
 15 change in the position of these bars, caused by the expansion and contraction of the parts, or by wear, may be readily taken up by readjusting the connection between the swinging arm and the shifting rod, and the  
 20 screw stops on the latch.

In the construction shown in my Patent No. 501,623, the grate bars are provided with flat faces. In shifting these bars from one position to the other, the space or clearance between adjacent bars increases and decreases as the bars assume different positions, owing to the fact that the central portion of the flat faces, being nearer the pivotal axis of the bars, travels in an arc of less radius than their end portions, which are at a  
 30 greater distance from the pivotal axis. When coal of certain sizes is used, this results in permitting an unnecessary quantity of the live fuel to fall between the grate bars when the same are being shifted. In the  
 35 present construction, this difficulty is overcome by making the operative faces *a* of the bars convex in form so that the central portion thereof will travel in a greater arc than  
 40 it would if the faces were flat, thus keeping the space or clearance between adjacent bars more nearly uniform in width during the shifting operation.

I claim as my invention:

45 1. The combination with a grate composed of bars, each having grate faces extending at an angle to each other, a shifting rod connected with said bars, a swinging operating arm for said rod, and a latch which is movable at right angles to the plane of movement of said swinging arm, said arm being  
 50 movable past said latch from a position at one side of said latch to a position at the opposite side thereof for shifting said grate bars to place one or the other of the grate faces thereof uppermost, and said latch being  
 55 movable into the path of said arm in front

thereof when said arm is in one position, and in rear thereof when said arm is in its other position, for retaining said arm from return  
 60 movement past said latch in either of said positions, substantially as set forth.

2. The combination with a grate composed of bars, each having grate faces extending at an angle to each other, a shifting rod connected  
 65 with said bars, a swinging operating arm for said rod, and a latch which is movable at right angles to the plane of movement of said swinging arm, said arm being movable past said latch from a position at one side of said  
 70 latch to a position at the opposite side thereof for shifting said grate bars to place one or the other of the grate faces thereof uppermost, and said latch being movable into the path of said arm between said two positions  
 75 thereof, and having oppositely disposed faces, one of which is adapted to engage said arm in one position thereof while the other is adapted to engage said arm in its other position for locking said arm against return  
 80 movement past said latch in either of said two positions, substantially as set forth.

3. The combination with a grate composed of bars having oppositely-extending grate faces, of a shifting rod for said bars, a swinging  
 85 arm which is connected to said rod, means for moving said swinging arm to shift said grate bars, a latch pivoted to swing at right angles to the plane of movement of said swinging arm into and out of engagement  
 90 therewith to lock said swinging arm from return movement in either of two positions, and adjusting means on said latch for engagement with said swinging arm to regulate the position in which the latter is locked, sub-  
 95 stantially as set forth.

4. The combination with a grate composed of bars having oppositely-extending grate faces, of a shifting rod for said bars, a swinging arm which is connected to said rod, means for  
 100 moving said swinging arm to shift said grate bars, and a latch pivoted to swing at right angles to the plane of movement of said swinging arm and having adjustable stops on its opposite sides adapted to be engaged by  
 105 said swinging arm whereby the latter is locked against return movement in either of two positions, substantially as set forth.

Witness my hand, this 24th day of February, 1908.

ELI L. LONG.

Witnesses:

EDWARD C. HARD,  
 C. B. HORNBECK.