No. 771,934. PATENTED OCT. 11, 1904.

J. N. QUINN.

FURNACE GRATE.

APPLICATION FILED FEB. 15, 1904.

NO MODEL. 2 SHEETS—SHEET 1.

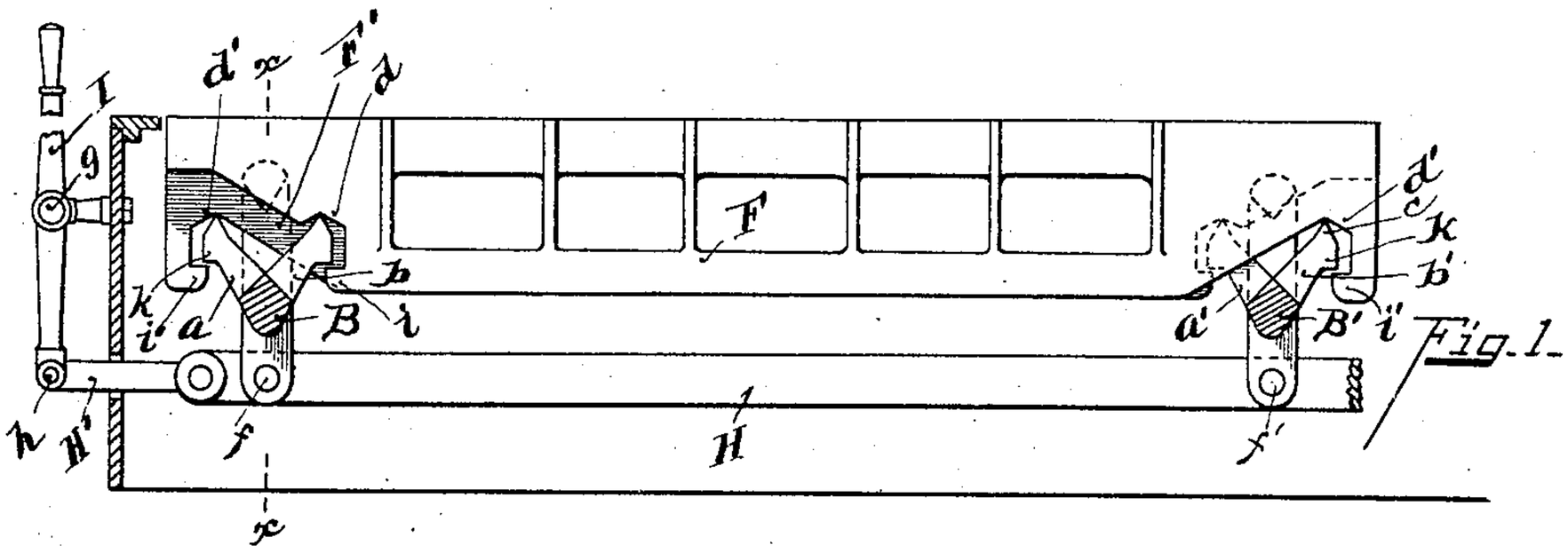

Fig. 1.

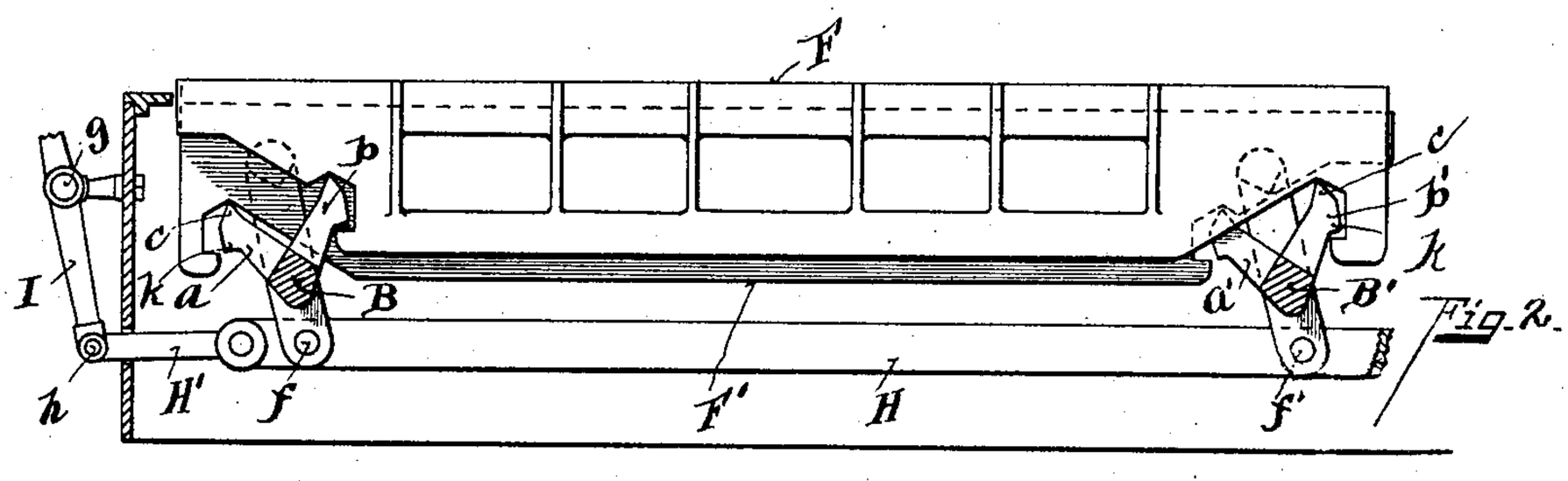

Fig. 2.

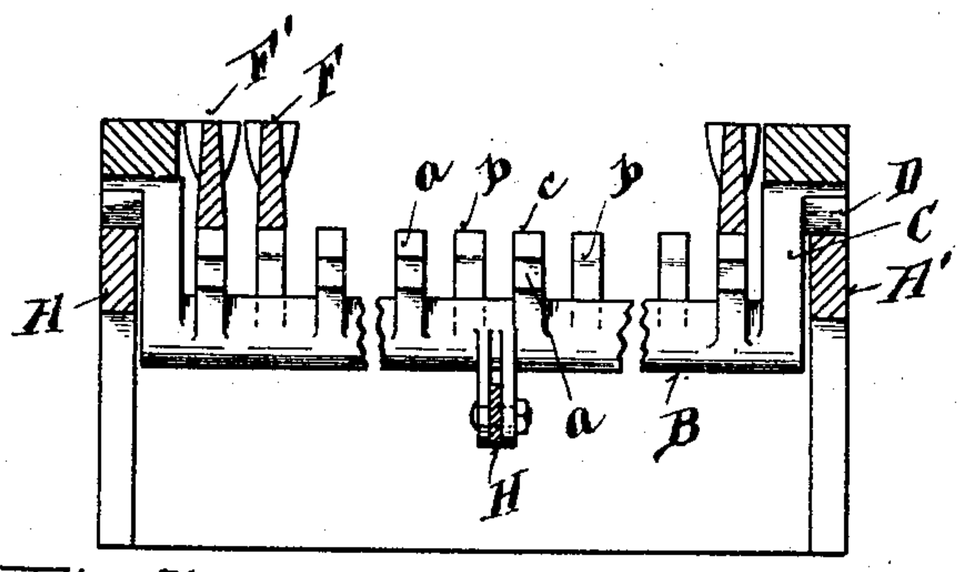

Fig. 3.

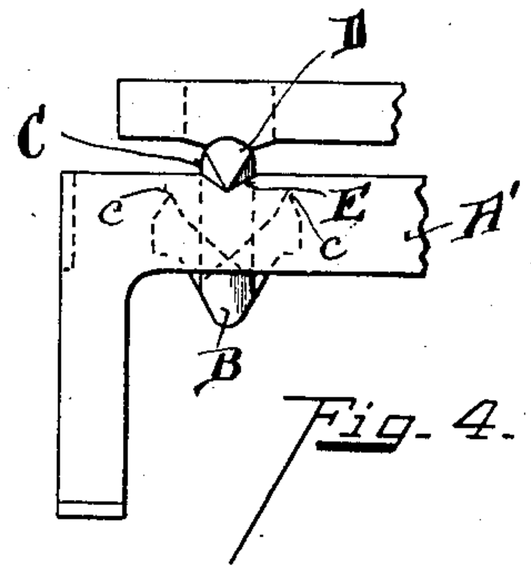

Fig. 4.

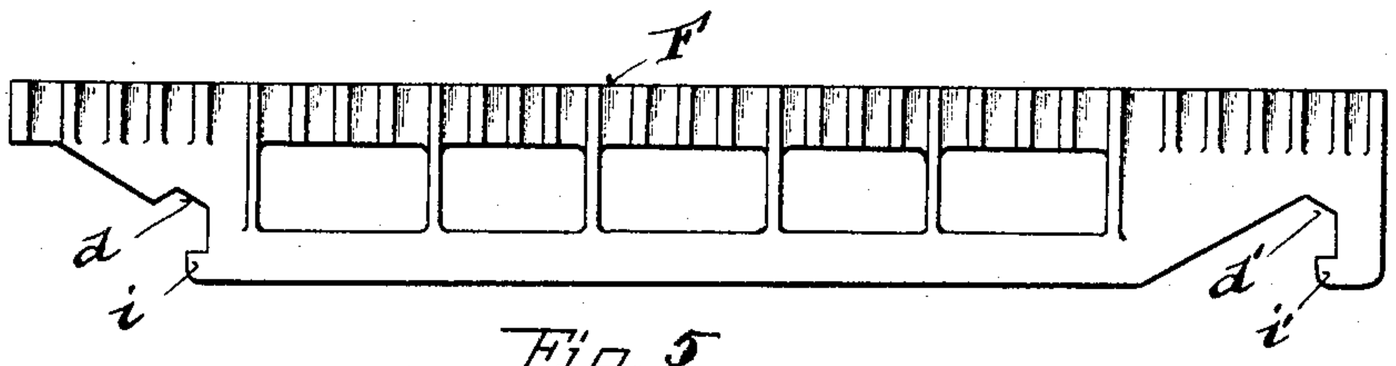

Fig. 5.

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FURNACE GRATE.

APPLICATION FILED FEB. 15, 1904.

NO MODEL. 2 SHEETS—SHEET 2.

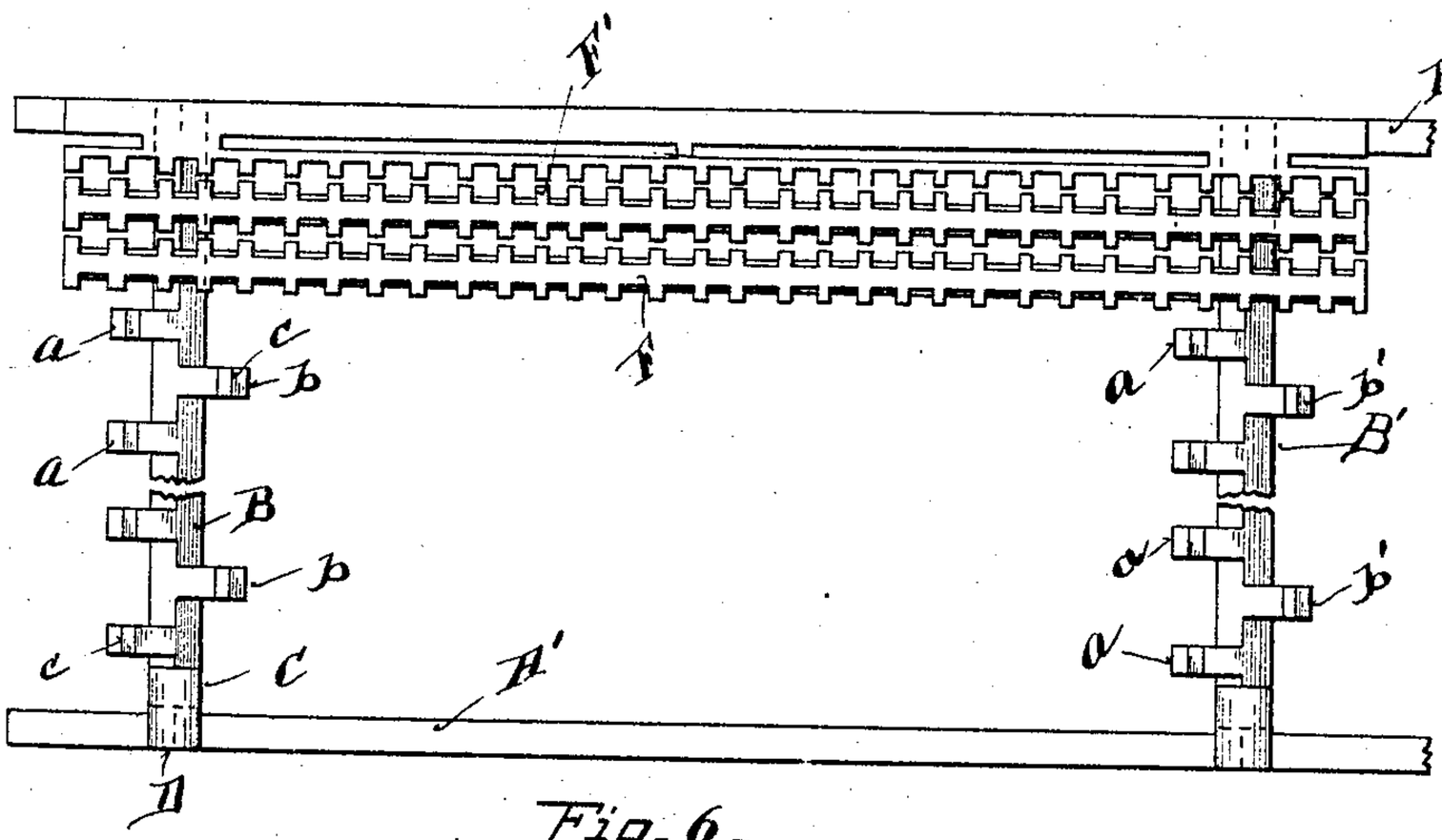


Fig. 6.

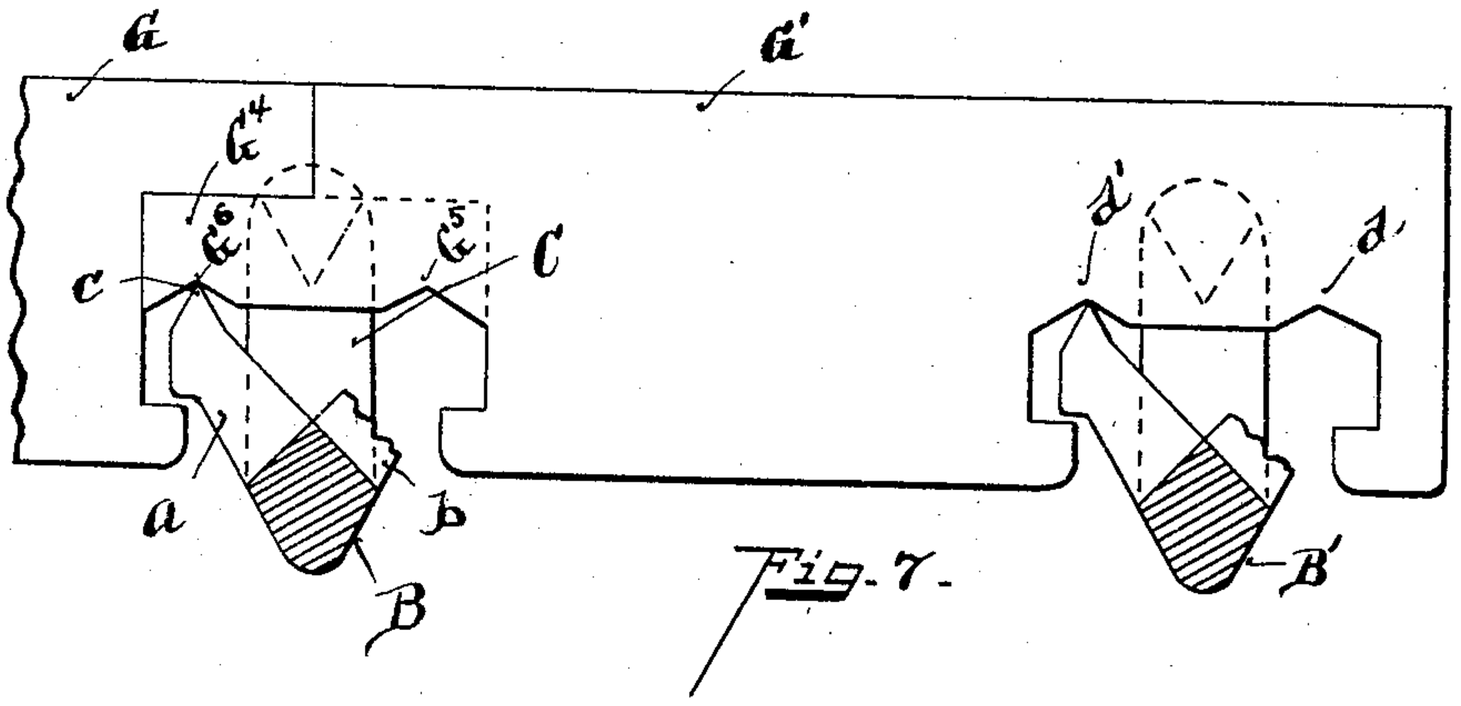
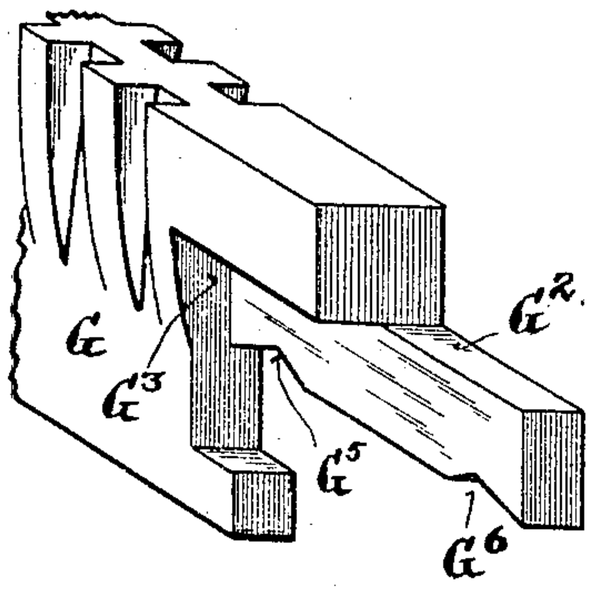


Fig. 7.

Fig. 8.



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No. 771,934. Patented October 11, 1904.

UNITED STATES PATENT OFFICE.

JOHN N. QUINN, OF CINCINNATI, OHIO.

FURNACE-GRATE.

SPECIFICATION forming part of Letters Patent No. 771,934, dated October 11, 1904.

Application filed February 15, 1904. Serial No. 193,527. (No model.)

To all whom it may concern:

Be it known that I, JOHN N. QUINN, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Furnace-Grates, of which the following is a specification.

My invention relates to an improvement in furnace-grates.

One of the objects of my invention is to provide means whereby each alternate grate-bar of a tier of grate-bars is moved in opposite direction from its next adjacent grate-bar in shaking, producing a chopping effect upon the fuel-bed and loosening up and removing the ashes and fine cinders.

Another object of my invention is to provide means whereby the grate-bars in one or more tiers may be controlled by one lever.

Other features of my invention will be more fully set forth in the description of the accompanying drawings, forming a part of this specification, in which—

Figure 1 is the central vertical section of the fire-box of a furnace, illustrating the grate-supports and two grate-bars in normal position thereon. Fig. 2 is a similar view illustrating the parts in one extreme position. Fig. 3 is a section taken on line *x x*, Fig. 1, but with parts broken away. Fig. 4 is an end elevation of a portion of the grate-bar support. Fig. 5 is a side elevation of one of the grate-bars. Fig. 6 is a top plan view of the furnace-grate, showing two grate-bars in position. Fig. 7 illustrates the modification consisting in a two-part grate-bar. Fig. 8 is a perspective view of a portion of the grate-bar shown in Fig. 7, illustrating an interlocking end.

A A′ represent opposite sides of a fire-box.

B B′ represent transverse swinging rods having at each end upwardly-extended rocking arms C, the upper end of each rock-arm being provided with an outwardly-extended lug terminating in the downwardly-extended knife-edge D. (See Figs. 4 and 6.) Preferably the sides A A′ are provided with V-notches E for engaging the knife-edges D. These knife-edges D form the fulcrums upon which the swinging rods swing to agitate the grate-bars.

The swinging rod B is provided with the fingers *a b*, which are alternately arranged upon opposite sides of said rod and upwardly inclined. The opposite swinging rod B′ has corresponding fingers *a′ b′*. These fingers radiate, as it were, from the swinging rods and are upwardly and angularly inclined relative to the grate-bars which they support. Each finger terminates with a knife-edge *c*. (See Figs. 1, 2, and 4.)

F F′ represent two grate-bars of the series. (See Figs. 1, 2, and 6.)

H represents a connecting-rod having the pivot-bolts *f f′*, connecting it to the swinging rods B B′. (See Figs. 1 and 2.)

I represents a shaking-lever fulcrumed at *g* to the framework, one end being pivoted at *h* to the link H′, which is in turn pivoted to the connecting-rod H. As the lever I is moved in one direction it will rock the arms C on their respective fulcrums, swinging rods B B′ and raising the coöperating supporting-fingers *b b′* thereof with the supported grate-bar F. The companion or adjacent grate-bar F′ being seated upon the inclined fingers *a a′* of the swinging rods B B′ will be lowered by the same movement. This movement raises a series of alternate bars above the normal grate-bar level and lowers the intermediate series of grate-bars below said normal level, as illustrated in Figs. 1 and 2. A movement of lever I in the opposite direction reverses the operation. This produces a vertically-chopping action, which most effectively agitates the fuel-bed, giving it constantly-shifting levels, which insures the effective cinder and ash freeing action desired. The bars do not rock on their individual axes, but are bodily lifted and depressed alternately. It will be observed that the three knife-edge pivot-points *c* D (see Fig. 4) are practically in a horizontal line, the purpose of which is to lift and lower the grate-bars with the least possible rocking movement in the direction of the length of the bars. The grate-bars are preferably provided with the notches *d d′* and with the opposite shoulders *i i′*, the fingers

having coacting shoulders K. It will be seen that bar F′ is constructed the same as bar F, but when placed in position is reversed from that of bar F. If a given grate-bar should become wedged by a cinder into its elevated position, the downward movement of the fingers *a a′* would bring the shoulders K against the grate-bar shoulders *i i′* and effectively knock the grate-bar down to its intended position.

For a wide fire-box I have provided the sectional grate-bar G G′, (shown in Fig. 7,) the end of the bar G being shown in Fig. 8. The bar G has the tongue G^2, which engages in a groove of the bar G′. The bar G is also provided with the groove G^3, in which the tongue G^4 of the bar G′ engages. On the under surface of both tongues G^2 and G^4 are provided notches G^5 and G^6 for engaging the knife-edges of the supporting-fingers. This is simply a modification of the style of bars shown in Figs. 1 and 2, they being capable of being used in the same way with equally good results.

Having shown this preferred form of rocking mechanism, which bodily raises and lowers the grate-bars in opposite direction in direct lines of movement, it is obvious that various modifications might be devised from the disclosures of this invention without materially departing from the principles thereof.

It is obvious that by suspending the swinging bars or rods pivotally a direct chopping action can be imparted to the grate-bars and also by means of this finger and grate-bar construction the grate-bar may be positively knocked down from its raised position in case of obstruction.

Having described my invention, I claim—

1. In combination with the fire-box of the combustion-chamber, the frame, a pair of swinging rods having at each end upwardly-extended arms, the ends of which are fulcrumed to the frame, each bar having fingers alternately arranged upon opposite sides of said rod and inclined upwardly, grate-bars extending transversely to the swinging rods, each bar being supported by two fingers, which are in line of the grate-bar and upwardly inclined from corresponding sides of said swinging rods, a connecting-rod for the swinging rods and means for operating the same, substantially as described.

2. In combination with the fire-box of a combustion-chamber, a pair of swinging rods, each rod having at each end an upwardly-extended rocking arm, with an outwardly-projected lug, formed with a downwardly-extending knife-edge pivotally engaging the side of the frame, whereby the swinging rod is suspended below the fulcrum-point, each rod being provided with a series of fingers upwardly inclined and alternately arranged upon opposite sides thereof, each finger terminating in a knife-edge, a series of grate-bars, each being supported upon a coöperating pair of fingers of the said swinging rods, a connecting-rod for the swinging rods and means for operating the same, substantially as described.

3. In combination with a fire-box of a combustion-chamber, a pair of swinging rods, each rod having at each end an upwardly-extended rocking arm, with an outwardly-projected lug formed with a downwardly-extended knife-edge pivotally engaging the side of the frame, each rod being provided with a series of fingers upwardly inclined and alternately arranged upon opposite sides of said rod and terminating in knife-edges, the knife-edges of the said lugs and fingers being normally in substantially the same horizontal plane, a series of grate-bars, each being supported upon a coöperating pair of fingers of the said swinging rods, and means for connecting and operating said swinging rods, substantially as described.

4. In combination with a fire-box of a combustion-chamber, a pair of swinging rods, each rod having at each end an upwardly-extended rocking arm with an outwardly-projected lug fulcrumed on the side of the frame, each rod being provided with a series of fingers upwardly inclined and alternately arranged upon opposite sides of said rod, a series of grate-bars each being supported upon an opposite coöperating pair of fingers, each grate-bar having a lug extending under the upper end of its supporting-finger whereby when the finger is rocked in one direction it will raise the grate-bar and in the other direction it will knock the grate-bar down to normal position, and means for connecting and operating said swinging rods, substantially as described.

In testimony whereof I have hereunto set my hand.

JOHN N. QUINN.

Witnesses:
OLIVER B. KAISER,
LUISE BECK.