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Patented Feb. 25, 1902.

R. MITCHELL.  
GRATE FOR BOILER FURNACES.

(Application filed Apr. 11, 1901.)

(No Model.)

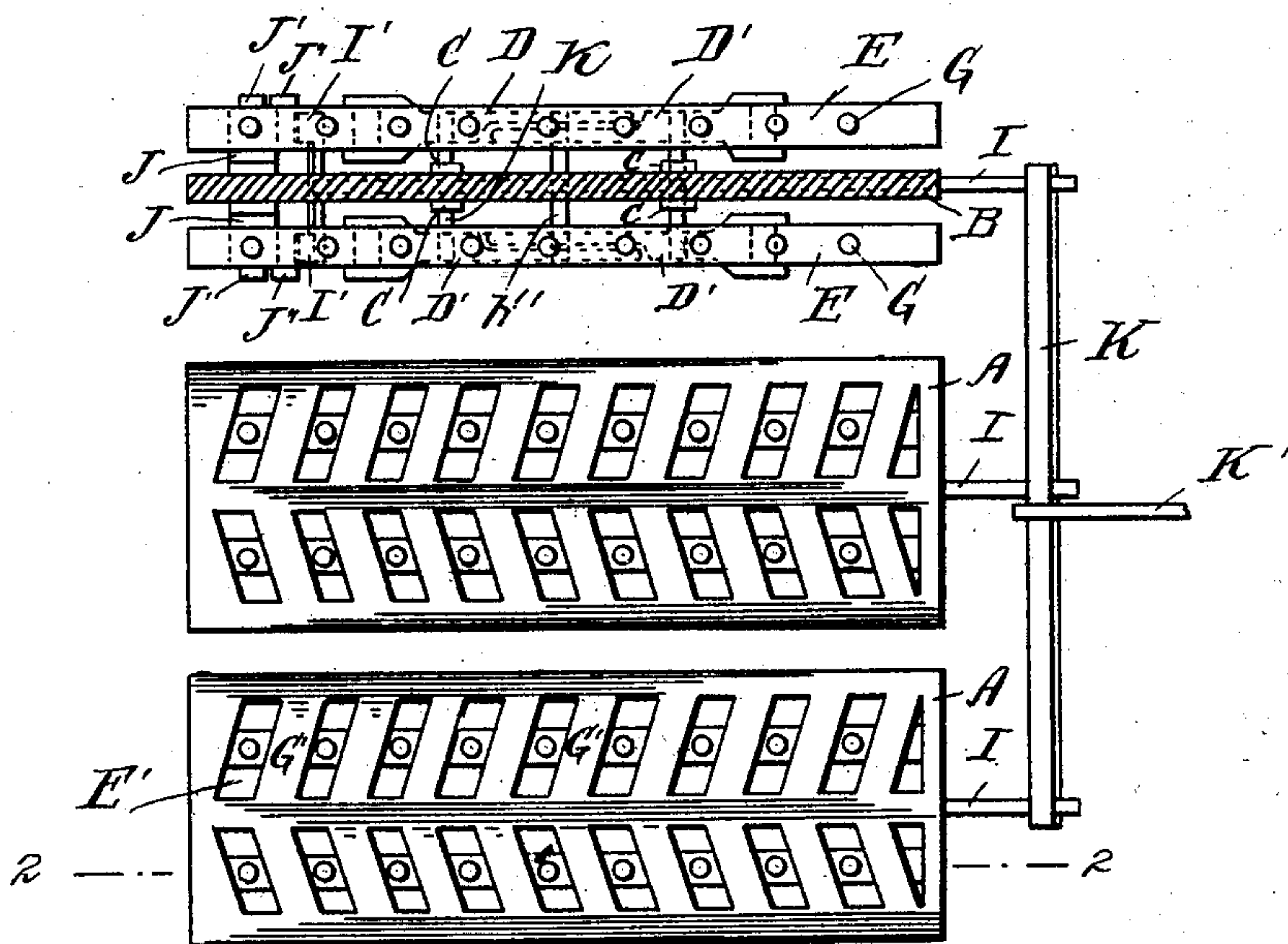
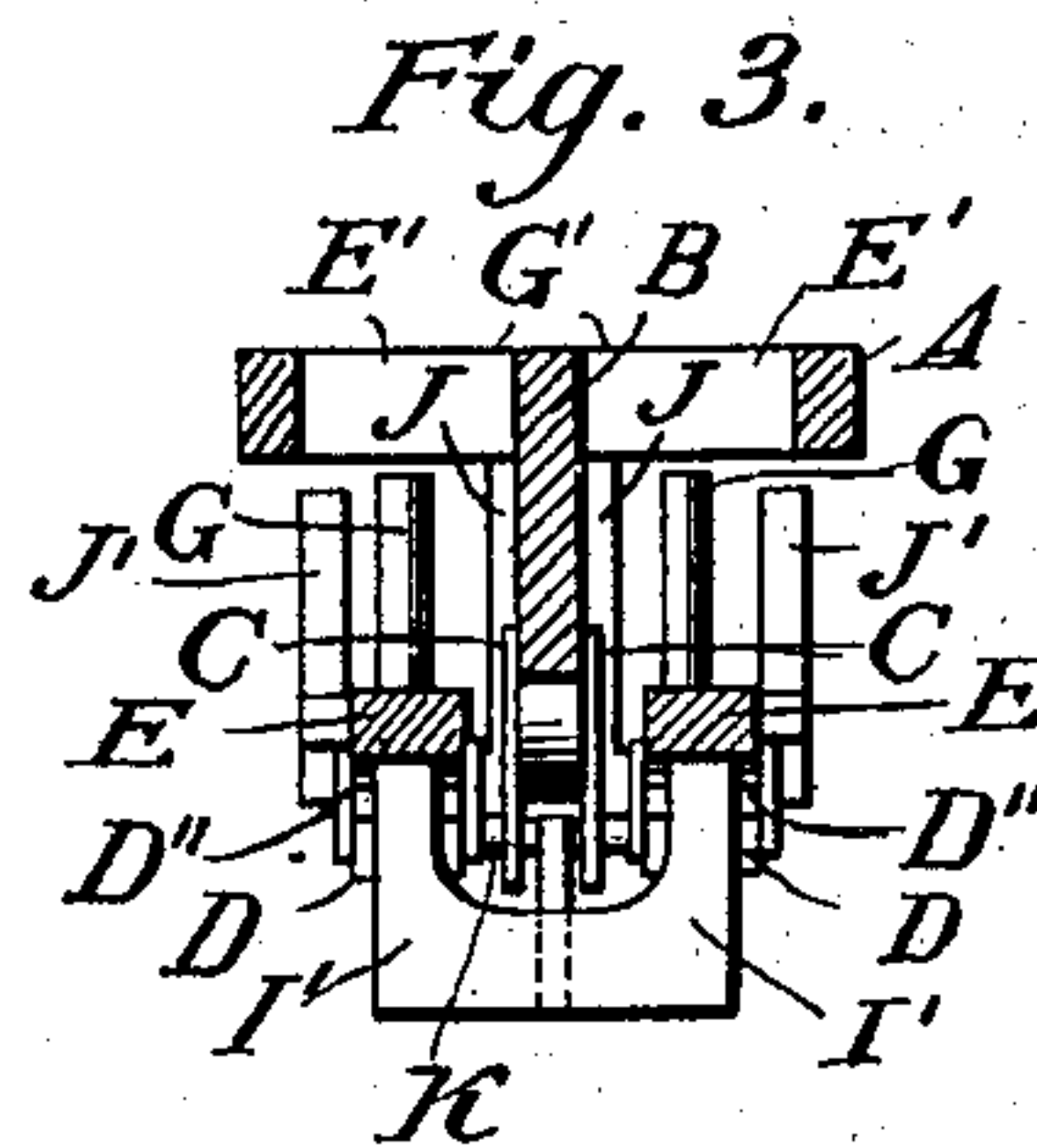
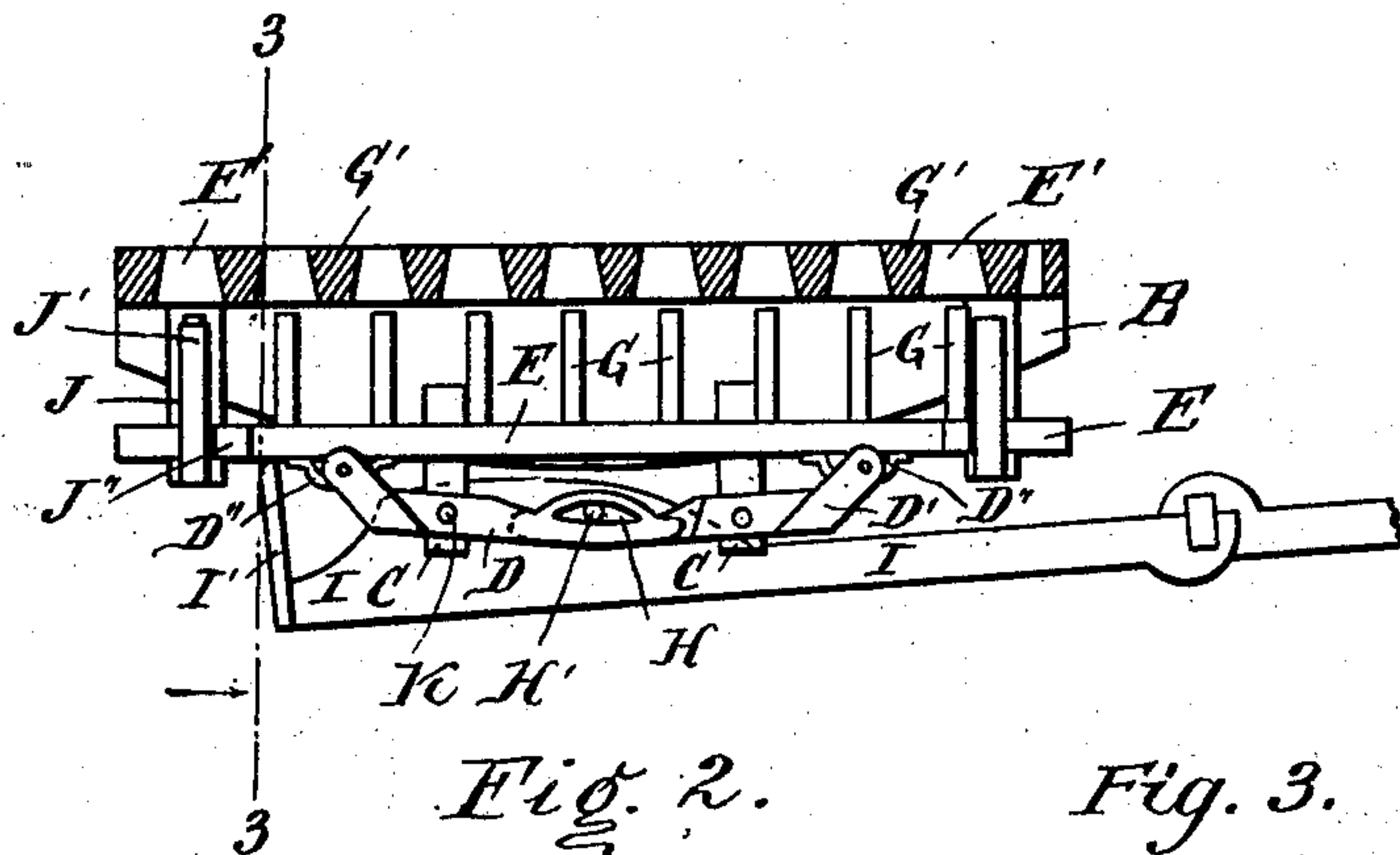


Fig. 1.

Witnesses.  
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# UNITED STATES PATENT OFFICE.

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## GRATE FOR BOILER-FURNACES.

SPECIFICATION forming part of Letters Patent No. 693,880, dated February 25, 1902.

Application filed April 11, 1901. Serial No. 55,298. (No model.)

*To all whom it may concern:*

Be it known that I, ROBERT MITCHELL, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented a certain new and useful Improvement in Grates for Boiler-Furnaces, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form part of my specification.

My invention relates to boiler-furnace grates; and it consists of a novel attachment to the same, which has for its object the clearing or raking of the spaces between the grate-bars, whereby air is permitted to circulate freely through the coal.

I find that the use of my invention promotes good stoking and that it causes the coal to be burned to a fine ash, with the production of little or no waste in the form of soot and smoke. Its advantages will appear more fully as I proceed with my description.

I have shown my improvement attached to a furnace-grate made in three parts; but of course it will be understood that it may be attached to a grate made up of any number of parts.

In the drawings, Figure 1 is a plan view of my improvement, shown partly in section. Fig. 2 is a section of Fig. 1 on the line 2 2, the raking attachment being shown in side elevation for the sake of clearness; and Fig. 3 is a section taken at right angles to the plane of Fig. 2 on the line 3 3 as it appears looked at from the left.

A A are the grates, supported in any usual manner in the furnace. I have not deemed it necessary to show such supports in the drawings. The grates A are provided with a downwardly-extending web B at the middle, extending the length of the grate. Secured to said web in any convenient manner or cast with it are downwardly-projecting bars C C, in which are pivoted levers D D'. The ends of said levers D D' are forked and carry rollers which have bearings in eyes D'' D'', formed in bars E by a curved strap attached thereto. The bars E are of the length of the grate and are as many in number as there are series of openings E' in the grate. Said bars E carry vertical pins G, which are so arranged that when the bars are raised, as

will be presently described, the pins will pass up through the middle of the spaces between the grate-bars G' and loosen and push aside any coal or slag which stops up and chokes said spaces.

The levers D D' are arranged in pairs on each side of the web B and are provided near their ends with oblong slots H, in which a pin H' has bearing. An auxiliary lever I is pivoted between the bars C on the same pin (in this case the pin k) upon which the one pair of the levers D are pivoted and carries at its end upwardly-projecting prongs I', one under each bar E, adapted when said lever I is operated to bear up against said bars E and supplement the action of the levers D D' in raising said bars. I prefer to place said prongs at the rear of the grate, as that is where the greatest weight is likely to come. The pin H' has bearing in the lever I, and it is evident that when the front end of the lever I is borne downward the ends of the levers D D' will be carried down with it, thus causing the rollers at their other ends to raise the bar E. When the lever I is lifted or raised, the bars E are pulled down again, and herein lies a particular advantage of my present construction, since the bars E are pulled down upon the return of the lever I to its normal position and not simply permitted to fall down by means of their weight, as is usual with other raking attachments of this character.

The bars E when at rest bear on angle-bars J, which are secured to the web B in any convenient manner. I preferably attach to these angle-bars uprights J' J', which serve to guide the bars E as they are raised, and such guiding function is aided by blocks J'', which are secured to the sides of the bars E in such a way as to bear against the uprights J'. A rectangular notch at the outer end of the lever I permits them to be connected by means of a bar K in such a manner that the simple rocking of said bar will operate my improved raking attachment. This is preferably done by means of a detachable rod K'.

Having thus described my invention, what I desire to claim as new and to cover by Letters Patent is—

1. In a furnace-grate, a downwardly-extending flange provided with bars, a set of



levers having pivotal connection with said downwardly-extending flange, an auxiliary lever, bars provided with teeth corresponding to the spaces of said grate, said bars being pivotally connected with one end of said levers, the other ends of said set of levers having pivotal connection with the auxiliary lever, whereby the bars may be raised or lowered upon the operation of said levers, substantially as shown and in the manner specified.

2. In a furnace-grate, a downwardly-extending flange provided with bars, a set of levers having pivotal connection with said downwardly-extending flange, the one end of said levers provided with slots, an auxiliary lever also having pivotal connection with said flange, bars provided with teeth corresponding to the spaces between said grate-bars, said bars being pivotally connected with the other end of said set of levers, a pin passing through said auxiliary lever and into the slots of said set of levers, whereby upon the depression of said auxiliary lever the slotted ends of said set of levers will be drawn downwardly and the bars raised, or vice versa, substantially as shown and in the manner described.

3. In a furnace-grate, a downwardly-extending flange provided with bars, a set of levers pivotally connected with said bars, the one end of said levers being forked bars provided with teeth corresponding to the spaces of said grate, and the levers having pivotal connection with the bars, the other ends of said levers having slots, an auxiliary lever

pivotally connecting with one of said downwardly-extending bars on the flange, a pin extending through said auxiliary lever and into the slots of said set of levers, prongs secured to the rear end of the auxiliary lever whereby, upon the depression of the auxiliary lever, the set of levers is operated and the prongs brought into contact with the toothed bars to assist in their raising, substantially as shown and described.

4. In a furnace-grate, a downwardly-extending flange provided with bars, a set of levers having pivotal connection with said bars, bars provided with teeth corresponding to the spaces of the grate, said bars having eyes on their lower sides, one end of the levers being forked and provided with rollers which take into said eyes, the other end of said levers provided with slots, an auxiliary lever having pivotal connection with one of said downwardly-extending bars on the flange, a pin secured to the auxiliary lever and extending into the slot of the set of levers, prongs secured to the rear end of the auxiliary lever to be brought into contact with and to assist the raising of said toothed bar upon the operation of said set of levers by the depression of the auxiliary lever, and guides to retain said toothed bar in proper position when raised or lowered, substantially as shown and for the purpose specified.

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