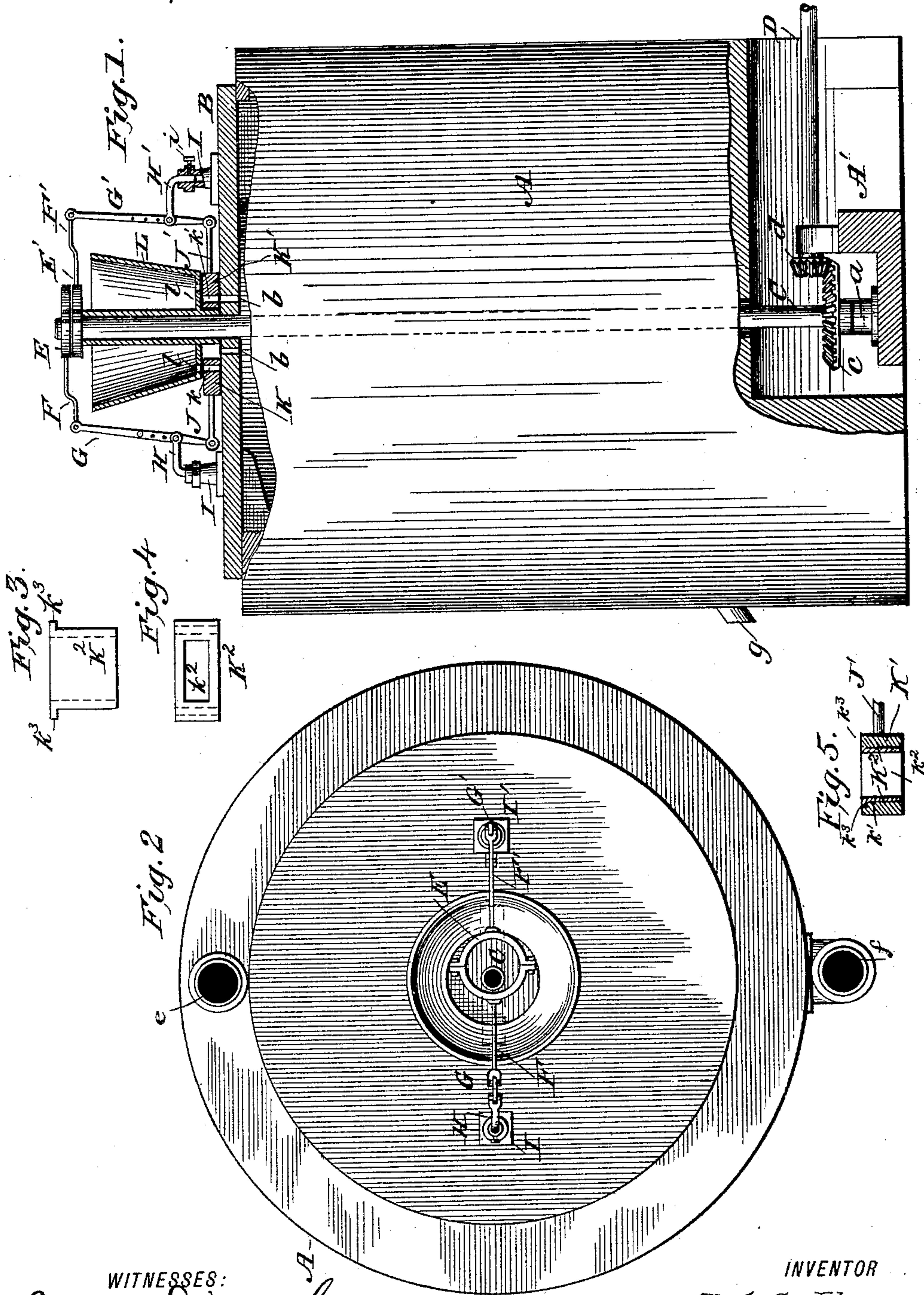


(No Model.)

A. C. JOHNSON.  
FEED DEVICE FOR ORE ROASTING FURNACES.

No. 418,952.

Patented Jan. 7, 1890.



WITNESSES:  
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# UNITED STATES PATENT OFFICE.

ALBERT C. JOHNSON, OF WILMINGTON, DELAWARE.

## FEED DEVICE FOR ORE-ROASTING FURNACES.

SPECIFICATION forming part of Letters Patent No. 418,952, dated January 7, 1890.

Application filed July 2, 1888. Serial No. 278,751. (No model.)

*To all whom it may concern:*

Be it known that I, ALBERT C. JOHNSON, of Wilmington, in the county of New Castle and State of Delaware, have invented a new and Improved Feed Device for Ore-Roasting Furnaces, of which the following is a full, clear, and exact description.

The object of my invention is to provide a new and improved feed device for ore-roasting furnaces, whereby the ore will be fed with regularity to the furnace and the supply of ore cut off as soon as the furnace is stopped.

The invention consists in the particular construction and arrangement of parts as hereinafter fully described, and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of a furnace, partly broken away and having my improvement applied. Fig. 2 is a plan view of the same. Fig. 3 is an end elevation of one of the interchangeable cups for the feed-gates. Fig. 4 is a plan view of the same; and Fig. 5 is a sectional elevation of a gate and cup, showing the cup in the aperture of the gate.

Referring to the drawings by letter, A represents a furnace of any suitable construction, provided with the top plate B, having apertures *b*, the smoke-flue *e*, the condensing-flue *f*, and the discharge-spout *g*. Passing centrally through the furnace A is the vertical shaft C, supported at its lower end in the step *a*. On the lower end of the shaft C is secured the bevel-wheel *c*, into which meshes the bevel-pinion *d*, secured on the end of the shaft D, having a rotary motion and serving to turn the said shaft C. Any other suitable means may be employed for imparting a rotary motion to the shaft C. The inner end of the shaft D, the gear-wheels *c d*, and the lower end of the shaft C are preferably inclosed in a compartment A' in the lower part of the furnace, as clearly shown in Fig. 1.

On the upper end of the shaft C are secured the two eccentrics E E', connected by their respective eccentric-rods F F' with the levers G G', respectively. The levers G G' are pivoted to the arms H H', held vertically ad-

justable in the standards I I' on the top plate B by the set-screws *i*, which pass through the standards and engage the arms. The arms H H' are made adjustable vertically, so as to change the fulcrums of the levers G G', and to permit this the levers G G' are provided with a number of apertures, one above the other, to receive the pivot pin or bolt by which the levers are pivoted to the said arms. The lower ends of the levers G G' are pivotally connected to the rods J J', the inner ends of which are connected to feed-gates K K' of like construction, and held on top of the top plate B, directly under the hopper L, located on the said top plate. The feed-gates K K' are provided with the vertical apertures *k k'*, adapted to register with the apertures *l* in the bottom of the hopper L, and also with the apertures *b* in the top plate B. The feed-gates K K' are placed diametrically opposite each other and the eccentrics E E' are so arranged that the said feed-gates are moved in and out alternately, so as to alternately connect their respective apertures with or disconnect them from the apertures *b* and *l* in the top plate B and hopper L. When the feed-gates K K' are in the positions shown in the drawings, the aperture of the gate K registers with the opening *l* in the bottom of the hopper L, and the aperture of the gate K' is out of register with the aperture in the bottom of the hopper and in register with the aperture in the top plate B. When the shaft C makes one revolution, the positions of the eccentrics E E' are changed, so that the positions of the feed-gates K K' are reversed twice. The ore passes through the respective aperture in the bottom of the hopper into the aperture in the feed-gate when the two apertures register, and when the feed-gate is moved inward it disconnects its aperture from the aperture in the bottom of the hopper and causes it to register with the aperture in the top plate B, so that the ore held in the respective feed-gate passes through the opening in the top plate into the furnace. Thus it will be seen that at every revolution of the shaft C a certain amount of ore is admitted into the furnace.

In order to increase or decrease the amount of ore fed into the furnace during one revolution of the shaft C, I may provide each gate



K K' with an interchangeable cup K<sup>2</sup>, fitting in the aperture of the gate and provided with an opening k<sup>2</sup>, which may be of any desired size, according to the amount which it is desired to feed into the furnace at each revolution of the shaft C. The interchangeable cup K<sup>2</sup> is provided with flanges k<sup>3</sup>, fitting into corresponding recesses in the gates K K', so as to hold the said cups in place in the gates.

The amount of material which it is desired to roast can be measured very accurately by using cups K<sup>2</sup> of varying sizes in the feed-gates K K', as above described. Thus each cup may hold from six to twelve pounds, so that the number of revolutions made by the shaft per hour gives any desired amount, whereby the material under treatment is fed to the furnace with great regularity. If the furnace should be stopped at any point, the material in the hopper is completely shut off, and the gas is also shut off and prevented from escaping while the hopper has any ore in it.

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

1. In an ore-roasting furnace, the combination, with the shell of the furnace having openings in its top and a hopper provided with openings in its bottom, the said openings being out of alignment with those in the top of the shell, of apertured gates between the top of the shell and the bottom of the hopper, and means for alternately reciprocating the said gates, substantially as described.

2. In an ore-roasting furnace, the combination, with the shell of the furnace having openings in its top and a hopper on the shell having openings in its bottom, of a shaft passing through the hopper, eccentrics on the shaft, levers pivoted on the furnace-shell, apertured gates between the bottom of the hopper and top of the shell, and connections

between the levers and the eccentrics and gates, substantially as herein shown and described.

3. In an ore-roasting furnace, the combination, with a feed-gate having a vertical aperture, of apertured cups fitting into the said feed-gate, substantially as shown and described.

4. In an ore-roasting furnace, the combination, with a shell provided with a top plate having apertures, of a hopper set on the top of the said top plate, a shaft passing through the said hopper and top plate, eccentrics mounted on the upper end of the said shaft, levers pivotally connected with the said eccentrics and provided with fulcrum-apertures, arms held vertically adjustable and forming a fulcrum for the said levers, and a feed-gate pivotally connected with each of the said levers and provided with openings to register with the bottom openings in the hopper and with the openings in the said top plate, substantially as shown and described.

5. In an ore-roasting furnace, the combination, with a shell provided with a top plate having apertures, of a hopper set on the top of the said top plate, a shaft passing through the said hopper and top plate, eccentrics mounted on the upper end of the said shaft, levers pivotally connected with the said eccentrics and provided with fulcrum-apertures, arms held vertically adjustable and forming a fulcrum for the said levers, a feed-gate pivotally connected with each of the said levers and provided with openings to register with the bottom openings in the hopper and with the openings in the said top plate, and a cup fitting into each of the said feed-gates, substantially as shown and described.

ALBERT C. JOHNSON.

Witnesses:

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JOHN W. CAREY.