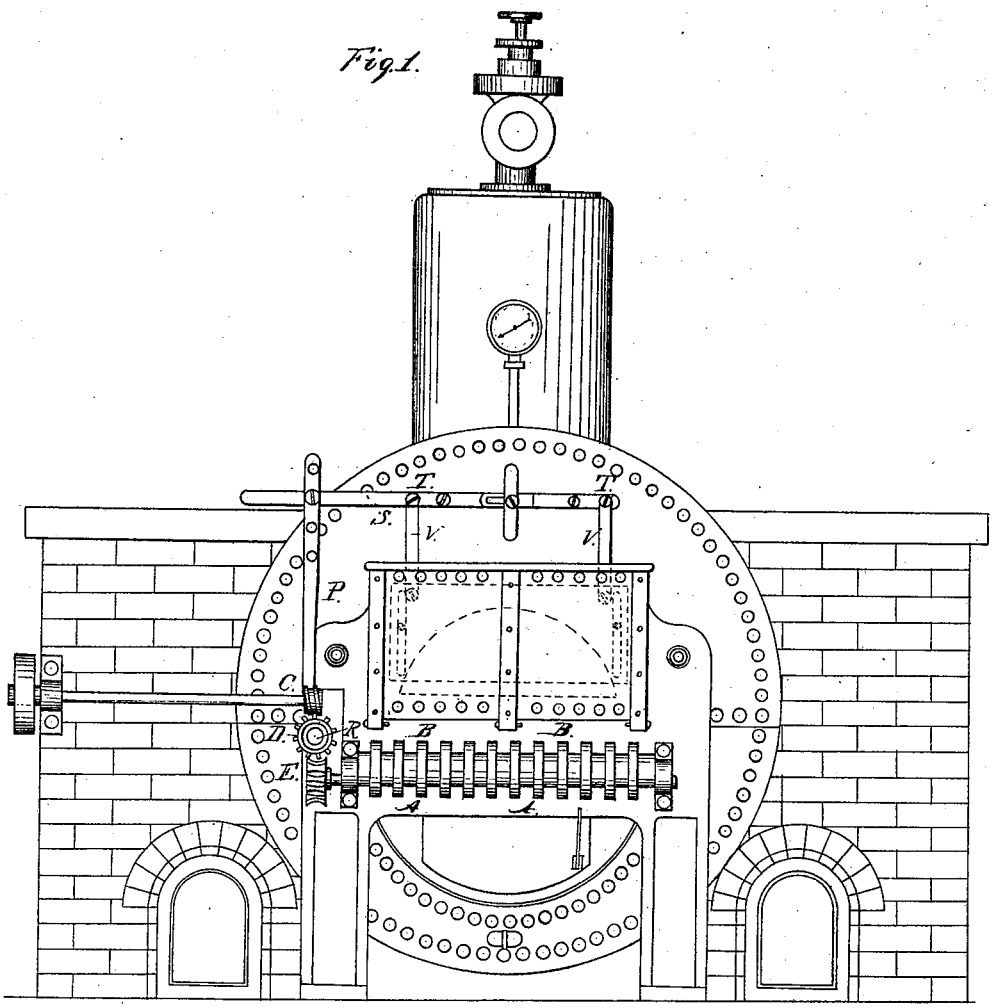
2 Sheets—Sheet 1

R. MORGAN.

Automatic Fuel-Feeder for Furnace.

No. 196,924. **Patented Nov 6, 1877.**

Fig. 1.



Attest:
S. W. Selly
R. F. Dyer

Inventor:
Robert Morgan
by Geo. W. Dyer
Atty.

2 Sheets—Sheet 2.

R. MORGAN.

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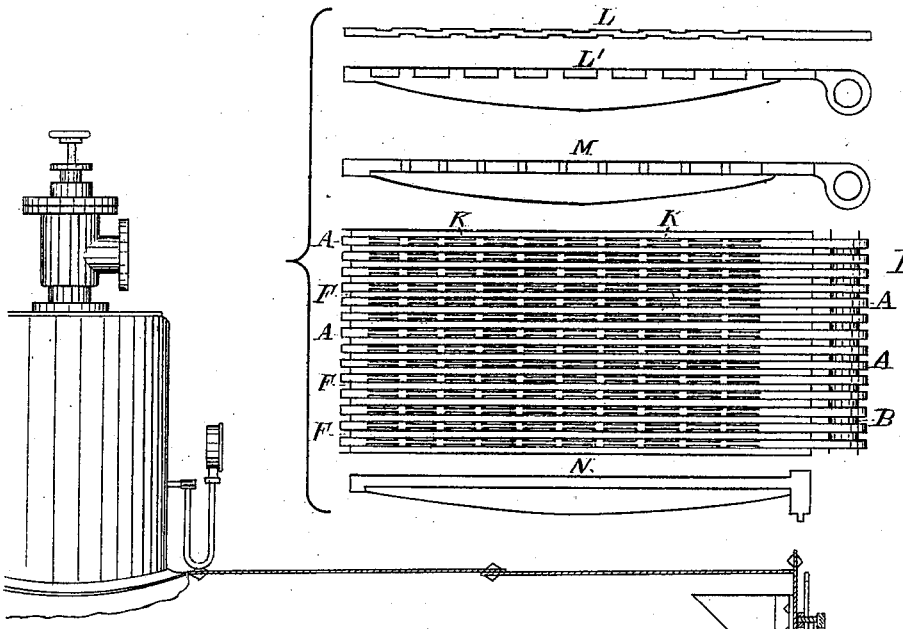

Fig. 3.

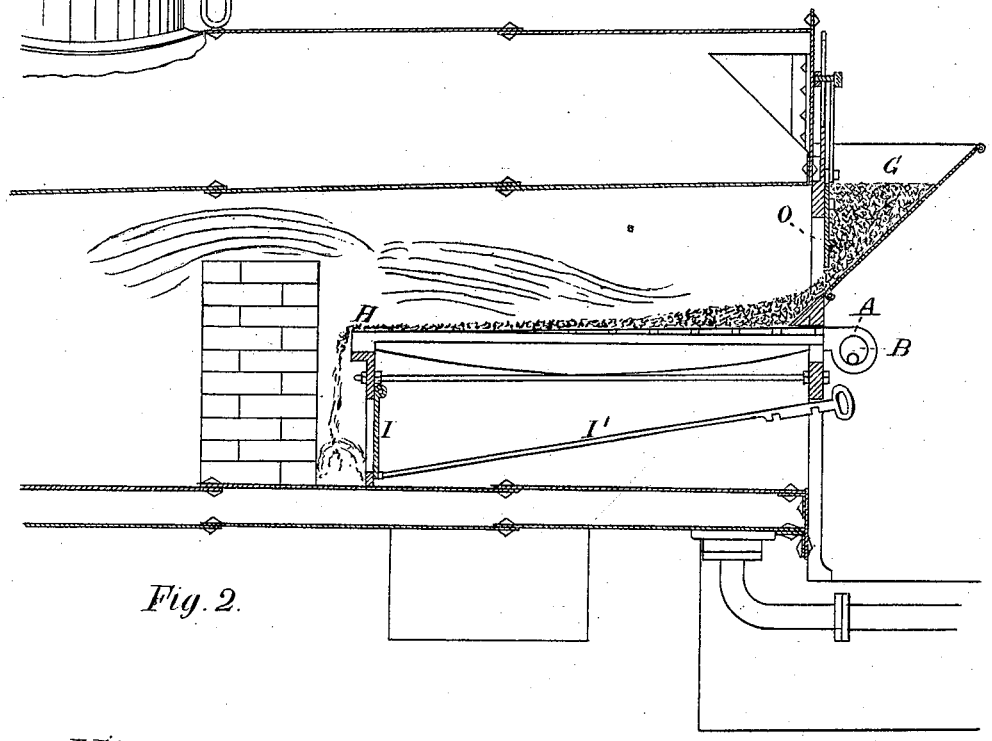

Fig. 2.

Witnesses;

Wm. Y. Foulkes.

Thos. A. Turner.

Inventor;

Robert Morgan

UNITED STATES PATENT OFFICE.

ROBERT MORGAN, OF BIRMINGHAM, ENGLAND.

IMPROVEMENT IN AUTOMATIC FUEL-FEEDERS FOR FURNACES.

Specification forming part of Letters Patent No. **196,924**, dated November 6, 1877; application filed April 19, 1877.

To all whom it may concern:

Be it known that I, ROBERT MORGAN, of Birmingham, in the county of Warwick and Kingdom of England, engineer, a subject under the Queen of Great Britain, have invented new and useful Improvements in Automatic Fuel-Feeders for Furnaces, which improvements are fully set forth in the following specification, reference being had to the accompanying drawings.

This invention relates to a vertically-reciprocating feed-door, operated by power, for automatically feeding fuel from a hopper into a furnace, and in the combination, with the same, of grate-bars having a longitudinal movement.

The object of my invention will be more readily understood by referring to the drawings, consisting of Figure 1, Sheet 1, which is, for the sake of illustrating the invention, a front elevation of a boiler-furnace fitted with my improved movable fire-bars, my invention being equally applicable to other descriptions of furnaces. Fig. 2, Sheet 2, is a part longitudinal section of the same; and Fig. 3 is a plan and side elevation of the bars and modifications thereof.

I connect one end of each alternate fire-bar, A, to a cranked axle or eccentric-shaft, B, which is caused to revolve slowly by means of cross-gear toothed and wormed pinions C D E, Fig. 1, driven from a main shaft, or by some other suitable arrangement, and the revolution of the cranked axle or eccentric-shaft B imparts to the movable fire-bars A a coincident motion, consisting of a rise and fall simultaneously with a forward and backward movement, the other fire-bars F being fixed and stationary. The movement of the bars A feeds onward the fuel from the hopper G, and the ashes fall over the end H of the bars, ready for removal by opening the door I by means of the rod and handle I′. The movable bars A are formed with hollows or indentations K in their sides, as in the plan, Fig. 3, allowing ashes to fall through, and also insuring the admission of air to the fire, and keeping the fire-bars cool.

L, Fig. 3, is a plan, and L′ a side elevation, of a movable bar, showing the hollows or indentations alternately on either side of the bar. M shows, in side view, the bar adapted for the arrangement in the plan, Fig. 3, and N is a side elevation of one of the fixed bars F. O is the feed-door of the furnace, which I arrange so as to have a slow and up-and-down movement, by means of a rising vertical lever, P, operated by a cam-disk from the pinion-shaft R, and connected to the lever P is a cross-jointed arm, S, having a slot and stud connected to axes T and arms V, so that as the lever P is raised or lowered, the door of the furnace will be similarly raised or lowered, and will thus prevent the fuel from bridging or clogging in the hopper, to facilitate which I serrate the bottom edge of the door, or I form teeth thereupon, and the atmospheric air is likewise prevented from entering at the door O. By the arrangements described the feeding to the fire from the hopper G, and the passing onward of the fuel to the bars, are automatic, and the fire will require no cleaning.

I claim—

1. In a furnace, the combination, with a fuel-feeding hopper, of a feed-door, O, connected with operating mechanism, and having a vertical reciprocating movement, whereby an automatic feed of the fuel from the hopper into the furnace is produced, substantially as described and shown.

2. In a boiler-furnace, the combination of a vertically-reciprocating feed-door and grate-bars having a movement in the direction of their length, operated by power through suitable mechanism, substantially as described.

3. The combination, with the shaft and its pinion C and pinion-shaft R, of the crank-shaft B, pinion E, vertical lever P, and cross-arm S, all operating together in the manner and for the purpose set forth and shown.

The above specification of my invention signed by me this 25th day of April, A. D. 1876.

ROBERT MORGAN.

Witnesses:
WM. T. FOULKES,
THOS. A. TURNER.