M. H SMITH.
Furnace-Feeder.

No. 199,000. Patented Jan. 8, 1878.

FIG. 1.

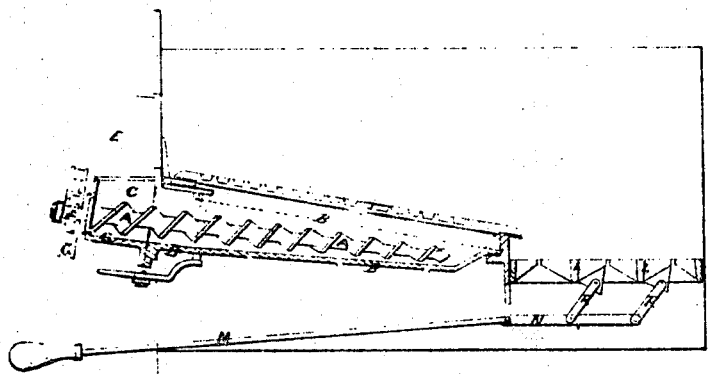


FIG. 2.

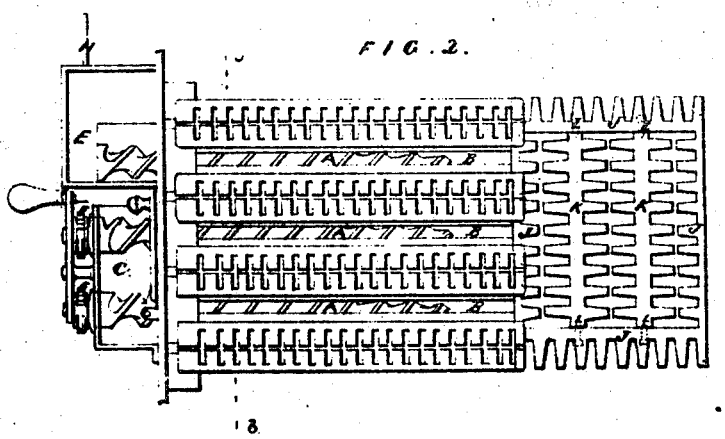


FIG. 4.

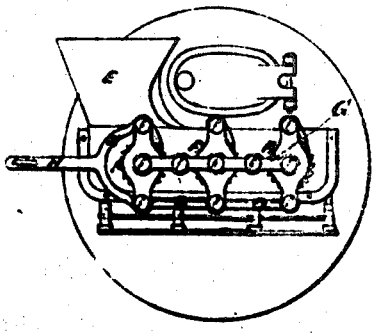
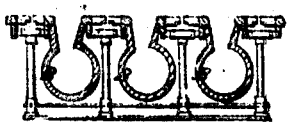


FIG. 3.



Witnesses
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Jno. L. Walsh.

Inventor
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by Briesen & Knauth attorneys

2 Sheets—Sheet 2.

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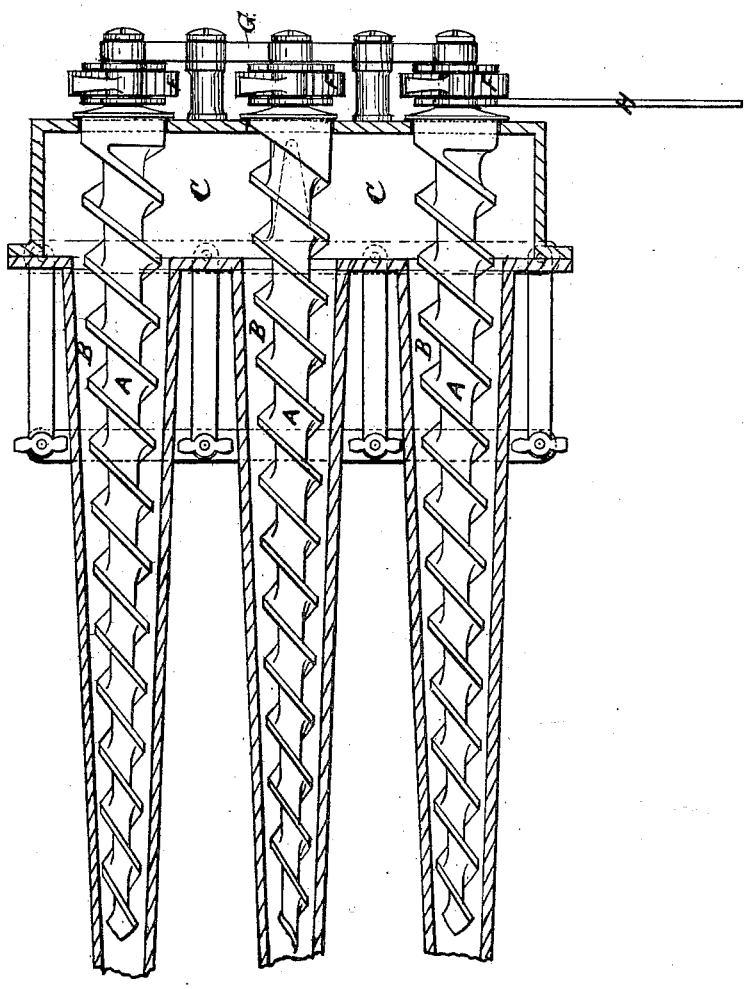

FIG. 5.

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UNITED STATES PATENT OFFICE.

MICHAEL H. SMITH, OF HALIFAX, ENGLAND.

IMPROVEMENT IN FURNACE-FEEDERS.

Specification forming part of Letters Patent No. **199,000**, dated January 8, 1878; application filed August 13, 1877.

To all whom it may concern:

Be it known that I, MICHAEL HOLROYD SMITH, of Halifax, in the county of York, England, have invented certain Improvements in Apparatus connected with Furnaces, of which the following is a specification:

My invention relates to improved apparatus for supplying the fuel by self-acting mechanism, designed to supply the fuel from underneath the fire, the object being to insure more complete combustion, and, as a consequence, increased economy of fuel.

This invention relates to an improved apparatus for feeding fuel to the grate of a furnace; and consists in combining the grate-bars of the furnace with troughs or screw-cases, that are placed between and communicate with the grate-bars, and are connected at one end to a feed-trough and a hopper, said screw-cases containing each a screw or worm, all being so arranged that the fuel is fed by the screws or worms from the hopper and feed-trough into the screw-cases, and from the screw-cases directly upon the grate-bars, all as is hereinafter more fully described. The screw has, by preference, two threads of such pitch and construction as to exert an outward and a propelling force. The propelling force of the screw at its commencement is in excess of its lifting force; but at its smaller end the lifting force is greatest, thereby insuring a uniform feed the whole length of the bars.

I prefer to use my improved feed mechanism in connection with improved supplementary or auxiliary back grids or grates (placed off the ends of the furnace-bars) and apparatus for operating the same, so as to remove the spent fuel or ashes therefrom.

The auxiliary bars I mount on axles within a frame, and the bars are connected by a link-motion that, by working a "draw" or "push" rod, the bars will tilt and throw off the ashes or spent fuel delivered onto them from the main fire-bars.

The several parts will be clearly understood by reference to the drawings, aided by the description annexed.

Figure 1 is a longitudinal elevation, partly in section, illustrating my invention applied to an internally-fired single-flue steam-boiler. Fig. 2 is a plan of the same. Fig. 3 is an elevation in cross-section, on line *a b* of Fig. 2, of some of the parts of the apparatus. Fig. 4 is a front or outside elevation. Fig. 5 is a plan view, enlarged scale, showing more clearly the screws and screw-case, the latter in section.

Similar letters of reference indicate corresponding parts in all the figures.

A A A are taper screws or worms; B B B, the screw-cases, connected at the front of the boiler by the feed-trough C, the latter being supplied with fuel by way of the hopper E. The screws A A A are supported at one end by the feed-trough C, and by contact with the bottom of the screw-case.

Motion is given to the screws A A A by means of the ratchet-wheels F F F and pawls, linked together by bar G and actuated by lever H; or the three worms A A A may be driven by longitudinal shaft-worm and worm-wheels.

J is a frame, within which the auxiliary bars K are received, being free to tilt on their axles or gudgeons L when, by means of the rod M, the links N R R are operated, so as to tilt and thereby discharge the ashes or spent fuel from the bars to the bottom of the flue.

Two screws may be put into one screw-case.

I do not claim as my invention the use of a screw *per se;* but

I claim—

The combination of the grate-bars of a furnace with the troughs or tapering screw-cases B B, that are placed below and between, and communicate with the several grate-bars, and connect at one end to a hopper, each of said screw-cases containing a tapering screw or worm, A, so arranged that the fuel is fed by the screws or worms A from the hopper into the screw-cases B, and from the screw-cases directly upon the grate-bars, all substantially as and for the purpose herein shown and described.

MICHAEL HOLROYD SMITH.

Witnesses:

WALTER BRIERLEY,

JOHN E. WALSH.