

(No Model.)

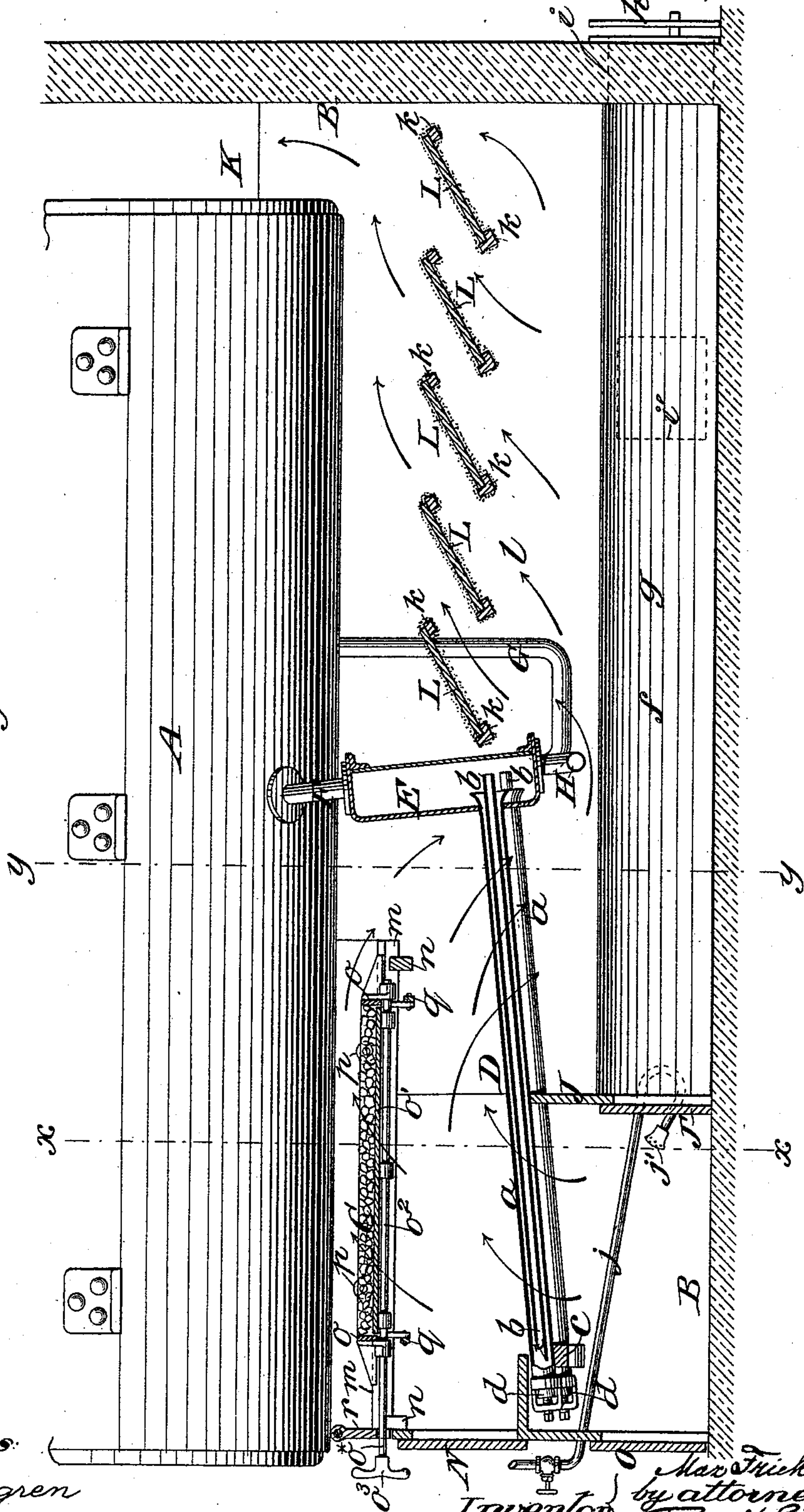
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M. FRICKE.  
FUEL FEEDER FOR FURNACES.

No. 497,469.

Patented May 16, 1893.

Fig. 1.



Witnesses:

C. Sundgren  
D. H. Hayward

Inventor

M. Fricke  
by attorneys  
Brown & Howard

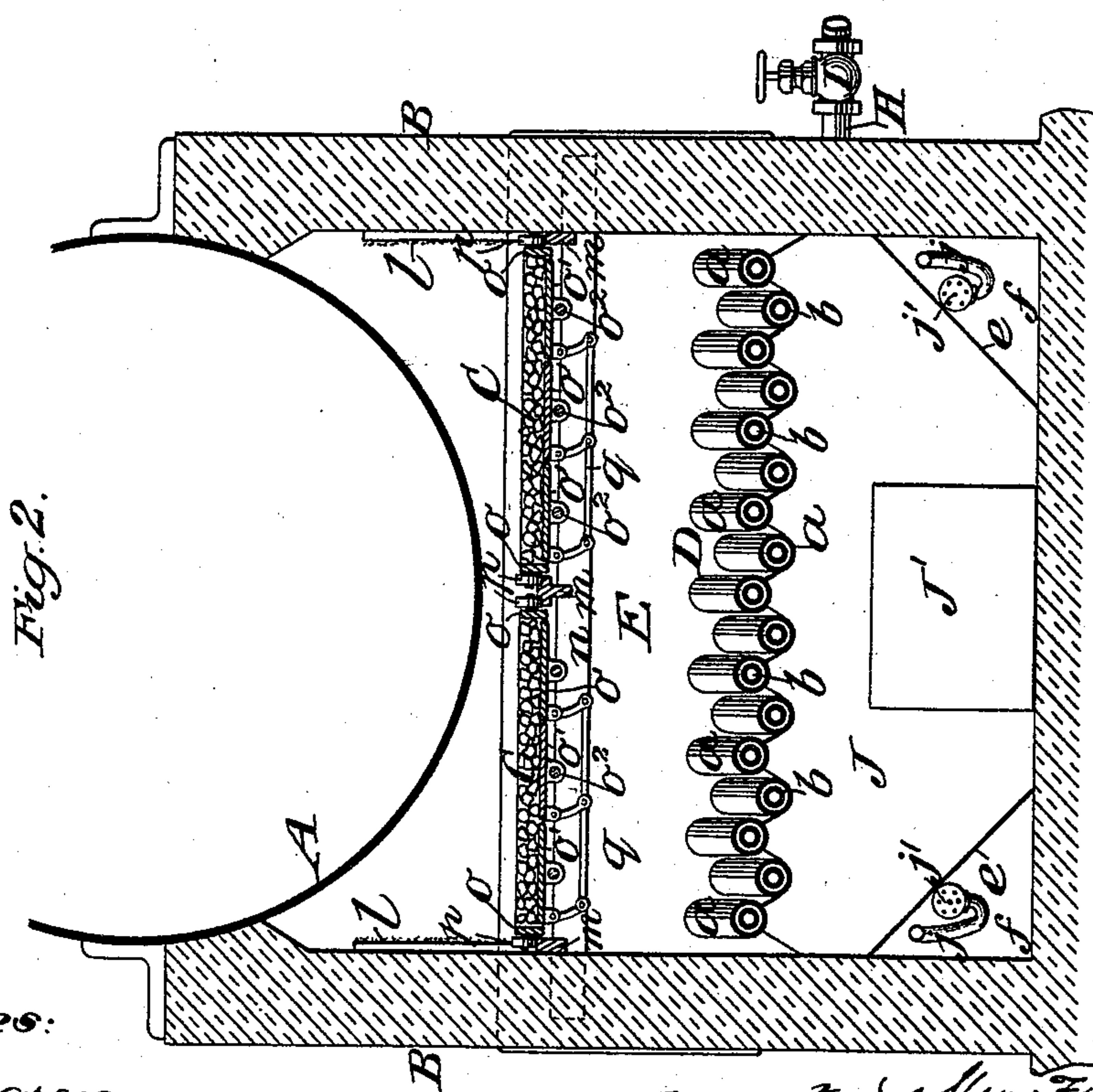
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# UNITED STATES PATENT OFFICE.

MAX FRICKE, OF NEW YORK, N. Y.

## FUEL-FEEDER FOR FURNACES.

SPECIFICATION forming part of Letters Patent No. 497,469, dated May 16, 1893.

Application filed January 9, 1893. Serial No. 457,731. (No model.)

### *To all whom it may concern:*

Be it known that I, MAX FRICKE, a subject of the Duke of Brunswick, Germany, at present residing in the city of New York, in the State of New York, have invented a new and useful Improvement in Fuel-Feeders for Furnaces, of which the following is a specification.

I will first describe the details of my invention with reference to the accompanying drawings and afterward point out its novelty by claims.

Figure 1 represents a vertical longitudinal section of a steam boiler furnace which embodies my invention. Fig. 2 represents a transverse vertical section in the line  $x x$  of Fig. 1.

Similar letters of reference designate corresponding parts in both the figures.

The boiler A represented in the drawings is of the simple cylindrical kind that serving as well as any other for the illustration of my invention. This boiler is represented as having a setting B of masonry such as is common except that in order to provide room for the fuel carriages C C, to be hereinafter described, above the fire grate D, it is or may be set somewhat higher than is usual. In rear of the grate is a bridge E which projects upward considerably above the grate but under which the space between the side walls and base of the setting is open. This bridge is represented as constructed of boiler plate and hollow to constitute a water chamber. The said bridge has a communication at the top by a pipe F with the lower part of the boiler and has at its bottom a communication with the lower part of the boiler by means of a pipe G. The said bridge is also provided at the bottom with a pipe H for blowing out the boiler, the said pipe being furnished with a stop valve I.

The grate D is represented as composed of a series of external pipes  $a$  constituting the fire bars and a series of internal pipes  $b$  which are arranged one within each of the external pipes  $a$ . The rear ends of the pipes  $a$  are set tightly in the lower part of the front of the bridge E and are open to the water space within the said bridge. The front ends of the said pipes rest upon a cross bar  $c$  arranged across the front of the furnace. The said

front ends are closed by means of plugs  $d$ . The internal pipes  $b$  are open at their rear ends to the water space in the bridge E and open at their front ends to the interiors of the external pipes  $a$ .

Under the grate D at or near the middle of its length, an upright bridge J, is arranged across the furnace (see Figs. 1 and 2), the said plate having a central door  $J'$  and having in its lower corners openings  $e e$  (Fig. 2) which communicate with air passages  $f f$  running lengthwise of the setting B and the boiler, the said passages being formed as shown by inclined plates  $g g$  which rest upon the base of the setting and against the side walls thereof, and having openings in the rear of the setting provided with valves  $h$  for the purpose of regulating the ingress of air.

$j j$  are small steam pipes connected with the steam space of the boiler and furnished with rose-heads  $j' j'$  which are arranged near the front ends of the air passages  $f$  for the purpose of throwing jets of steam in a forward direction for inducing a forward draft within the passages  $f f$ .

Across the space under the boiler in rear of the bridge E, which space communicates with the up-take K, there is arranged a series of inclined plates L L supported upon transverse bars  $k$ . These plates are for absorbing a portion of the heat from the products of combustion which have passed the bridge E and giving out the said heat again in an upward direction to the boiler and in a downward direction to the plates  $g$  and through them to the air passages  $f$ .

Above the grate D, within the space between it and the boiler, there are arranged parallel with the boiler and side walls of the furnace, horizontal tracks  $m m$  supported in any suitable manner as upon transverse bearers  $n n$  (see Fig. 1) and upon these tracks are supported the fuel carriages C C hereinbefore mentioned. These carriages consist each of a frame  $o$  having a removable bottom composed of a series of perforated traps  $o'$  pivoted centrally of their width by pivots  $o^2$  at their front and rear ends into the front and rear ends of the carriage so that they are balanced laterally either when loaded or unloaded and so easily maintained on a level. The said frames are provided at their



sides with rollers or wheels *p p* which run on the tracks *m m*. The several traps *o'* of each carriage are connected by a rod *q* in such manner that all the traps in a carriage are opened or closed together, and the pivot *o<sup>2</sup>* of one trap in each carriage is prolonged through an opening in the furnace as shown at *o\** in Fig. 1 and furnished with a handle *o<sup>3</sup>* by the turning of which by hand, owing to the connection by the rods *q*, all the traps of a carriage may be opened together or closed together.

Opposite the tracks *m m* there is provided for each carriage a hanging door *r* (see Fig. 1) which is pivoted at its upper edge to swing freely inward or outward to permit the carriage to be run out from the furnace to be charged with coal and to be run in again with the charge. The same handle *o<sup>3</sup>* which provides for the opening and closing of the traps of a carriage serves for drawing out and returning the carriage.

The furnace front is provided with a door *N* above the grate which needs only to be opened for the purpose of cleaning the grate and taking out clinkers and with a door *O* below the grate which needs only to be opened for cleaning out the ashpit. The tracks *m* and carriage *C* are above the door *N*.

In describing the operation of my improvement I will first suppose a fire to have been built on the grate *D* and the fuel on the back part of the grate to be in a state of incandescence while that on the front part is comparatively fresh, and the fuel carriages to have been charged with fresh fuel. The air for supporting combustion enters the air passages *ff* at or near the rear thereof, passes through the openings *e* in the bridge *J* into the space below the front portion of the grate within which space and through said portion of the grate a draft is induced by the jets of steam from the pipes *j*. The draft through the fuel on this portion of the grate is upward and that through the rear portion of the grate is downward. The gaseous and fuliginous products of the imperfect combustion on the front portion of the grate together with the uncombined air which has passed through the grate pass down together through the brighter portion of the fire on the portion of the grate in rear of the bridge *J* between the

said bridge and the water bridge *E*. On this latter part of the grate the combustion is for the most part completed, but any smoke and such of the gases as have not undergone perfect combustion and such of the air as has not been perfectly combined are so intimately mixed in the space in rear of the water bridge *E* that the combustion is perfectly completed so that not only the heat of the gases of such complete combustion as has taken place over the rear portion of the grate but the heat evolved by the completion of the combustion behind the water bridge *E*, is transmitted to the boiler. While combustion is taking place as above described, the fresh coal on the carriages *C C* is heated and though it is not intended that the actual combustion of the coal in the said carriages is to take place, some of the gases will be carried off from it by the upward draft through the spaces between the traps and the holes in them and these gases will enter into the combustion which takes place over the rear portion of the fire grate and in the rear portion of the furnace.

What I claim as my invention is—

1. In a furnace, the combination substantially as herein described of a grate, a fuel carriage having its bottom composed of two or more balanced pivoted traps, tracks for said carriage arranged within the furnace above the grate, a door in the furnace front for entrance and exit of said carriage and connections between the several traps whereby they are caused to open and close simultaneously.

2. In a furnace, the combination substantially as herein described of a grate, a fuel carriage having its bottom composed of two or more balanced pivoted traps, tracks for said carriage arranged within the furnace above the grate, a door in the furnace front for entrance and exit of said carriage, a handle on the front pivot of one of the said traps for opening and closing the said trap and for drawing the carriage from the furnace and returning it thereto, and connections between the several traps whereby they are caused to open and close simultaneously.

MAX FRICKE.

Witnesses:

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ORIN STANFORD.