

997,206.

T. E. MURRAY.  
UNDERFEED STOKER.  
APPLICATION FILED JAN. 22, 1909.

Patented July 4, 1911.

3 SHEETS-SHEET 1.

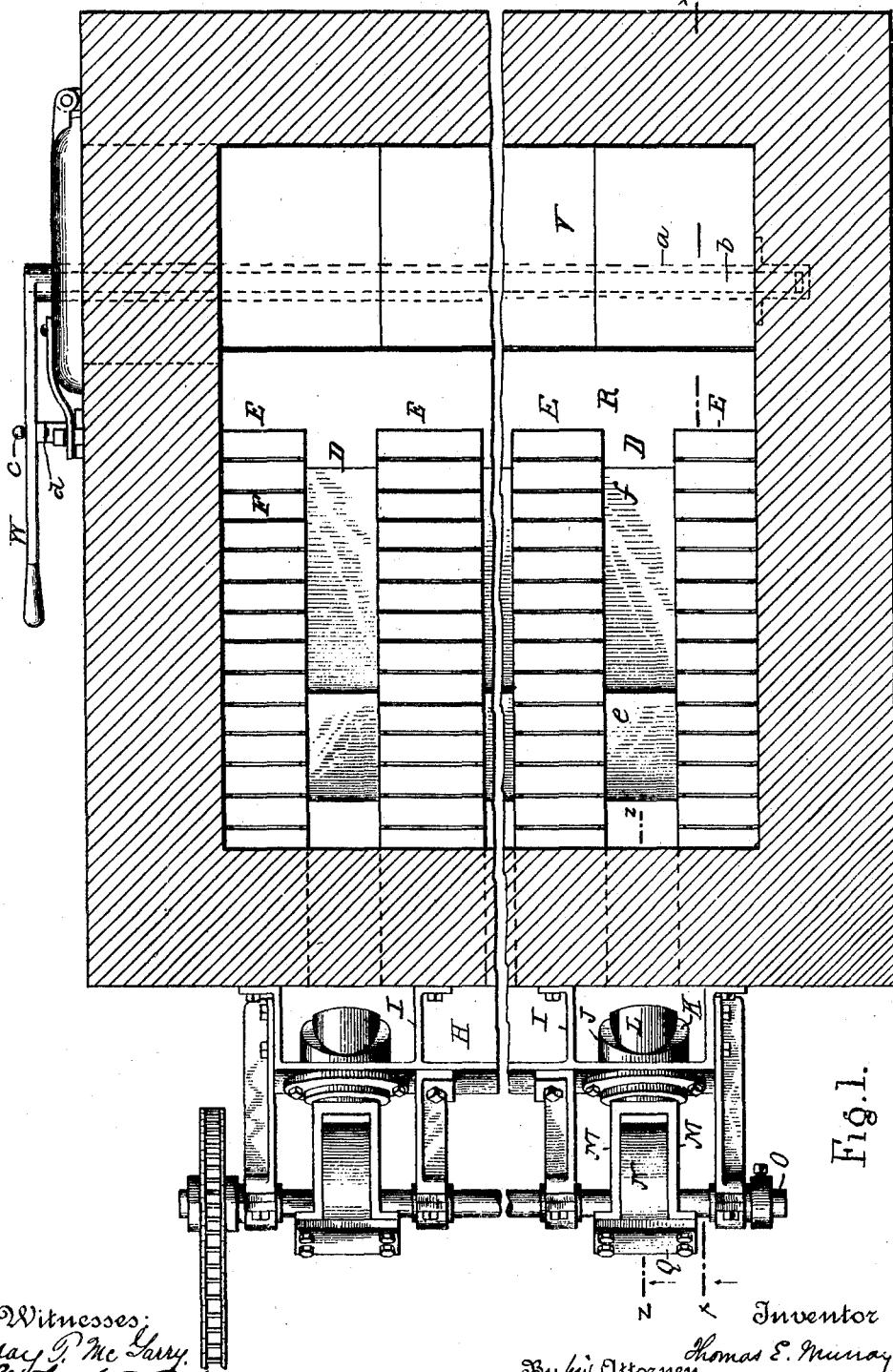


Fig. 1.

Witnesses:  
May J. Mc Garry.  
Gertrude T. O'Brien.

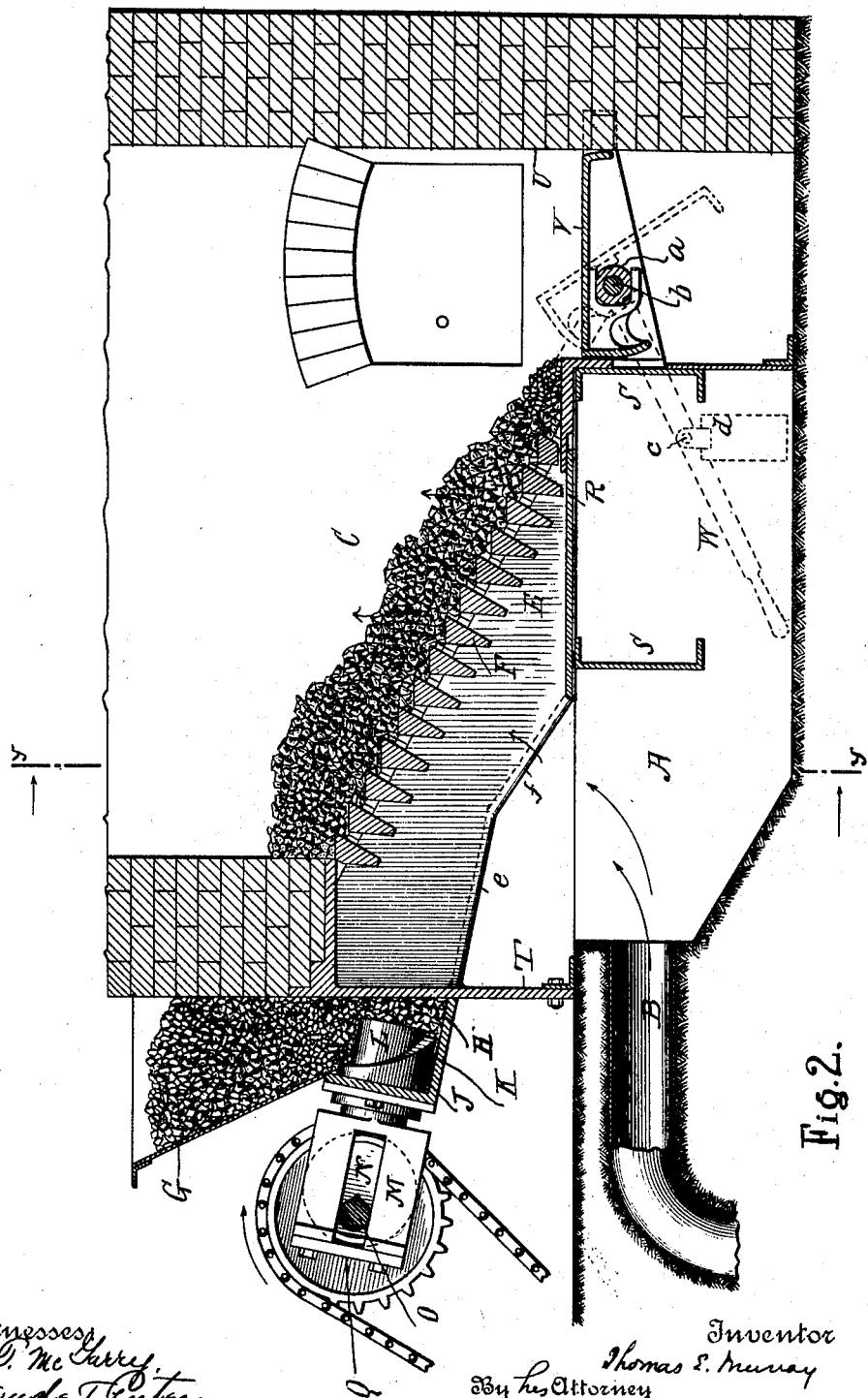
Inventor  
Thomas E. Murray  
By his Attorney  
Park Barron

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3 SHEETS-SHEET 2.



Witnesses  
May J. McCaffrey.  
Gertrude T. Carter.

Inventor  
Thomas E. Murray  
By his Attorney  
Taft Benjamin

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3 SHEETS-SHEET 3.

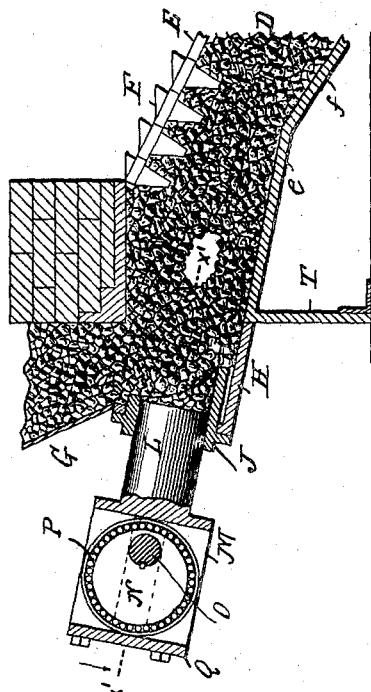


Fig. 4.

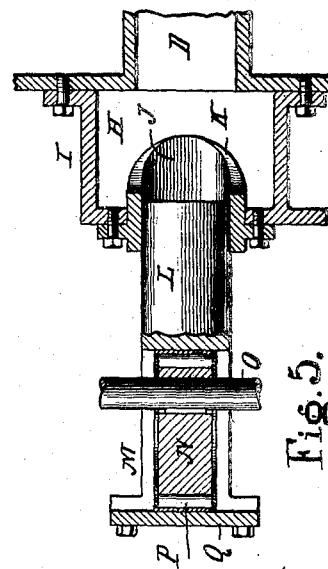


Fig. 5.

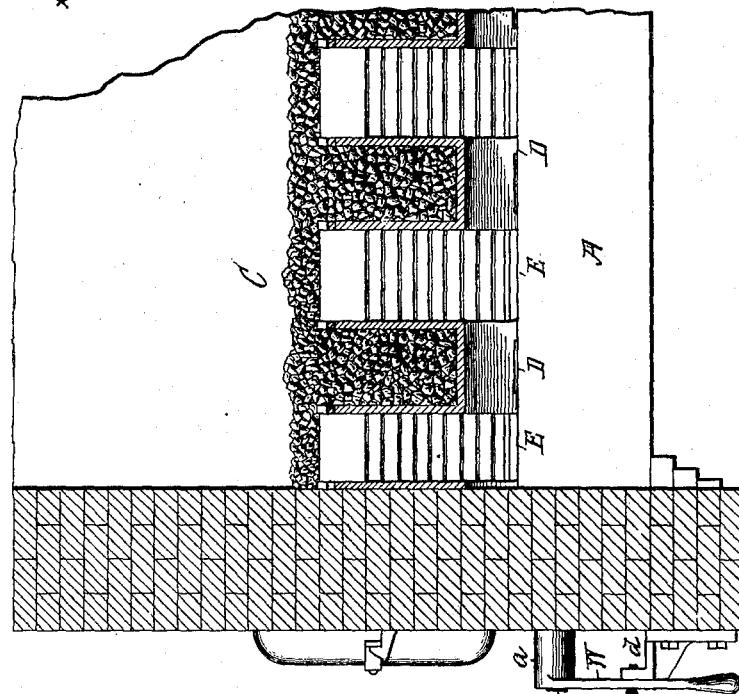


Fig. 3.

Witnesses:  
May T. McCarty  
Bertrude T. Goller.

By his attorney Inventor  
Thomas E. Murray  
Clark Payzant

# UNITED STATES PATENT OFFICE.

THOMAS E. MURRAY, OF NEW YORK, N. Y.

## UNDERFEED STOKER.

997,206.

Specification of Letters Patent. Patented July 4, 1911.

Application filed January 22, 1909. Serial No. 473,639.

To all whom it may concern:

Be it known that I, THOMAS E. MURRAY, a citizen of the United States, residing at New York, in the county of New York and 5 State of New York, have invented a certain new and useful Improvement in Underfeed Stokers, of which the following is a specification.

The invention relates to underfeed stokers 10 and consists in the construction of the grate, in the combination of the grates, constructed as set forth, with the retorts, and in the construction of the retorts and feeding plungers whereby a greater proportion of 15 the fuel is caused to pass upon the upper portion of the inclined grates, and in the various combinations more particularly recited in the claims.

In the accompanying drawings—Figure 1 20 is a plan view of my improved underfeed stoker. Fig. 2 is a section on the line  $x, x$ , of Fig. 1. Fig. 3 is a section on the line  $y, y$ , of Fig. 2. Fig. 4 is a section on the line  $z, z$ , of Fig. 1, and Fig. 5 is a section on the line  $x', x'$ , of Fig. 4.

Similar letters of reference indicate like parts.

A is an air box which receives air from any suitable source by pipe B. Above the 30 air box is the fire chamber C, and between said box and fire chamber are interposed the inclined fuel retorts D and the inclined grates E which alternate with said retorts. The retorts D extend below the grates E, so 35 that the air entering the box A passes between the retorts and then upward into the fire chamber, the said air finding its sole outlet to said fire chamber through the interstices between the stationary grate bars F, and through the fuel which, after being fed into the retorts, rises upward and arches over the grates, as shown in Fig. 3. While the grates E are as a whole inclined, the individual grate bars F, which extend trans- 40 versely across the space between the retorts, are placed with their upper surfaces horizontal, or in other words, in steps, the object being to retard the descent of the fuel down the grate, which is due to gravity. It is to be observed that the direction of the air currents through the fuel is upward through the interstices between the grate bars, and not laterally into the retorts as is common 45 when twyters are interposed between said retorts: Nor is said air directed into the fuel in the form of jets also as when twyters are

used. In fact, one of the principal objects here is to do away with twyters completely and thus simplify and cheapen the construction.

In order to feed the fuel into the retorts, I provide a hopper G, and below the same a box H which may be divided by partitions I into compartments corresponding in number to the retorts. In the front wall of each compartment is mounted a guide sleeve J having its inner edge cut away and curved, as shown at K, so as not to impede the descent of the fuel in front of the plunger L. Integral with the plunger L are parallel 65 flanged plates M, between which is disposed the eccentric N carried by rotary shaft O which may be driven by a sprocket pulley and belt, as shown, and surrounded by friction rollers P journaled in said plates. To 70 the flanges on said plates M is bolted a back plate Q.

A horizontal plate R, supported on cross beams S, extends below and beyond the lower ends of the inclined grates E, and between said plate R and the front wall T, the air passes to said grates, as shown by the arrows in Fig. 2. Beyond the plate R and between the rear wall of air box A and the furnace wall U are pivoted dumping plates 80 V, operated by the hand lever W and carried on a sleeve a on shaft b. Said grate is retained in horizontal position by means of a headed pin c passing through a hole in said lever and entering a hole in the upturned flange of a bracket d on the outside 85 of the furnace wall.

The fuel being placed in the hopper G descends by gravity in front of the reciprocating plungers L, by which it is moved into the retorts D, from which it rises over the grates E and at the same time descends said retorts and grates, meanwhile being burned on the grates. The ashes are received on 90 the dumping plates V and disposed of in 100 the usual way.

It is to be noted that the bottom of each retort is placed at a less angle to the horizontal at its upper portion e than at its lower portion f, and that the reciprocating plunger L is placed at the same angle as said upper portion e. The consequence is that, at the upper ends of the retorts, not only is the forward movement of the fuel 105 positively effected by the plunger, but the tendency of the fuel to rise up out of the retorts and pass upon the grates is increased.

I claim:

1. An underfeed stoker comprising a retort having a downwardly and rearwardly inclined bottom, the upper portion of said bottom being disposed at a less angle to the horizontal than the lower portion, a fuel receptacle at the upper end of said retort having its bottom inclined in continuation of the upper portion of said retort bottom, and means in said fuel receptacle for intermittently feeding fuel therefrom into said retort.
2. An underfeed stoker comprising a retort having a downwardly and rearwardly inclined bottom, the upper portion of said bottom being disposed at a less angle to the horizontal than the lower portion, a fuel receptacle at the upper end of said retort having its bottom inclined in continuation of the upper portion of said retort bottom, an

inclined plunger moving in a path parallel to said receptacle bottom, and means for reciprocating said plunger in said receptacle.

3. An underfeed stoker comprising a furnace, an inclined grate formed of fixed transverse bars having horizontal upper surfaces and vertical air passages between said bars, an inclined retort adjacent to said grate, the said grate and retort forming a partition dividing the furnace space into two chambers, and a supply duct for air under pressure opening into the chamber below said grate.

In testimony whereof I have affixed my signature in presence of two witnesses.

THOMAS E. MURRAY.

Witnesses:

GERTRUDE T. PORTER,  
MAY T. MCGARRY.