

No. 740,669.

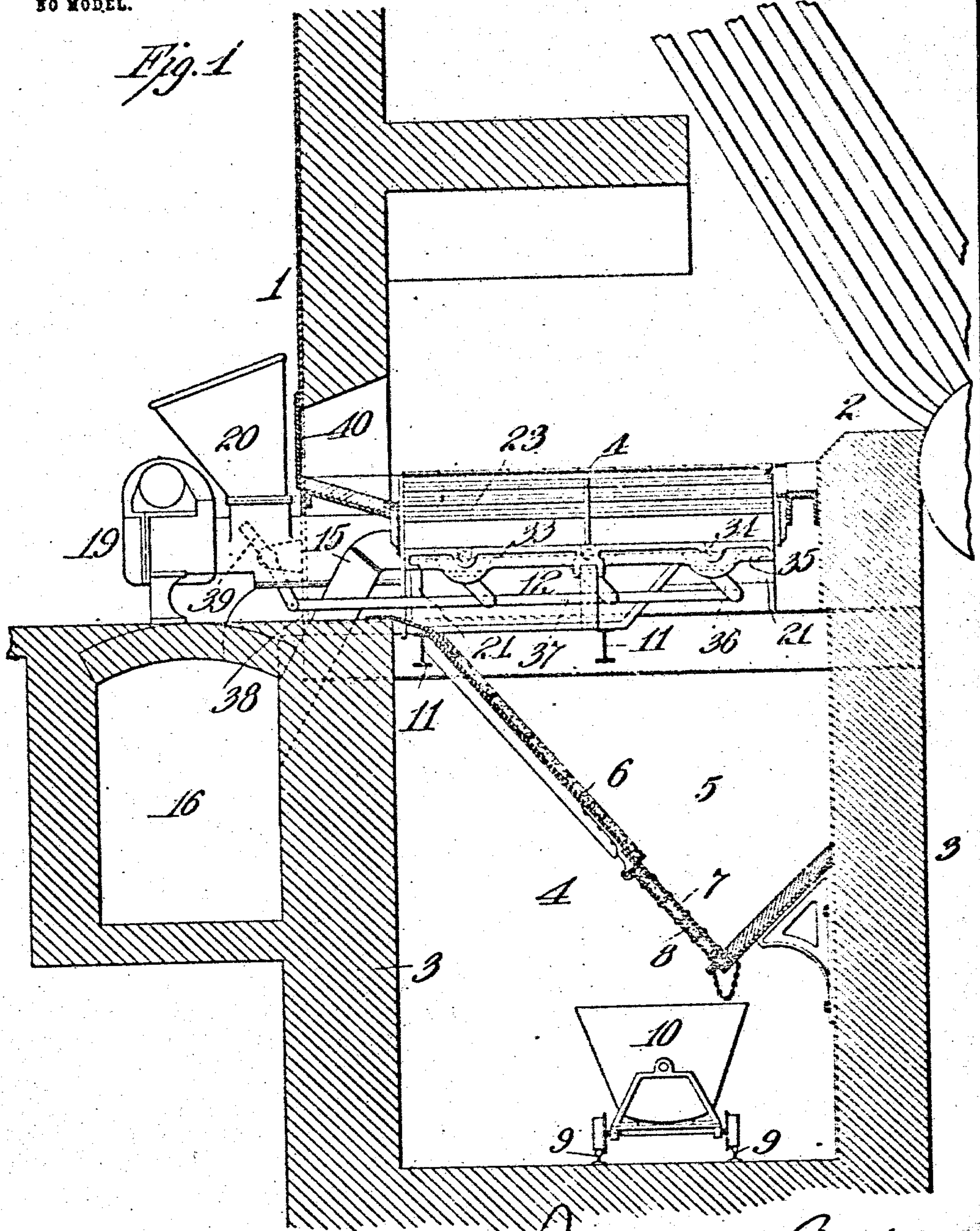
PATENTED OCT. 6, 1903.

J. MACCORMACK.
FURNACE.

APPLICATION FILED JUNE 23, 1902.

NO MODEL.

3 SHEETS—SHEET 1.



Witnesses:

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Geo. Robt. Taylor

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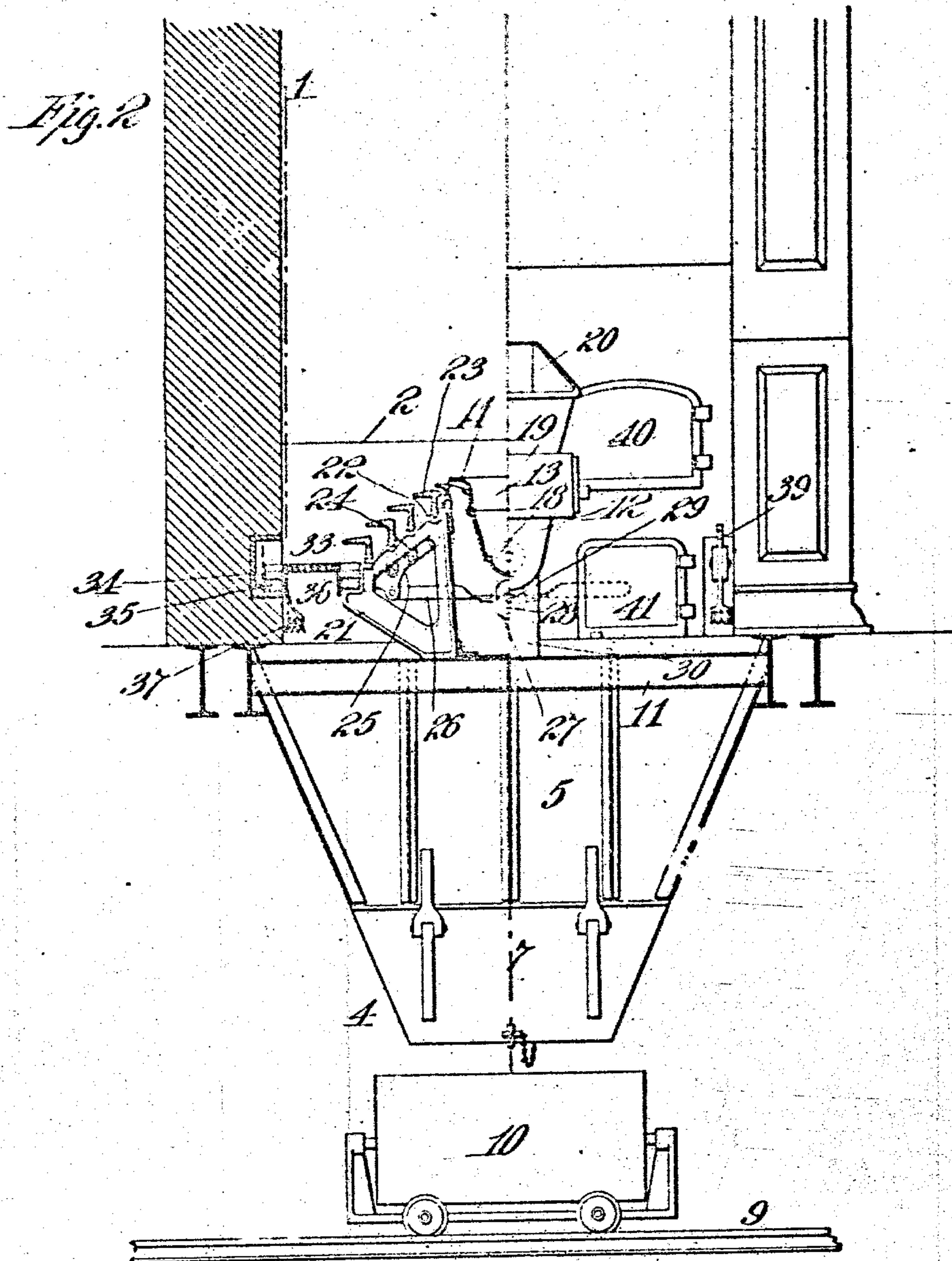
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3 SHEETS—SHEET 2.



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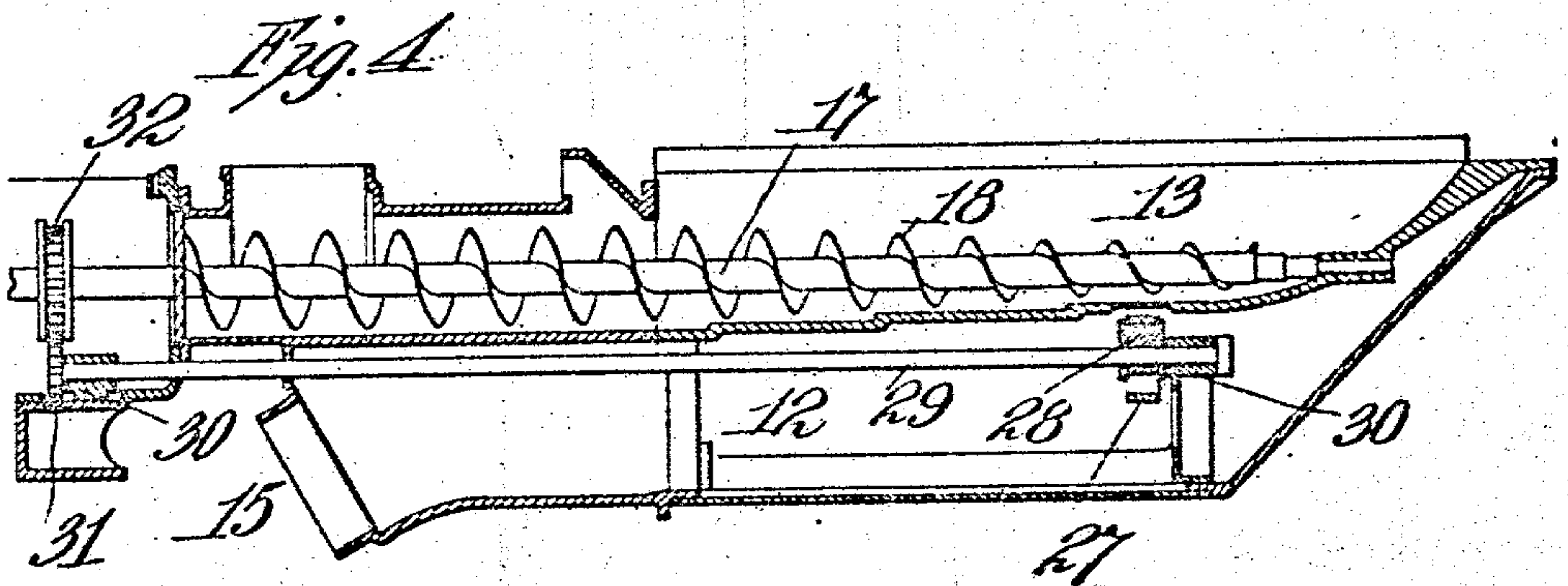
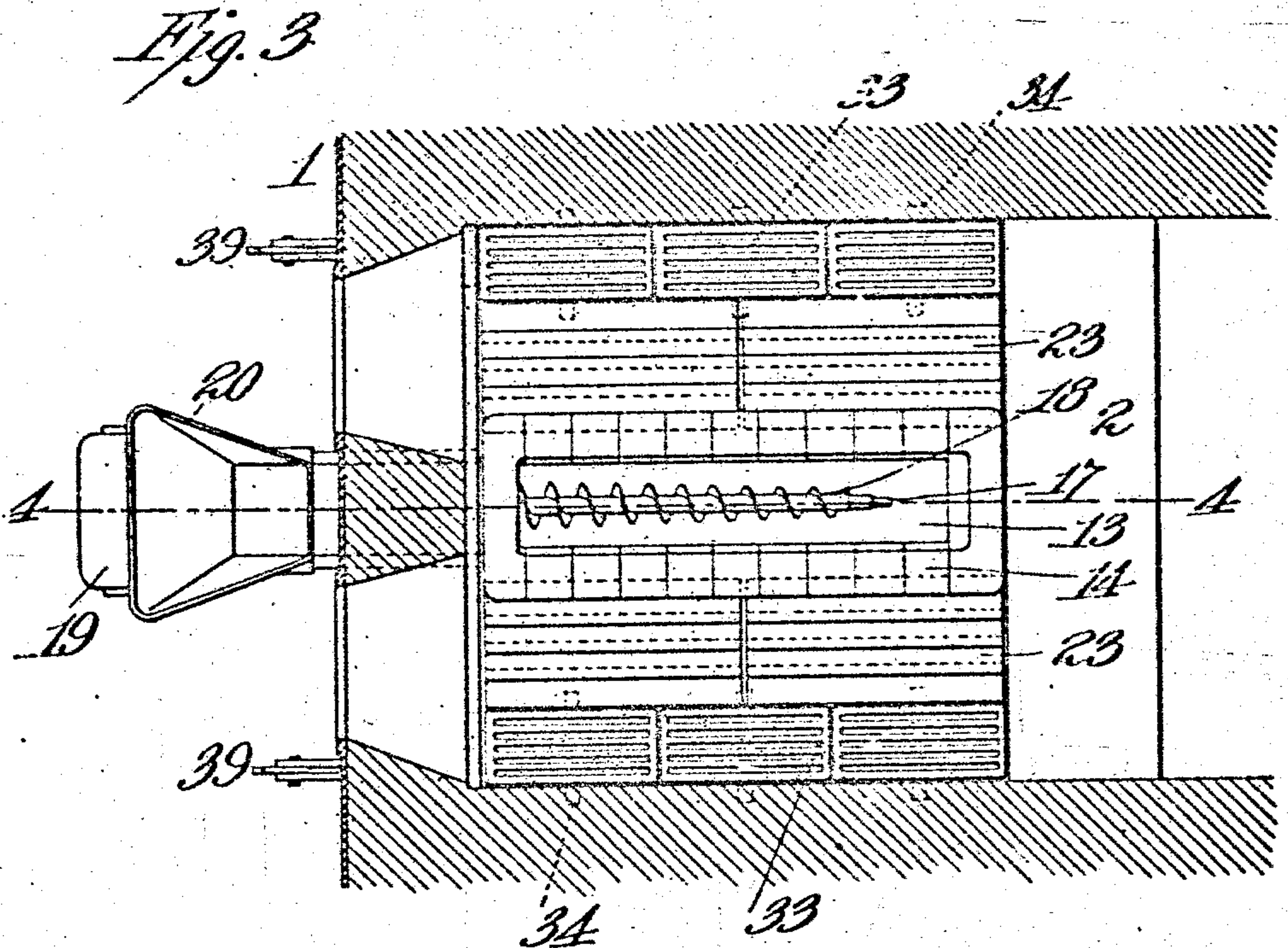
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

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FURNACE.

SPECIFICATION forming part of Letters Patent No. 740,669, dated October 6, 1903.

Application filed June 23, 1902. Serial No. 112,751. (No model.)

To all whom it may concern:

Be it known that I, JOHN MACCORMACK, a citizen of the United States, residing at Bayonne, in the county of Hudson and State of New Jersey, have invented a certain new and useful Improvement in Furnaces, of which the following is a description.

My invention relates to improvements in furnaces, and particularly to furnaces of the type employing automatic stokers for supplying fuel to the combustion-surfaces.

My objects generally are to simplify the construction and improve the operation of these devices.

My invention consists, in the first place, of improvements in the construction and manner of mounting and operation of shaking grate-bars which receive fuel from the fuel-magazine of an automatic stoker or other source whereby the construction will be very simple and efficient and will readily permit any one of the grate-bars to be removed or replaced when desired.

Further, the invention consists of details of construction and of subcombinations of elements entering into the make-up of the complete device, as will be more fully hereinafter described and claimed.

In order that the invention may be better understood, attention is directed to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a longitudinal sectional view through the furnace in its preferred form, showing a part of a water-tube boiler, the section being taken on the line 1 1 of Fig. 2; Fig. 2, a front elevation, partly in section; Fig. 3, a horizontal sectional view taken immediately above the fuel-magazine, and Fig. 4 a longitudinal sectional view through the fuel-magazine on the line 4 4 of Fig. 3.

In all of the above views corresponding parts are represented by the same numerals of reference.

The front and bridge walls 1 and 2, respectively, of the furnace are carried on heavy foundations 3 3, forming an ash-pit chamber 4 below the furnace. In this chamber is located a hopper-shaped ash-bin 5, constructed of sheet metal, with a lining 6 of refractory material, such as fire-brick. At its lower end

the ash-bin is provided with a pivoted door 7, which is normally closed and which is formed of two plates with a filling 8 between them of refractory material, preferably kaolin or other non-conductor of heat. The ash-pit chamber is provided on its floor with rails 9, carrying a dumping-car 10, into which the contents of the ash-bin may be deposited by opening the door 7. Obviously any other form of conveyer can be located in the ash-pit chamber, and although I prefer to make use of a door 7, which can be opened to periodically discharge the contents of the ash-bin, it will be evident that the ash-bin may be open at its lower end and may continuously discharge into the conveying devices. A door, however, is preferable, as when closed it prevents any updraft through the ash-bin and permits the ashes to settle effectively therein. Extending across the top of the ash-pit chamber are I-beams 11, which support the wind-box 12 of a stoker of a common type. Located in this wind-box is a fuel-magazine 13, provided with twyers 14 at its upper side edges. Leading into the space between the fuel-magazine and the wind-box is a wind-pipe 15, which extends from a flue 16, supplied with natural or forced draft. Obviously by employing a flue arranged as shown air may be supplied to a bank of furnaces arranged side by side. Located in the fuel-magazine 13, as is common with stokers of the kind illustrated, is a shaft 17, carrying a conveyer-screw 18 and driven by a small motor 19. Fuel is supplied to the conveyer-screw 18 through a hopper 20 and by the conveyer-screw is forced into the fuel-magazine and caused to pile up over the side edges of the same. Mounted on the I-beams 11 at each side of the wind-box are skeleton brackets 21, provided with recessed seats 22 in their upper inclined faces. Resting on these seats are the vertical members of right-angular grate-bars 23, the horizontal members of which overlap the next adjacent bars. Each of these grate-bars is provided with a downwardly-extending arm 24, and all of said arms are connected together by a link 25, connected to a rod 26, the latter being formed centrally with an extended eye 27, as shown. Although in Fig. 2 I illustrate only

one of these sets of grate-bars at one side of the wind-box, it will be understood that a corresponding set is formed at the other side of the wind-box, arranged as explained, and
5 that the corresponding rod 26 thereof connects with the eye 27. The eye 27 incloses an eccentric cam 28, carried on a shaft 29, mounted in bearings 30, one of said bearings being located within the wind-box, as shown.
10 The end of this shaft is provided with a spur-gear 31, which meshes with and is driven from a gear 32 on the shaft 17 for the feed-screw, so that as the feed-screw is rotated the shaft 29 will be also rotated, and by the op-
15 eration of the cam 28 the rods 26 will be reciprocated back and forth to shake the right-angular grate-bars 23. At the side of each set of inclined shaking grate-bars are mounted dumping-grates 33, arranged in three sets, as
20 shown. Each of these dumping-grates is provided with trunnions 34, by which it is mounted, so as to be dumped in supporting-brackets 35. Each dumping-grate is provided with a downwardly-extended arm 36, from which
25 extends a rod 37, passing through an opening 38 in the front wall of the furnace and provided outside of the front wall with a lever 39, which may be engaged by a suitable tool in order to dump any one of said dump-
30 ing-grates. The front wall of the furnace is provided with an opening closed by a door 40, above each of the inclined grate-surfaces, in order that the interior of the furnace may be reached for any purpose, and is also provided
35 with an opening closed by a door 41, in line with each set of dumping-grates, to permit the space beneath the latter to be also reached when necessary.

In operation power is applied by the motor
40 19 to rotate the conveyer-screw, which also rotates the shaft 29 and by means of the cam

28 oscillates the shaking-grates. Fuel is supplied to the hopper 20 and is conveyed by the conveyer-screw into the fuel-magazine and caused to pile up over the sides of the latter
45 to be deposited uniformly on both sets of shaking-grates. The oscillation of these grates causes the material to progressively pass over the same toward the dumping-
50 grates 33 and in transit the fuel will be consumed. Air is supplied through the twyers 14 from the wind-box 12 and also to the space beneath the shaking-grates, so that air can enter the burning fuel through the spaces be-
55 tween the right-angular grate-bars. When desired, any ash or clinker accumulated on the dumping-grates 33 can be removed by dumping said grates to thereby deposit the ash and other refuse into the ash-bin, from
60 which it can be removed as explained.

Having now described my invention, what I claim as new therein, and desire to secure by Letters Patent, is as follows:

In a furnace, the combination with an automatic stoker having a fuel-magazine and
65 an air-chamber partially surrounding said magazine, of a triangular bracket secured to the side of said air-chamber, an inclined bank of rectangular grate-bars on each side of the fuel-magazine, each bank of grate-bars rest-
70 ing pivotally and loosely with their vertical members in socket on one side of said bracket, an arm on each grate-bar, connections between said arms and a cam for simultane-
75 ously rocking the grate-bars of each set, substantially as set forth.

This specification signed and witnessed this 26th day of May, 1902.

JOHN MACCORMACK.

Witnesses:

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