

1,239,403.

E. KIDWELL.
REFUSE FURNACE.
APPLICATION FILED NOV. 6, 1912.

Patented Sept. 4, 1917.
3 SHEETS—SHEET 1.

Fig. 1.

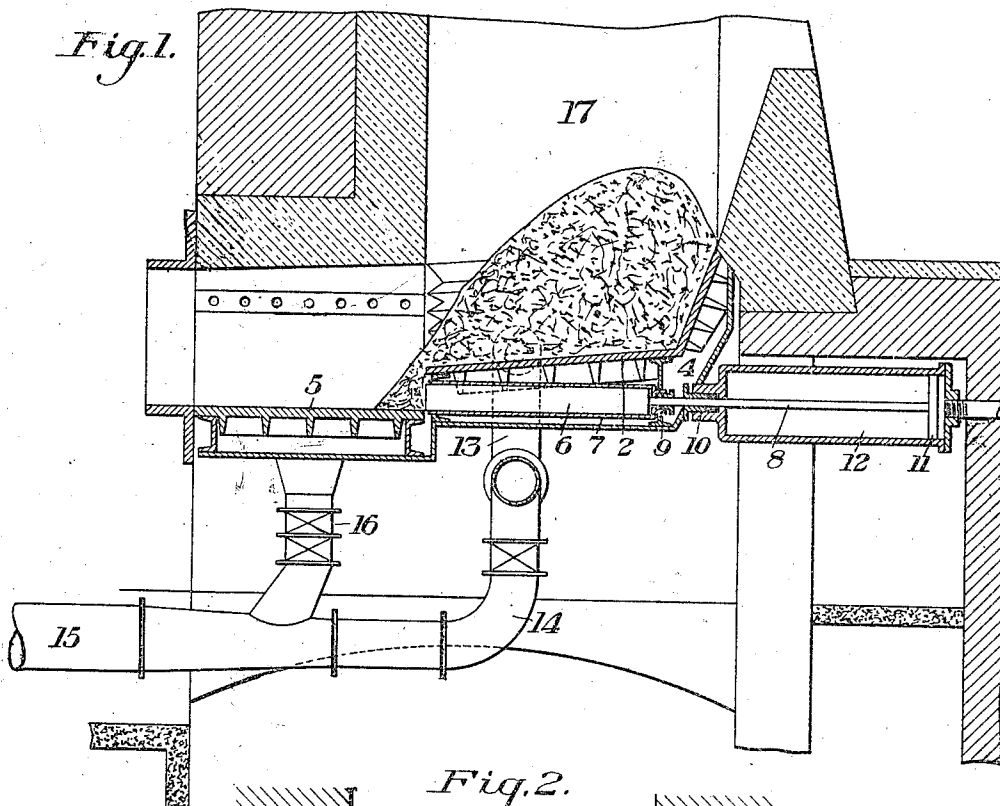
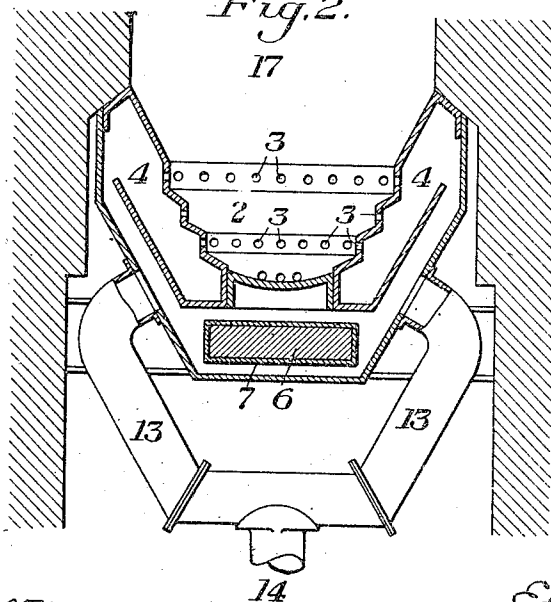


Fig. 2.



WITNESSES

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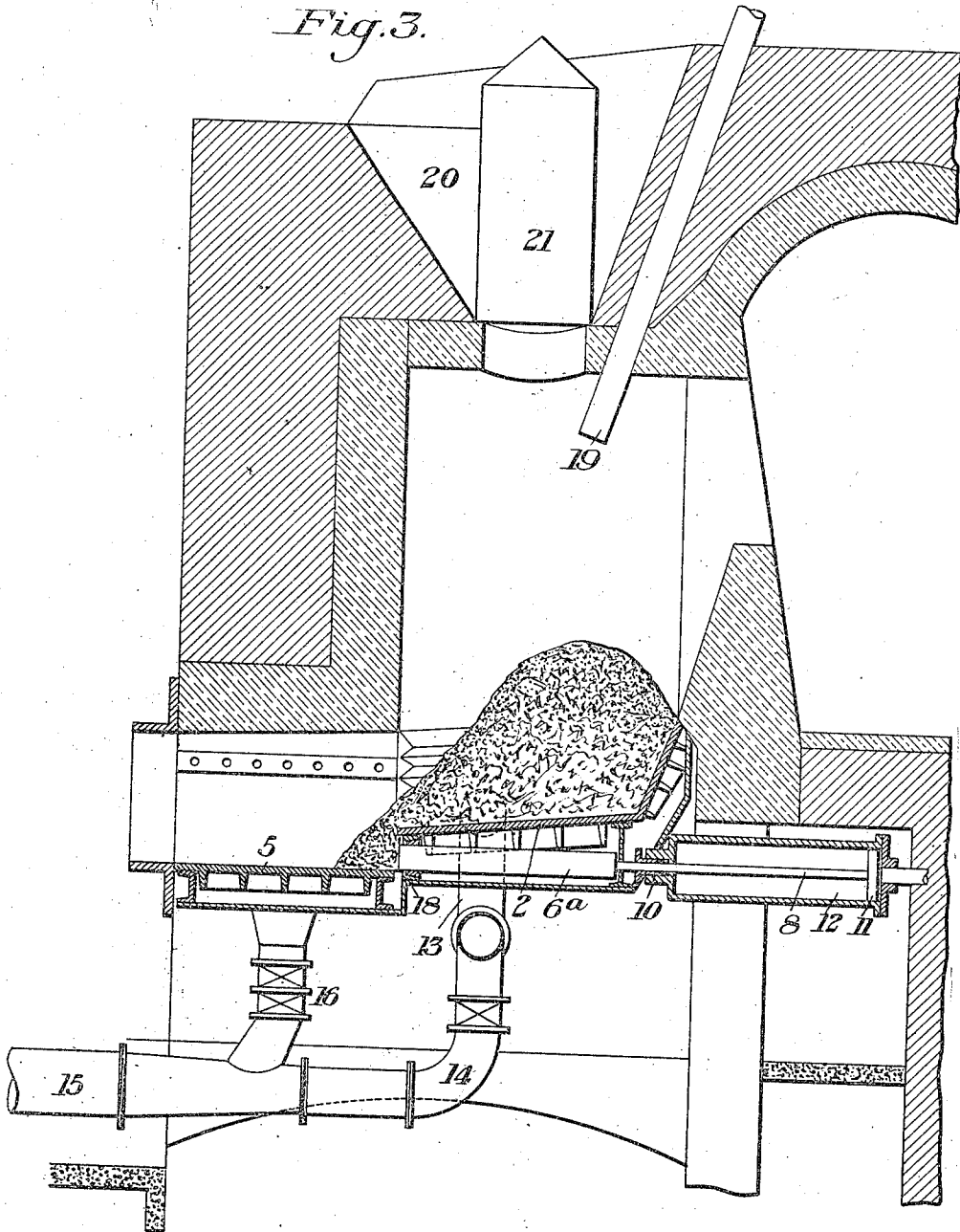
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3 SHEETS—SHEET 2.

Fig. 3.



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3 SHEETS—SHEET 3.

Fig. 4.

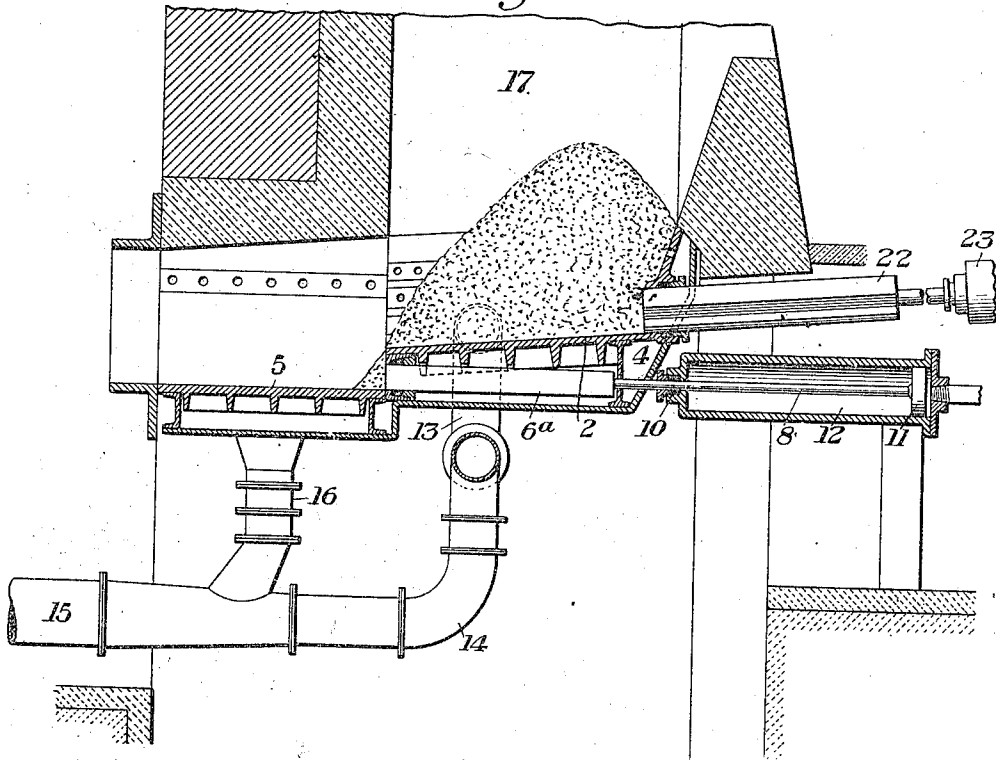
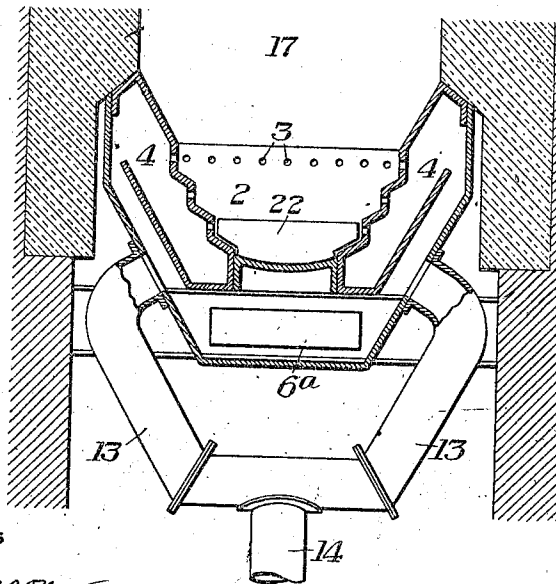


Fig. 5.



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UNITED STATES PATENT OFFICE.

EDGAR KIDWELL, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR TO WASTE UTILITIES COMPANY OF DELAWARE, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

REFUSE-FURNACE.

1,239,403.

Specification of Letters Patent.

Patented Sept. 4, 1917.

Application filed November 6, 1912. Serial No. 729,737.

To all whom it may concern:

Be it known that I, EDGAR KIDWELL, a citizen of the United States, and a resident of Washington, in the District of Columbia, have invented a new and useful Improvement in Refuse-Furnaces, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a longitudinal vertical section showing a portion of a furnace constructed in accordance with my invention;

Fig. 2 is a vertical cross section of the main grate and connections;

Fig. 3 is a view similar to Fig. 1, but showing a modification; and

Figs. 4 and 5 are longitudinal and transverse vertical sections showing another form of my invention.

The invention relates to the burning of garbage or low-grade fuels, and particularly, to the type of furnace set forth in the United States Patent to Fried No. 1,002,575. In that type of furnace, the slagged material is drawn from the main grate forwardly upon a foregrate, to which air is supplied, the heated air passing from the foregrate to the fuel on the main grate and assisting in the combustion. After the slagged material on the foregrate has been employed to heat the air, it is pulled forward and removed from this foregrate. In the preferred form, air is supplied to both grates, each under separate control, for better combustion, in accordance with the Fried process.

One of the objects of my invention is to do away with hand labor in withdrawing the slagged material from the foregrate or from the main grate to the foregrate or both. To that end, it consists in a power-operated pusher or pushers arranged to move the slagged material forwardly on one or both grates.

In the drawings, referring to the form of Figs. 1 and 2, 2 represents the main grate, which is preferably of hollow stepped form, shown in Fig. 2, having air holes 3, leading into it from the air jacket space 4, to which air is supplied under pressure. 5 is the foregrate, which is at a somewhat lower level, and may be of any desired form. At the rear end of the foregrate and in the jacket space of the main grate, as shown, I arrange a hydraulic pusher 6, fitting neatly

within a casing 7. This pusher is preferably flat and substantially rectangular in cross section. It is secured to the front end of a piston rod 8, which extends through stuffing boxes 9 and 10, and is secured to a piston 11 in motive cylinder 12.

The air for the main grate is supplied through branch pipes 13, which embrace the pusher casing and enter the air jacket above it. The branches 13 lead from a valved extension 14, of the main 15, for supplying air under pressure. A valved pipe 16 also leads from the main to deliver air to the foregrate.

In the operation of the device, the garbage is intermittently dropped into the main chamber 17, and upon the main grate thereof, and as the material is slagged, it is drawn forward upon the foregrate. The air fed to the foregrate becomes heated and passes back over the garbage on the main grate; and after the charge on this main grate is well ignited, the air supplied to the main grate is so regulated as to produce a large amount of CO gas with which the oxygen of the hot air from the foregrate unites, giving a very high heat and practically perfect combustion. After the slagged material has been used a proper length of time on the foregrate, the motive fluid is admitted to the cylinder 12, thus forcing the pusher forward and ejecting the slagged material from the foregrate out into a car or other receptacle. The slagged material on the main grate may be drawn forward, or flow forward, as desired. After the slagged material is ejected from the foregrate, the pusher is withdrawn within its case or sheath, and its end is preferably beneath the front end of the main grate to protect it from the ashes or slagged material.

In Fig. 3, I show a form similar to that of Fig. 1, except that the closed chamber 7 around the pusher 6 is done away with, and the wall 18, through a hole in which the front end of the pusher works, is suitably packed around the pusher to prevent entrance of ashes or slagged material into the air chamber below the grate. In other words, instead of packing the back end of a closed pusher chamber, I pack the hole through which the forward end of the pusher operates. In this case, I have also shown a pipe 19, entering the top of the main chamber, and through which pulverized or granulated fuel may be fed. This

furnace is capable of use with low-grade fuels, either with or without the use of the garbage. If the garbage is used, it is dropped at intervals from the hole below the hopper 20, which is opened and closed by the stopper or valve device 21. A suitable feeder is attached to pipe 19, if this is used, so that the pulverized or granulated fuel may be fed either continuously or intermittently as desired.

In Figs. 4 and 5, I show another form, wherein a pusher 22 is provided for the main grate, this pusher being operated by another hydraulic cylinder 23. This pusher may be set at an angle to the horizontal to suit the angle of the grate and may fit the lower trough portion of the grate.

The advantages of my invention result from doing away with hand labor in moving the material on the grates.

By the word "refuse" in my claims, I intend to cover any low-grade combustibles.

Many changes may be made in the form and arrangement of the grates, the air supply, etc., without departing from my invention.

I claim:

1. A refuse-burning furnace having a main combustion grate with an imperforate bottom arranged to prevent entrance of slag.

and a foregrate at a lower level and arranged to receive slagged material from the main grate, a vertical rear wall between the main grate and foregrate, and a power-actuated pusher operating through a hole in the vertical rear wall between the main grate and the foregrate and arranged to push the slagged material from the foregrate out of the furnace, substantially as described.

2. A refuse-burning furnace having a main combustion grate with an imperforate bottom arranged to prevent entrance of slag, and a foregrate at a lower level and arranged to receive slagged material from the main grate, means for separately supplying air to each grate and regulating the supply to the main grate, a jacket for the main grate forming the air chamber, and a power-actuated pusher arranged to push the slagged material off the foregrate out of the furnace, said pusher operating through the jacket space of the main grate, substantially as described.

In testimony whereof, I have hereunto set my hand.

EDGAR KIDWELL.

Witnesses:

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