

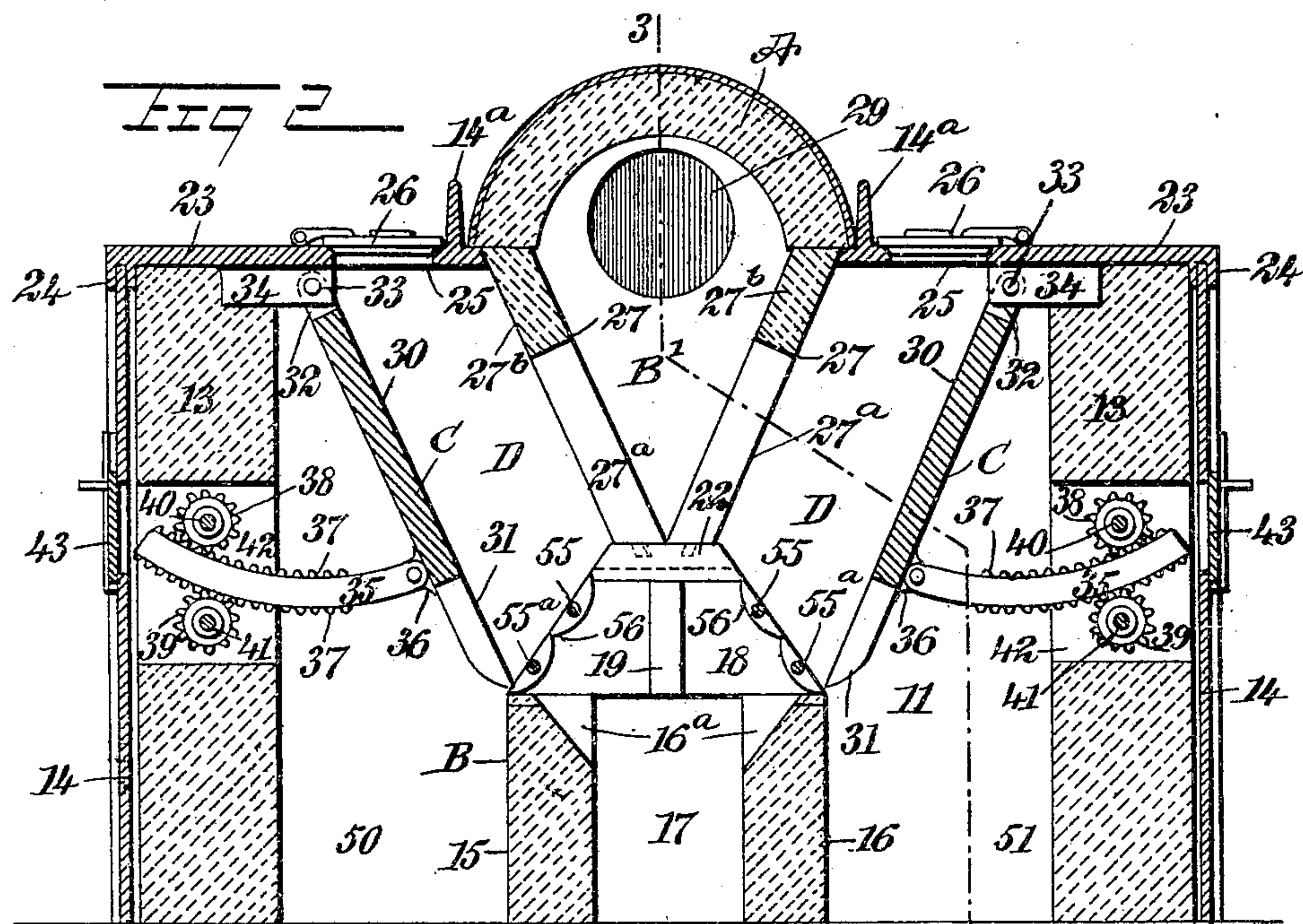
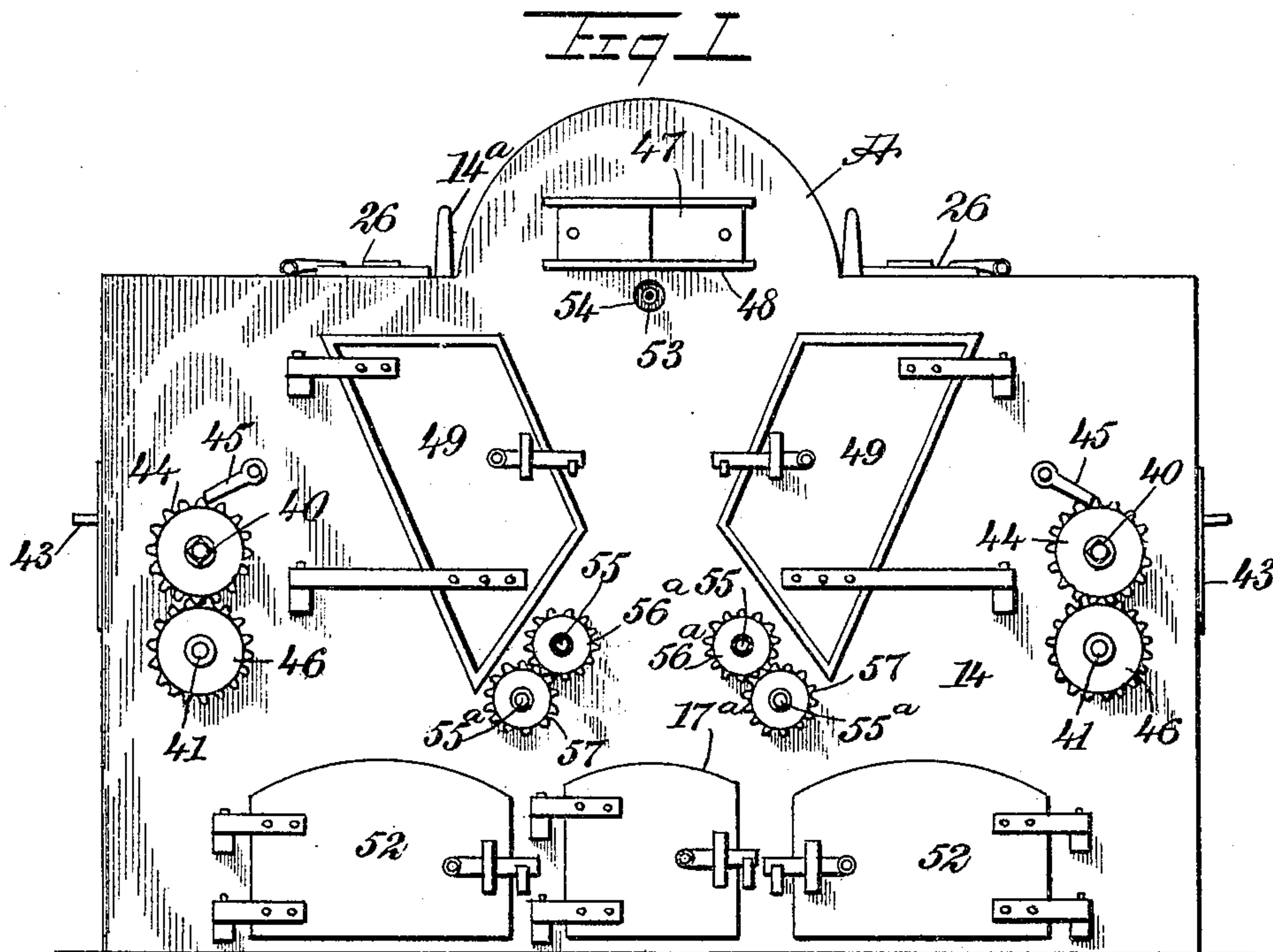
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PATENTED JUNE 13, 1905.

G. S. KENT.
FURNACE.

APPLICATION FILED SEPT. 21, 1904.

2 SHEETS—SHEET 1.



WITNESSES:

H. Walker
Geo. S. Kent

INVENTOR
George S. Kent

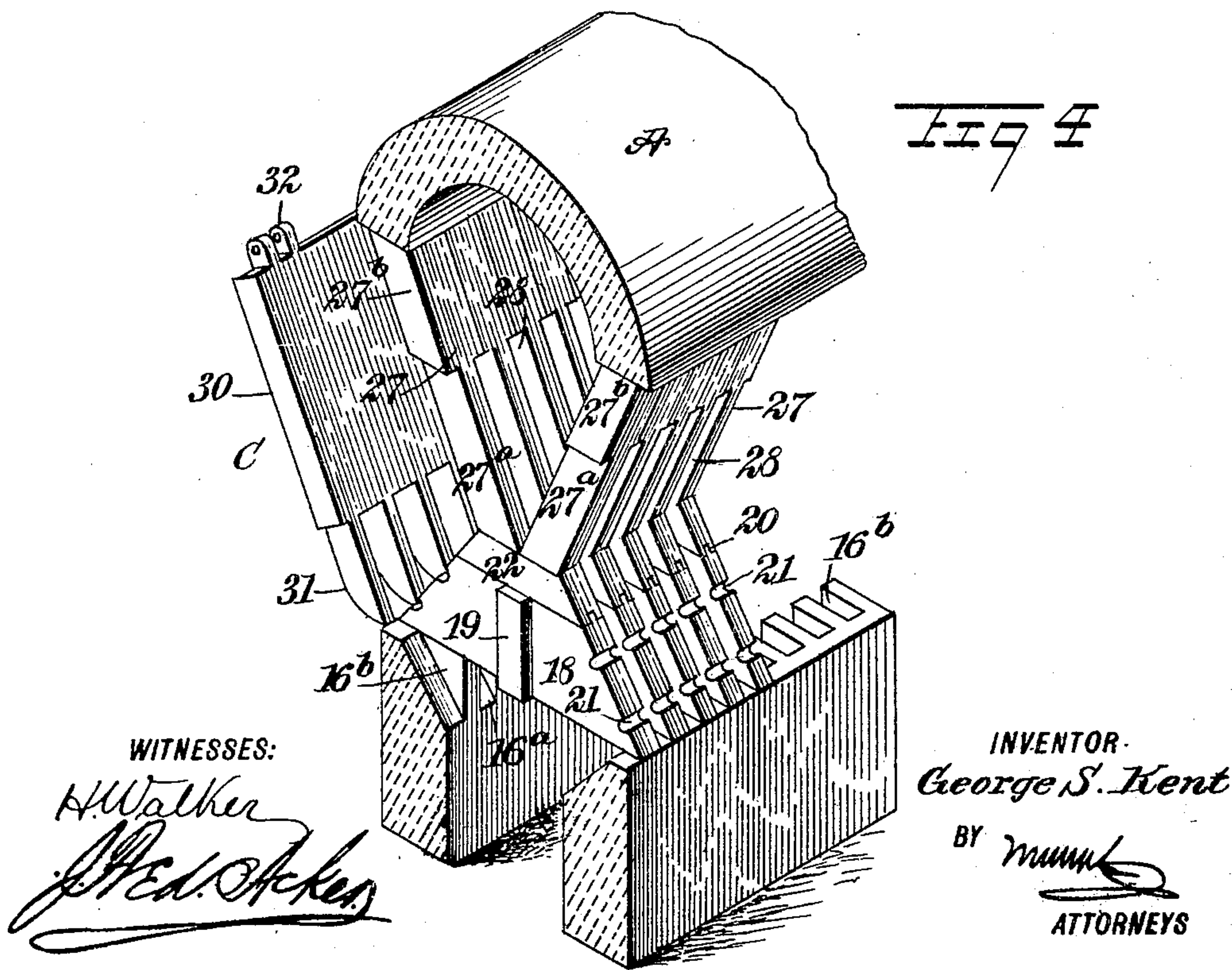
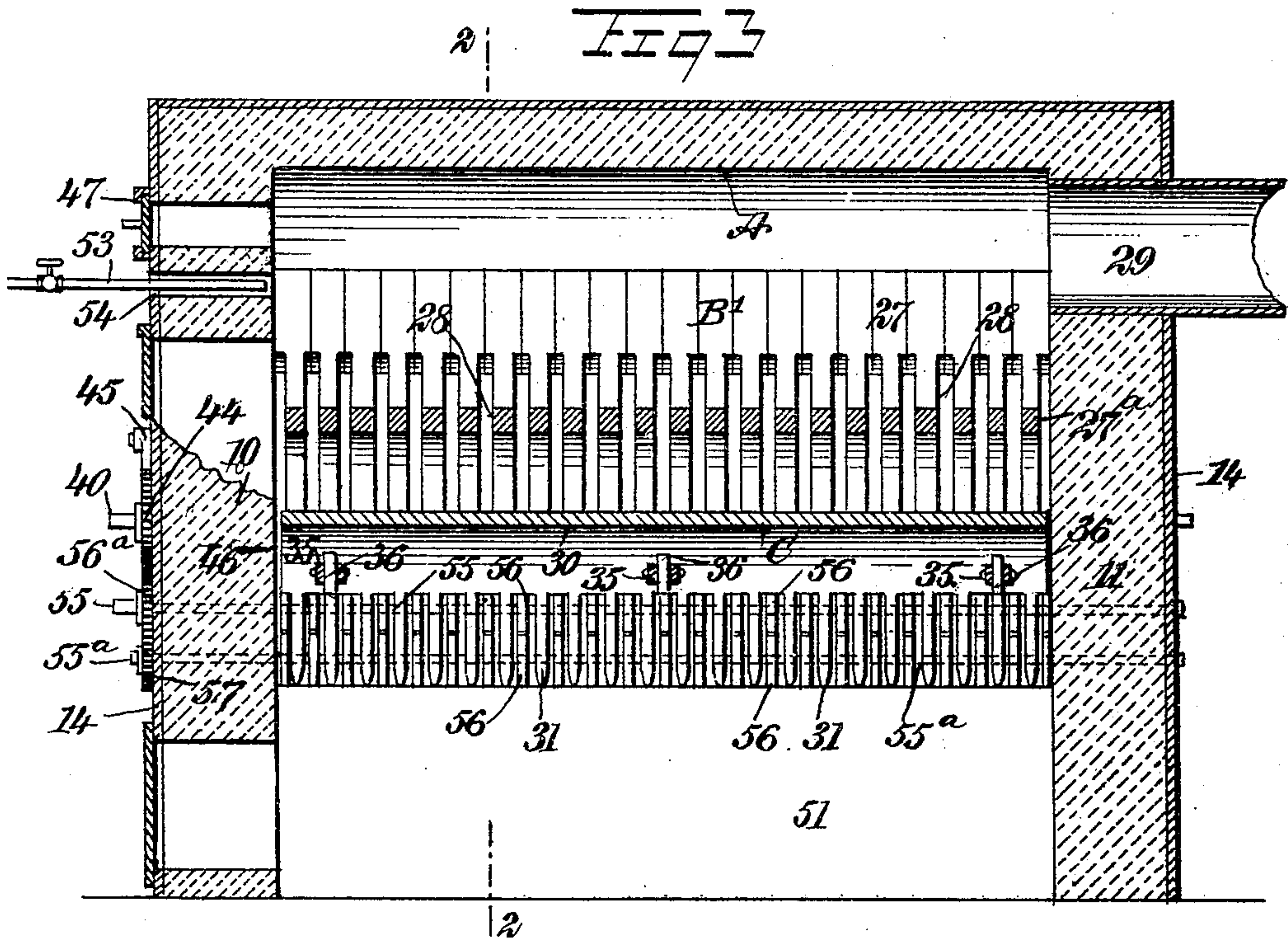
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2 SHEETS—SHEET 2.



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GEORGE SAMUEL KENT, OF BUFFALO, NEW YORK.

FURNACE.

SPECIFICATION forming part of Letters Patent No. 792,048, dated June 13, 1905.

Application filed September 21, 1904. Serial No. 225,297.

To all whom it may concern:

Be it known that I, GEORGE SAMUEL KENT, a citizen of the United States, and a resident of Buffalo, in the county of Erie and State of New York, have invented a new and Improved Furnace, of which the following is a full, clear, and exact description.

The purpose of the invention is to provide an improvement upon a furnace for which a patent was granted to me September 27, 1904, No. 771,159, the main purpose of the invention being to so construct a furnace that it will be an overdraft-furnace and will have a vast capacity for producing heat and which will thoroughly burn fine coal before said coal can escape to the ash-pits.

A further purpose of the invention is to provide a central combustion-chamber the side walls of which have lower spaced teeth and an upper dead-plate, which side walls of the combustion-chamber constitute the inner walls of fuel-chambers, the outer walls of said fuel-chambers being in the form of hinged plates having upper dead-sections and lower spaced toothed sections, the latter sections being normally held in engagement with the base-section of the combustion-chamber.

Another purpose of the invention is to provide three ash-pits, one beneath the combustion-chamber and one beneath each fuel-chamber, thus providing for a free discharge of the cinders.

Another purpose of the invention is to provide agitators or breakers adapted to turn in spaces in the base portion of the combustion-chamber and operate in the bottom of the fuel-chambers, the said agitators or breakers being operated from the exterior of the furnace, so that the bed of cinders which usually accumulates at the bottom of a fuel-chamber may be so effectually reduced that said cinders will quickly drop into the ash-pits.

The invention consists in the novel construction and combination of the several parts, as will be hereinafter fully set forth, and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a front elevation of the improved furnace. Fig. 2 is a transverse section taken vertically on the line 2 2 of Fig. 3. Fig. 3 is a longitudinal section likewise taken vertically on the line 3 3 of Fig. 2; and Fig. 4 is a perspective view of a portion of the combustion-chamber, portions of the fuel-chamber and the base on which the combustion-chamber is supported, and the central ash-pit.

The front wall 10, the back wall 11, and the side walls 13 of the furnace are preferably made of brick, although any other suitable material may be employed, and these walls are provided, preferably, with an outer jacket 14, of metal.

At the central portion of the furnace, or practically so, a partition B is formed, adapted as a portion of the base of a combustion-chamber B', to be hereinafter described. This partition B consists of suitably-spaced parallel walls 15 and 16, extending from the front to the rear of the furnace, providing what I term a "central ash-pit" 17, closed at the rear by the rear wall of the furnace and having an opening in the front of the furnace normally closed by a suitable door 17^a. (Shown in Fig. 1.)

In the upper portion of the inner faces of the walls 15 and 16 upwardly and outwardly inclined recesses 16^a are produced, alternated by upwardly-extending tongues 16^b, which are of a depth equal to the thickness of the said walls, as is shown in Figs. 2 and 4, and the upper faces of the tongues 16^b are flush with the upper faces proper of the said walls 15 and 16. The walls 15 and 16 may be of any suitable material; but fire-brick is preferably employed for the purpose.

Bridge-bars 18, preferably made of metal, extend across the upper portion of the ash-pit, resting upon the upper edges of the walls 15 and 16, where the tongues 16^b are located, and these bridge-bars 18 are separated by suitable battens 19, transversely and centrally produced on their side faces, and the ends of the bridge-bars 18 are upwardly and inwardly inclined or are inclined in direction of each other, as is shown in Figs. 2 and 4. Tongues 20 are longitudinally formed at the upper

faces of the said bridge-bars 18, while in the side edges of the bridge-bars concave transverse recesses 21 are produced, the recesses being preferably two in number, and the recesses 21 of all of the bridge-bars are in longitudinal alinement.

Cap-bars 22, made of fire-brick and having a corresponding shape to the bridge-bars, are located on the upper faces of the bridge-bars, being held in place by producing grooves in the bottom portions of the cap-bars; which grooves receive the tongues 20 at the upper portions of the bridge-bars, as is illustrated in Fig. 4.

The top portion of the furnace may be constructed in different ways, but is provided under all conditions with metal side sections 23, having marginal flanges 24 extending down over the upper portions of the outer jacket 14, and in these upper side sections 23 openings 25 are produced, normally closed by covers 26, as is illustrated in Figs. 1 and 2, and fuel for the fuel-chambers, to be hereinafter described, is passed into the said chambers through said openings 25.

It may be here remarked that upwardly-extending flanges 14^a are produced near the inner edges of the side sections 23, and between these extensions 14^a a segmental dome-section A is located, properly supported by the said side sections 23, which dome-section A may be either permanent or removable, as desired. The said dome-section and the upper plate-sections 23 constitute the top of the furnace.

Bars 27, preferably made of fire-brick, extend from the cap-bars upwardly and outwardly to an engagement with the bottom edges of the dome A and to an engagement with the inner edges of the top plates 23, as is shown best in Fig. 2. These bars are therefore in opposing series, and the bars of the series are spaced one from the other a suitable distance, thereby providing what I term a "combustion-chamber" B', having an outlet 29 at the rear of the furnace, adapted to be connected wherever desired. Each bar 27 consists of a lower toothed section 27^a and an upper dead-plate section 27^b, the toothed section 27^a of the said bars being made by longitudinally recessing their side edges, and therefore when these bars 27 are placed in position so that the side edges of the dead-plate section 27^b engage, as is shown in Fig. 4, a series of openings 28 is produced, and these openings 28 communicate with the openings between opposing bridge-bars and cap-bars, as is shown in Fig. 4, and the latter openings communicate with the ash-pit 17 by reason of the recesses 16^a in the inner faces of the walls of the ash-pit, thus enabling the ashes coming in contact with the ends of the bridge and cap bars to be directed to the central ash-pit 17.

The grate-bars C are two in number, located one at each side of the central partition B, as

is shown in Fig. 2. Each grate-bar consists of an upper dead-wall section 30 and a lower toothed section 31, the said grate-bars at their upper edges near their ends being provided with lugs 32, which are pivoted, by means of pins 33, to suitable projections 34, from the under faces of the top plates 23, and in the closed or normal position of the grate-bars they are parallel with the bars 27, forming the sides of the combustion-chamber B', and the ends of the toothed sections 31 of the said grate-bars rest upon the partition B where the bridge-bars engage with the walls 15 and 16, as is shown in Figs. 2 and 4.

Sectors 35 are shown in Figs. 2 and 3 as hinged to lugs 36, located on the outer faces of the grate-bars C, adjacent to the lower edge of the dead-plate sections 30 of said grate-bars. These sectors are preferably three in number for each grate-bar, one sector being located about centrally between the ends of the grate-bar and the other two at or near the ends of the said bar. These sectors 35 are provided with top and bottom teeth 37, adapted to engage with upper and lower pinions 38 and 39, secured upon upper and lower shafts 40 and 41, mounted to turn in the side walls of the furnace, and where the sectors 35 are located suitable openings 42 are produced in the side walls. Said openings are normally closed by doors 43 of any approved construction, which doors are opened when the grates are to be dumped to enable the sectors 35 to pass outward at their outer ends beyond the outer faces of the side walls of the furnace. All of the shafts 40 and 41 extend out through the front of the furnace, and the upper shafts 40 at their projecting ends are rendered polygonal to receive a suitable crank whereby to turn said shafts 40.

A gear-wheel 44 is secured to the outer end of each shaft 40, and a pawl 45 is employed in connection with each of the gear-wheels 44 to hold the grate-bars C in their inner or outer positions after they have been adjusted to such positions by the action of the pinions 38 and 39 on the toothed sectors 35, and in order that both shafts 40 and 41, employed in the adjustment of a grate-bar, shall move together a gear 46 is secured to the outer end of each of the shafts 41, and these gears 46 mesh with the gears 44, as is illustrated in Fig. 1.

More or less air may be admitted to the combustion-chamber B' by opening doors 47 at the front of the furnace, mounted to slide in suitable guides 48, and attention may be given to the fire in the fuel-chambers D by the use of suitable stoking-tools. In the front of the furnace doors 49 are located, which doors may be sliding or swing doors, and these doors when opened permit access to be obtained to the fuel-chamber, uncovering openings leading thereto. Access is gained to the two side ash-pits 50 and 51 through the medium of doors

52, also located at the front of the furnace, as is illustrated in Fig. 1. In order to facilitate combustion, a steam-pipe 53 is made to pass through an opening 54 in the front of the furnace; but the nozzle end of the steam-pipe does not extend into the interior of the furnace, as is shown in Fig. 3, so that when the steam enters the combustion-chamber it will have been thoroughly mixed with the admitted air.

Shafts 55 and 55^a are located at each side of the bridge-bars 18, being mounted to turn in the recesses 21 in the said bridge-bars, and on each shaft 55 and 55^a a segmental agitating or crushing plate or member 56 is mounted, and these crushing plates or members 56 are adapted as the shaft is revolved to make a complete revolution, and when they are in their normal position with their segmental faces downward, as is shown in Fig. 2, they form a grating at the bottom portion of the fuel-chambers D, and the said crushing or agitating plates on the upper shaft 55 have movement in said fuel-chambers adjacent to the combustion-chamber, while the lower crushing or agitating plates 56 on the lower shafts 55 have movement in the lower outer portions of the said fuel-chambers and in the spaces between the toothed sections 31 of the grate-bars C, and all of the said crushing or agitating plates 56 have movement in the spaces which occur between the bridge-bars 18.

Both shafts 55 and 55^a extend out through the front of the furnace, and the shafts 55 have their outer ends rendered polygonal to receive a wrench or a key of any description, and each upper shaft 55 at its outer end is provided with an attached gear 56^a, and these gears 56^a mesh with gears 57, secured on the corresponding end of each lower shaft 55^a, as is shown in Fig. 1.

The covers 26 are provided with suitable dampers which are operated to furnish the fire with suitable draft, thus rendering the furnace an overdraft furnace, which is of importance in the art.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In a furnace, a casing, a combustion-chamber located within the casing, said casing being provided with a dome-top and with side walls inclined toward each other at their lower ends, the said side walls comprising upper dead-plate sections and lower toothed sections, a hollow base constituting a central ash-pit, bridge-bars spanning the said ash-pit, which bridge-bars are spaced, the spaces between the bridge-bars corresponding to the openings between the toothed portions of the sides of the combustion-chamber, the openings between the bridge-bars being likewise in communication with the central ash-pit, adjustable grate-bars spaced from the side walls of the combustion-chamber, being movable to

and from them, and side ash-pits beneath the grate-bars.

2. In a furnace, a casing, a combustion-chamber located within the casing, said casing being provided with a dome-top and with side walls inclined toward each other at their lower ends, the side walls comprising upper dead-plate sections and lower toothed sections, a base comprising an ash-pit, bridge-bars spanning the said ash-pit, which bridge-bars are spaced, the spaces between the bridge-bars corresponding to the openings between the toothed portions of the sides of the combustion-chamber and the openings between the bridge-bars being in communication with the said ash-pit, grate-bars spaced from the walls of the combustion-chamber and hinged at their upper ends to the casing, their lower ends being toothed and adapted to normally rest at the upper edges of the ash-pit, means for opening and closing the said grate-bars, shafts located at the sides of the bridge-bars, means for operating the said shafts from the exterior of the furnace, and crushing or agitating plates secured to the said shafts, operating partially within the space between the grate-bars and the combustion-chamber and through the spaces between the teeth of the grate-bars and within the spaces between the bridge-bars.

3. In a furnace, a casing, a combustion-chamber formed in the said casing, having side walls which extend from the top of the casing downward toward each other within the casing, bridge-bars spaced from one another, forming supports for the side walls of the said combustion-chamber, the said side walls having series of openings in the lower portions thereof communicating with the spaces between the bridge-bars, the ash-pit beneath the said bridge-bars in communication with the spaces between them, adjustable grate-bars located at each side of the combustion-chamber, and spaced therefrom forming fuel-chambers, means for adjusting the said grate-bars, which grate-bars are provided with toothed lower portions and upper dead-plate sections, an ash-pit located beneath each grate-bar, said ash-pits being one at each side of the ash-pit heretofore mentioned, and means for supplying fuel to the fuel-chamber.

4. In a furnace, a casing, a combustion-chamber within the casing, having openings at the lower portions of its sides, an ash-pit, a support for the lower portion of the combustion-chamber carried by the ash-pit and provided with a series of openings in communication with the openings in the sides of the combustion-chamber, grate-bars hinged at their upper ends within the said casing spaced from the walls of the combustion-chamber and adapted to rest upon the upper portion of the ash-pit, the lower portions of the said grate-bars being toothed, and exteriorly-operated

shafts journaled in the bridge-bars at their
ends, and segmental agitating-plates secured
to the said shafts, operating within the open-
ings between the bridge-bars and within the
5 spaces between the combustion-chamber and
the grate-bars, and through the openings be-
tween the teeth of the grate-bars.

In testimony whereof I have signed my name
to this specification in the presence of two sub-
scribing witnesses.

GEORGE SAMUEL KENT.

Witnesses:

D. WILSON,
JAMES STURDY.