

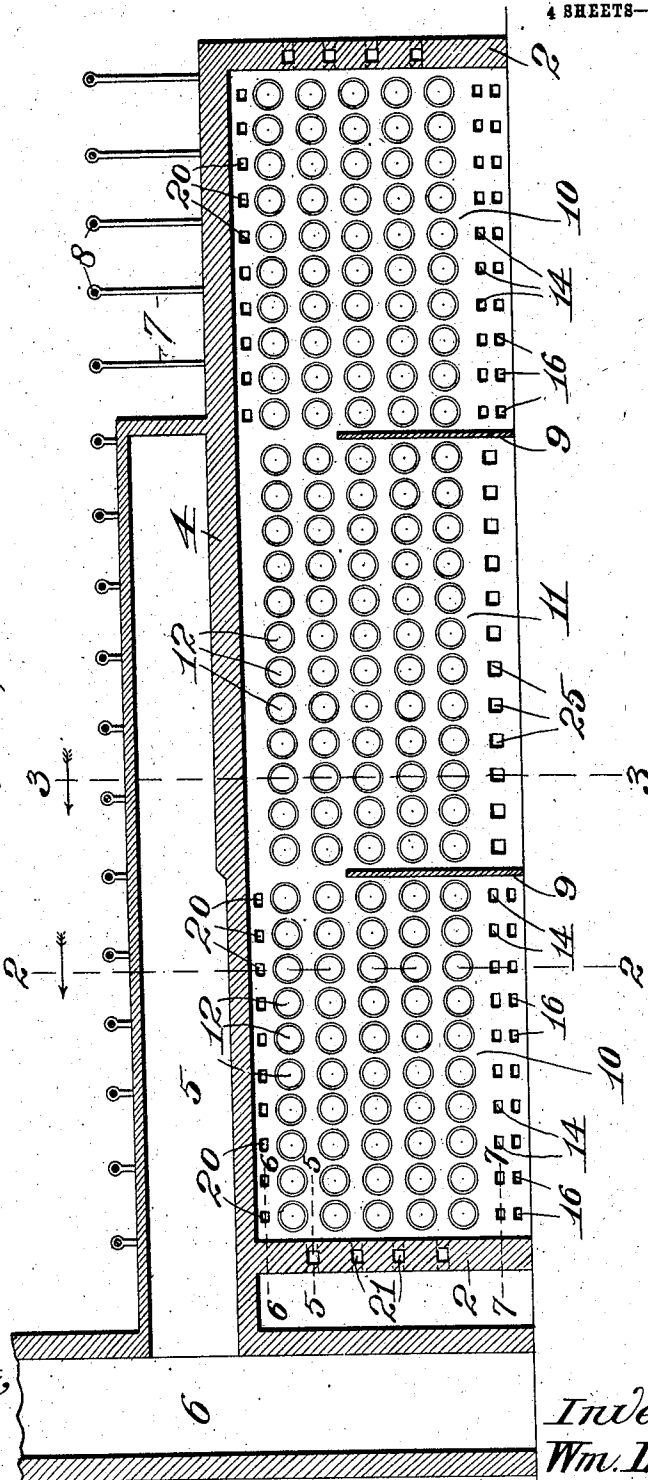
No. 839,160.

PATENTED DEC. 25, 1906.

W. LANYON.
ZINC SMELTING FURNACE.
APPLICATION FILED JULY 31, 1906.

4 SHEETS—SHEET 1.

Fig. 1.



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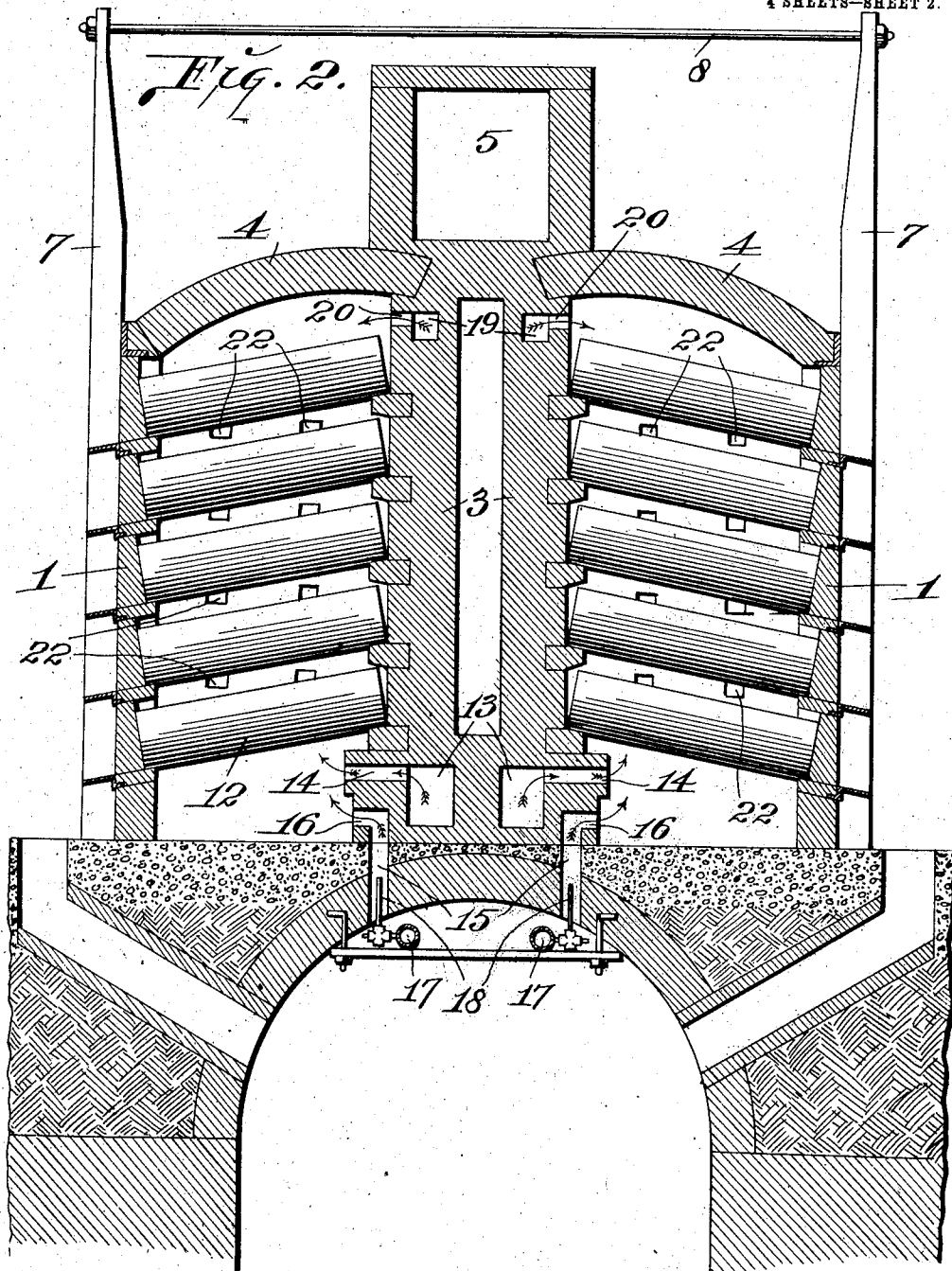
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4 SHEETS—SHEET 2.



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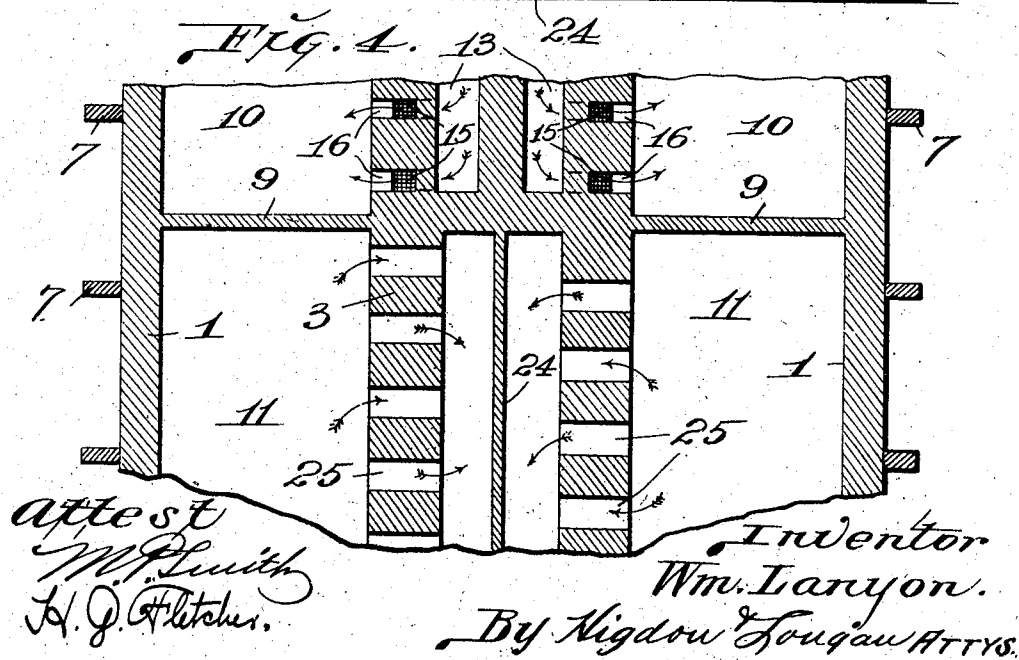
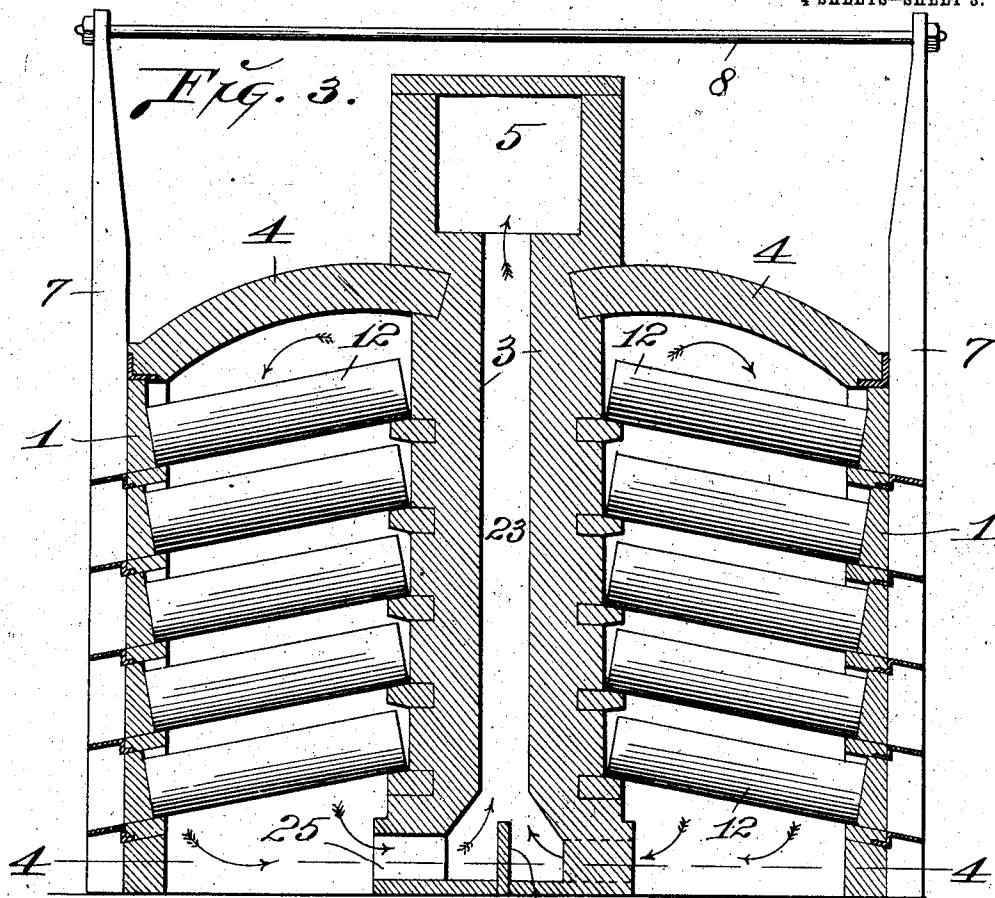
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4 SHEETS—SHEET 3.



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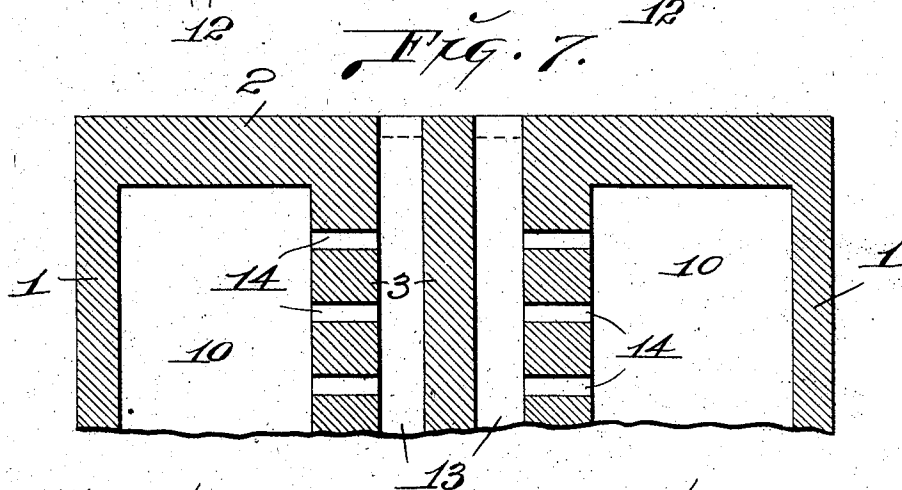
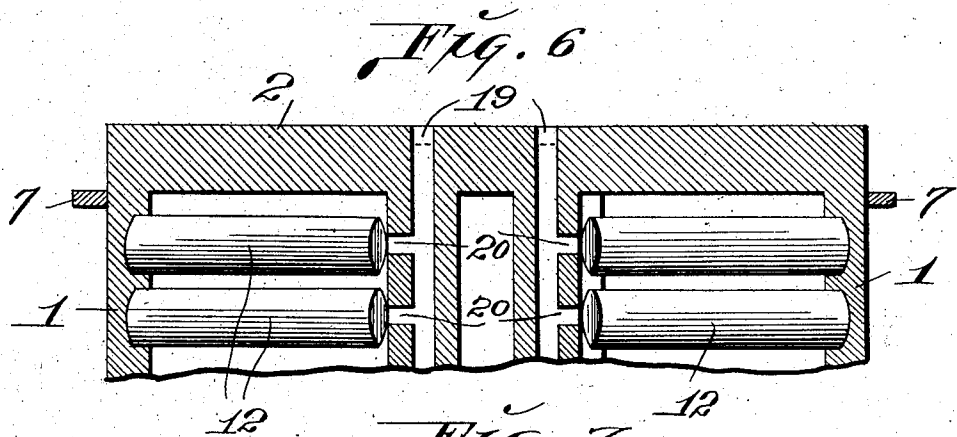
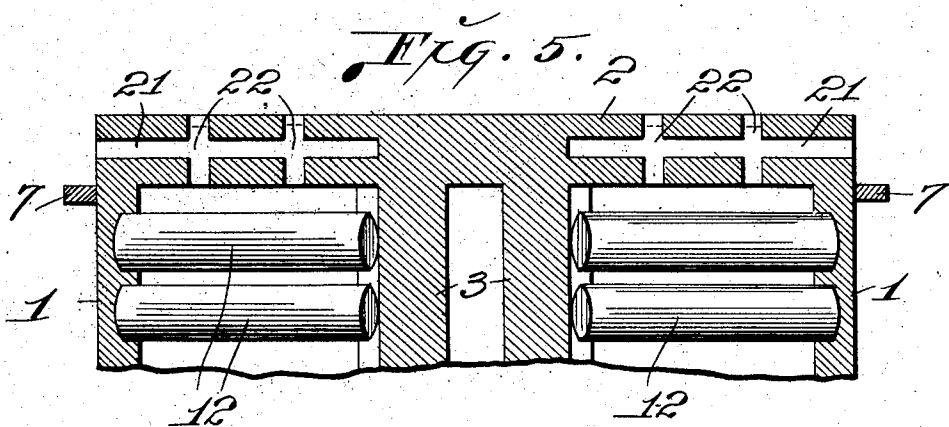
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4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

WILLIAM LANYON, OF IOLA, KANSAS.

ZINC-SMELTING FURNACE.

No. 839,160.

Specification of Letters Patent.

Patented Dec. 25, 1906.

Application filed July 31, 1906. Serial No. 328,616.

To all whom it may concern:

Be it known that I, WILLIAM LANYON, a citizen of the United States, and a resident of Iola, Allen county, Kansas, have invented certain new and useful Improvements in Zinc-Smelting Furnaces, of which the following is a specification containing a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to zinc-smelting furnaces, and particularly to a furnace for the heating of retorts used in the distillation of zinc ores and oxides into metallic zinc.

The primary object of my invention is the arrangement of a zinc-furnace whereby a gradual and perfect combustion of the fuel used for heating is obtained, thereby producing not only economy in fuel, but at the same time a more uniform and desirable character of combustion and consequent steadiness of temperature in the retort-furnace chamber, which results are highly essential for the proper volatilization and distillation of the metallic zinc and likewise the saving of the retorts or muffles from destruction usually resulting from spotted, irregular, and uncontrollable heats, as is the case in many furnaces heretofore constructed.

By my improved construction the fuel is taken in at the lower end or bottom of the furnace-chambers, where said fuel is ignited, and the fire and heat thus obtained naturally pass upwardly through the retort-chambers, strike against the furnace roof or arch, and are deflected thereby downwardly, and the flame and heat are withdrawn from outlets at the bottom of the furnace. This arrangement, together with the admission of air for combustion at the proper points, produces a condition whereby the air and gases are very easily mixed and intermingled, which naturally results in an easily-regulated perfect combustion.

The construction herein shown and described is designed to operate with natural or artificial gas or any other suitable oil or fluid fuel.

Simple and conventional alterations will readily change the furnace, so that coal or other fuel may be utilized for furnishing the desired heat.

To the above purposes my invention consists in certain new and novel features of construction, which will be hereinafter more fully set forth, pointed out in the claims, and illustrated in the accompanying drawings, in which—

Figure 1 is a vertical section taken longitudinally through the center of the furnace adjacent the center wall and showing the horizontal flue on top of the furnace in section. Fig. 2 is a vertical section taken approximately on the line 2 2 of Fig. 1. Fig. 3 is a vertical section taken approximately on the line 3 3 of Fig. 1. Fig. 4 is a horizontal section taken approximately on the line 4 4 of Fig. 3. Fig. 5 is a horizontal section taken approximately on the line 5 5 of Fig. 1. Fig. 6 is a horizontal section taken approximately on the line 6 6 of Fig. 1. Fig. 7 is a horizontal section taken approximately on the line 7 7 of Fig. 1.

Referring by numerals to the accompanying drawings, 1 1 designate the side walls of the furnace, which are built up in the usual manner; 2 2, the end walls; 3, the center wall which divides the furnace into two equal-sized retort-chambers.

4 4 designate the arches forming the roof of the furnace, which arches extend from the side walls 1 to the center wall 3, and extending longitudinally on top of the center wall 3 is a flue 5, which communicates at one end of the furnace with a stack 6.

Buckstays 7 are arranged against the side walls 1 in the usual manner, the upper ends thereof being connected by rods 8.

Transversely arranged on the interior of each of the chambers of the furnace is a pair of partition-walls 9, which divide each chamber into three approximately equal-sized compartments 10 and 11, the compartments 10 being termed the "end" compartments, as they are adjacent the ends of the end walls 2 of the furnace, and the compartments 11 being termed the "middle" compartments, owing to their location between the pairs of the end compartments 10. The partitions 9 do not extend all the way to the arches 4, so that sufficient space is provided for the free passage of the burning gases and heat from the end to the middle compartments.

Arranged in the usual manner within the

furnace between the side walls and center wall are the retorts 12, which are of the ordinary construction.

Formed in the base of the center wall 3 at each end of the furnace and extending inward as far as the partition-walls 9 are air-inlet ducts 13, and leading therefrom outward through the base of the wall 3 and discharging into the chambers 10 are the horizontally-arranged discharge-openings 14.

Leading upward through the bottom of the furnace into the base of the center wall 3 is a series of passages 15, the upper ends of which extend horizontally through the base of the center wall 3, as designated by 16, and discharge into the chambers 10, there being preferably one of these inlets 15 and discharge-openings 16 for each one of the openings 14.

Arranged in a suitable chamber beneath the furnace are gas-mains, such as 17, and leading therefrom into each one of the passages 15 is a discharge-nozzle 18.

Leading inwardly from the end walls 2 of the furnace through the upper portion of the center wall 3 and adjacent the arches 4 are air-inlet passages 19, which extend to the partitions 9, and leading from said inlet-passages through the center wall 3 into the upper ends of the chambers 11 are the discharge-openings 20. A series of air or gas inlet passages 21 are transversely arranged in the end walls 2 and extend from the side walls 1 to the center wall 3, and each one of these passages 21 is intersected by inlet-openings 22, which are formed in the end walls 2 and which discharge into the outer ends of the chambers 10. Formed in the center wall 3 and extending from one partition 9 to the other and between the compartments 11 is a vertically-disposed flue 23, the upper end of which discharges into the horizontal flue 5. The lower end of this flue 23 is somewhat wider than the upper portion, and longitudinally-disposed in said widened lower end is a baffle-plate 24, which extends from one end of said flue to the other. Leading through the base of the center wall 3, from the lower end of the flue 23 to the chambers 11, are the horizontally-disposed openings 25.

The construction as just described, and as shown in the accompanying drawings, provides for two single-retort furnace-chambers arranged back to back or divided by the center wall 3 and having no communication with each other.

Each chamber comprising the compartments 10 and 11 contains the retorts, and the space between and around the retorts in the chambers 10 is utilized for conducting the burning gases upward, and the space between and around the retorts in the chambers 11 is utilized for conducting said burn-

ing gases downward, while the arrangement of gas and oil inlet flues at the ends of the furnace is identical. The gas or fluid fuel utilized for heating the furnace discharges from the nozzles 18 upwardly through the passages 15 and horizontally outward through the openings 16. Here said gas or fluid fuel becomes mixed with air entering the passages 13 and 15 and discharging through the openings 14 and 16, and thus the mixed gas and air enters the chambers 10 and is ignited. The explosive effect of the mixture and the ignition of the air and gases as they meet in the bottoms of the chambers 10 carries them upward through the space between and around the retorts in said chambers until they finally reach the arches 4, where they are thrown backward, and at the same time they are thrown toward the center of the furnace by the natural draft, and after passing through the spaces above the partitions 9 said ignited gases pass downward through the space between the retorts in the chambers 11, and finally discharge through the openings 25 and pass from thence upward through the flue 23 to and through the flue 5 and into the stack 6.

Additional air, or a mixture of air and gas, may be discharged into the upper ends of the compartments 10 through the passages 19 and openings 20, the outer ends of which passages 19 can be partially closed by temporary fillings or suitable draft-regulating devices. In the same manner additional air or a combination of air and gas may be discharged into the ends of the chambers 10 through the passages 21 and openings 22, the outer ends of which may be partially closed by temporary fillings or draft-regulating devices.

Suitable draft-regulating devices may be, if desired, arranged at the outer ends of the passages 13.

The baffle-plate 24, arranged in the lower end of the flue 23, is for the purpose of preventing conflict or interference with the passage of the draft of the burned gases passing out of the retort-chambers 11, and said plate also tends to naturally deflect said gases upward through the flue 23.

The draft of the furnace, as shown and described, is produced by a stack or chimney; but this is not essential, inasmuch as the draft may be produced by means of an exhaust-fan or by forcing the air and gas into the furnace by pressure.

I desire to call especial attention to the arrangement of the center wall between the two retort-chambers and the construction of said wall for the purpose of throwing off the products of combustion after the same have passed through retort-chambers, which arrangement economizes space in the con-

struction of a furnace and also tends to the conservation of heat in the retort-chambers.

I do not desire to limit myself to the exact details of construction herein shown and specified, as slight variations may be made without departing from the spirit of my invention. For instance, the same result could be obtained and the same principles would be involved if the burning gases were conducted upward through the space between one-half or two-thirds of the retorts and thence drawn downward at the opposite end of the furnace through the space between the remaining retorts.

I claim—

1. A zinc-furnace, constructed with a center wall in which is formed a flue, means whereby air and gas are delivered into the ends of said furnace, and means whereby the air and gas during combustion are caused to pass upward between the retorts in the ends of the furnace, downward between the retorts in the center of the furnace, and thence outward through the flue in the center wall; substantially as specified.

2. A zinc-furnace, constructed with an inclosed chamber for the retorts, means whereby air and gas are delivered into the ends of said furnace, and means whereby the air and gas during combustion are caused to pass upward through the retorts at the ends of the furnace, and drawn downward between the retorts in the center of the furnace; substantially as specified.

3. A zinc-furnace, constructed with a center wall, there being a flue arranged in said center wall at the center of the furnace, means whereby the fuel gases and air are delivered into the ends of the furnace, and means arranged on the interior of the furnace for directing the burning gases and air upward from their point of discharge into the furnace, and thence downward and into the flue in the center wall; substantially as specified.

4. A zinc-furnace, constructed with a wall having an outlet-flue formed in its center, transverse partitions arranged in the furnace at the ends of the outlet-flue, and there being air and gas inlet passages formed through the wall in which the flue is formed at the ends of the furnace; substantially as specified.

5. A zinc-furnace, constructed with a wall having an outlet-flue formed in its center, transverse partitions arranged in the furnace at the ends of the outlet-flue, air and gas inlet passages formed through the wall in which the flue is formed at the ends of the furnace, and there being air-inlet passages formed through the end walls of the furnace; substantially as specified.

6. A zinc-furnace, constructed with a cen-

ter wall, there being a flue centrally arranged in said center wall, means whereby air and gas are delivered into the ends of the furnace through the base of the center wall, and there being inlet-openings from the exterior of the furnace through the top of the center wall at the ends of the furnace; substantially as specified.

7. A zinc-furnace, constructed with a center wall, there being a flue centrally arranged in said center wall, means whereby air and gas are delivered into the ends of the furnace through the base of the center wall, inlet-openings from the exterior of the furnace through the top of the center wall at the ends of the furnace, and there being inlet-openings formed through the end walls of the furnace; substantially as specified.

8. A zinc-furnace, constructed with a center wall, there being a flue centrally arranged in said center wall, means whereby air and gas are delivered into the ends of the furnace through the base of the center wall, inlet-openings from the exterior of the furnace through the top of the center wall at the ends of the furnace, and means whereby the air and gas during combustion are led upward between the retorts in the ends of the furnace and downward between the retorts at the center of the furnace, and the products of combustion discharging through the flue in the center wall; substantially as specified.

9. A zinc-furnace, constructed with a center wall, there being a flue centrally arranged in said center wall, means whereby air and gas are delivered into the ends of the furnace through the base of the center wall, inlet-openings from the exterior of the furnace through the top of the center wall at the ends of the furnace, inlet-openings formed through the end walls of the furnace, and means whereby the air and gas during combustion are led upward between the retorts in the ends of the furnace and downward between the retorts at the center of the furnace, and the products of combustion discharging through the flue in the center wall; substantially as specified.

10. A zinc-furnace, constructed with a center wall, there being an outlet-flue arranged in the center of said wall at the center of the furnace, and means whereby the fuel gases and air are delivered into the ends of the furnace and caused to pass longitudinally there-through and discharge through the flue at the center of said furnace; substantially as specified.

11. A zinc-furnace, constructed with a center wall, there being a flue formed in said wall at the center of the furnace, there being outlet-passages formed through the base of the wall to said flue underneath the bottom row of retorts in the furnace, and means whereby

the fuel gases and air are discharged into the ends of the furnace and caused to pass longitudinally through said furnace and discharge through the outlets and flues; substantially as specified.

12. A zinc-furnace, constructed with a wall provided with an outlet-flue, there being openings formed through the base of said wall from the retort-chambers to said flue beneath the lower row of retorts, and means whereby the fuel gases and air are delivered

to the ends of the retort-chamber and caused to pass longitudinally therethrough and to discharge through the outlets and flue; substantially as specified.

In testimony whereof I have signed my name to this specification in presence of two subscribing witnesses.

WILLIAM LANYON.

Witnesses:

W. F. ROSSMAN,
H. J. DORMAN.