

No. 749,269.

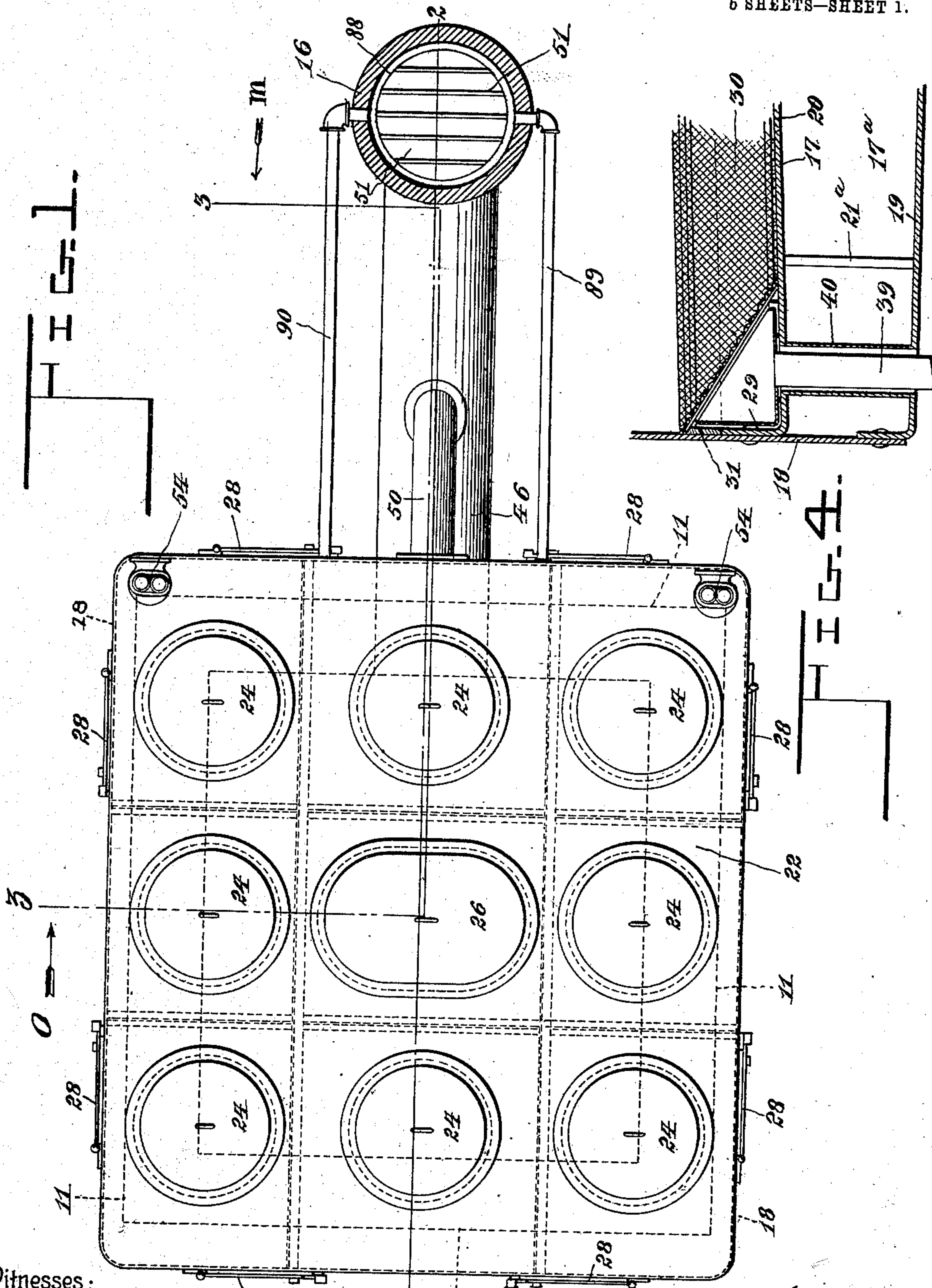
PATENTED JAN. 12, 1904.

L. F. DECARIE.
GARBAGE CREMATORY.

APPLICATION FILED JUNE 15, 1901.

NO MODEL.

5 SHEETS—SHEET 1.



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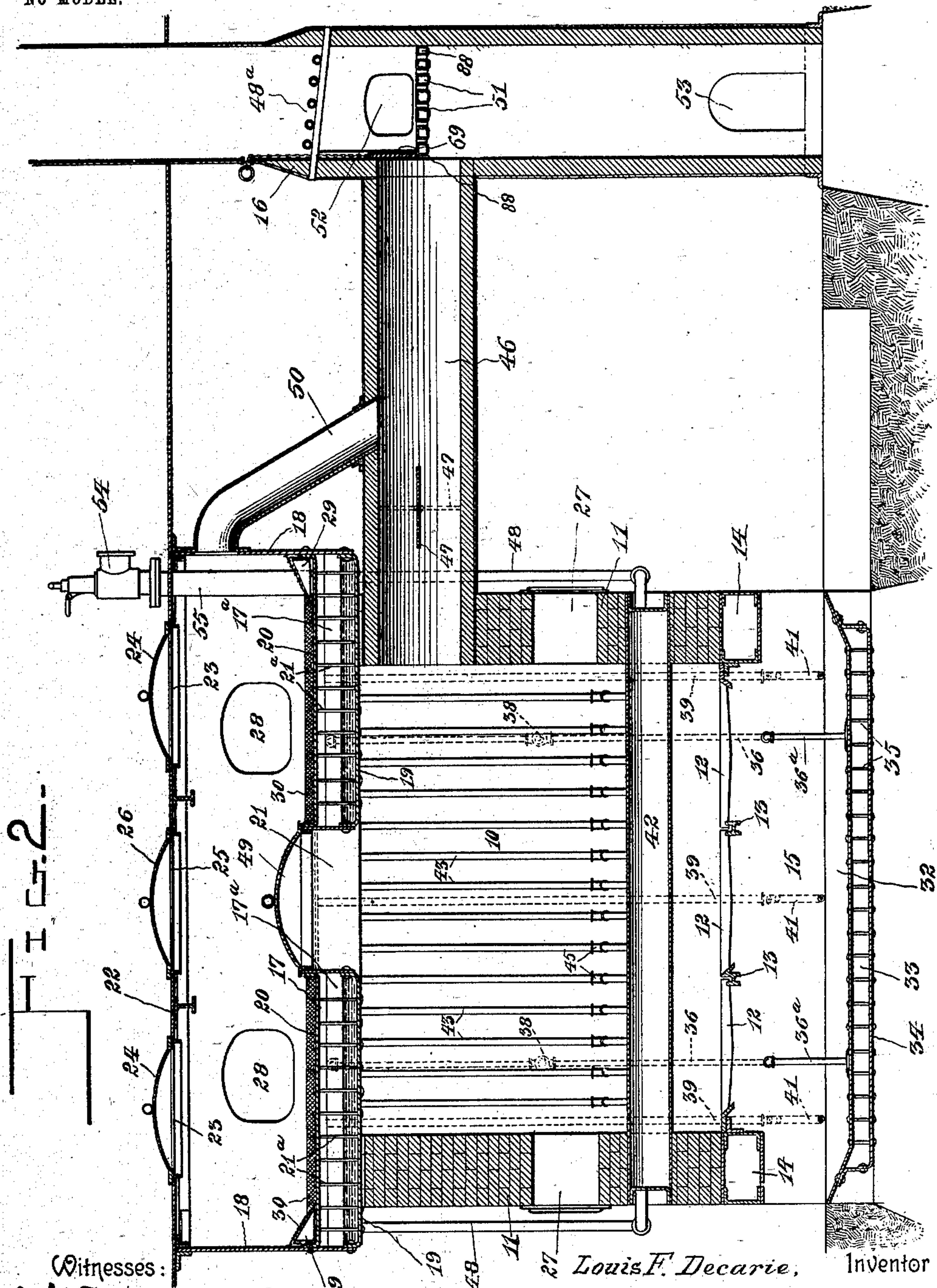
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5 SHEETS—SHEET 2.



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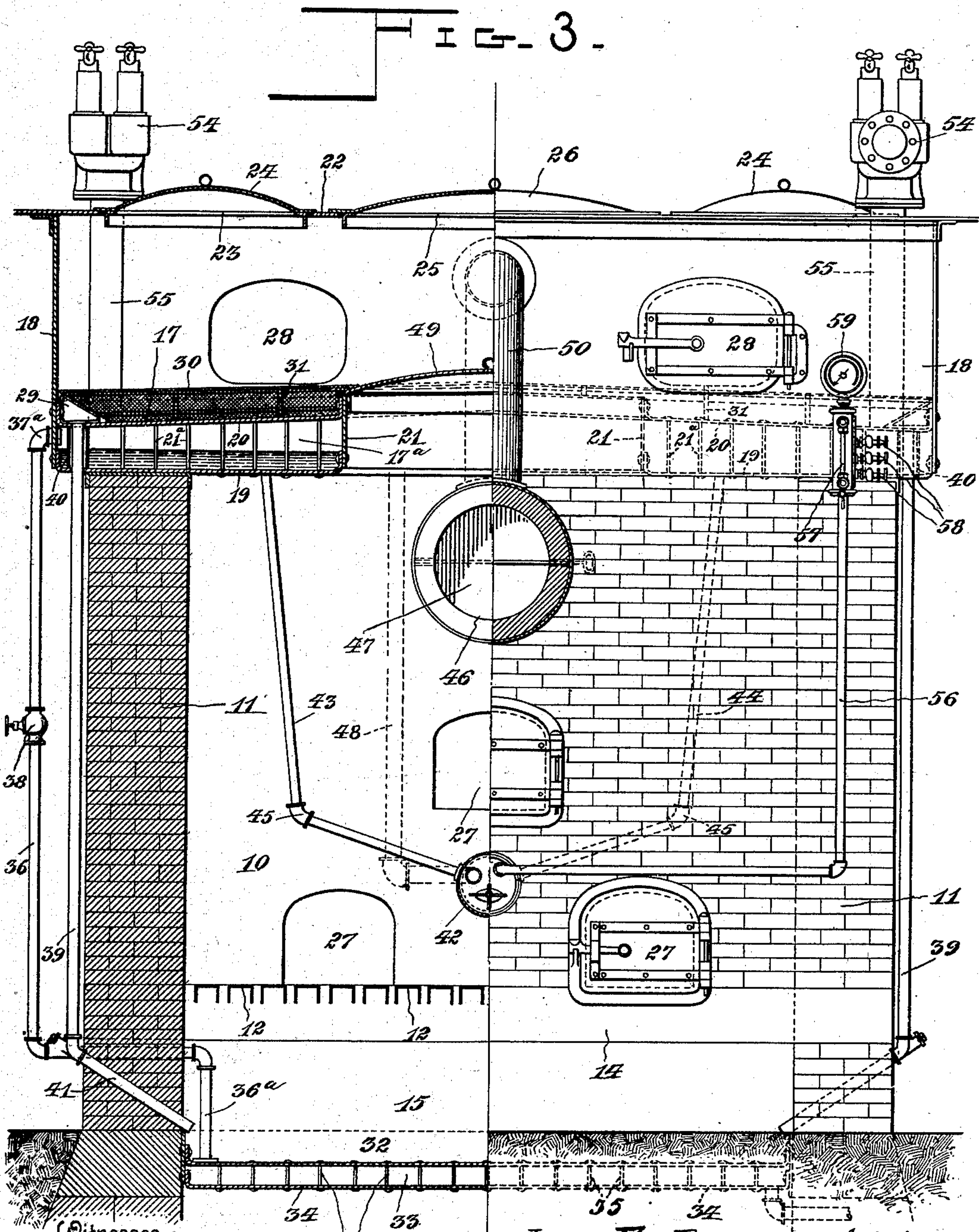
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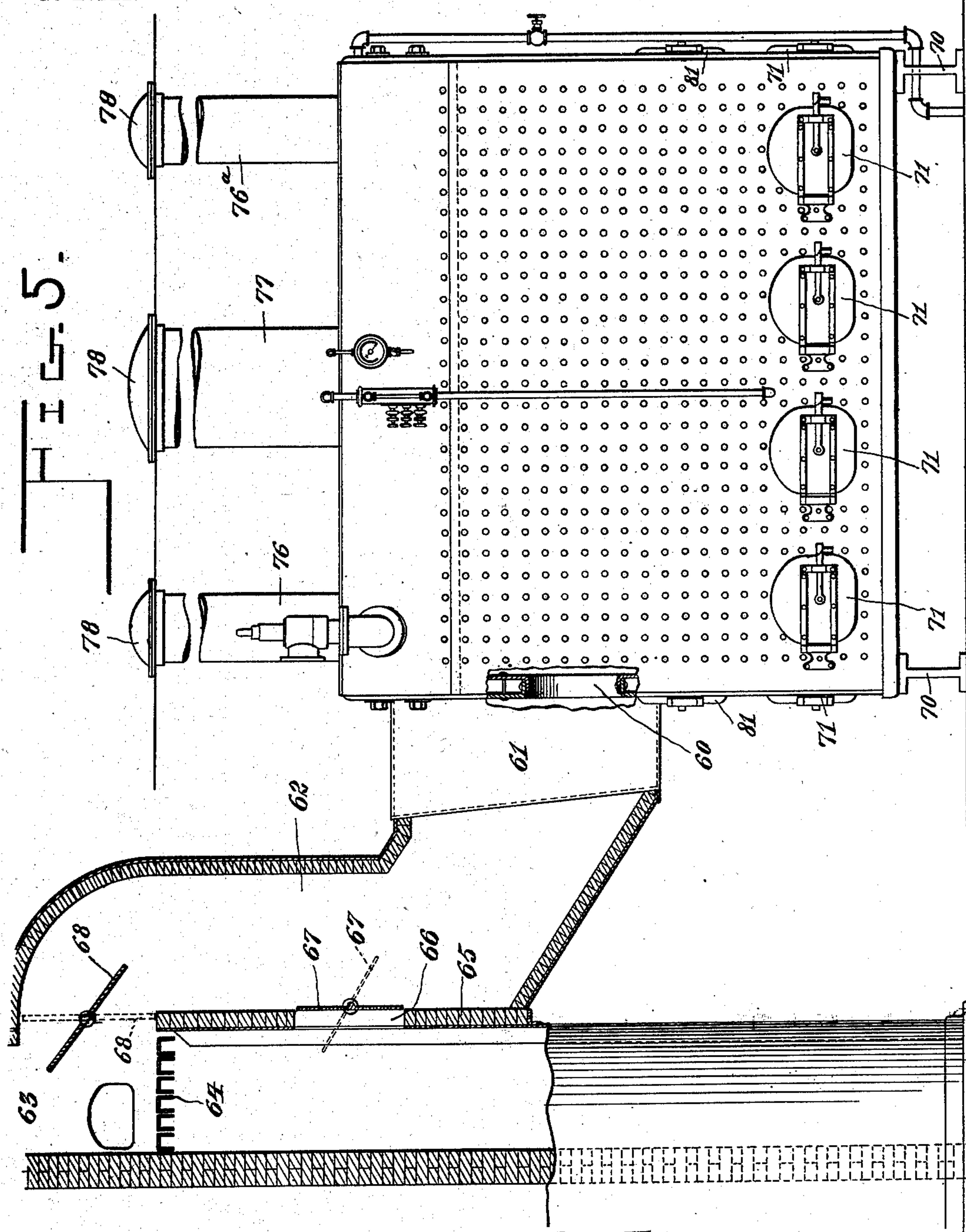
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5 SHEETS—SHEET 4.



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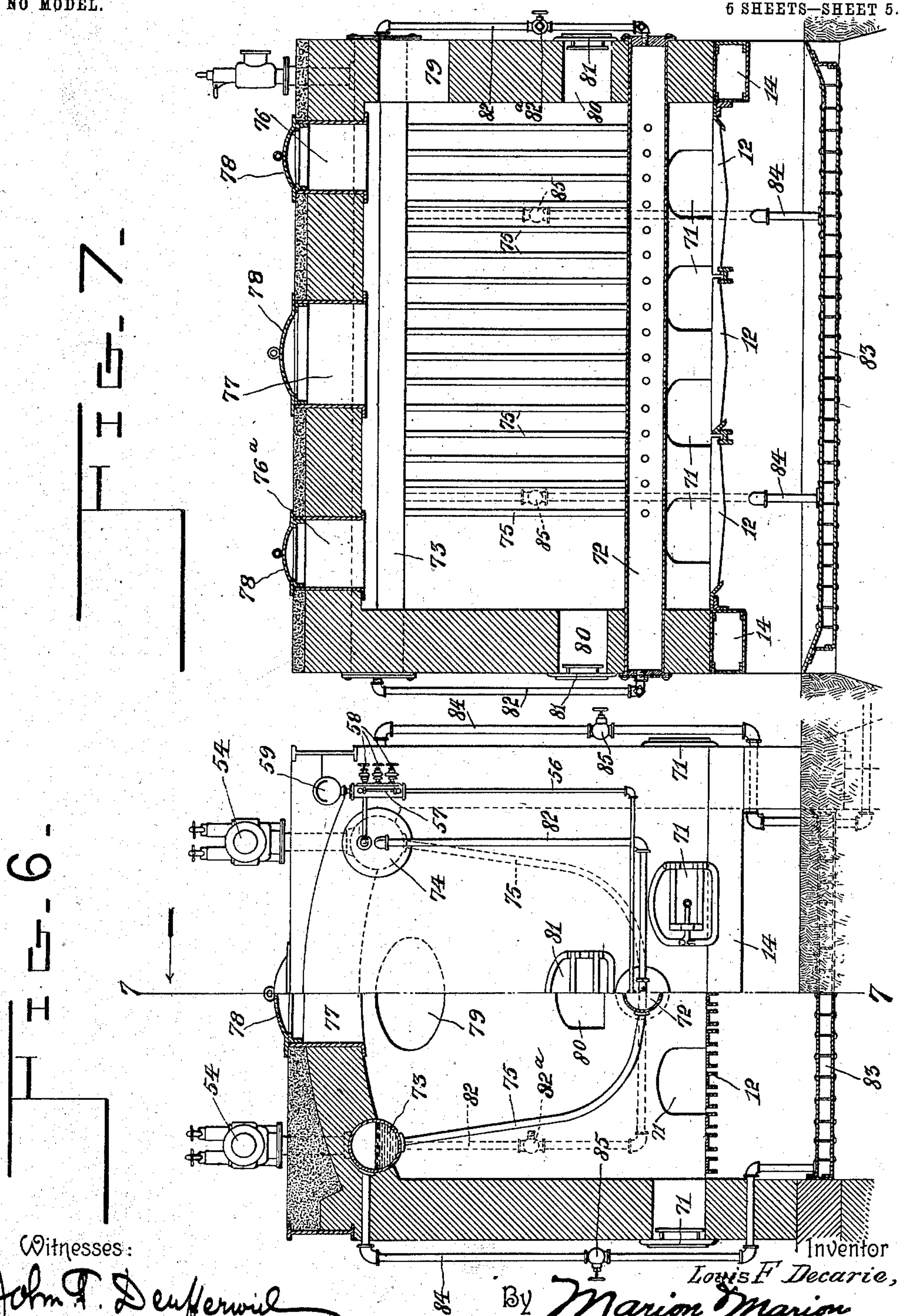
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NO MODEL.

6 SHEETS—SHEET 5.



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UNITED STATES PATENT OFFICE.

LOUIS FELIX DECARIE, OF MONTREAL, CANADA.

GARBAGE-CREMATORY.

SPECIFICATION forming part of Letters Patent No. 749,269, dated January 12, 1904.

Application filed June 15, 1901. Serial No. 64,627. (No model.)

To all whom it may concern:

Be it known that I, LOUIS FELIX DECARIE, a subject of the King of Great Britain, residing in the city and district of Montreal, Province of Quebec, Canada, have invented certain new and useful Improvements in Garbage-Crematories; and I do hereby declare that the following is a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention is an improvement in garbage-crematories; and the primary object in view is the provision of a plant by which the reduction of garbage either saturated with liquid or in a relatively dry condition may be economically conducted in a hygienic manner and without the escape of offensive gases and odors to contaminate the surrounding air.

A further object of the invention is the consumption of foul gases and odors which arise from the garbage during the preliminary drying stage of treatment and the subsequent cremation of the substance, the principal of such foul-gas consumption being available in crematories of small and large capacity.

A further object is the provision of means by which the semiliquid substance known as "swill" or liquid-saturated garbage may be treated successfully by first mechanically separating the liquid matter from the comparatively solid matter, and thereafter the process of evaporating the liquid matter, drying and incinerating the solid matter, and destroying the fumes and gases from the solid and liquid matter may all be simultaneously carried on.

A further object is to equip the plant with steam-generating appliances which are exposed to the heat maintained in the furnace for the production of steam, which may be availed of for power purposes, such as in electric generating plants, water-works, and other municipal or private installations, such generating appliances of the present invention being arranged to permit of the ready deposit of a large mass of material or of a large animal into the cremating-chamber without any hindrance whatever from the steam-generating apparatus in such chamber.

With these ends in view the invention consists in a garbage-crematory embodying certain novel features of construction and arrangement of parts, as will be hereinafter fully described, and defined by the claims.

In the drawings hereto annexed, forming a part of this specification, Figure 1 is a plan view of a crematory embodying my improvements. Fig. 2 is a longitudinal sectional elevation taken in the plane of the dotted line 2 2 on Fig. 1. Fig. 3 is a vertical transverse sectional elevation in the irregular plane indicated by the dotted line 3 3 on Fig. 1, the parts represented in elevation looking in the direction of the arrow *m*, while the parts in section are seen as looking in the direction of the arrow *o*. Fig. 4 is an enlarged sectional view through the drain-gutter and separating-screen therefor, which are located in the drying-chamber of the crematory. Fig. 5 is a view in side elevation with parts broken away and in section of a steel-plate crematory of large capacity equipped with means for consuming the fumes and foul gases which rise from garbage in process of reducing the same. Fig. 6 is a view half in cross-section and half in end elevation of another style of crematory constructed of brickwork and embodying features of my invention. Fig. 7 is an enlarged longitudinal section through the crematory of Fig. 6, the plane of the section being indicated by the dotted line 7 7 on Fig. 6.

The same numerals of reference are used to indicate like and corresponding parts in each of the several figures of the drawings.

I will first proceed to describe the crematory represented by Figs. 1 to 4, inclusive, of the drawings, in which the numeral 10 designates an incinerating or cremating chamber having the side walls 11 of fire-brick erected on a suitable foundation. Within this incinerating-chamber are a series of fire-grates 12, supported on suitable beams 13. The front and back walls rest upon the metallic girders 14, which are arranged to provide large air-spaces at the front and back of the chamber, and thus make the air-inlets to the grate equal in width to the grate itself, which insures free combustion of the garbage on the grate, said spaces also insuring easy access to the

ash-pit chamber 15 below the grates 12. 16 designates the stack or chimney of the crematory, and connection between this stack and the chambers of the crematory is had by a plurality of flues which are disposed in a manner to be hereinafter pointed out and so as to secure direct or indirect circulation of the heat and gaseous products of combustion from the incinerating and drying chambers of the apparatus to the uptake of the stack. The walls 11 of the incinerating-chamber support a steam-generator 17, from which generator rises a metallic casing 18, adapted to provide a plurality of feed-openings, and said casing forming with the steam-generator a drying-chamber into which is dumped the substance to be cremated, whereby the liquid-saturated garbage may be mechanically treated so as to separate liquid from the solid matter and to dry the solid matter to a condition suitable for feeding to the incinerating-chamber. The steam-generator consists of a bottom sheet 19, a top sheet 20, and a multiplicity of stay-bolts 21^a, which are united to the two sheets, so as to maintain the same in their spaced relations for the formation of the intermediate chamber 17^a, which is adapted to contain water up to a suitable level, as clearly indicated by Figs. 2, 3, and 4. As shown by the drawings, the top and bottom sheets of the steam-generator are united to a shell 21, which is preferably disposed at the middle of the generator and immediately over the incinerating-chamber 10, so as to form a feed-opening between the upper drying-chamber and the lower incinerating-chamber. The casing 18 is united all around to the top and bottom sheets, so as to make a simple and strong structure; but it is evident that the details of construction may be varied within the province of the skilled constructor. The top 22 of the casing 18, forming the drying-chamber, is provided with numerous feed-openings 23, which are closed by individual covers 24, and said top 22 is furthermore provided with an enlarged feed-opening 25, the latter arranged immediately over the shell 21 in the steam-generator and temporarily closed by a removable cover 26. I prefer to make the openings 25 in the cover 22 and the feed-opening formed by the shell 21 of the steam-generator of an area exceeding the area of the other openings 23, whereby a large animal may be passed through the opening 25 and the shell 21 into the incinerating-chamber 10 whenever it is desired to cremate a carcass. It is evident that garbage of any nature and from any receptacle may be deposited in the drying-chamber through either of the openings 23, the cover to which should be replaced in order to confine the fumes and gases within the drying-chamber. Access to the garbage on the grate and to the basket within the incinerating-chamber may be had by a door or doors 27, which are provided at

suitable intervals in proper walls of the furnace, and in like manner the drying-chamber is equipped with doors 28, through which the contents of the chamber may be raked or stoked in a manner familiar to those skilled in this art. It will be evident that garbage in a dry condition may be forced from the drying-chamber through the feed-opening 21 into the incinerating-chamber 10 by any suitable means or by handwork.

One of the important features of my apparatus resides in the mechanical separation of the liquid from the solid matter in swill or semiliquid garbage at an early stage in the treatment of the substance, and preferably immediately after dumping the same into the drying-chamber. To this end I construct the top sheet 20 of the steam-generator so that it will incline from the shell toward the casing 18, as clearly shown by Figs. 3 and 4 of the drawings, thus making the liquid flow toward the casing and accumulate at the outer margin of the generator or at the line where the pan joins with the metallic casing 18. A drain-gutter 29 is arranged or provided so that it will extend entirely around the margin of said steam-generator. This drain-gutter is provided for collecting the liquid matter in the garbage or swill and to separate the solid matter from the liquid, the latter having a tendency to flow by gravity toward the margin of the steam-generator owing to the inclination of its top sheet 20. As described, I provide a separator-screen 30, which is secured in any suitable way, and preferably in an inclined condition, over the drain-gutter 29, as more clearly represented by Fig. 4. This screen may consist of wire-gauze, as shown, although perforated sheet metal or other foraminous material may be substituted therefor, and this screen is backed or reinforced by a suitable frame 31, whereby the screen is supported over the open top side of the drain-gutter, and it extends continuously around the margin of the steam-generator co-extensive with the drain-gutter and across the open side thereof. The liquid matter is free to pass through the interstices or meshes of the screen, while the solid matter will be caught thereon and retained within the drying-chamber. This part of my invention also contemplates the provision of means for evaporating the liquid matter obtained from the substance under treatment, and to this end I install a jacketed evaporating-pan 32 at the bottom of the crematory and below the ash-pit 15 thereof. This evaporating-pan is co-extensive in area to that of the ground area of the incinerating-chamber or even larger than the same. Said evaporating-pan has a steam-space 33, which is provided by the employment of a jacket 34, united to the flared edge of the pan and substantially reinforced by the employment of stay-bolts 35. It is to be noted that the evaporating-pan constitutes

the floor of the ash-pit and that it is installed below the ground-line or floor of the reduction plant, the inclined walls at the front and back of the pan extending flush with the floor or ground-line. The evaporating-pan is heated by the agency of steam heat, as well as by radiation of heat from the bed of incandescent fuel on the grates 12 and by the heat contained in the ashes which may lodge in the ash-pit 15.

A plurality of steam-circulating pipes 36 connect the jacketed evaporating-pan with the steam-space of the steam-generator 17, each circulating-pipe having one length 36^a thereof disposed within the ash-pit for union with the evaporating-pan and in communication with the steam-chamber thereof, while the upper exposed portion of said circulating-pipe has an elbow 37^a, which is coupled to the steam-generator 17 at a point above the water-line in the chamber 17^a thereof, (see full lines in Fig. 3 and dotted lines in Fig. 2,) each of said pipes 36 having a suitable globe valve or cock 38, adapted to cut off the passage of steam from the steam-generator to the jacketed evaporating-pan. I also employ a series of drain-pipes 39 for conducting the liquid contents of the drain-gutter 29 to the evaporating-pan. Each drain-pipe has its upper extremity carried through a tube 40, which is expanded into the top and bottom sheets of the steam-generator on the overhanging exposed portion thereof. (Shown by Figs. 2 and 3.) The upper end of the drain-pipe may thus communicate with the drain-gutter, as shown by Figs. 3 and 4, while the lower part of said drain-pipe has an inclined length 41, arranged to extend through the wall of the furnace and to terminate directly above the evaporating-pan, whereby the liquid drained from the garbage may flow from the gutter through the pipes 39 and directly into the evaporating-pan 32 at the bottom of the furnace.

Another important feature of my apparatus is the provision of a garbage-holding basket situated in the incinerating-chamber above the grate therein, said basket holding the damp or dried garbage above the grate, so that the fire may burn brightly thereon, but at the same time the dried garbage is free to pass through the basket or it may be raked mechanically therefrom so that the garbage is available for use as fuel to support combustion on the grate. This basket consists of tubular members which provide for circulation of water into and from the incinerating-chamber, so as to utilize the heat in the generation of steam to be used for power purposes, and said water-circulating and steam-generating devices are, furthermore, arranged to permit of the deposit of any matter through the feed-opening in the shell 21 without obstruction from said devices. In the preferred embodiment of this feature of the invention a header 42 is arranged in a horizontal position longitudinally of the incinerating-chamber and at a suit-

able distance above the grates 12. This header is connected with the steam-generator 17 through the medium of two series of hollow members or supports 43 44, which constitute the garbage-holding basket above the grate, said members or supports arranged as indicated by full and dotted lines in Fig. 3 and one series of supports being also represented by Fig. 2. The two series of supports diverge on inclined lines from the header 42 toward the sides of the incinerating-chamber, and said supports thence extend upwardly in vertical or slightly-inclined lines, so as to be joined to the steam-generator. Said supports are disposed in such relation to the feed-opening in the shell 21, located in the steam-generator, that they permit the free and unobstructed passage of a large carcass or any material therethrough or from the drying-chamber or from the feed-opening 25 into the incinerating-chamber. The upper ends of the two series of hollow members or supports are coupled or united in any preferred way to the steam-generator 17, so as to have communication with the water-space thereof; but the lower ends of said tubular supports are united to the header 42 for communication with the chamber thereof. The tubular supports provide for circulation of water from one side of the steam-generator to and through the header and back to the other side of the steam-generator, thus exposing the circulating water to the action of heat in the incinerating-chamber and evolving steam, which accumulates in the steam-space of said steam-generator, and at the same time these hollow members or supports afford grates or surfaces for the lodgment and retention in the basket of the material to be consumed.

46 designates a smoke-flue, which leads from the back wall of the incinerating-chamber to the stack to establish communication between these parts and secure the necessary draft in the chamber. This flue is provided with a draft-controlling damper 47, and said flue is coupled to the incinerating-chamber just below the steam-generator and at the middle portion of the end of the basket afforded by the tubular members or supports 43 44. The members or supports of this basket are arranged to hold the garbage in a dry or a damp condition over the bed of fuel on the grates 12 and in a manner for the fire to burn brightly thereon. Also the smoke and products of combustion are free to rise from the grate and to circulate upwardly and around the basket, over and around and through the garbage confined in the latter, so that they can pass from the incinerating-chamber to the flue 46 in a manner to burn or dry the garbage in the basket and to heat the water contained in the tubular members or supports 43 44. The upright and inclined lengths of the tubular supports are united by elbows 45, so arranged as to permit expansion

of the members in a downward direction and avoid rupturing the joint between the members and the pan 17 or the elevation of the latter. The upright lengths of the tubular members serve to suspend and strengthen the inclined lengths of the members in a manner to make them capable of sustaining the maximum load of garbage. The arrangement of the basket relative to the grate makes the flame flow in paths around the mass of garbage and to closely follow the outlines of the mass of garbage, so that as the size of the mass decreases the flame and products of combustion will pursue a course of escape more nearly direct to the flue 46 and the stack. The garbage in the basket is thus dried and partly consumed; but the garbage may be stoked and raked, so as to be discharged from the basket to the grates 12 to be used as fuel thereon. Water circulation between the header 42 and the steam-generator is also obtained by the pipes or columns 48, arranged outside of the furnace.

The fumes and foul gases arising from the garbage during the process of drying the same in the elevated drying-chamber are free to escape from the inclined connecting-flue 50, the latter having one end coupled to the rear portion of the drying-chamber and its other end united to the flue 46 at a point between the damper 47 and the stack, thus making provision for the unobstructed circulation of the fumes from the drying-chamber to the stack through the rear part of the flue 46. When the operation of cremating garbage is well under way, the damper 47 may be closed, so as to partially check the draft through the incinerating-chamber and the stack, and thus the products of combustion pass upwardly from the feed-opening in the shell 21 and circulate in the drying-chamber. The fumes, steam, and products of combustion are drawn from the drying-chamber through the downwardly-inclined connecting-flue 50. It will be noted that the flues 46 50 discharge the gaseous products of combustion into the uptake of the stack, and in this stack is provided means for consuming the fumes and gases. This means resides in a supplementary grate 51, which is suitably secured in the stack so as to support a bed of incandescent material in the stack. This supplementary grate is arranged in the plane of the longitudinal axis of the flue 46, into which discharges the flue 50, and it supports the bed of incandescent material somewhat above the plane of the horizontal axis of the flue. The gaseous products of combustion passing through the flues 46 50 are drawn by the draft from the stack over the bed of incandescent material on the supplementary grate; but some of the fumes which escape through the flues 46 50 are compelled to pass beneath the grate and up through the fuel on said supplementary grate. This combination and arrangement of parts provides for con-

sumption of the fumes and foul gases which are generated by combustion of garbage in the incinerating-chamber and drying of garbage in the drying-chamber, and thus the process of reducing garbage may be carried on in a hygienic manner and without contaminating the air. A suitable door-closed opening 52 is provided in the stack above the supplementary grate for stoking the fire thereon, and a clean-out door 53 is also provided in the stack below said grate.

Suitable safety-valves 54 are connected by pipes 55 with the chamber of the steam-generator 17 to allow of automatic reduction in the steam-pressure of said generator. The incinerator is also provided with a water-column 56, having communication with the header and with the steam-generator, and this water-column is equipped with appliances usually provided in steam-boilers—such as the gage 57, the try-cocks 58, and the pressure-gage 59. (See Fig. 3.)

The feed-opening in the shell 21, which is provided in the steam-generator, or, as it may be termed, a "water-tank," is intended under some circumstances to be closed by means of a cover, which is indicated by the numeral 49 in Fig. 2. In the use of the furnace during working hours of the day this cover 49 is removed from the opening in the shell 21, so as to permit the heat and a part of the products of combustion to pass from the incinerating-chamber into the drying-chamber, as heretofore described; but when the plant is left without attention, as at night, it becomes desirable to "bank" the furnace. This is accomplished by supplying the necessary quantity of partially-dried garbage to the basket within the incinerating-chamber, so as to feed garbage as fuel to fire on the grates 12, placing the cover 49 in the opening in the shell 21, and filling the drying-chamber to the desired extent. This permits the fire to burn continuously in the incinerating-chamber, the draft through which is checked by closing the opening in the shell 21 and by proper adjustment of the damper 47, and at the same time the contents of the drying-chamber are being dried over night, so as to be in proper condition for feeding to the grate in the incinerating-chamber, the liquid matter from the garbage in the drying-chamber being free at all times to escape from said chamber to the evaporating-pan.

Although I have shown and described the walls 11 of the furnace as being made of masonry or fire-brick, I do not limit myself to this particular material, because it is my purpose under some circumstances to make the entire furnace from plates of rolled steel or other equivalent material. In fact, the furnace represented by the accompanying drawings has its whole upper part constructed from plate-steel, including the steam generator or tank 17, the drying-chamber 18, and the cover

or top of said chamber 18, said cover or top being provided with suitable openings, which are closed by the covers 24, as heretofore described. In the construction of the crematory of plate-steel the walls thereof may be made hollow, so as to provide for circulation of water therethrough.

I also provide the stack or uptake with means for arresting the escape therethrough of paper and other light materials which may be drawn by the draft from the incinerating-chamber and carried upwardly through the stack. This arresting means consists of one or more series of bars or tubes 48^a, which are secured in the uptake at a suitable distance above the supplementary grate 51 and are arranged therein so as to leave openings or spaces for the free passage of products of combustion. These checking bars or tubes are arranged, preferably, in inclined positions and they extend through the walls of the stack in order to provide for the circulation of air through the tubes, thus preventing the tubes from burning out by the heat escaping through the stack, and at the same time the tubes catch and detain any pieces of paper which may be drawn from the incinerating or drying chamber.

In the crematory shown by Fig. 5 the communication between the incinerating-chamber and the stack is established by a single flue, and the supplementary grate (indicated at 64) is arranged at a considerable elevation above the plane of the outlets (one of which is shown at 60) from the incinerating-chamber. The outlets provide for the passage of the products of combustion from the rear portion of the incinerating-chamber into a short shell 61, and from this short shell extends the flue 62, which has direct communication with the uptake 63 at a point above the horizontal plane of the incinerator. The supplementary grate 64 is provided in the uptake at a considerable distance above the shell 61, and in one of the walls 65 of this uptake is provided a port 66. Said port is at a suitable distance below the supplementary grate, so as to establish communication between the flue 62 and the uptake at a point below the supplementary grate for the passage of foul gases into the uptake at a point which will insure circulation thereof through the grate and the incandescent material thereon. A suitable damper 67 is arranged to close this port and cause all the products of combustion to circulate through the flue 62 over the incandescent bed and into the stack. If it is desired to thoroughly consume the fumes and gases which pass from the crematory of Fig. 5, I provide the flue 62 with another damper 68, the same being arranged at the line of communication of the flue 62 with the uptake 63, and said damper is adapted to be operated in any suitable way. It is evident that the damper 68 may be closed to cut off direct commu-

nication from the flue to the stack and that the damper 67 may be opened in order to allow the fumes, gases, and other products of combustion to pass through the port 66 into the space below the supplementary grate 64, whereby the fumes and gaseous products of combustion are made to circulate through the bed of incandescent material on said supplementary grate. This provision for entirely consuming the fumes and gaseous products of combustion may also be embodied in the crematory represented by Figs. 1 to 3, inclusive, and by reference to Fig. 2 it will be seen that a cut-off 69 may be employed to close the space between the upper half of the flue 46 and the supplementary grate 51. This cut-off may be slidably fitted in the stack or uptake and operated in any suitable way, so as to be adjusted above the horizontal plane of the flue 46 when it is desired to allow the unobstructed exit of the gaseous products of combustion from the furnace to the stack. When the cut-off is lowered for its bottom edge to rest next to the supplementary grate 51, the gaseous products of combustion from the furnace and the flue 46 are caused to pass beneath the grate, thence upwardly through the bed of incandescent material thereon, and to make their exit through the stack, thereby effectually destroying any foul gases or fumes which may be generated in the crematory by the combustion of refuse therein.

I prefer to support the rolled metallic or steel plate furnace shown by Fig. 5 upon the metallic girders or I-beams 70, which are placed at the ends of the crematory, although they may be provided at other and intermediate points. This construction provides wide air spaces or openings beneath the crematory, so that the air will be free to pass from either side of the furnace to the grates, the width of the air openings or passages being equal to the width of the grate, thus insuring the most perfect combustion of the fuel thereon.

Although I have shown and described the tubular supports 43, which form the basket within the incinerating-chamber, as made of lengths of piping which are united together by the elbows 45 and although this construction contemplates the union of these tubular supports 43 with the header 42 and with the steam-generator 17 by screw-threaded joints, I do not limit myself to this particular construction of the tubular supports 43 nor to the employment of the elbows 45, because each tubular support may be made of a single piece of piping which is curved or bent, as shown by Fig. 6, and which has its ends expanded into the header in the steam-generator, thus firmly uniting the parts by expansion-joints.

The crematories shown by Fig. 5 and by Figs. 6 and 7, respectively, embody the same generic features with respect to the employment of the basket, which is formed by the series of tubular supports extending upwardly

from a header which is located immediately above the fire-grates, and said supports having communication with other headers, which may be considered the equivalent for the steam-generator 17 in the construction of the swill-garbage crematory represented by Figs. 1 to 3, inclusive. There is one difference, however, in the construction of the furnace shown by Figs. 6 and 7 from that shown in Fig. 5, and this resides in the employment of fire-brick to form the walls and arched roof of the crematory in Figs. 6 and 7, whereas the construction shown by Fig. 5 is made of rolled metal or steel plate, as hereinbefore set forth. In each of the crematories shown by these three figures of the drawings—to wit, Figs. 5, 6, and 7—the structure is equipped with the grates 12, access to which is obtained by a series of stoking-doors 71, which are provided in the side and end walls of the furnace. Each crematory has a lower header 72, which is the equivalent for the lower header 42, said header 72 extending longitudinally of the furnace at the middle thereof and just above the grate 12, the end portions of said lower header being suitably received in the end walls of the furnace, as shown more clearly by Fig. 7. Furthermore, each crematory is provided with two upper headers 73 74, the same being arranged at the upper portion of the incinerating-chamber, near the opposite sides thereof, and extending the full length of the crematory, so as to be partially supported by the end walls thereof. These headers 73 and 74 are the equivalent for the steam-generator shown in Figs. 1, 2, and 3 of the drawings and are included in the general term “generator” in the description and claims herein. The two series of tubular supports are indicated at 75, and they are disposed on opposite sides of the vertical plane of the lower header 72, each tubular support consisting of a single length of piping bent or curved at an intermediate point of its length and having its lower end expanded into the lower header and its upper end expanded into one of the upper headers. The two series of tubular supports extend upwardly from the lower header to the upper header, so as to form with said headers a basket or grate which is adapted to receive and contain the garbage that is subjected to the action of the flame and heat on the grate 12, so as to be partially consumed and to be thoroughly dried while it is contained in said basket or grate. The sides of this basket or grate are disposed quite close to the side walls of the crematory, thus allowing the narrow spaces to exist between the grate and the side walls of the furnace; but the lower portion of this basket is formed by the header 72 and the lower portions of the tubular supports 75, whereby the garbage is suspended by the basket directly above the bed of incandescent material on the grates 12, as shown by Figs. 6 and 7. The

garbage may be supplied to the suspension-basket through the series of feed-openings 76 76^a 77, each having a cover 78, said feed-openings 76 76^a being of smaller cross-sectional area than the feed-opening 77, the latter being arranged centrally with respect to the crematory. The upper and lower headers extend the full length of the crematory; but the series of tubular supports are preferably arranged so that they will extend from the rear end wall of the furnace nearly to the feed-opening 76^a, which is situated near the opposite end wall of the furnace, said feed-opening being indicated at 76^a to distinguish it from the feed-opening 76. (See Fig. 7.) From this description it will be evident that the garbage which may be deposited through the feed-openings 76 77 will fall directly into the basket and lodge upon the header 72 and some of the tubular supports 75; but any garbage which may be dumped through the feed-opening 76^a will not enter the basket, but will continue to drop through the incinerating-chamber until it rests upon one of the grates 12 at one end of the furnace. This termination of the garbage-suspending basket within the plane of one of the feed-openings, as 76^a, allows garbage of a certain character to be dumped through the crematory directly upon the grate; but other garbage of a moist or semiliquid character may be dumped in either of the feed-openings 76 or 77, so as to be received within the garbage-suspending basket, in which said moist garbage is retained for a certain length of time in order to subject it to the action of the heat and flame, and thus reduce the garbage to a condition sufficiently dry to serve as fuel when discharged from the suspending-basket upon the grate 12. Furthermore, the flame and products of combustion rising from the grate will pass upwardly on opposite sides of the mass of garbage and upwardly around one end of the mass of garbage which is confined within the basket that extends only part way the length of the furnace, and thus the garbage is subjected on all of its sides to the action of the heat which flows in different directions around the suspended mass until the currents of the flame and heat meet in the outlet-opening 79, which discharges to a flue, such as 62. The partially-dried garbage which is confined within the suspending-basket may be mechanically stoked by suitable implements that may be thrust through the stoke-holes 80, which are provided in the walls of the furnace above the horizontal plane of the lower header 72, said stoke-holes adapted to be closed by the doors 81. The crematory constructed of fire-brick, as represented by Figs. 6 and 7, is advantageous over the steel-plate construction shown by Fig. 5, because the upper headers 73 74 may be partially embodied in the arched brick roof, whereby the steam-spaces of these upper headers are protected from the action of the heat by the roof, whereas the lower

water-spaces of said headers are exposed to the action of the heat and products of combustion within the incinerating-chamber, all as more clearly represented by Fig. 6.

5 Suitable water-circulating pipes 82 are provided between the upper and lower headers and on the outside of the crematory, as shown by Figs. 5 to 7, in order to maintain the desired circulation of water through the parts
10 comprising the basket, and one of these circulating-pipes may be provided with a suitable cock, as at 82^a, by which water may be supplied to the water-spaces of the garbage-suspending basket. Said crematory should
15 also be equipped with steam safety-valves and with the water-gages. I also provide the crematory with the jacketed evaporating-pan 83, which is arranged within the limits of the furnace and directly below the fire-grates 12.
20 This jacketed pan is maintained at a high temperature by the agency of steam supplied through the steam-pipes 84, which have communication at their lower ends with the chamber of said pan and at their upper ends with
25 the steam-spaces of the headers 73 74, each steam-pipe having a suitable cock or valve 85. The feed-openings 76, 76^a, and 77 of the crematory shown by Figs. 6 and 7 may be arranged flush with the exposed side of the roof;
30 but it is evident that these feed-openings may be extended to and through a floor in the manner represented by Fig. 5.

It is thought that the operation and advantages of the invention will be readily understood from the foregoing description taken in
35 connection with the drawings.

Changes within the scope of the appended claims may be made in the form and proportion of some of the parts, while their essential
40 features are retained and the spirit of the invention is embodied. Hence I do not desire to be limited to the precise form of all the parts as shown, reserving the right to vary therefrom.

45 Under some conditions of service the supplementary grate 51 in Figs. 1 and 2 or the grate 64 in Fig. 5 may be exposed to such intense heat from the furnace as to burn out or deteriorate if an ordinary solid-bar grate is
50 used. I overcome this objection by the employment of a grate formed of hollow bars, which have communication with a circulating-ring, as 88, and to this ring is coupled the circulating-pipes 89 90, the latter being in com-
55 munication with the water-chamber in the drying-pan of Figs. 1 and 2 or with one of the upper headers of Figs. 6 and 7. Provision is thus made for the circulation of water through the supplementary grate, and the latter cannot
60 burn out.

It is of course evident that the hollow-bar grate may be employed as the medium for heating water adapted to be supplied to the

water-tank or to a header, thus serving as a feed-water heater. 65

Having thus described my invention, what I claim as new is—

1. A garbage-crematory comprising, in combination, an incinerating-chamber, a receiving and drying chamber, a stack or up-
70 take, a supplementary grate in said stack adapted to support a bed of incandescent fuel, a flue connecting the incinerating-chamber with said stack or uptake, a flue leading from the receiving and drying chamber and con-
75 necting with the flue from the incinerating-chamber, and suitable valve or damper mechanism for causing the gases passing from said flues into said stack to enter the stack either
80 above or below said supplementary grate, substantially as described.

2. A garbage-crematory comprising an incinerating-chamber, a receiving and drying chamber, a stack or uptake, a grate located in the stack, a flue communicating with both the
85 incinerating and the drying chamber and with the stack, and damper mechanism arranged to direct the gases from the flue into the stack either above or below the grate therein.

3. The combination, in a garbage-crema-
90 tory, of an incinerating-chamber, a receiving and drying chamber located above said incinerating-chamber and arranged to be heated therefrom, a stack or uptake, a supplementary grate in said stack adapted to support a
95 bed of incandescent fuel, a flue having communication with said receiving and drying chamber and with said stack or uptake, a flue connecting the incinerating-chamber with said
100 stack or uptake, and means for causing the gases from said receiving and drying chamber and from incinerating-chamber to enter the stack below said grate, substantially as de-
scribed.

4. The combination, in a garbage-crema-
105 tory, with an incinerating-chamber, of a receiving and drying chamber located above said incinerating-chamber, means within said receiving and drying chamber for separating
110 liquid from solid garbage, a steam-generator forming the dividing-wall between said incinerating-chamber and said receiving and drying chamber, means for conducting the liquid from said receiving and drying chamber, and
115 means for permitting the passage of the solid garbage from said receiving and drying chamber to said incinerating-chamber.

5. The combination, in a garbage-crema-
120 tory, with an incinerating-chamber, of a receiving and drying chamber located above said incinerating-chamber, a steam pan or generator, forming the top wall of said incinerating-chamber and the bottom of said receiving and
125 drying chamber, means for separating liquid from solid garbage in said receiving and drying chamber, an evaporator, means for con-

ducting liquid from said receiving and drying chamber to said evaporator and means for conducting steam from said generator to said evaporator for the purpose of heating the same.

5 6. The combination, in a garbage-crematory, with an incinerating-chamber, of a receiving and drying chamber located above said incinerating-chamber, a steam pan or generator, forming the top wall of said incinerating-chamber and the bottom of said receiving and drying chamber, a basket within said incinerating-chamber, formed of a series of tubular bars connected with said generator, and
10 said generator being provided with an opening extending through it above said basket through which material may be fed from said receiving and drying chamber into said basket.

7. The combination, in a garbage-crematory, with an incinerating-chamber, of a steam-generator, located at or near the top of said incinerating-chamber, a receiving and drying chamber located above said incinerating-chamber, a basket arranged within said incinerating-chamber, formed of a series of tubular bars connected with said steam-generator, an
20 evaporator arranged in the lower part of said incinerating-chamber, and means connecting said steam-generator with said evaporator.

30 8. The combination, in a garbage-crematory, with an incinerating-chamber, provided with a suitable grate, of a steam-generator, located at or near the top of said incinerating-chamber, a basket arranged within said incin-

erating-chamber and comprising a series of 35 tubular bars connected with said steam-generator, an evaporator arranged below said grate, and means connecting said steam-generator with said evaporator.

9. The combination, in a garbage-crematory, with an incinerating-chamber, of a receiving and drying chamber located above said incinerating-chamber, a steam pan or generator forming the top wall of said incinerating-chamber and the bottom wall of said receiving and drying chamber, a basket within said incinerating-chamber formed of a series of tubular bars connecting with said generator, and means permitting the passage of garbage from said receiving and drying chamber into said
40 basket. 45 50

10. The combination, in a garbage-crematory, with an incinerating-chamber, of a steam pan or generator, having a feed-opening extending through it, a header arranged within 55 the incinerating-chamber and below said generator, and tubular bars connected to the steam-generator on opposite sides of the feed-opening and arranged within the incinerating-chamber to form grate-surfaces for the support of material to be incinerated. 60

In witness whereof I have hereunto set my hand in the presence of two witnesses.

LOUIS FELIX DECARIE.

Witnesses:

H. T. BERNHARD,
JOHN F. DEUFFERWIEL.