Dec. 9, 1924. 1,518,200

D. HERLIHY

GARBAGE BURNER

Filed May 15, 1924 3 Sheets-Sheet 1

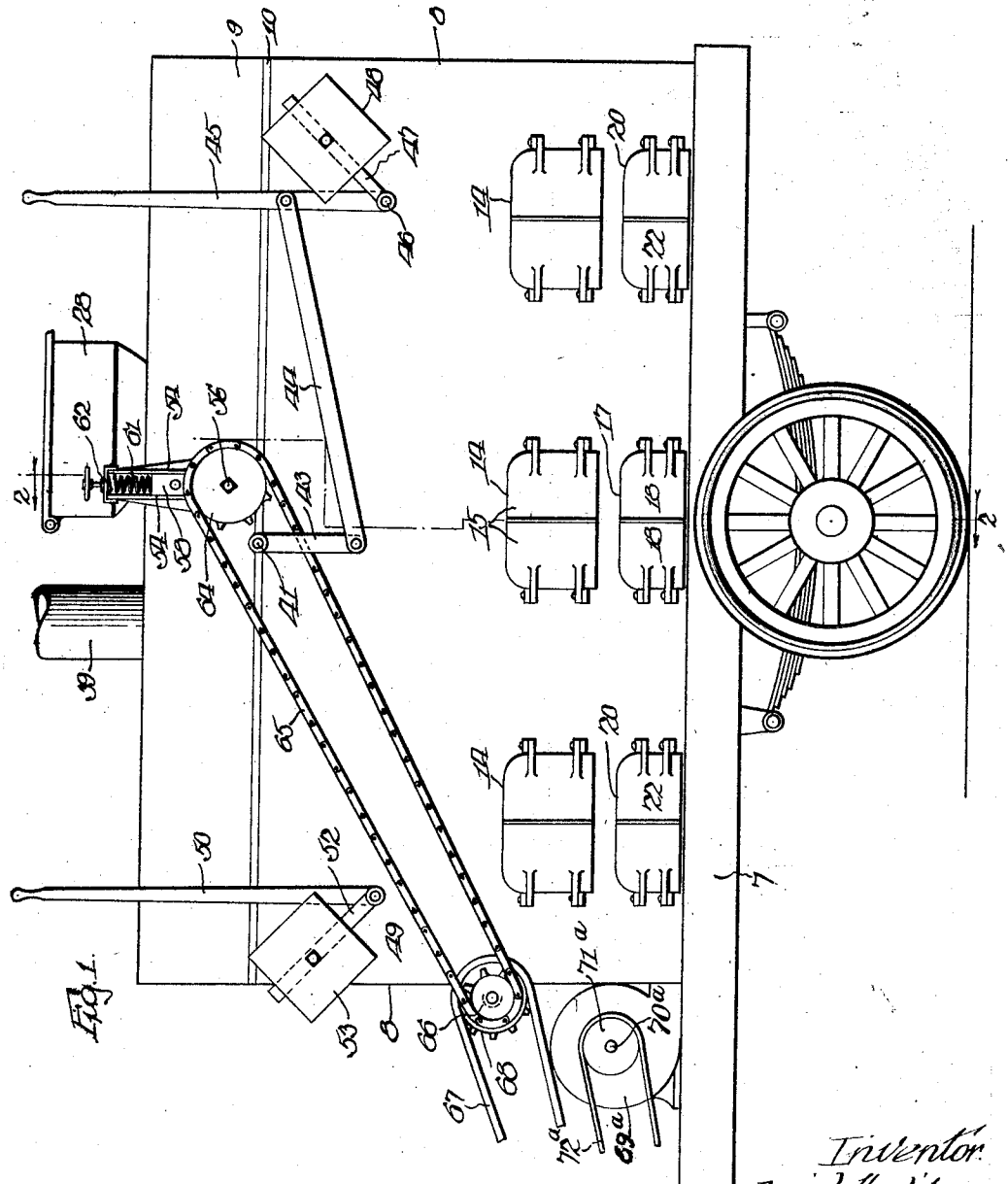


Fig. 1.

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Fig. 1.

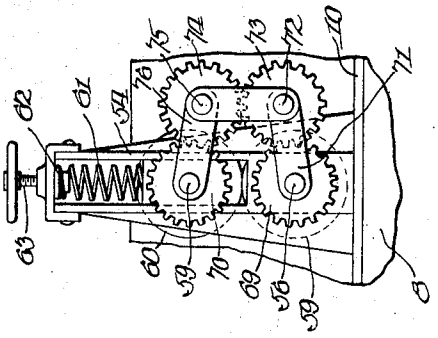
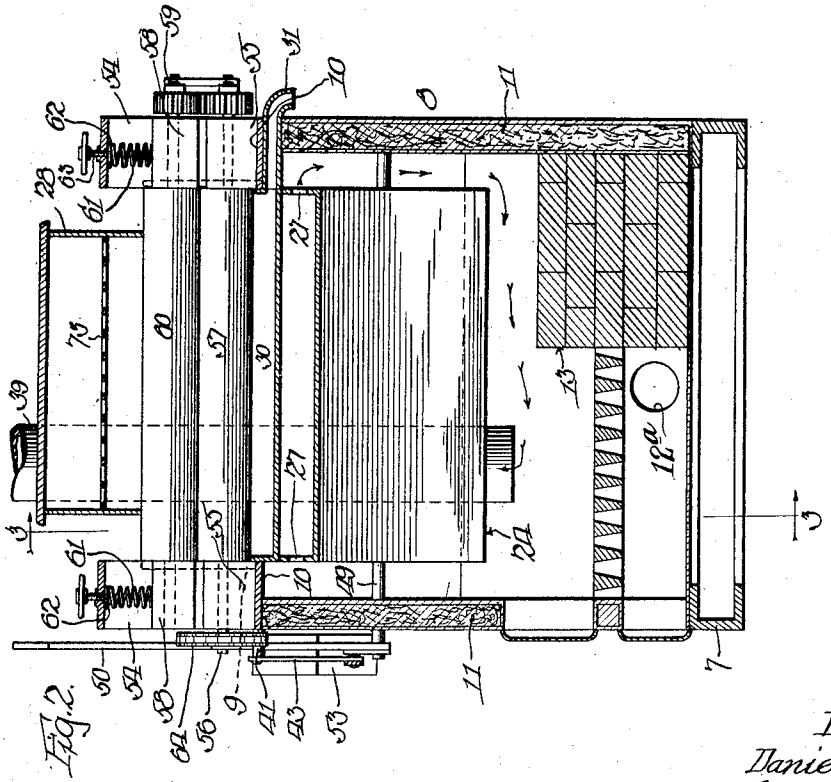


Fig. 2.



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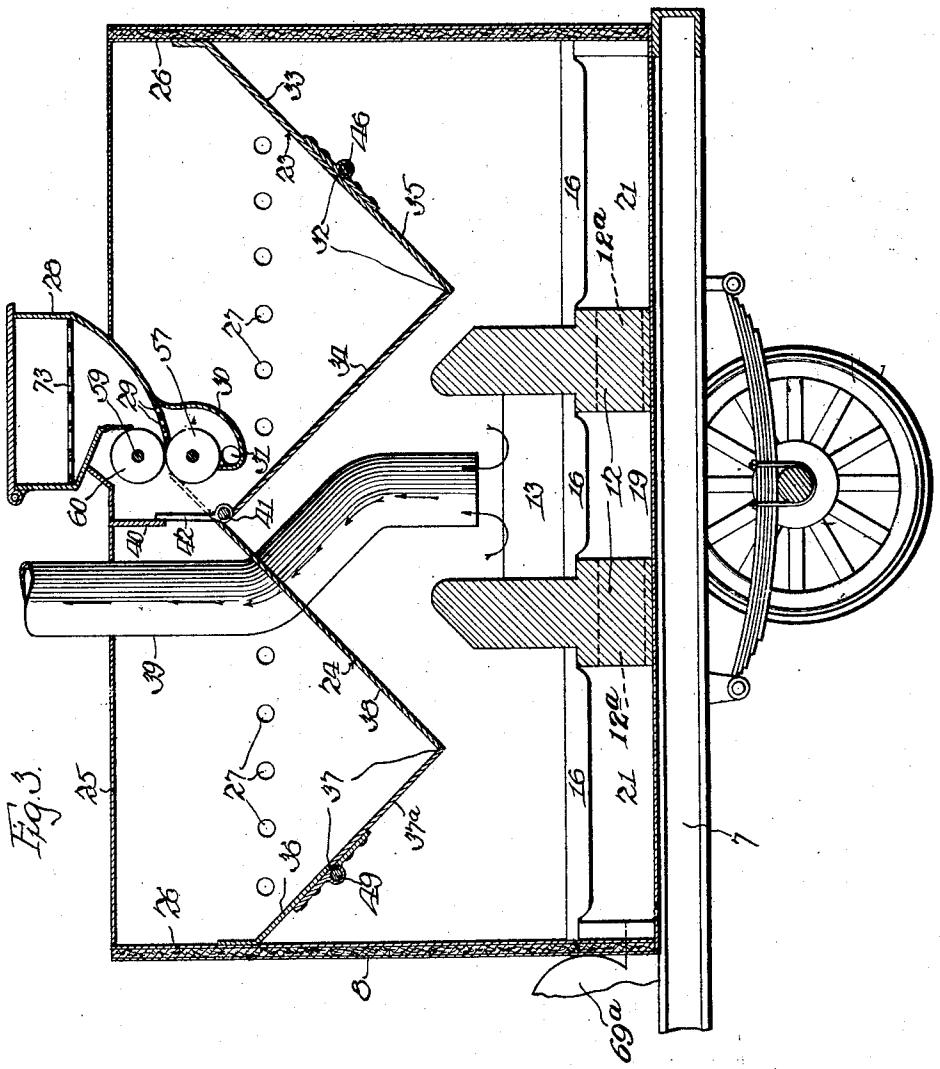


Fig. 3.

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# UNITED STATES PATENT OFFICE.

DANIEL HERLIHY, OF CHICAGO, ILLINOIS.

## GARBAGE BURNER.

Application filed May 15, 1924. Serial No. 713,387.

*To all whom it may concern:*

Be it known that I, DANIEL HERLIHY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Garbage Burners, of which the following is a specification.

This invention relates, generally, to improvements in garbage burners, and particularly to improvements in such burners of a wheeled or portable type, and consists in certain peculiarities of the construction, novel arrangement and combination of the various parts thereof as will be hereinafter more fully set forth and specifically claimed.

The principal object of the invention is, to furnish a garbage burner or crematory, either stationary or portable, of a very simple and inexpensive yet strong and durable construction, by means of which, garbage or refuse, in its condition as taken from the garbage containers or heaps, can be so treated as to remove substantially all moisture therefrom, then manipulated in such a way as to dry or roast and expel odors and fumes therefrom and then subject said odors and fumes, as well as the dried garbage, to a degree of heat sufficient to totally consume the garbage and to eliminate all noxious odors and fumes, thus preventing pollution of the air in their discharge from the burner.

Another object of the invention is, the provision of a garbage or refuse burner of such construction and arrangement of its parts, as to render it portable, or enable it to be readily moved from one point to another, to the end, that garbage or refuse from different houses, back-yards, or lots, can be easily and quickly gathered, dumped into a receiving hopper of the burner, and then totally consumed or reduced to ashes thereby, without the emanation and distribution in the air of the usual offensive and deleterious odors.

Another object is the provision of means in a garbage burner whereby air drafts may be supplied to the furnaces thereof and regulated to increase or diminish the temperature in the burner, as well as the draft through the smoke-stack of the latter.

Still another object is the provision of means whereby the garbage can be handled for drying the same in separate batches, so that the burning or consumption thereof may be more quickly and effectively done.

Still another object is to provide means for crushing the garbage and expressing water therefrom.

A further object is to provide means whereby said crushing and water extracting means may be automatically driven or operated in the travel of the burner, or manually while stationary.

Other objects and advantages of the invention will be disclosed in the following description and explanation, which will be more readily understood when read in conjunction with the accompanying drawings, in which an embodiment of which the invention is susceptible is illustrated, it being understood that modifications and changes may be resorted to without departing from the spirit of the invention, so long as they come within the scope of the appended claims.

In the drawings,

Fig. 1 is a view in side elevation of a portion of a wheeled main frame with a garbage burner embodying my improvements mounted thereon.

Fig. 2 is a cross-sectional view partly in elevation taken on line 2—2 of Fig. 1 looking in the direction indicated by the arrows.

Fig. 3 is a longitudinal sectional view taken on line 3—3 of Fig. 2 as indicated by the arrows, and

Fig. 4 is a side view in elevation of one end of the garbage crushing and water extracting rollers of the device showing a means for imparting rotary movement from one roller to the other and for permitting vertical movement of one of said rollers.

Like numerals of reference refer to corresponding parts throughout the different views of the drawings.

In the drawings, I have shown the rear portion only of a wheeled main frame designated as a whole by the numeral 7 upon which is mounted a furnace casing 8 of any suitable size, shape and material, but by preference of metal of a generally rectangular shape, although the upper portion of said casing is cross-sectionally reduced as at 9 in order to provide base or supporting portions 10 on each side of said reduced portion for the frames or hangers for the journal boxes of the garbage crushing rollers as will be presently explained. The front part of the main frame 7 not shown, may be provided with traction wheels and have mounted thereon a motor, not shown, for driving the vehicle and certain parts of

the burner, or said portion of the main frame may carry a motor for driving parts of the burner only and may be so constructed as to be connected as a trailer to a motor driven vehicle. However, should it be desired to use the burner as a stationary one, it is obvious that the traction wheels of the main frame 7 may be omitted as well as the motor.

Again referring to the casing 8, it will be seen and understood that the walls thereof are lined with suitable non-heat-conducting material 11 such as asbestos or fire brick and the like.

Mounted on the floor of the casing 8 are a pair of spaced and transversely extended bridge walls 12 which extend from one side of the casing towards the other side thereof but terminate at a point near the cross-sectional middle of the casing and have at their rear ends a wall 13 of brick or other suitable material, which, together with the bridge walls 12, furnish a furnace or retort at about the longitudinal middle of the casing 8, which furnace has an opening 14 leading through one of the side walls of the casing for the admission of fuel. This opening is provided with doors 15 hinged at their opposite edges to the side of the casing in which said opening is located.

Horizontally located in the furnace between the bridge walls 12 at a suitable distance above the floor of the casing is a grate 16 upon which coal, coke, or other fuel may be placed and consumed. Just below the opening 14 the casing is provided with another opening 17 having doors 18 hinged to the casing, said last named opening being for the purpose of removing the ashes from the ash-pit 19 of the central furnace. The bridge walls 12 as will be seen, are spaced from the end walls of the casing 8 thus providing a furnace or compartment on each side of the bridge walls, each of which furnaces is provided with a horizontally disposed grate 16 and has an opening 14 leading through the side wall of the casing in which the opening 14 of the middle furnace is located. Below the openings of the last named furnaces the side of the casing 8 is provided each with an opening 20 leading to the ash-pits 21 located below the two-side grates 16 for the withdrawal of ashes, which openings are equipped with doors 22 which are hinged to the casing near said openings.

Mounted on the lower portion of the reduced part 9 and within the casing 8 is a pair of cross-sectionally V-shaped receptacles designated generally by the numerals 23 and 24, which as shown in Figs. 2 and 3, depend from the lower inner portion of the reduced portion 9 of the casing or rather the inner edges of the horizontal bases or supports 10 which are of angular shape in cross-section, see Fig. 2, and united at their upper edges by a flat cover 25 and at their ends by upwardly extended portions 26 of the ends of the casing. It will also be understood by reference to Fig. 2, that these receptacles are spaced at their sides from the walls of the casing and are each provided with a series of openings 27 by preference located in a horizontal row extended from one end to the other of each of said receptacles.

Mounted on the top 25 of the reduced portion 9 of the casing at one side of its longitudinal middle is a hopper 28 which has its lower portion contracted and extended into the cavity of the extension or contracted portion 9 of the casing, as is clearly shown in Fig. 3 of the drawings. This hopper has its lower portion deflected towards the middle of the casing and is provided in said part with a series of perforations 29 for the purpose of permitting the passage of water into a trough 30 with which the upper portion of the receptacle 23 is transversely provided at a point below the perforated portion of the hopper 28, which trough has at one of its ends an outlet pipe 31 extended through one side of the casing. This trough as shown in Fig. 3 has one of its edges in contact with the lower surface of the hopper rearwardly of the perforations therein.

The receptacle 23 is provided in one of its inclined walls with an opening 32 which extends from the lower edge of the inclined wall 33 to the lower edge of the other inclined wall 34 of said receptacle, which opening is for the discharge of garbage from the receptacle 23 and may be closed by means of a door 35 rigidly mounted at its upper edge to a rock-shaft 46 transversely journaled on the lower edge of the wall 33 of the receptacle 23 and extended at one of its ends through that side of the casing having the said openings leading to the furnaces. The other receptacle 24 is equipped in one of its inclined walls 36 with a door-way 37 and a door $37^a$ rigidly mounted at its upper edge on a rock-shaft 49 transversely journaled on the lower edge of the inclined wall 36 of the receptacle 24 and extended at one of its ends through the side wall of the casing 8 in which the furnace doors are located. The opening 37 in the receptacle 24 is for the purpose of permitting the garbage to be discharged from the receptacle 24 into the furnace located under the same.

Mounted on the inclined wall 38 of the receptacle 24 is a smoke-stack 39 which extends through the top 25 of the casing and is offset at its lower portion so as to extend into the upper part of the middle furnace, or the furnace between the bridge walls 12 of the casing. Located between the hopper 28 and the smoke-stack 39 and depending

from the top 25 of the casing is a horizontally and transversely disposed partition 40 which as shown is located directly above the juncture of the inclined walls 34 and 38 of the receptacles 23 and 24 respectively but terminates at its lower edge at a distance from the said juncture.

Horizontally mounted on the upper portion of the wall 34 of the receptacle 23 is a rock-shaft 41 on which a door 42 to close the space between the partition 40 and upper portion of the wall 34 is mounted to turn with said shaft. This shaft is transversely journaled in the casing and is operatively united at one of its ends by a link 43 to one end of another link 44 the other end of which is pivotally secured to a hand lever 45 rigidly fixed at its lower end to the outer end of the rock-shaft 46. This lever 45 is provided at its lower end with an arm 47 which has adjustably mounted thereon a counterbalancing weight 48. Rigidly secured to the outer end of the rock-shaft 49 is the lower end of a hand lever 50 which is provided with an arm 52 which carries a weight 53 as a counterbalance for the door $37^a$ of the depending receptacle in the front portion of the furnace casing.

By the foregoing arrangement of the levers 45 and 50 and their connections with the rock-shafts 41, 46 and 49, it is apparent that by moving the lever 45 in the proper direction, the door 42 in front of the hopper 28 will be moved from the position of said door shown by continuous lines in Fig. 3 to that shown by dotted lines in said figure, thus causing the garbage as it is discharged from the hopper 28, to be conducted into the receptacle 24 or front receptacle, from which it can be dumped by operating the lever 50 in the proper direction to open the door $37^a$ of said receptacle.

To cause the garbage to be discharged from the hopper 28 into the rear receptacle or receptacle 23, the reverse movement of the lever 45 need only be made, which will move the door 42 from its dotted line position to its full line position shown in Fig. 3 of the drawing. On each side of the upwardly extended reduced portion 9 of the furnace casing at points near the front end of the hopper 28 is vertically mounted a guide bracket or hanger 54 each of which has in its lower portion a journal box or block 55 for the shaft 56 which is transversely journaled in said blocks and has mounted thereon a roller 57 which as is clearly shown in Fig. 3 is located just below the front portion of the perforated portion 29 of the hopper 28 and just above the front portion of the trough 30 which as before stated has a discharge pipe extended through one side of the furnace casing.

Located in each of the guides or hangers 54 above the journal boxes 55 is a journal box or block 58 which are vertically movable. Transversely journaled in the blocks 58 is a shaft 59 upon which is mounted to turn therewith a crushing roller 60 disposed horizontally above the roller 57 and normally held in such position by a pair of springs 61 one of which is located in the upper portion of each of the guide brackets or hangers 54 and has one of its ends in contact with the upper surface of the journal block 58 thereunder, and its other end resting against the head 62 of a screw 63 suitably mounted on the top of the guide bracket and employed for adjusting the tension of the spring 61 thereunder.

Mounted on one end of the shaft 56 of the lower crushing roller 57 is a sprocket wheel 64 around which is extended a sprocket chain 65 which also extends over a sprocket wheel 66 journaled on the front portion of the casing 8 which latter sprocket wheel is driven through the medium of a belt 67 passing over a pulley 68 on the shaft of the sprocket wheel 66, which belt may be connected to a suitable part, not shown, driven by the motor above referred to. That end of the shaft 56 adjacent the sprocket wheel 64 may be formed angular in cross-section so that if it is desired to drive the shaft 56 manually, a crank handle can be applied thereto for so doing.

On the opposite end of each of the shafts 56 and 59 from that adjacent the sprocket wheel 64 is mounted to turn therewith a gear 69 and 70 respectively, which as shown are out of mesh with one another. Connected at one of its ends to that end of the shaft 56 adjacent the gear 69 thereon is a link 71 the other end of which link carries a stub-shaft 72 on which is mounted a gear 73 which meshes with the gear 69 and also with a gear 74 journaled on a stub-shaft 75 carried by one end of a link 76 the other end of which link is loosely mounted on the end of the shaft 59 adjacent its gear 70, all of which will be clearly understood by reference to Fig. 4 of the drawings, in which view it will be seen that the gear 74 meshes with the gear 70 as well as the gear 73, thus providing means for transmitting power from the shaft 56 to the shaft 59 when the rollers 57 and 60 are separated by the passage of garbage therebetween from the hopper 28 in the operation of crushing and extracting water therefrom, in which operation it is manifest that the water will be caught by the trough 30 and discharged through the discharge pipe 31 thereof to one side of the furnace casing and if desired into a receptacle for the same.

Mounted on the main frame 7 in front of the lower portion of the casing 8 of the burner and communicating with the ash pit 21 of the front furnace or that one in front

of the middle furnace, is a casing 69ª for a rotary fan of the ordinary or any well known construction, the shaft 70ª of which has mounted thereon a pulley 71ª over which a belt 72ª is extended and co-operates with a suitable part not shown driven by the aforesaid motor for rotating the fan whereby air drafts will be furnished to the ash pits of the various furnaces so as to increase the consumption of fuel thereon and also in such a way as to increase the draft through the smoke-stack, it being understood that the lower portion of the bridge walls 12 may be provided with transverse openings 12ª to permit air to pass from the blower or fan through the same.

From the foregoing and by reference to the drawings, it will be understood that by my improvements I have furnished a portable garbage burner or crematory which is especially adapted for use in back alleys for consuming garbage as it is gathered from the various receptacles therefor or heaps, and in such a way that the operation of burning the garbage may be performed during the travel of the burner. It is further apparent that by reason of the novel construction and arrangement of the parts of the receptacles 23 and 24, which depend within the casing of the burner, the garbage can be handled in batches; that is to say, the garbage from one of the containers dumped into the hopper 28, can be caused to pass from the hopper 28 into one of the receptacles 23 or 24, and the garbage from another container caused to pass into the other depending receptacle where the same will be quickly dried or the moisture forced therefrom by reason of the heat of the furnaces below said receptacles. In this drying or roasting operation it is manifest the fumes and gases from the garbage will pass through the openings 27 in the sides of the said receptacles and into the casing 8, when by reason of the draft through the smoke-stack, the said gases and fumes will be drawn over the central furnace in which a more intense heat or fire may be maintained and from thence out through the smoke-stack in a purified condition.

In order to prevent non-crushable articles contained by the garbage when it is dumped into the hopper 28 passing to the crushing rollers a separator or sieve 73 with large meshes may be horizontally mounted in the hopper for this purpose.

The base members 10 of the reduced portion 9 of the casing may be detachably secured to the upper end of the side walls of the casing 8 and the top 25 of said casing may be detachably secured to the upper ends of the extensions 26 at each end of the casing, which arrangement will permit the receptacles 23 and 24 to be removed vertically from the casing for repairs when necessary, as it is obvious from the foregoing description that these receptacles are carried by the cross-sectional portion of the casing.

Having thus fully described by invention, what I claim as new and desire to secure by Letters Patent is:

1. In a garbage burner, the combination with a casing, of means in its lower portion for the consumption of fuel, a smoke-stack leading from said means through the casing, a receiving hopper mounted on the casing and having an outlet located to discharge its contents thereinto, a receptacle located within the casing below the outlet of the hopper and having means for the passage of gases therefrom into the casing and provided with a discharge outlet, and means to close said outlet.

2. In a garbage burner, the combination with a casing, of means in its lower portion for the consumption of fuel, a smoke-stack leading from said means through the casing, a receiving hopper mounted on the casing and having an outlet located to discharge its contents thereinto, a pair of receptacles located within the casing one of them below the outlet of the hopper and each having means for the passage therefrom of gases into the casing and each provided with a discharge outlet, means for closing said outlets, and means co-operating with the outlet of the hopper to selectively shift the discharge therethrough into one or the other of said receptacles.

3. In a garbage burner, the combination with a casing, of means in its lower portion for the consumption of fuel, a smoke-stack leading from said means through the casing, a receiving hopper mounted on the casing and having an outlet located to discharge its contents thereinto, a pair of crushing rollers mounted one above the other at the outlet of the hopper, means to drive said rollers, a receptacle located within the casing below the outlet of the hopper and said rollers and having means for the passage of gases therefrom into the casing and provided with a discharge outlet, and means to close said outlet.

4. In a garbage burner, the combination with a casing, of means in its lower portion for burning fuel, a smoke-stack leading from said means through the casing, a receiving hopper mounted on the casing and having an outlet located to discharge its contents thereinto, a pair of crushing rollers mounted one above the other at the outlet of the hopper, a trough located under said rollers and having a discharge through the casing, a receptacle mounted within the casing below the outlet of the hopper and said rollers and having means for the passage of gases therefrom into the casing and provided with a discharge outlet, and means to close said outlet.

5. In a garbage burner, the combination with a casing, of means in its lower portion for the consumption of fuel, means co-operating with said fuel consuming means for supplying air under pressure thereto, a smoke-stack leading from said fuel consuming means through the casing, a receiving hopper mounted on the casing and having an outlet located to discharge its contents thereinto, a pair of crushing rollers mounted one above the other at the outlet of the hopper, means to drive said rollers, a trough located under said rollers and having a discharge through said casing, a receptacle within the casing below the outlet of the hopper and said rollers and having means for the passage of gases therefrom into the casing and provided with a discharge outlet, and means to close said outlet.

6. In a garbage burner, the combination with a casing, of means in its lower portion for the consumption of fuel, a smoke-stack leading from said fuel consuming means through the casing, a receiving hopper mounted on the casing and having an outlet located to discharge its contents thereinto and provided with perforations in its lower portion, of a pair of crushing rollers mounted one above the other at the outlet of the hopper, means to drive said rollers, a trough located under said rollers and the perforated portion of the hopper and having a discharge through said casing, a pair of receptacles located within the casing one of them below the outlet of the hopper and each having means for the passage therefrom of gases into the casing and each provided with an outlet, means for closing said outlets, and means co-operating with the outlet of the hopper to selectively shift the discharge therethrough into one or the other of said receptacles.

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