June 23, 1931. D. M. REESE 1,811,562

GARBAGE INCINERATOR

Filed May 3, 1928 2 Sheets-Sheet 1

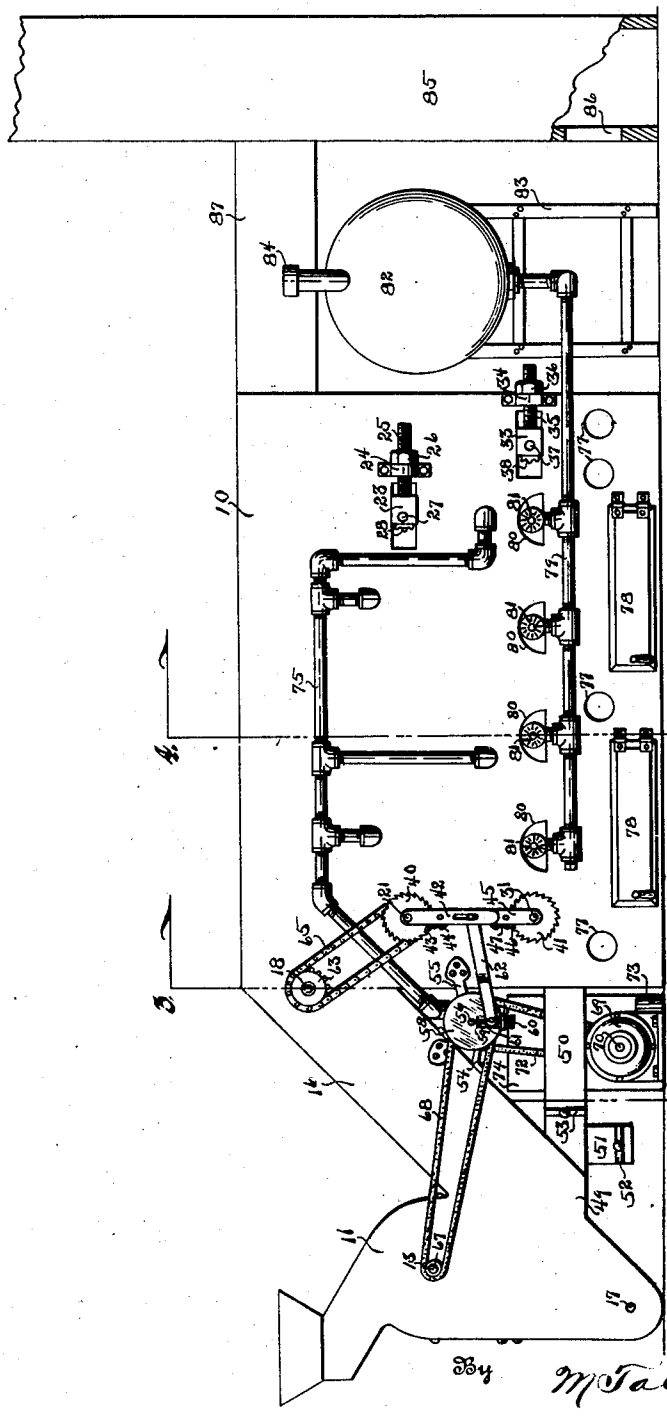


Fig. 1.

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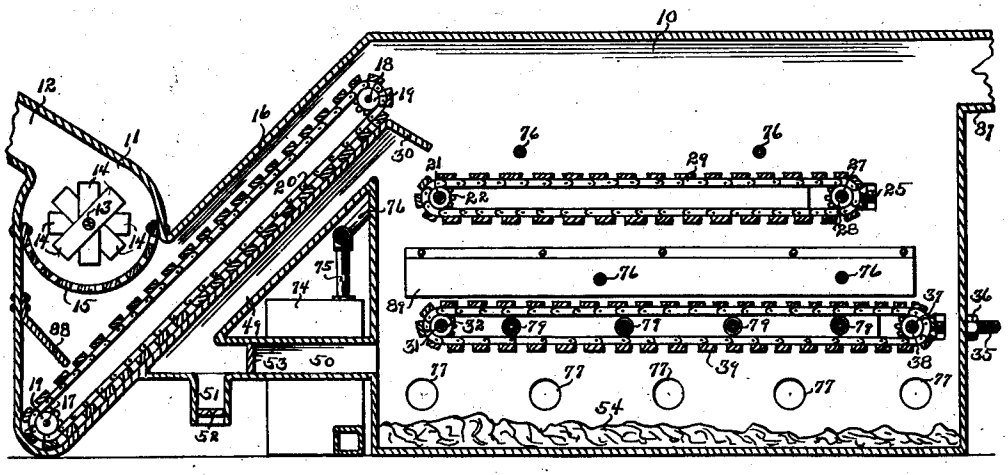


Fig. 2.

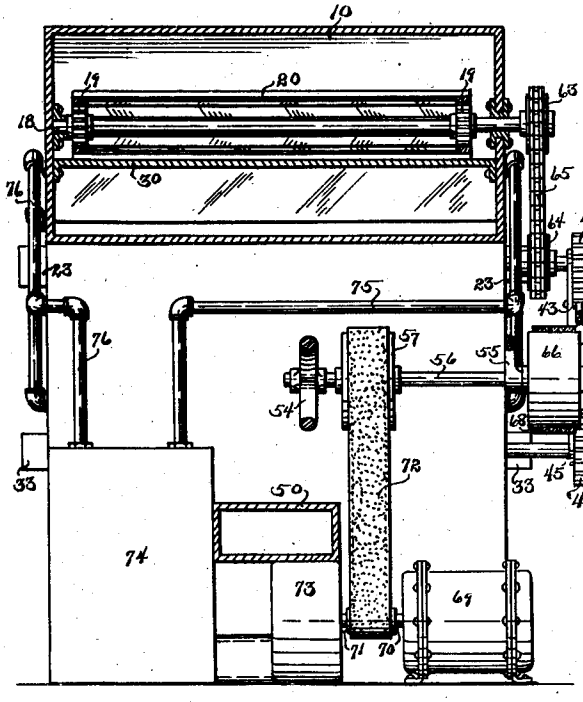


Fig. 3.

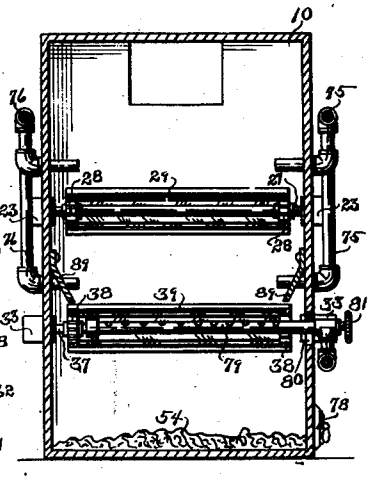


Fig. 4.

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1,811,562

UNITED STATES PATENT OFFICE

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GARBAGE INCINERATOR

Application filed May 3, 1928. Serial No. 274,780.

The principal object of this invention is to provide a device for disposing of waste matter such as garbage and the like, by dehydration and combustion.

More specifically the object of this invention is to provide a garbage incinerator having a plurality of slowly moving endless grates on which the waste matter is first dried, to remove the volatile products from the charge and then subjected to fire which reduces the solid portions to an ash.

A further object of my invention is to provide a garbage incinerator that tears up or otherwise disintegrates the mass of waste before it reaches the cremating zone.

A still further object of this invention is to provide a garbage incinerator that utilizes the heat from the ashes to dehydrate the oncoming waste matter.

A still further object of this invention is to provide a garbage incinerator that is capable of adjustment relative to the speed of movement of the endless grates.

A still further object of this invention is to provide a garbage incinerator that has air forced into its burning zone and is odorless in operation.

A still further object of this invention is to provide a garbage incinerator having adjusting means for compensating for the contraction and expansion of the moving grates while in operation.

These and other objects will be apparent to those skilled in the art.

My invention consists in the construction, arrangement and combination of the various parts of the device, whereby the objects contemplated are attained as hereinafter more fully set forth, pointed out in my claims and illustrated in the accompanying drawings, in which,

Fig. 1 is a side view of the complete device ready for use with a section cut away to illustrate the smoke and odor eliminating means.

Fig. 2 is a side sectional view of my invention and more fully illustrates its interior construction.

Fig. 3 is a cross sectional view of the garbage incinerator taken on line 3—3 of Fig. 1 and illustrates the driving mechanism of the device.

Fig. 4 is a cross sectional view of my invention taken on line 4—4 of Fig. 1 and shows the position of the endless grates and oil burner.

The disposing of garbage is very costly due to the fact that it is subjected to fire in its original wet condition. It is known that garbage consists of about one third wet paper, one third vegetable offal, such as leaves, peelings, trimmings and decayed matter, and the balance is composed of meat scraps, bones, package paper and the like. This means that approximately seventy percent of ordinary garbage is combustible material and if properly distributed is sufficient to dry and incinerate the whole mass. This I have practically accomplished by first cutting the garbage into small particles, drying the garbage of all volatile matter by the heat from the burning solid matter, and forcing air into the cremating housing. As an aid to this and for starting and more quickly cremating the garbage I use a small oil burner.

I have used the numeral 10 to designate the cremating housing made of sheet metal or the like and designed to rest on a floor or other suitable support. The numeral 11 designates a hopper having the opening 12. Rotatably mounted in this hopper is the shaft 13 carrying the tearing and breaking hammers 14. Mounted in the bottom portion of the hopper is the perforated member 15 through which the garbage that is broken up into small particles passes. Communicating with the bottom portion of the hopper 11 below the member 15, and the top portion of the cremating housing 10 is the enclosed trough 16. Rotatably mounted in each end of this trough is a shaft 17 and 18, respectively. Permanently secured to each of these shafts and inside the trough are sprocket wheels 19. Embracing these sprocket wheels is the endless chain conveyor 20 for carrying the garbage from the hopper to the top portion of the housing 10, as shown in Fig. 3.

Rotatably mounted in the top portion of the housing 10 adjacent the trough 16 is the

shaft 21 carrying the sprocket wheels 22. Slidably mounted in each side of the housing 10 and in the same plane as the shaft 21, is a bearing member 23. Secured to each of these bearing members and passing through a lug 24 on each side of the housing 10, is a threaded rod 25. Threaded onto each end of these rods is a nut 26. By this arrangement the movement of the bearing members may be limited in one direction. Rotatably mounted in these two bearing members is the shaft 27 carrying the sprocket wheels 28. Embracing the sprocket wheels 22 and 28 is the endless chain grate 29, designed to receive the garbage from the conveyor 20. The projection 30 integrally formed on the bottom portion of the trough 16 is designed to guide the garbage from the conveyor 20 onto the endless grate. Rotatably mounted in the bottom portion of the housing 10 and adjacent the trough end is the shaft 31 carrying the sprocket wheels 32. Slidably mounted in each side of the housing, in the rear portion and in the same plane as the shaft 31, is a bearing member 33. Secured to each of these bearing members and passing through a lug 34 on each side of the housing 10, is a threaded rod 35 having on its free end a nut 36. Rotatably mounted in these two bearing members is the shaft 37 carrying the sprocket wheels 38. Embracing the sprocket wheels 32 and 38 is the endless chain grate 39, designed to receive the garbage from the grate 29. It is upon this grate 39 that the garbage is burned. It should here be noted that in order that the grate 29 can deposit the garbage on the grate 39, the last mentioned grate is the longest.

Secured to the shaft 21 against relative movement thereto and on the outside of the housing 10 is the ratchet wheel 40. The numeral 41 designates a similar wheel secured to the shaft 31. Rotatably mounted on the shaft 21 and embracing the ratchet wheel 40 is the operating arm 42 secured to which is the dog 43 capable of engaging the teeth on the ratchet wheel 40. The numeral 44 designates a leaf spring secured to the arm 42 and designed to yieldingly hold the dog 43 in engagement with the teeth of the ratchet wheel 40. Rotatably mounted on the shaft 31 and embracing the ratchet wheel 41 is the operating arm 45 secured to which is the dog 46 capable of engaging the teeth on the ratchet wheel 41. The numeral 47 designates a leaf spring secured to the arm 45 designed to yieldingly hold the dog 46 in engagement with the teeth on the ratchet wheel 41. Integrally formed on the bottom of the enclosed trough 16 is the hot air distributing pan 49 communicating with the inside of the housing 10 at a point just below the top portion of the conveyor 20. Communicating with the bottom portion of this pan and the inside of the housing 10 at a point below the endless grate 39 is the large pipe 50. The numeral 51 designates a second pipe having one end communicating with the inside of the pipe 50 and its other end communicating with the outside atmosphere. Slidably mounted in this second pipe is the gate valve 52 and slidably mounted in the pipe 50 between the housing 10 and the point where the second pipe communicates with the first pipe is the gate valve 53. By this construction the heat from the ashes 54 in the bottom of the housing 10 will pass up under the trough 16 and then back into the upper portion of the housing, thereby heating the trough member and partially drying the garbage before it enters the housing 10.

The gate valves 52 and 53 make it possible to regulate the amount, if any, of heat passing up under the trough 16 and also makes it possible to regulate the amount of cool air to be mixed with the warm air.

Secured by suitable means to the pan 49 is the bearing member 54, while the numeral 55 designates a second bearing member secured by suitable means to the pan 49 and the housing 10 as shown in Fig. 1 and Fig. 3. Journaled in these bearing members is the shaft 56; mounted upon which is the pulley wheel 57. Permanently secured to one end of the shaft 56 is the wheel 58 having the radial slot 59. Rotatably mounted in this slot is the screw 60 threaded through the member 61 slidably mounted in the slot 59. By this construction if the screw 60 is rotated the member 61 will be moved toward or away from the center of the wheel 58. Having one end pivoted to the member 61 and its other end slidably and rotatably secured to the two arms 42 and 45, as shown in Figs. 1 and 2, is the link 62. By this arrangement if the shaft 56 is rotated the arms 42 and 45 will be reciprocated and the endless grates 29 and 39 will slowly be rotated. Their speed, relative to the speed of rotation of the shaft 56 may be regulated by adjusting the screw 60.

The numerals 63 and 64 designate two sprocket wheels secured to the shafts 18 and 21, respectively. Embracing these two sprocket wheels is the endless chain 65, thereby operatively connecting the conveyor 20 to the endless chain grate 29. Secured to the shaft 56 is the pulley wheel 66 of much greater diameter than the pulley wheel 67 on the shaft 13. The numeral 68 designates an endless belt around the pulley wheels 66 and 67. By the pulley wheel 67 being smaller than the pulley wheel 66, the hammers 14 will be rotated at a great speed.

I have designated the prime mover of my device by the numeral 69 having the driving shaft 70. Secured on this driving shaft is the pulley wheel 71 and is of less diameter than the diameter of the pulley wheel 57. Embracing the pulley wheels 57 and 71 is the endless belt 72. By this arrangement the prime

mover will make several revolutions to one revolution of the shaft 56. The numeral 73 designates a centrifugal fan housing communicating with the air tank 74. Inside the fan housing and secured to the driving shaft 70 is a centrifugal fan (not shown). The numeral 75 designates an air pipe leading from the air tank and extending along the right hand side of the housing 10. This air pipe has four pipe connections leading into the housing 10, two of which are just above the grate 29 and two of which are just above the grate 39, as shown in Fig. 1 and Fig. 4. The numeral 76 designates a second pipe leading from the air tank and extending along the left hand side of the housing 10. This last mentioned pipe has also four pipe connections leading into the housing 10, two of which are just above the grate 29 and two of which are just above the grate 39. When the device is in operation these pipes furnish the proper amount of air for the successful burning of the garbage. The numerals 77 designate air holes in the side of the housing 10 to furnish air under the grates 29 and 39.

The numeral 78 designates doors in the housing 10 through which the garbage ash is removed.

The numeral 79 designates an ordinary oil burner extending through the openings 80 in the side of the housing 10 and so located that the same will throw a flame up and through the upper portion of the endless grate 39 as shown in Fig. 4. This oil burner is controlled by the usual needle valves 81, and gets its liquid fuel from the supply tank 82 which is supported at a greater height than the oil burner by a suitable support 83. This tank may easily be replenished with oil fuel by removing the filling cap 84.

I have used the numeral 85 to designate a chimney having the opening 86 near its bottom through which air may pass. Having one end communicating with the inside of the housing 10 at a point near its top and the inside of the chimney 85 is the large smoke pipe 87. By this arrangement all smoke, odor and combustible gas will burn up on coming in contact with the clean air passing through the chimney through the opening 86, as smoke and gas are due to insufficient air for proper combustion.

I have used the numeral 88 to designate a baffle plate inside the hopper 11 to guide the broken up garbage onto the conveyor 20. The numeral 89 designates two baffle plates inside the housing 10 to prevent any unburned garbage from falling into the bottom of the housing from the sides of the endless grate 39.

From the foregoing it will be noted that when the motor 69 is functioning, the hammers 14, the endless conveyor 20, the centrifugal fan, the grate 29 and the grate 39 will be rotating.

The practical operation of the complete device is as follows: The garbage to be reduced to an ash is placed in the hopper 11 where it is broken and chopped up into pieces capable of passing through the perforated member 15 from which it falls onto the conveyor 20. The conveyor 20 slowly carries the broken garbage (which in such broken condition is easily dried and burned) up and into the upper portion of the housing 10. During this procedure, heat from the ashes in the bottom of the housing 10 is passing up under the trough portion 16 thereby partially drying the garbage before the same enters the cremating housing 10. The garbage is then allowed to fall on the slowly moving grate 29 where it is thoroughly dried by heat from the burning garbage on the slowly moving grate 39. From the grate 29 the garbage falls on the grate 39 where it is burned, and the ashes deposited in the bottom of the housing 10. The burning of the garbage on the grate 39 is aided by the oil burner 79. The air pipes 75 and 76 furnish sufficient air under pressure to assure proper combustion. It will be found that as soon as the complete device gets hot the grates will expand and be too loose for proper functioning. This expansion is easily compensated for by tightening the nuts 26 and 36. As soon as the device ceases to operate, these nuts of course should be loosened. After the device has been operating for a few minutes the oil burner may be turned on low flame and little if any fuel oil will be nceessary as the garbage will almost burn itself. If it is desired the complete device may be made portable by mounting it on suitable wheels.

Some changes may be made in the construction and arrangement of my improved garbage incinerator without departing from the real spirit and purpose of my invention and it is my intention to cover by my claims any modified forms of structure or use of mechanical equivalents which may be reasonably included within their scope.

I claim:

1. In a device of the class described, a cremating housing, grates in said housing, a hopper, an enclosed trough having one end communicating with the bottom of said hopper and its other end communicating with the upper portion of said housing, a hot air distributing pan embracing the bottom of said trough having its upper end communicating with the inside upper portion of said housing, a pipe leading from said cremating housing to said pan, and a means for regulating the amount of hot air passing through said pipe.

2. In a device of the class described, a cremating housing, a trough member through which the waste material must pass in entering said housing, a hot air distributing pan embracing said trough member having its

upper end communicating with the upper end of said housing, a pipe leading from said cremating housing to said pan, a second pipe having one end communicating with the inside of the first mentioned pipe and its other end communicating with the outside atmosphere, and a valve in each of said pipes.

3. In a device of the class described, a cremating housing, an elongated trough communicating with the inside of said cremating housing, through which the garbage to be burned passes, a hot air distributing pan embracing the bottom of said trough having its upper end communicating with the inside of said housing, and a pipe leading from the said cremating housing for transferring heated air to said pan for drying garbage passing through said trough.

4. In a device of the class described, a cremating housing, a hopper, an elongated trough extending at an angle to the vertical, having one end communicating with the bottom of said hopper and its other end communicating with the upper portion of said housing, a hot air distributing pan embracing the bottom of said trough, having its upper end communicating with the upper portion of the said cremating housing, and a pipe leading from the lower portion of said cremating housing to the lower portion of said pan.

5. In a device of the class described, a cremating housing, a hopper, a shaft rotatably mounted in said hopper, breaking and chopping hammers secured on said shaft, an elongated trough extending at an angle to the vertical, having one end communicating with the bottom of said hopper and its other end communicating with the upper portion of said housing, a hot air distributing pan embracing the bottom of said trough, having its upper end communicating with the upper portion of the said cremating housing, and a pipe leading from the lower portion of said cremating housing to the lower portion of said pan.

6. In a device of the class described, a cremating housing, a hopper, a shaft rotatably mounted in said hopper, hammers on said shaft, an elongated trough extending at an angle to the vertical having one end communicating with the bottom of said hopper and its other end communicating with the upper portion of said housing, a perforated member in said hopper located below said hammers and above the point where said trough communicates with the bottom of said hopper, a hot air distributing pan embracing the bottom of said trough having its upper end communicating with the upper portion of said cremating housing, and a pipe leading from the lower portion of said cremating housing to the lower portion of said pan.

7. In a device of the class described, a cremating housing, a hopper, an elongated trough extending at an angle to the vertical, having one end communicating with the bottom of said hopper and its other end communicating with the upper portion of said housing, a hot air distributing pan embracing the bottom of said trough, having its upper end communicating with the upper portion of the said cremating housing, a pipe leading from the lower portion of said cremating housing to the lower portion of said pan, and a means for supplying air under pressure into said cremating housing.

8. In a device of the class described, a cremating housing, a hopper, a plurality of endless chain grates in said housing one above the other, a means for rotating said grates, an elongated trough extending at an angle to the vertical, having one end communicating with the bottom of said hopper and its other end communicating with the upper portion of said housing, a hot air distributing pan embracing the bottom of said trough, having its upper end communicating with the upper portion of the said cremating housing, and a pipe leading from the lower portion of said cremating housing to the lower portion of said pan.

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