Jan. 25, 1966 F. J. LA MERE 3,230,913

INCINERATOR AND DISPOSAL UNIT FOR HUMAN WASTE

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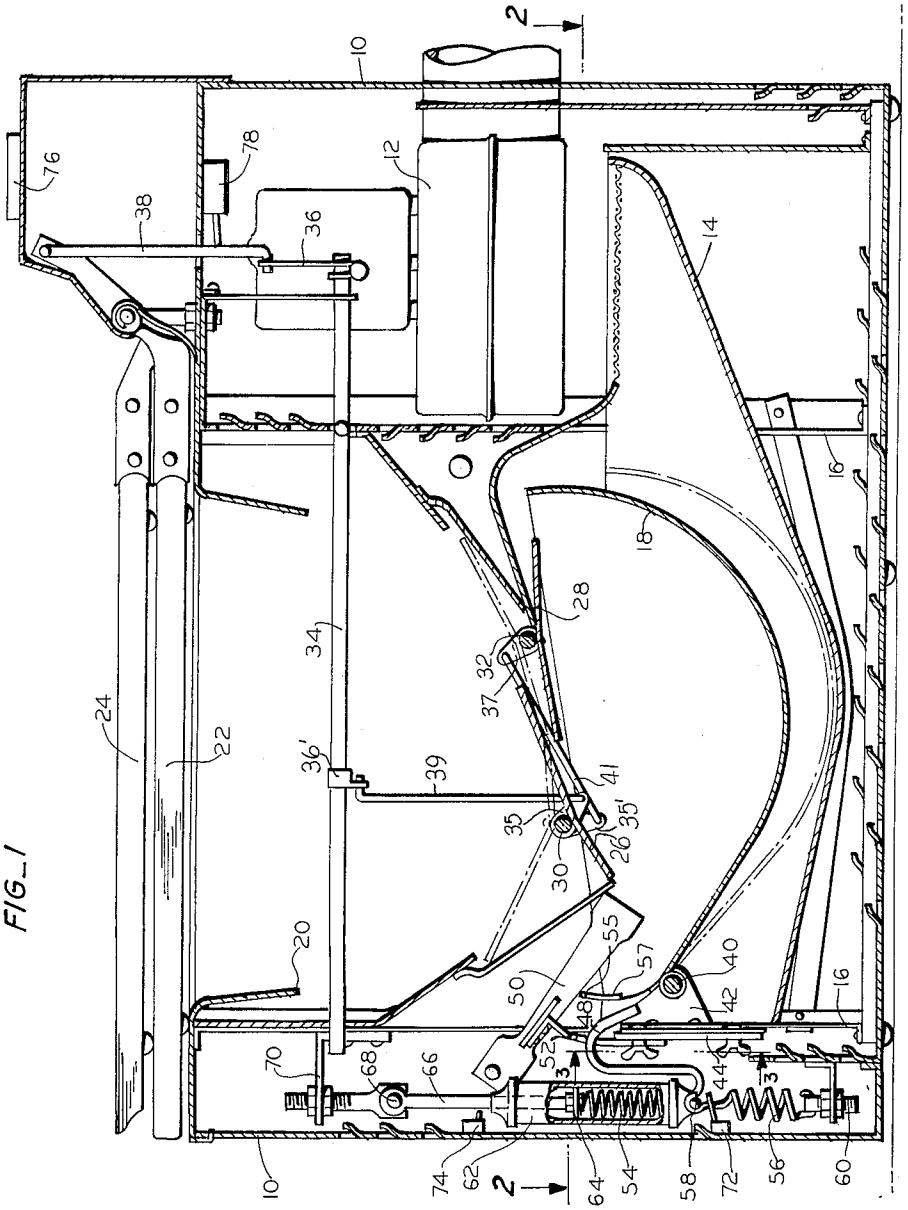


FIG_1

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FIG_2

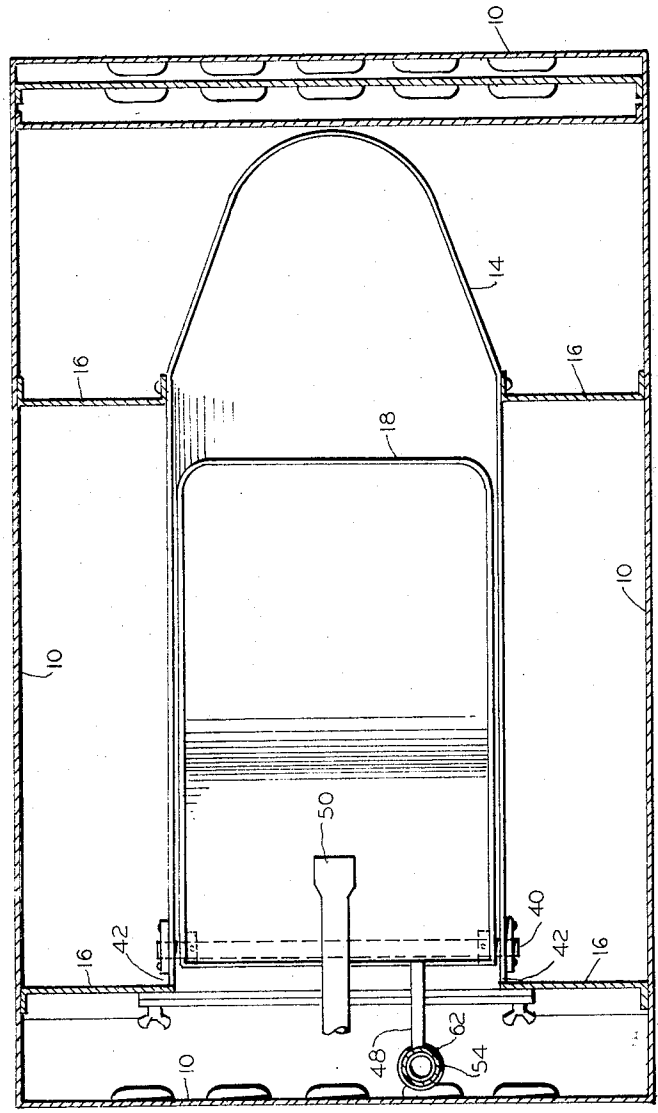
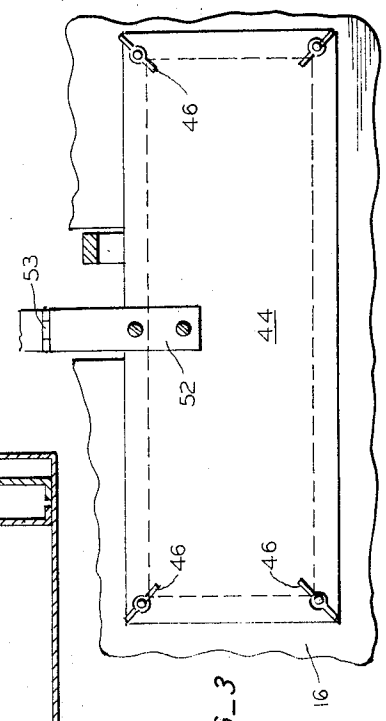


FIG_3



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3,230,913

INCINERATOR AND DISPOSAL UNIT FOR HUMAN WASTE

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8 Claims. (Cl. 110—9)

This invention relates to incinerators for the disposal of human waste and represents an improvement over apparatus shown in my co-pending application, Serial Number 123,784 and filing date July 13, 1961, now Patent No. 3,103,017.

It is an object of this invention to provide apparatus for incinerating human waste which is very efficient in its manner of operation and which is particularly efficient in adapting its operation to the variable quantities of material which it is required to consume.

It is another object of the invention to provide such apparatus in which the heating means for incinerating material operates whenever there is a minimum weight of material in the apparatus to be incinerated but in which the heating means does not operate when less than this minimum weight of material is present.

It is another object of the invention to provide such apparatus in which control of this minimum weight of material can be accomplished by the action of spring means which supports a movable incinerator firebox with the spring means acting in opposition to the weight of material in the firebox.

It is another object of the invention to provide such apparatus with spring means where the spring means is very precise and is insensitive to thermal changes in the apparatus.

It is another object of the invention to provide such apparatus which is sensitive to both minimum and maximum weights of material in the firebox and in which the sensing of a minimum weight of material controls operation of the apparatus while the sensing of a maximum weight of material prevents the deposit of further quantities of material in the apparatus.

Other objects and advantages of the invention will become apparent from the following description read in conjunction with the attached drawings in which:

FIG. 1 is a view in vertical section of apparatus constructed in accordance with this invention;

FIG. 2 is a horizontal sectional view of the apparatus of FIG. 1 taken along the plane indicated at 2—2 in FIG. 1, and

FIG. 3 is an interior view of the apparatus of FIG. 1 taken along the plane indicated at 3—3 in FIG. 1.

Referring now in detail to the drawings the apparatus includes a housing 10 similar in many respects to the housing of the apparatus shown in my above mentioned application with the housing containing an exhaust fan 12, an outer firebox 14 mounted on interior baffles 16 and an inner firebox 18 supported in a manner described hereinafter centrally of the housing 10 beneath a deposit opening 20, seat 22, and lid 24. An operating mechanism (corresponding substantially in detail and operation to that shown in said co-pending application) includes a pair of pivot plates 26 and 28 mounted on pivot shafts 30 and 32 which are connected to the lid 24 by means of pivot rod 34, cranks 36 and 36' fixed to said pivot rod, cranks 35 and 35' fixed to the shaft 30, crank 37 fixed to the shaft 32, and links 38, 39 and 41 interconnecting said cranks and said lid so that the plates are swung between alternative positions illustrated in solid and phantom lines responsive to opening and closing of the lid 24. The plates operate when the lid is open to catch material deposited through the opening 20 either directly or in a suitable combustible container, and the plates invert to deposit the material in the firebox and shield the firebox when the lid 24 is moved to closed position.

The firebox 18 is mounted in the housing 10 by means of a pivot shaft 40 which is attached to the firebox 18 and pivotally received in ears 42 which are mounted on a plate 44 which is in turn mounted on one of the baffles 16 by means of thumb screws 46 (FIG. 3.) An arm 48 is rigidly attached to the firebox 18 to control the pivotal position of the firebox 18, and a fuel burner nozzle 50 is mounted on the plate 44 by means of a bracket 52 having a hinge 53 intermediate of its ends. The nozzle 50 may be of a standard type adapted to burn butane or natural gas.

The inner firebox 18 is pivotally movable between empty and full positions illustrated in solid and phantom lines respectively responsive to the addition of masses of material to the firebox 18, with the firebox moving progressively from the empty to the full positions as progressively increasing weights of material are added thereto. A roller 55 is mounted on a bracket 57 and engages the nozzle 50 to move the nozzle 50 upwardly around the axis of hinge 53 as the firebox 18 moves down to its full position; this pivotal action of the nozzle permits its to be most effectively directed against material in the firebox while preventing it from being drowned when the firebox is full. Movement of the firebox from the empty to the full positions is opposed by two springs 54 and 56 which resiliently urge the firebox toward the empty position. The spring 56 is mounted under tension with its ends connected to a pivot pin 58 on the end of arm 48 and an adjustable bracket 60. The spring 54 on the other hand is mounted under compression with the spring mounted in a pot motion damper cylinder 62, the spring being between one end of the cylinder and the piston 64 in the cylinder. The piston 64 is connected to a piston rod 66 which is attached at pivot pin 68 to an adjustable bracket 70 with the adjustable brackets 60 and 70 permitting adjustment of the tension and compression on springs 56 and 54 respectively. The tension and compression on the springs 56 and 54 is adjusted to barely support the firebox 18 in the empty position thereof, and a limit switch 72 is mounted on the housing 10 positioned to be opened by the pivot rod 58 when the firebox 18 is in its empty position. When a minimum weight of material is added to the firebox 18, it swings downwardly from its empty position moving the pivot rod 58 upwardly and thereby closing the limit switch 72, and the limit switch 72 is connected to starter means, not shown, for permitting heat generation by the nozzle 50 to be started; preferably the limit switch 72 is electrically connected in series with a second switch (not shown) which prevents the operation of the nozzle 50 from being started when the lid 24 is not closed.

A second normally open limit switch 74 is mounted on the housing 10 positioned to be contacted by and closed by the cylinder 62 when the cylinder 62 moves upwardly responsive to movement of the firebox 18 into its full position. Thus, the limit switch 74 is normally not closed after a single use of the apparatus, but when an unusually large quantity of material is deposited in the box 18, the limit switch 74 is closed. The limit switch 74 is connected to operate an electrical sign, indicated generally at 76, and a solenoid latch 78 by which the sign 76 indicates that the unit is not to be used, and the latch 78 locks the rod 38 to prevent the lid 24 from being opened. The latch 78 functions by extending a solenoid operated rod 78' into locked engagement with the rod 38.

It should be noted that the support of the firebox 18 by compression and tension springs 54 and 56 which operate jointly to resiliently support the box provides resilient support which is insensitive to thermal changes in the

unit since thermal elongation of the compression spring 54 which results in increased spring compression is accompanied by thermal elongation of the tension spring 56 and reduced spring tension so that the combined resilient effect of the two springs remains substantially constant. It should also be noted that the mounting of the dash pot motion damper 62 to damp vibratory motion of the firebox 18 is quite desirable in adapting the unit for use in moving vehicles.

While one specific embodiment of this invention has been illustrated and described in detail herein it is obvious that may modifications thereof may be made without departing from the spirit and scope of the invention.

I claim:

1. In apparatus for the incineration of human waste having a housing with a firebox therein for the receipt of material for incineration and heating means in said housing for heating material in said firebox, the improved means for operating said heating means which comprises support means mounting said firebox in said housing for movement with respect to said housing from an empty position responsive to the weight of material deposited therein, control means connected to said heating means for operating said heating means when said firebox moves out of said empty position, and first and second springs interconnecting said housing and firebox to jointly resiliently urge said firebox toward said empty position with one of said springs under compression and the other of said springs under tension.

2. In apparatus for the incineration of human waste having a housing with a firebox therein for the receipt of material for incineration and heating means in said housing for heating material in said firebox, the improved means for operating said heating means which comprises support means mounting said firebox in said housing for movement with respect to said housing from an empty position responsive to the weight of material deposited therein, control means connected to said heating means for operating said heating means when said firebox moves out of said empty position, spring means interconnecting said housing and firebox to resiliently urge said firebox toward said empty position and motion damper means interconnecting said firebox and said housing.

3. In apparatus for the incineration of human waste having a housing with an opening therein for the introduction of material to be incinerated, a lid on said opening, a firebox therein for the receipt of material for incineration, and heating means in said housing for heating material in said firebox, the improved means for operating said apparatus which comprises support means mounting said firebox in said housing for progressive movement with respect to said housing from an empty position to a full position responsive to the introduction to said firebox of a maximum weight of material to be incinerated, first control means for sensing said firebox in said empty position and operating said heating means when said firebox moves out of said empty position, and second control means for sensing said firebox in said full position and locking said lid on said opening when said firebox is in said full position.

4. The apparatus of claim 3 in which said support means includes a pair of springs interconnecting said firebox and said housing and both resiliently urging said firebox toward said empty position with one of said springs under compression and the other said springs under tension.

5. In apparatus for the incineration of human waste having a housing with a firebox therein for the receipt of material for incineration and heating means in said housing for heating material in said firebox, the improved means for operating said heating means which comprises support means mounting said firebox in said housing for movement with respect to said housing from an empty position responsive to the weight of material deposited therein, control means connected to said heating means for operating said heating means when said firebox moves out of said empty position and wherein said heating means comprises a nozzle for directing an incinerating stream of gas into said firebox and adjustable mounting means interconnect said firebox and said nozzle for moving said nozzle upwardly away from said firebox responsive to movement of said firebox progressively away from said empty position.

6. In an apparatus for the incineration of human waste having a housing with a firebox therein for the receipt of material for incineration and heating means for emitting flame trained downwardly onto the upper surface of material in said firebox, improved means for operating said heating means comprising:

(a) directing means controllable to train flame emitted from said heating means downwardly onto the upper surface of material in said firebox regardless of the amount of material in said firebox;

(b) control means responsive to the amount of material in said firebox to control said directing means, and

(1) said firebox is mounted in said housing for movement with respect thereto from an empty position responsive to the weight of material deposited therein; and,

(2) said control means functions responsive to movement of said firebox.

7. An apparatus according to claim 6, wherein:

(a) said directing means comprises a connection mounting said heating means for movement relative to said housing; and,

(b) said control means comprises means operatively interconnecting said firebox and heating means to impart movement to said heating means responsive to movement of said firebox.

8. An apparatus according to claim 6, wherein:

(a) said directing means comprises a connection mounting said heating means on said housing for rotational movement relative thereto about a substantially horizontal axis; and,

(b) said control means comprises means operatively interconnecting said firebox and heating means to impart rotational movement to said heating means responsive to movement of said firebox.

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