April 4, 1961 E. H. PURDY 2,977,903

GARBAGE DISPOSAL APPARATUS

Filed Aug. 7, 1958 3 Sheets-Sheet 1

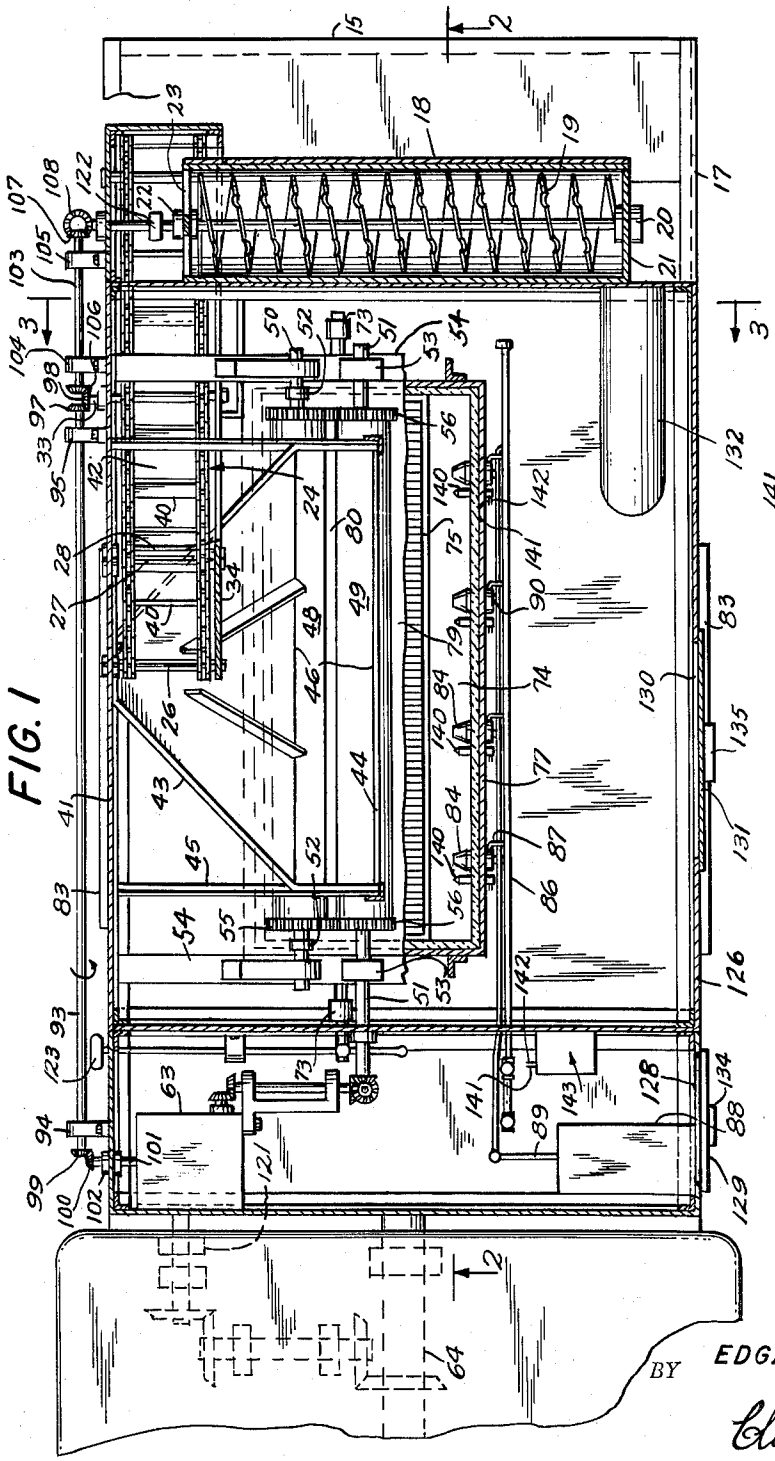


FIG. 1

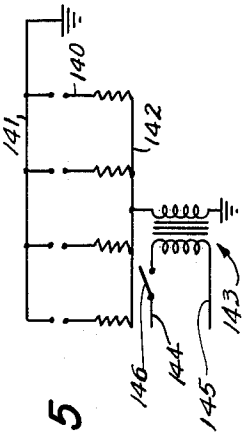


FIG. 5

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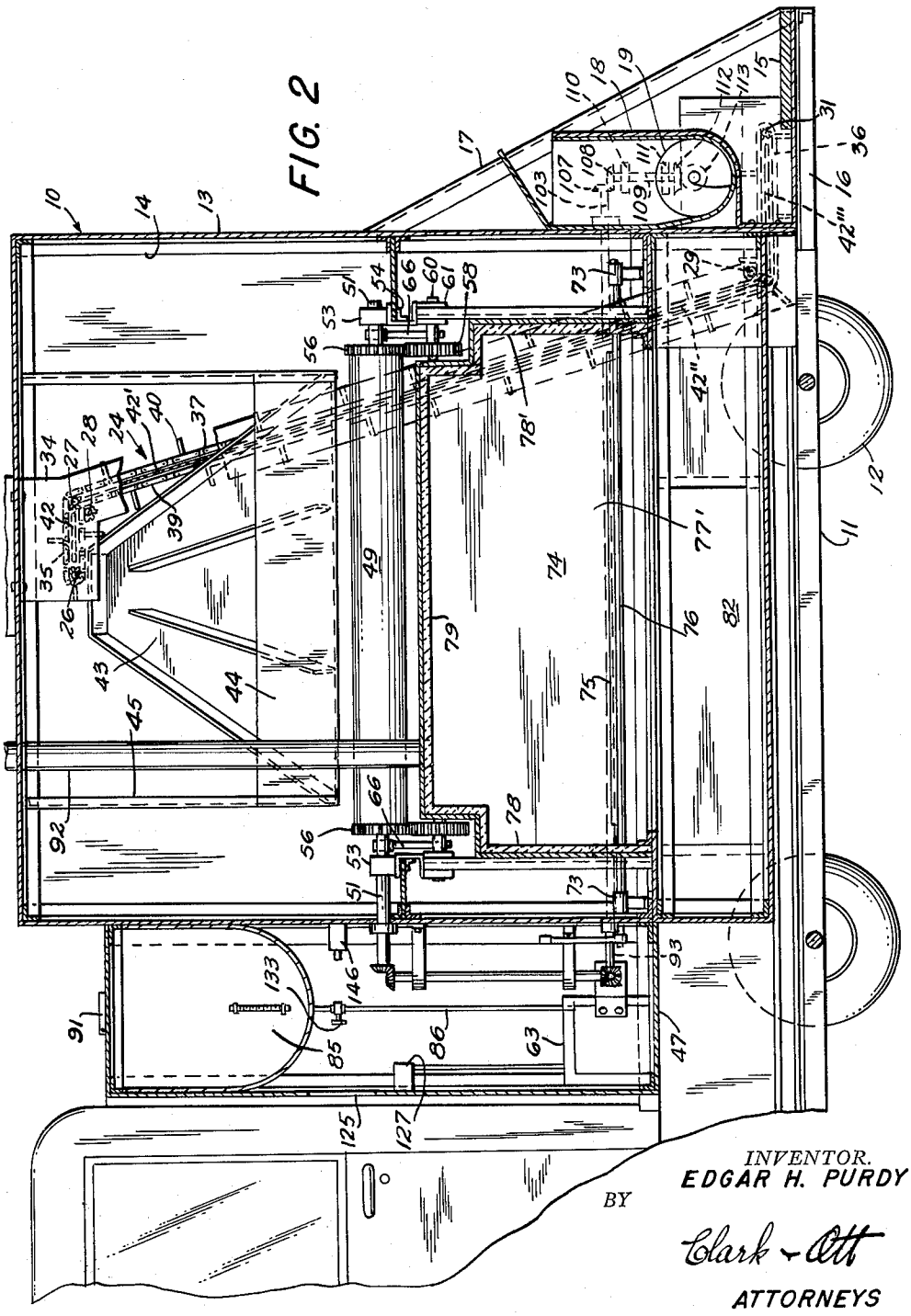
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GARBAGE DISPOSAL APPARATUS

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FIG. 2



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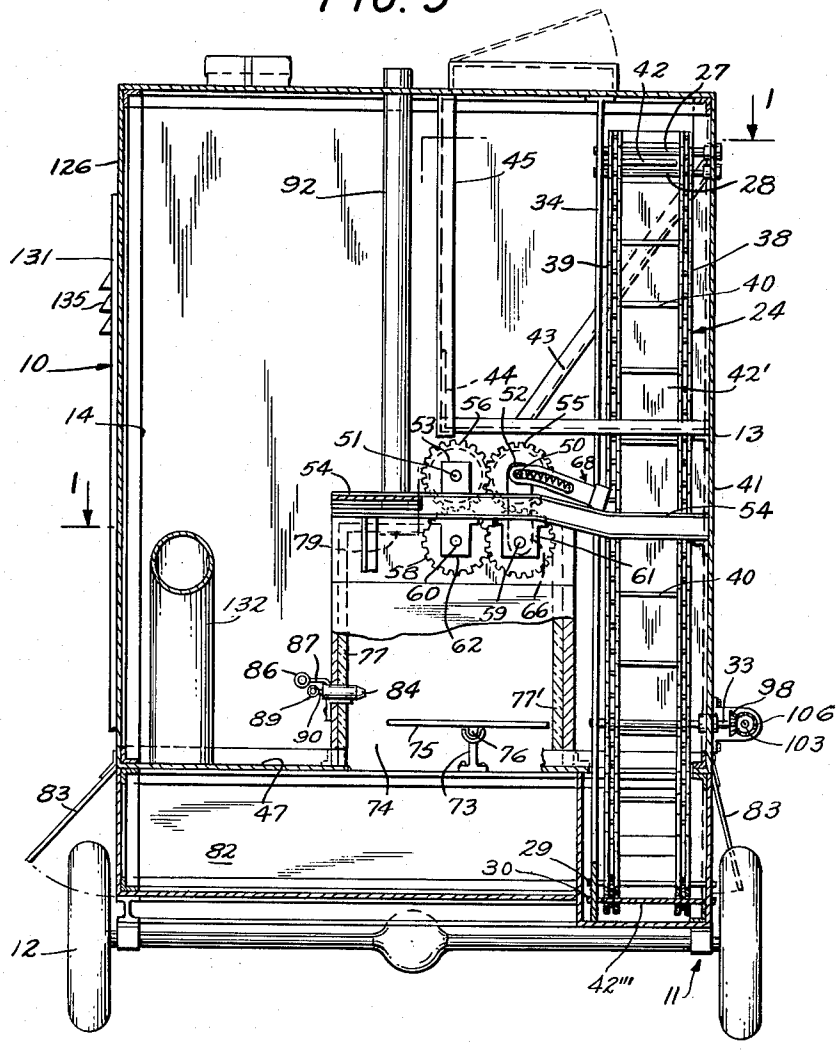
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GARBAGE DISPOSAL APPARATUS

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FIG. 3



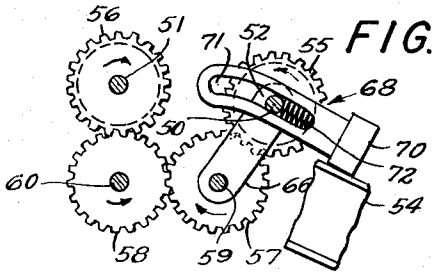


FIG. 4

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GARBAGE DISPOSAL APPARATUS

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This invention relates to garbage disposal apparatus. The invention has more particular reference to a mobile apparatus for the disposal of garbage by burning as it is loaded onto the apparatus.

An object of the invention is to provide a motor driven vehicle having means for receiving and conveying garbage to an incinerating chamber and with an ash receiving compartment disposed below the incinerating chamber which is accessible from either side of the apparatus.

Still another object of the invention is to provide a motor driven vehicle provided with a housing mounted on the chassis thereof and with a rear platform provided with an open top receptacle for receiving garbage and in which a spiral screw is rotatably mounted for conveying the garbage to the lower end of a conveyor with the upper end thereof disposed above and in adjacent relation to hopper means for feeding the garbage to an incinerating chamber.

Another object of the invention is to provide an incinerating chamber having crushing rollers disposed thereabove for crushing the garbage discharged from the hopper means.

Still another object of the invention is to operatively connect the motor of the vehicle with the spiral screw, the conveyor and the crushing rollers for rotating the same.

A further object of the invention is to provide means for feeding fuel oils to burners projecting into the incinerating chamber for consuming the garbage discharged upon horizontally disposed grates overlying the ash receiving compartment.

With the foregoing and other objects in view, reference is now made to the following specification and accompanying drawings in which the preferred embodiment of the invention is illustrated.

In the drawings:

Fig. 1 is a view taken approximately on line 1—1 of Fig. 3 of a garbage disposal apparatus constructed in accordance with the invention and showing a trough in horizontal section at the rear with conveyor means mounted therein.

Fig. 2 is a longitudinally sectional view taken approximately on line 2—2 of Fig. 1.

Fig. 3 is a vertical cross-sectional view taken approximately on line 3—3 of Fig. 1.

Fig. 4 is an enlarged fragmentary view taken at one end of the rollers showing the arrangement of the chain of gears for turning the rollers.

Fig. 5 is a schematic view of the electric circuit for igniting the fuel oil issuing from the nozzles.

Referring to the drawings, the garbage disposal apparatus is in the form of a vehicle 10 which may be of any desired character having a chassis 11 rollably supported on wheels 12 and with the usual driving means operatively connecting the rear wheels with the motor of the vehicle for propelling the same. Mounted upon

the chassis 11 is a sheet metal housing 13 having an angle iron frame 14 to which the sheet metal walls of the housing are riveted or otherwise secured.

Arranged at the rear of the housing is a platform 15 which is supported by an angle iron frame 16 and by diagonally extending frame members 17 bolted or otherwise affixed to the housing frame 14. Also affixed to the housing frame above the platform 15 is an open top garbage receiving trough 18 having a semi-circular bottom wall. A spiral screw 19 is located in the bottom of the trough with one end of the screw journaled for rotation in a bearing 20 in the end wall 21 of the trough and with the other end of the screw journaled in a bearing 22 in a spider 23 at the discharge end thereof.

The screw 19 projects over the lower end of an endless chain conveyor 24 located adjacent one side of the housing and which operates over sprocket wheels carried by three upper shafts 26, 27 and 28 and over sprocket wheels carried by three lower shafts 29, 30 and 31 and which is driven by sprocket wheels carried by an intermediate shaft 33. The said shafts are journaled in bearings in the side wall 41 of the housing and in a vertically disposed plate 34 which extends alongside of and parallel with the conveyor and is affixed to the housing at the top and bottom thereof.

The arrangement provides upper and lower horizontally disposed conveyor portions 35 and 36 and an inclined conveyor portion 37. The conveyor includes oppositely disposed endless sprocket chains 38 and 39 and a plurality of longitudinally spaced narrow extending members 40 affixed at their ends to spaced links of said chains. Arranged between the upper and lower courses of the conveyor portions 35, 36 and 37 are metal plates 42, 42', 42'' and 42''' respectively which are secured along their inner and outer edges to the vertical plate 34 and side wall 41. The plate 42 extends horizontally between the shafts 26 and 27 of the upper conveyor portion 35. The plate 42' is disposed between the shafts 27 and 33. The plate 42'' extends between the shafts 33 and 30 while the plate 42''' extends between the shafts 30 and 31. The said plates together with the vertically disposed plate 34 and the side wall 41 form a continuous trough within which the upper course of the conveyor moves to carry the garbage therewith and to discharge the same into a chute located below the upper conveyor portion 35.

The said chute includes an inclined bottom wall 43 and an upstanding side wall 44 and is supported by an angle iron frame 45 which is riveted or otherwise affixed to the housing frame 14. The bottom of the chute is open as at 46 between the inclined bottom wall 43 and the side wall 44 with the opening 46 disposed above a pair of horizontal rollers 48 and 49.

The rollers 48 and 49 are affixed to shafts 50 and 51 which are mounted for rotation in bearings 52 and 53 carried by upstanding angle iron frames 54 arranged transversely of the housing at the ends of said rollers. The frames 54 are supported upon a horizontal wall 47 of the housing and are riveted or otherwise affixed to the housing frame 14. The rollers 48 and 49 are of metal and affixed to the ends of the shafts 50 and 51 thereof are meshing gears 55 and 56 which maintain the rollers in narrowly spaced parallel relation. Arranged below said gears at each end of the rollers are meshing gears 57 and 58 affixed to stub shafts 59 and 60 which are journaled for rotation in bearings 61 and 62 mounted on said frames 54 and which are in engagement with the roller gears 55 and 56 respectively as shown in Fig. 3 of the drawings. The shaft 51 of the roller 49 is operatively connected through reduction gearing contained in a gear box 63 with the drive shaft 64 of the motor of the vehicle for turning the rollers 48 and 49 in clockwise and counterclockwise directions respectively for com-

pressing the garbage discharged from said chute and passing therebetween. The bearings 52 of the roller 48 are mounted on the ends of arms 66 which are provided for swinging movement on the outer ends of stub shafts 59. The shaft 50 is tensioned by coil spring tensioning means 68 to normally dispose the gears 55 in engagement with the gears 56 of the oppositely disposed roller 49. This provides means by which the rollers may be spread apart in the event that a large object or a large mass of garbage passes between the rollers whereupon the gears 57 and 58 will remain in engagement with the roller gears 55 and 56 respectively and the roller gears 55 and 56 will automatically mesh again when the large object or mass of garbage has passed from between the rollers and the tensioning means moves the shaft 50 to its normal position.

Two coil spring tensioning means 68 are provided which are located at the ends of the shaft 50. Each includes a member 70 affixed to one of the frames 54 and having an arcuate slot 71 formed on a radius with the shaft 59 as the center thereof as shown in detail in Fig. 4 of the drawings. The shaft 50 is slideable in the slots 71 and is tensioned to normally maintain the same at the outer ends thereof by coil springs 72.

Located below the rollers 48 and 49 and between the frames 54 is an incinerating chamber 74 in which the garbage discharged from between the rollers 48 and 49 is burned as the same falls upon a horizontally disposed grate 75 supported by a longitudinally extending bar 76 rockable on supports 73 affixed to the wall 47. The incinerating chamber includes opposite side walls 77 and 77' and opposite end walls 78 and 78' and a top wall 79 having a top opening 80 extending longitudinally of the rollers 48 and 49 and disposed therebelow. The incinerating chamber is provided with an open bottom which communicates with an underlying ash receiving compartment 82 extending transversely of the housing and having hinged doors 83 at the opposite sides of the truck for removing the ashes. The walls of the incinerating chamber are preferably of sheet metal and covered on the inner face thereof with a layer of fire resisting brick or other insulating lining. The sheet metal walls are supported upon the horizontal wall 47 of the truck housing 13 and are riveted or otherwise affixed thereto.

In order to ignite and burn the garbage, a plurality of longitudinally spaced nozzles 84 are provided which extend through the side walls 77 of the incinerating chamber with the inner ends thereof located adjacent one side of the grate 75 for projecting a flame across the top thereof. Fuel oil is fed by gravity to the nozzles from a fuel oil tank 85 through a pipe line 86 having branches 87 connected to the outer ends of the nozzles 84 respectively. Air is mixed with the fuel oil in the nozzles to atomize the oil and force the same from the nozzles in the form of a spray. The air is delivered to the nozzles under pressure from a motor driven air compressor 88 through a pipe line 89 having branches 90 connected with the nozzles 84 respectively. The products of combustion produced by the burning of the oil and garbage are exhausted from the incinerating chamber through a stack 92 opening through the top of the housing. The fuel oil tank 85 is affixed to the housing frame 14 adjacent the top thereof and is provided with a filling opening which is closed by a cover 91. The motor driven air compressor 88 is diagrammatically illustrated and is supported on the horizontal wall 47 of the housing.

The conveyor 24 is rotated for elevating the garbage by means of a shaft 93 rotatable in bearings 94 and 95 affixed to the side wall 41 of the housing. A bevel gear 97 affixed to said shaft is disposed in engagement with a bevel gear 98 affixed to the protruding end of the shaft 33. The shaft 93 is also provided with a bevel gear 99 affixed to the forward end thereof which is disposed in engagement with a bevel gear 100 secured to the outer end of a shaft 101 journaled in a bearing 102 affixed to the side wall 41 of the housing and with the inner end of said shaft operatively connected with the reduction gearing in the gear box 63. The shaft 93 is rotated in a counterclockwise direction as viewed in plan in Fig. 1 of the drawings whereby the shaft 33 is rotated to effect upward movement of the upward course of the conveyor. The shaft 93 also effects rotation of the spiral screw 19 by means of a horizontally disposed shaft 103 journaled for rotation at its ends in bearings 104 and 105 affixed to the side wall 41 of the housing and which shaft is provided with a bevel gear 106 disposed in engagement with the bevel gear 98 affixed to the protruding end of the shaft 33. The rear end of the shaft 103 has a bevel gear 107 affixed thereto which is disposed in engagement with a bevel gear 108 affixed to the upper end of a vertical shaft 109 journaled for rotation in bearings 110 and 111 affixed to the side wall 41 of the housing. The said shaft has a bevel gear 112 affixed to the lower end thereof which is disposed in engagement with the bevel gear 113 affixed to the protruding end of the spiral screw 19. By this arrangement the shaft 103 is rotated in a clockwise direction as viewed in plan in Fig. 1 of the drawings which results in the turning of the vertical shaft 109 in a clockwise direction and the spiral screw 19 in a counterclockwise direction as viewed from above.

In operation the incinerating chamber 74 is heated before using the same for disposing of garbage. This is effected by turning on the valve 133 to feed fuel oil to the burners 84 and by closing the switch 127 connecting the motor of the air compressor 88 with the electric generator of the vehicle driving means. The vehicle driving means is maintained in operation at all times when the disposal apparatus is in use. The fuel oil issuing from the nozzles 84 may be ignited by a torch inserted through either of the ash removal openings which are closed by the doors 83. When the incinerating chamber is at the proper temperature, the conveyor 24 is set in motion by manipulating a clutch lever 121 arranged in the cab of the vehicle to operatively connect the shaft 93 with the driving shaft 64 of the motor through the reduction gearing contained in the gearing box 63.

As the vehicle is driven through the streets the garbage is collected and deposited in the trough 18 upon the screw 19 and a clutch 121 is operated to connect the shaft of the screw with the stub shaft of the beveled gear 113 to thereby throw the screw into operation. The garbage is conveyed by the screw onto the lower portion 36 of the conveyor. The garbage moves with the conveyor up the inclined portion 37 and is discharged from the upper portion 35 onto the chute 43. The garbage slides down the chute 43 through the opening 46 and is deposited between the rollers 48 and 49 which are narrowly spaced apart so as to compress the garbage therebetween. The garbage is discharged from the rollers by gravity upon the grate 75. The flame jets issuing from the nozzles 84 consume the garbage, ashes being deposited in the ash compartment 82. From time to time the grate 75 may be rocked by manipulating the lever 123 so as to agitate and loosen up the garbage on the grate and to separate the ashes therefrom. The products of combustion in the form of consumed ashes are discharged from the stack 92.

A small opening 125 is provided in the front of the housing 13 for manipulating the valve 133 and switch 127 from the cabin of the vehicle. The air compressor 88 is open to the atmosphere through the side wall 126 of the housing 13 for supplying outside air to the nozzles 84. Above the air compressor 88 the side wall 126 is provided with an opening 128 which is closed by a hinged door 129 for gaining access to the gear box 63 and air compressor 88. The side wall 126 is also provided with an opening 130 which is closed by a hinged door 131 to permit an operator to enter the housing

13 for inspection and cleaning the conveyor and rollers. The doors 129 and 131 may be provided with louvers 134 and 135 in the top thereof for ventilating the housing. A tube 132 opens through the rear wall of the housing and above the trough 18 with the forward end of the tube opening downwardly into the ash receiving compartment 82. This tube is of a size to receive tin cans and the like which may be mixed with the garbage and which may be separated therefrom by the operator and deposited in the tube for collection in the ash pit.

Instead of utilizing a torch for igniting the fuel oil issuing from the nozzles 84, the fuel oil may be ignited at each of the nozzles by a spark across the terminals of spark plugs 140 mounted in the side wall 77 of the incinerating chamber with the terminals of each of the spark plugs 140 located in close relation with the discharge orifices of the nozzles 84 respectively. The spark plugs 140 are arranged in parallel between conductor wires 141 and 142 which latter is connected with the secondary of a high potential transformer 143. The secondary of the transformer and the conductor wire 141 are grounded as shown. The primary of the transformer is connected by conductor wires 144 and 145 with the generator of the motor vehicle. A switch 146 is interposed in the primary circuit and which switch is located in position to be actuated by the operator from the cab through the opening 125.

While the preferred form of the invention has been shown and described herein, it is to be understood that the same is not so limited but shall cover and include any and all modifications thereof which fall within the purview of the invention.

What is claimed is:

1. In a garbage disposal apparatus, a motor driven rollably mounted vehicular chassis, a housing mounted on said chassis, an inclined chute mounted within said housing and having an open lower end extending longitudinally of the chassis, a pair of aligned side by side horizontally disposed rollers disposed beneath the open end of said chute in spaced relation therefrom and extending longitudinally of said chassis for receiving garbage thereon deposited through said open end of said chute, means rotatably mounting said rollers within said housing, said means including pivoted arms on which one of said rollers is mounted for rotation and means biasing said roller toward the other roller and permitting of the swinging of said arms and said roller mounted thereon away from said other roller against the tension of said biasing means by the passing of garbage between said rollers, furnace walls mounted within said housing providing a combustion chamber and including a top wall having an opening extending longitudinally of said chassis and arranged in spaced relation below said rollers for receiving and burning in said combustion chamber garbage passing between said rollers, means operatively connecting said rollers with the driving means of said chassis for turning said rollers for compressing the garbage passing therebetween, conveyor means operatively mounted in said housing including an inclined portion, an upper end portion extending longitudinally of the chassis and disposed above said inclined chute at one side of the housing, and means operatively connecting said conveyor means with the driving means of said chassis for conveying garbage up said inclined portion and onto said upper end portion and for depositing the same onto said chute.

2. In a garbage disposal apparatus, a motor driven rollably mounted vehicular chassis, a housing mounted on said chassis, an inclined chute mounted within said housing and having an open lower end extending longitudinally of the chassis, a pair of aligned side by side horizontally disposed rollers disposed beneath the open end of said chute in spaced relation therefrom and extending longitudinally of said chassis for receiving garbage thereon deposited through said open end of said chute, means rotatably mounting said rollers within said housing, said means including pivoted arms on which one of said rollers is mounted for rotation and means biasing said roller toward the other roller and permitting of the swinging of said arms and said roller mounted thereon away from said other roller against the tension of said biasing means by the passing of garbage between said rollers, furnace walls mounted within said housing providing a combustion chamber and including a top wall having an opening extending longitudinally of said chassis and arranged in spaced relation below said rollers for receiving and burning in said combustion chamber garbage passing between said rollers, means operatively connecting said rollers with the driving means of said chassis for turning said rollers for compressing the garbage passing therebetween, conveyor means operatively mounted in said housing including an inclined portion, an upper end portion extending longitudinally of the chassis and disposed above said inclined chute at one side of the chassis and a horizontally disposed outer end portion protruding through said housing, an open top trough affixed to the rear of said chassis, a transversely extending screw rotatably mounted in said trough and having its outer end disposed above said outer end portion of said conveyor, and means operatively connecting said conveyor means and said screw with the driving means of said chassis for conveying and depositing garbage dumped on said screw onto said chute.

3. In a garbage disposal apparatus, a motor driven rollably mounted vehicular chassis, a housing mounted on the chassis, an open topped trough mounted transversely of the chassis behind the housing, first power driven conveyor means disposed in the trough and having a discharge end at one side of the chassis, second power driven conveyor means mounted in the housing on said one side of the chassis, said second power driven conveyor means being inclined forwardly upwardly and terminating forwardly in an upper end, the lower end of said second power driven conveyor means being disposed beneath said discharge end of said first power driven conveyor means and extending longitudinally of the chassis to receive garbage falling by gravity from said first conveyor means, a chute mounted in the housing, the upper end of the chute being disposed adjacent said one side of the chassis and beneath said upper end of said second power driven conveyor means, the chute being inclined downwardly away from said one side of the chassis and terminating in a lower edge extending lengthwise of the chassis, a pair of aligned parallel horizontally disposed crushing rollers rotatably mounted in the housing and disposed in spaced relation below the lower edge of the chute and extending lengthwise of the chassis for receiving garbage thereon deposited from the lower edge of the chute, and furnace walls mounted in the chassis providing a combustion chamber below the rollers and including a top wall having an opening extending longitudinally of said chassis and arranged in spaced relation below said rollers for receiving and burning in the combustion chamber garbage passing between the rollers.

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