

[54] **COMPACTING SYSTEM**

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[22] Filed: Aug. 13, 1971

[21] Appl. No.: 171,708

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 847,567, Aug. 5,
1969, abandoned.

[52] U.S. Cl. 53/124 B, 100/49, 100/100,
100/229 A, 100/255

[51] Int. Cl. B65b 1/24

[58] Field of Search 53/24, 124 B;
100/100, 255, 229 A, 49

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[57] **ABSTRACT**

A container is located below a refuse chute and a gate unit in the chute is opened to allow refuse to discharge from the chute into the container. The container is then moved to a compacting station wherein the refuse in the container is compacted. If the compacted refuse is below a predetermined level in the container, the container is moved back below the chute and the gate unit opened to allow further refuse to fall within the container. This procedure is repeated until the level of the compacted refuse in the container reaches a predetermined level. Then the full container is ejected from the system, and empty container is moved below the chute and the gate unit is operated as above to allow further refuse to fall in the empty container. The gate unit may be operated in response to refuse falling. Alternatively, the apparatus is operated by means of a timer at predetermined times.

22 Claims, 13 Drawing Figures

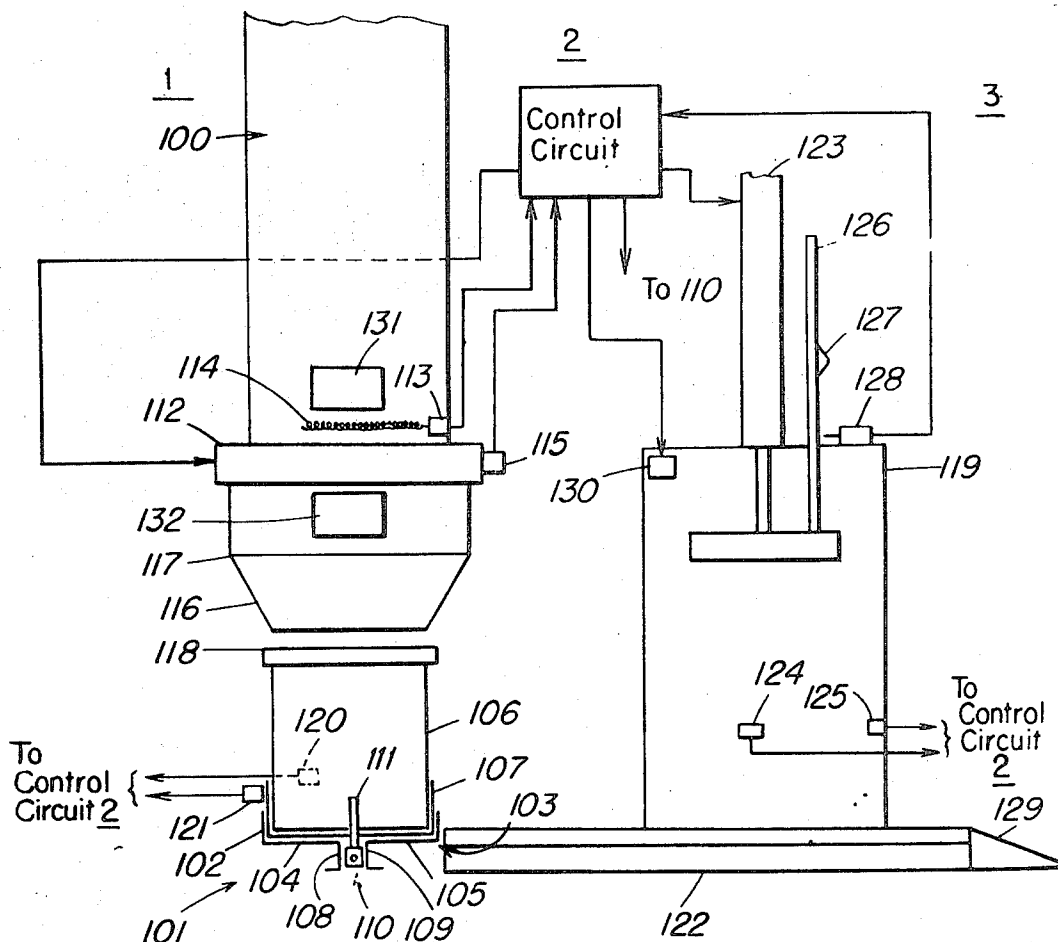


FIG. 1

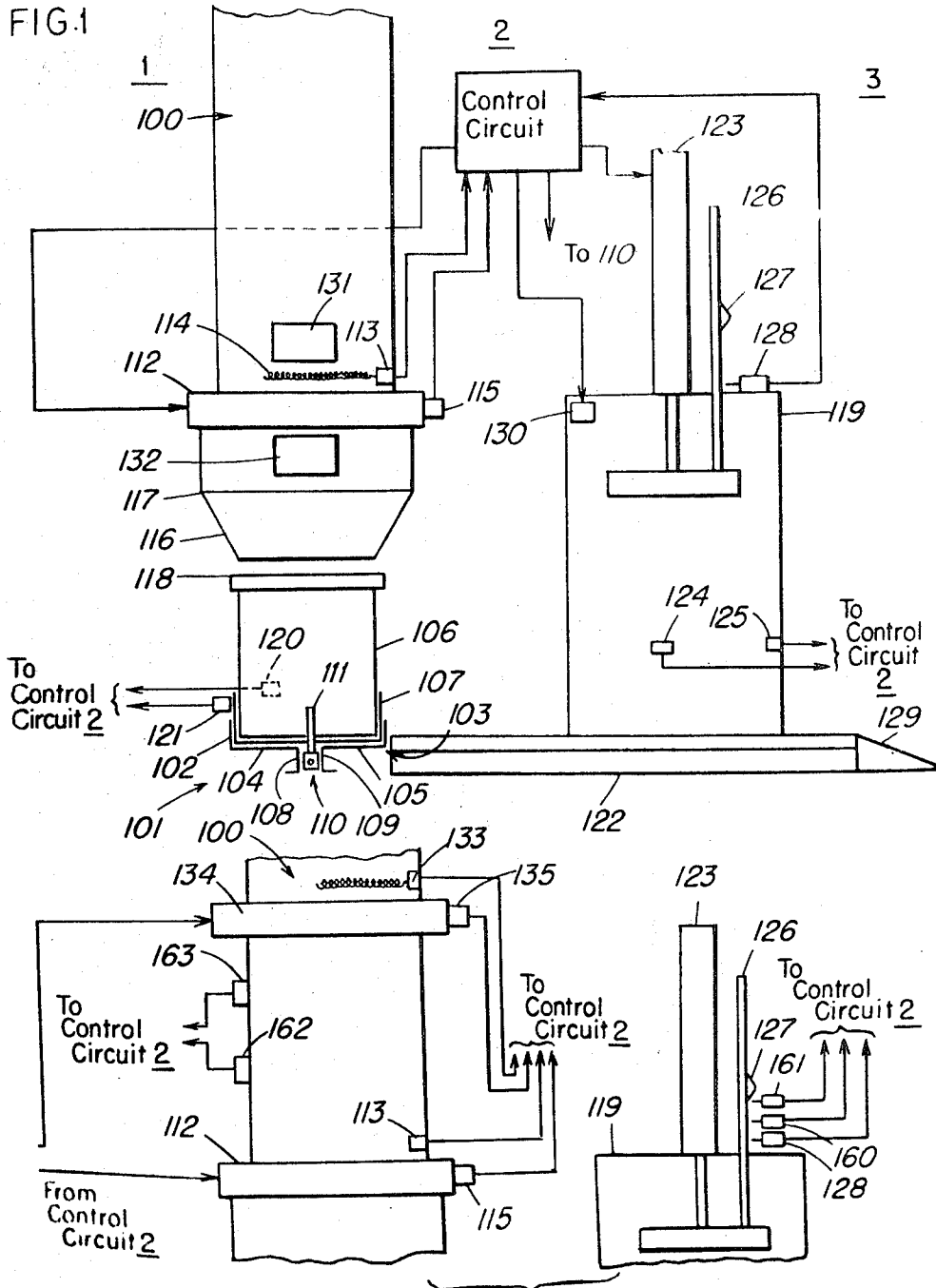


FIG. 3

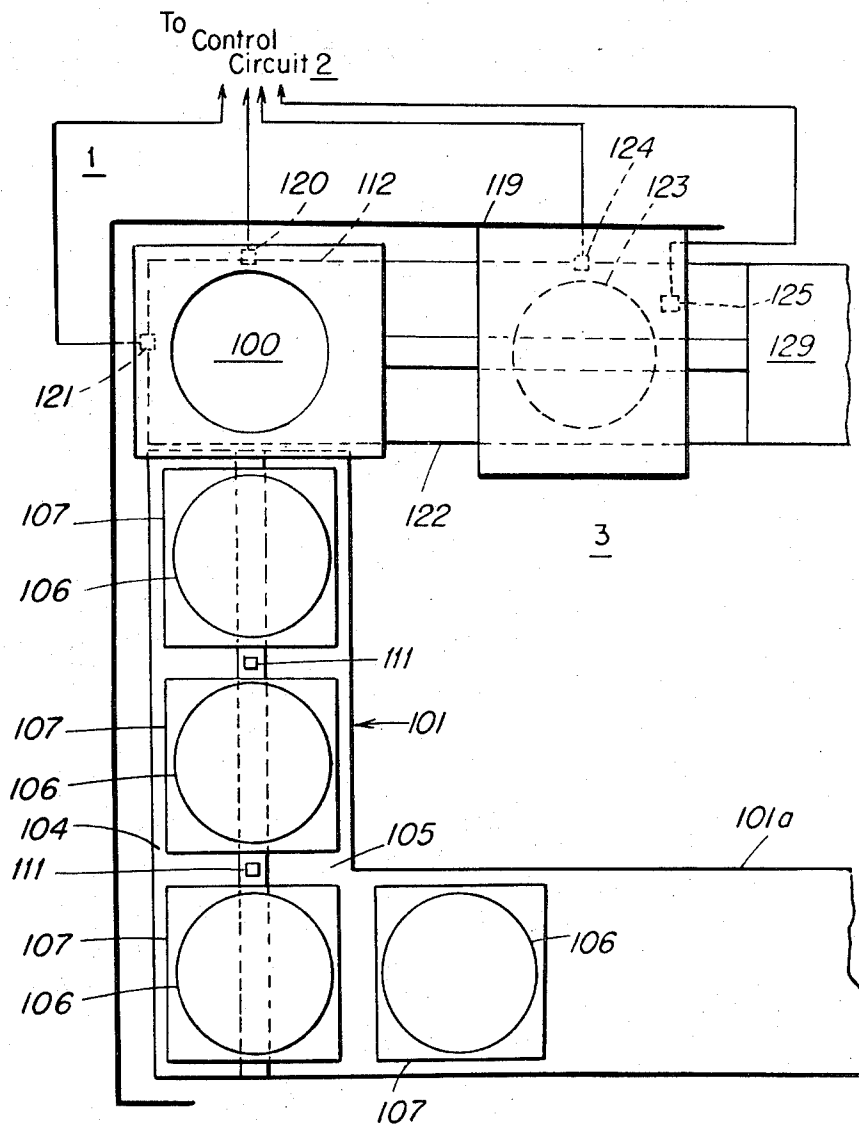


FIG. 2

FIG. 4a

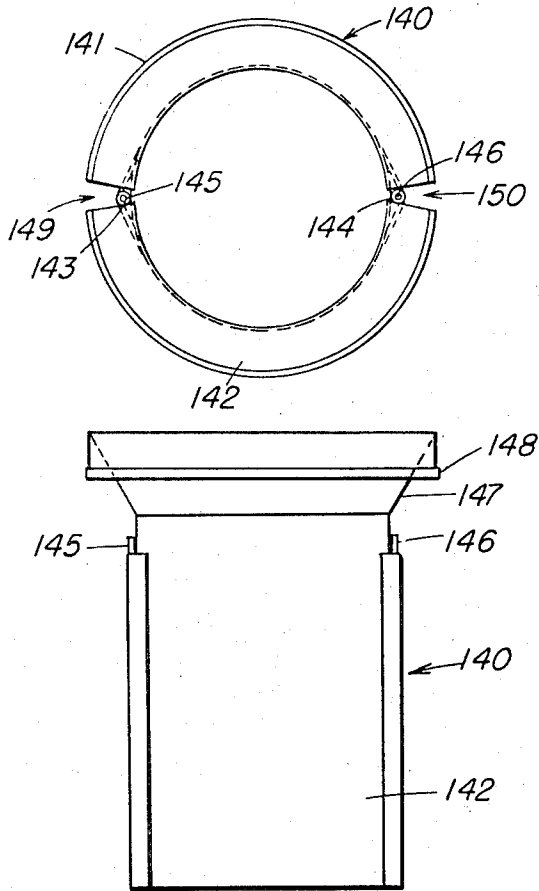


FIG. 4b

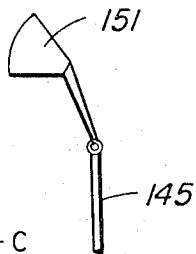


FIG. 4c

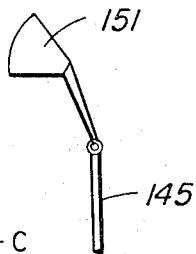


FIG. 5a

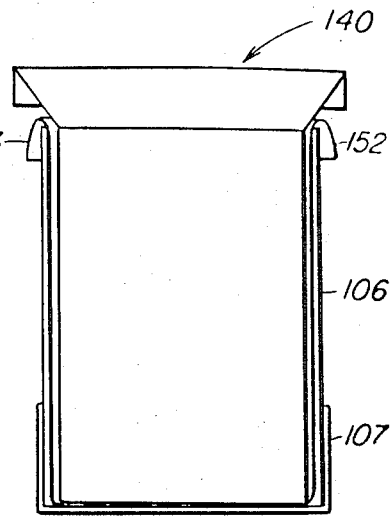
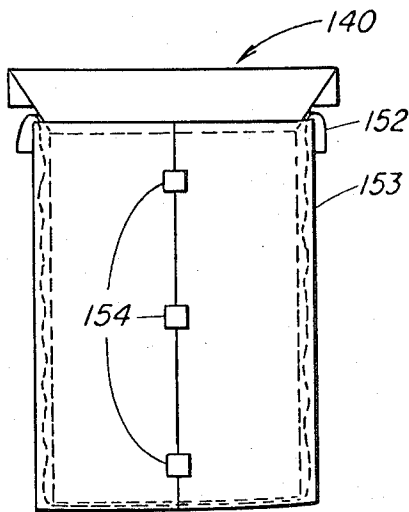


FIG. 5b



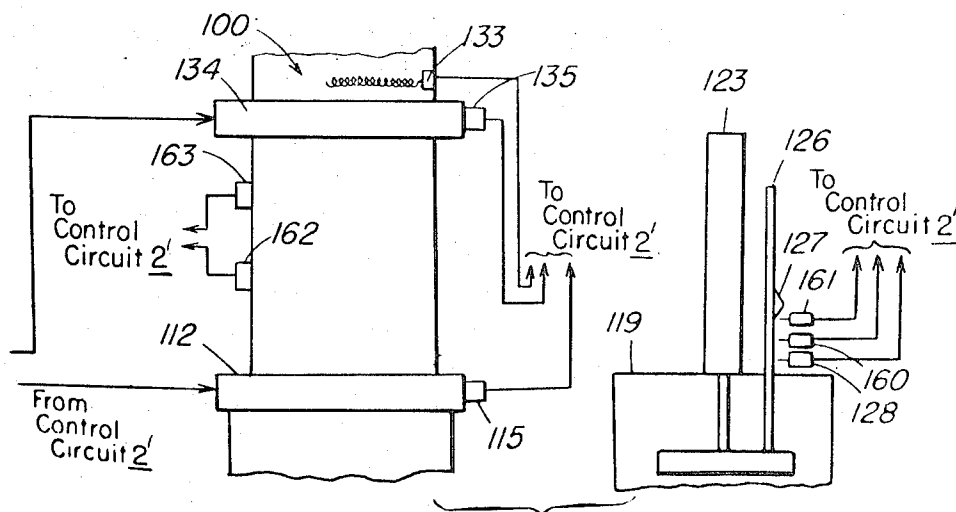


FIG. 6.

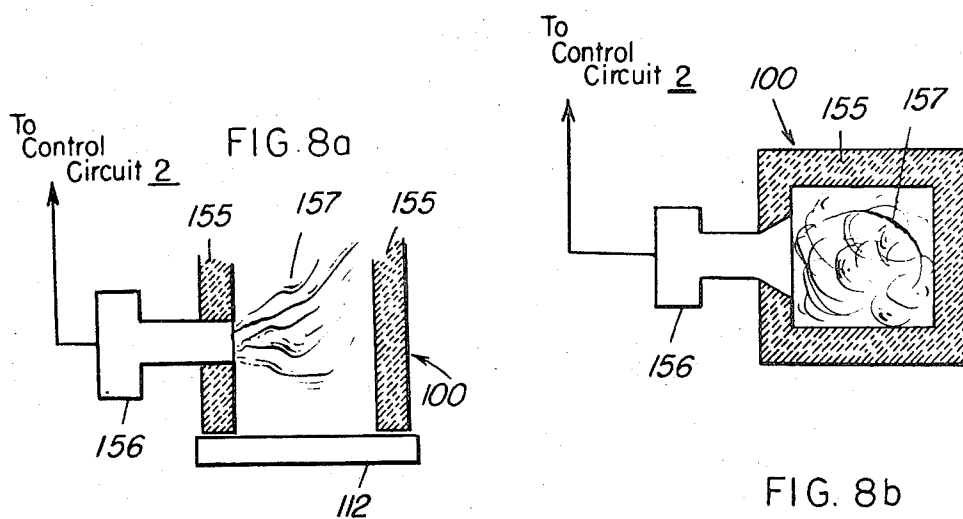
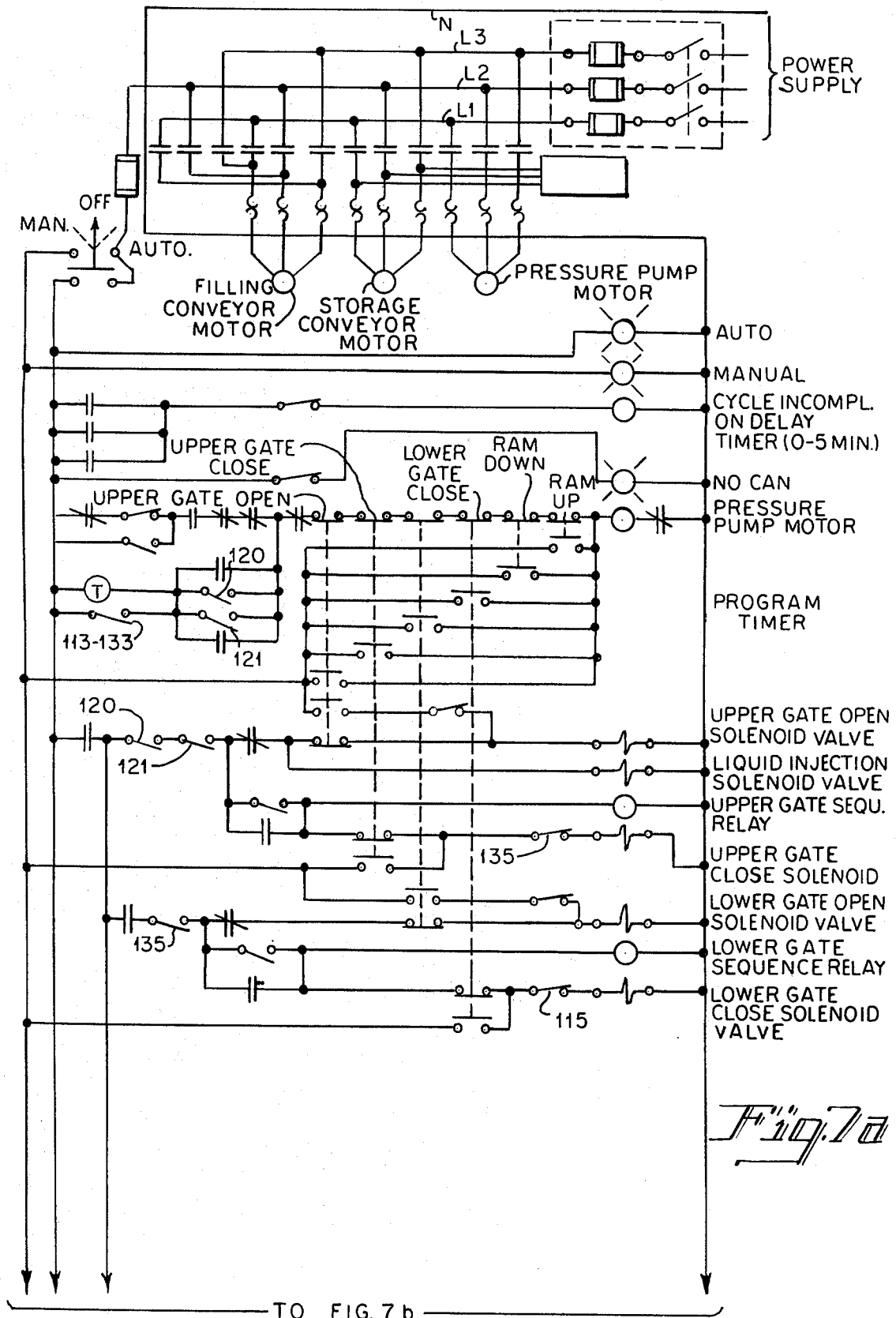


FIG. 8b



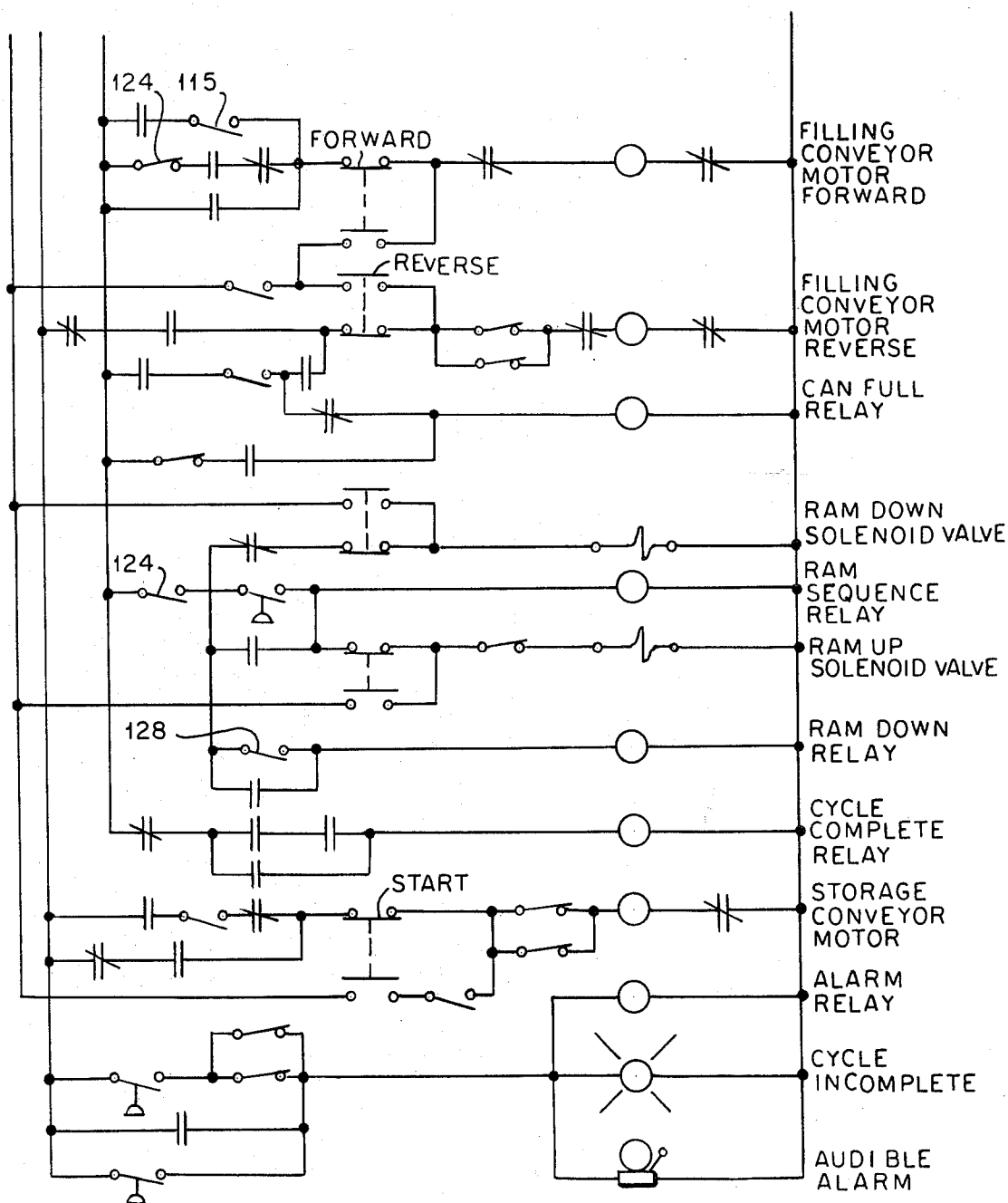


Fig. 7b

COMPACTING SYSTEM

This is a continuation-in-part of Ser. No. 847,567, filed Aug. 5, 1969, now abandoned.

This invention relates to compacting systems and, more particularly, to apparatus for compacting material such as refuse received from a chute, such as an incinerator chute, or the like.

The present invention will be described in detail herein with respect to a chute-type refuse handling system. The present system is particularly suitable for compacting refuse of the type encountered in residential systems, such as those in apartment houses, and for replacing existing incinerators with compacting systems utilizing the existing chute arrangement. The system is also useful for handling other waste materials and refuse such as waste from department stores, supermarkets and various industrial plants. However, it should be clear that the principles set forth herein are equally applicable to any other application wherein it is required to compact material received from a chute or a hopper, a direct-fed operating system or the like.

It is an object of the present invention to provide a compacting system which is relatively simple, inexpensive to manufacture and which is adaptable to replace existing incinerator systems without making major modification to the existing installation.

SUMMARY OF THE INVENTION

In accordance with the present invention, a compacting system comprises a receiving station which includes a chute for receiving material to be compacted and means for receiving a container. Also included is a gate unit in the receiving station for opening and closing the chute for selectively feeding material to be compacted into the container. The system further includes a compacting station and a transport mechanism for moving the container between the receiving station and the compacting station. Responsive to the operating of the gate unit and/or the discharge of material into the container, the transport means operates to move the container to the compacting station after the gate unit is closed, the material in the container being compacted at the compacting station. At the compacting station, a level sensing means is provided for sensing the level of the compacted material in the container. The transport mechanism operates to move the container back to the receiving station for receiving further material to be compacted if the level of the compacted material in the container is below a predetermined level, and operates to eject the container from the compacting system if the level of the compacted material in the container is above the predetermined level. The gate unit and the associated apparatus may be operated in response to sensing of material in the chute, or may be operated periodically by means of a timer or the like.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevational view of a compacting system according to the present invention for use with a chute.

FIG. 2 is a top view of a portion of the system of FIG. 1;

FIG. 3 illustrates a portion of the system shown in FIG. 1 modified in accordance with further features of the invention;

FIGS. 4a-4c illustrate a container liner for use with the compacting system of the present invention;

FIGS. 5a and 5b illustrate container and liner configurations for use with disposable bags or the like.

FIG. 6 illustrates a portion of the system shown in FIGS. 1-3 further modified in accordance with the present invention;

FIGS. 7a and 7b are schematic diagrams of the control circuit used in the embodiment of FIG. 6; and

FIGS. 8a and 8b illustrate a portion of the system showing a further modification in accordance with the present invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Referring to FIG. 1, at the refuse receiving station 1 is a platform 101 for locating containers below a chute 100 which may be part of an existing incinerator system. The platform 101 comprises a pair of support members 102 and 103 having bearing portions 104 and 105, respectively for carrying a container 106. In this embodiment, the container is accommodated within a container holder 107. The upper surfaces of portions 104 and 105 are preferably coated with a material having a low coefficient of friction, such as teflon, so the container 106 and its holder 107 may easily slide thereon. Located between the lower portions 108 and 109 of members 102 and 103, respectively is a chain drive mechanism 110 having dogs 111 thereon. Alternatively, a track having a surface of low coefficient of friction may comprise, or be attached to, the upper surfaces of bearing portions 104 and 105. The chain drive mechanism 110 is well-known in the art and is not described in detail herein. The dogs are driven by the chain drive and are adapted to push the container 106 to the desired positions on platform 101. Alternatively, the platform 101 comprises a plurality of rollers to enable the container 106 and its holder 107 to be easily rolled thereon. A conveyor-belt-type or chain-type arrangement having dogs thereon to locate the containers apart from each other may also be used. Other equivalent devices may be used for platform 101.

A second platform 122, which is similar to platform 101 is also partially located below chute 100 for moving containers 106 from the receiving station to a compacting station 3. The chain drive for platform 101 is a unidirectional drive and the chain drive for platform 122 is a bi-direction drive.

An automatically operated gate 112 is mounted at or near the bottom opening of the chute 100 to selectively open and close the chute to allow refuse to selectively fall within the container 106. Gate 112 is constructed of suitable impact resistant material to insure that refuse falling thereon is properly blocked and that falling refuse will not damage the gate. Gate 112 is operated by means of refuse sensor 113 which causes gate 112 to open when the sensor senses the presence of material to be compacted in the chute 100. Refuse sensor 113 may be an electrical switch having a "whisker-type" operating arm 114 which is activated by the refuse falling from the chute. Sensor 113 may also take the form of a sonic sensor or photoelectric sensor, both of which are well-known in the art. Gate 112 will not operate unless limit switches 120 and 121 are operated to indicate that container 106 and its holder 107 are properly located below chute 100. Switches 120 and 121 may be mounted to the housing (not shown) of the system. All of the sensor 113, 115, 120 and 121 are coupled to control circuit 2 which contains the appropriate logic

to operate the system described herein. The logic is straightforward and the design thereof to operate the various portions of the system should be apparent to those skilled in the art.

Sensor 115 is provided for indicating when gate 112 is properly closed. Gate sensor 115 may be a well-known limit switch or the like which is operated when the movable part of the gate is properly located in its closed position.

A funnel-shaped transition chute unit 116 is positioned between the container 106 and the chute 100 to ensure that all of the falling refuse is received in container 106. The outer edge 117 of funnel unit 116 substantially conforms to the chute opening (either square, round, oval, etc.) and the inner edge 118 of the funnel unit 116 is designed to conform with the opening of container 106 to ensure that all of the refuse falls within the container 106.

Located adjacent the refuse receiving station 1 is compacting station 3 which comprises a housing 119 which receives the container 106 on platform 122 after the container 106 has received material to be compacted and after the gate 112 has been closed. After these conditions are determined, control circuit 2 causes chain drive for platform 122 to move container 106. When the container 106 is properly positioned in the compacting station 3, as indicated by limit switches 124 and 125, a ram 123 is caused to descend (in a manner well-known in the art) by control circuit 2 and compact the refuse in container 106. Coupled to the ram 123 is a sensor rod 126 for indicating when the container 106 is filled with compacted material. The rod 126 has a protrusion 127 thereon which cooperates with switch 128, switch 128 being coupled to the control circuit 2. Each time the ram descends, protrusion 127 will operate switch 128, indicating the container 106 is not full. When the ram descends and switch 128 is not operated, this indicates that container 106 is full. When the full pressure has been applied by the ram, the ram rises. This application of full pressure is sensed by a pressure switch which forms part of the ram mechanism. Clearly, sensing devices other than the rod 126 and switch 128 may be used to provide the desired results.

After the ram 123 is raised, if the container 106 is not full, as determined by sensor 126, then the container 106 is automatically moved back to the refuse receiving station 1 for receiving more refuse. In this case, the gate 112 is caused to open after the container 106 is in position and if refuse is present on gate 112, as determined by sensor 113, so that refuse may again fall within container 106. This procedure is repeated until compacting sensor 126 senses that container 106 is full after compaction by ram 123. The platform is then energized and container 106 is automatically ejected out of the compacting station 3, down ramp 129 to a disposal station (not shown).

A sprayer 130 may be provided at compacting station 3 to spray a chemical solution containing insecticide, and/or deodor-agents, and/or a sealing compound on top of the compacted material in the container 106 prior to ejection of container 106 down ramp 129.

Generally, ram force of about 3,000 lbs. will be used for ordinary apartment house use. Obviously, this can be greater or less as required for household, commercial or industrial use, and depending upon the type of material being compacted.

In order to facilitate movement of the containers 106 throughout the system, a container holder 107 is optionally provided. The container holder 107 in the Figures is a device of substantially square configuration within which the container 106 is accommodated. It should be clear that container holder 107 can take any other convenient shape, depending upon the application and depending upon the shape of the container 106. It has been found in practice that by providing a container holder 107, the movement of the container 106 within the system between the various stations is greatly facilitated. The bottom of the holder is so constructed to accommodate the configuration of the bottom of the container and to withstand the force applied by the ram. Clearly, depending upon the particular system, container holder 107 may be omitted.

As shown in FIG. 2, the platform 101 can be extended and can be linked with a further platform 101a which also includes a chain drive mechanism, a roller bearing surface, conveyor belt, or the like, for storage of empty containers which are automatically fed to the refuse receiving station 1 when a full container 106 is ejected down ramp 129. The operation of the additional platform or platforms is coordinated with the system by means of control circuit 2. A typical chain drive system which can be easily adapted to the present invention is shown in U.S. Pat. No. 3,226,764, dated Jan. 4, 1966, and issued to W. Hostettler.

Doors 131 and 132 are located above and below the gate 112 in order to provide access to gate 112 in the event a jam occurs.

In order to insure that too much refuse does not fall into a container 106, a second gate 134 (see FIG. 3) may be mounted a predetermined distance above gate 112 in chute 100. The second gate 134 is maintained closed whenever gate 112 is opened. The spacing between gates is such that the volume of material accommodated therebetween does not exceed the capacity of a container. This will reduce the possibility of an overflow of refuse at the receiving station 1 when lower gate 112 is opened. Gate 134 includes sensing switch 135 coupled to control circuit 2 to signal when the gate 134 is closed. A sensing switch 133, coupled to control circuit 2, is provided to sense the presence of material to be compacted on gate 134. Switch 133 operates in a similar manner as does switch 113. These sensors 133 and 135 are coupled to control circuit 2 which causes gate 134 to operate at the appropriate times. Further details of the operation of gate 134 should be apparent to those skilled in the art.

FIG. 3 shows another modification of the present system which is usable with or without the upper gate 134. Additional switches 160 and 161, coupled to control circuit 2 and operable by protrusion 127 on rod 126 are located above switch 128. Selective operation of these switches by protrusion 127 as the ram 123 descends will sense the degree to which container 106 is filled. This information is operated on in control circuit 2. Also sensors 162 and 163, such as sonic sensors, are provided above gate 112 to sense how much material is present in chute 100 to be compacted. This information is also sent to control circuit 2 which determines (from the selective operation of switches 128, 160 and 161) if container 106 has enough available space to accommodate the amount of material waiting to be compacted. If not, the container is ejected down ramp 129 and an empty container is located under chute 100.

This is a more complex, but more effective, method of preventing container overflow in compacting systems. However, this more complex system is not believed to be necessary in compacting systems for use with refuse chutes in large residential dwellings and the like. In these residential systems the refuse flow is predictable and the probability of overflow is slight. This modified system is particularly useful in other applications where the delivery of material to be compacted is less predictable than in residential systems.

It should be clear that other sensors may be used in place of switches 128, 160 and 161 and in place of sonic sensors 162 and 163 to provide equivalent results.

The control circuit 2 further includes timing circuits which are activated when a gate (gate 112 and/or gate 134) is opened. After opening, if a signal is not received from sensor switches 115 and/or 135, to indicate that the gate has closed within a predetermined period of time, an alarm is activated and the system shut down. This indicates a jam in a gate mechanism which must be cleared manually through access doors, such as doors 131 and 132 of FIG. 1.

In a preferred embodiment, the gates 112 and 134 are hydraulically operated (by means not shown). The design of the hydraulic system should be apparent to one skilled in the art within the spirit of this invention. The ram 123 may be a conventional hydraulically operated ram which is also not described herein in detail. The gates and ram may alternatively be pneumatically, mechanically or electrically operated devices. A typical hydraulic gate mechanism and operating circuit, which is easily adaptable to the present invention, is shown in U.S. Pat. No. 3,481,268, dated Dec. 2, 1969, and issued to H. Price et al.

Referring to FIG. 4 in order to facilitate removal of the compacted contents of a container 106 after it is ejected from the compacting system, a removable liner unit 140 is provided within the container 106. By providing a removable liner unit 140 which is made of a relatively sturdy and corrosion-proof material (such as stainless steel, fiberglass or plastics) the containers 106 can be of relatively inexpensive construction. If desired, the containers 106, when used with a liner 140 of FIG. 4, can be disposable containers, thereby enabling further automation of the present system.

Referring to FIGS. 4a and 4b, the liner 140, which is adapted for use with a cylindrically shaped container 106, includes first and second substantially semi-cylindrical members 141 and 142 which are secured together at their edges by hinges 143 and 144. In this embodiment, both hinges 143 and 144, have removable hinge pins 145 and 146, respectively, to releasably secure the two members 141 and 142 together. Alternatively, only one end of the semi-cylindrical portions can be releasably secured together by a removable hinge pin, the other pin being permanently in place. The sections 141 and 142 will pivot about the fixed hinge pin. However, when both hinge pins are made removable, the members 141 and 142 can be detached from each other in order to facilitate removing the liner 140 from the container 106.

As seen in FIG. 4b, the upper portions of the semi-cylindrical members 141 and 142 are outwardly flared as shown at 147 and have a flange 148 at the end of the flared portion. The flange 148 may be omitted. The flared portion 147 is to further insure that all of the ma-

terial from the chute is directed into the container and the combination of the flared portion 147 and flange 148 is to facilitate removal of the liner 140 from the container 106. The flange 148 protrudes from the container 106 so that it is easily gripped for removal thereof. As is more clearly seen in FIG. 4a, the flared portions 147 and the flange 148 of the liner 140 have cut-outs therein to form spaces 149 and 150. The spaces 149 and 150 are to facilitate the removable hinge pins 145 and 146 while the liner is still within the container 106. The spaces 149 and 150 are also provided when only one removable hinge pin is used so that sufficient room is provided for the semi-cylindrical members 141 and 142 to be pivoted about the fixed hinge in the outward direction to release the compacted refuse so that the liner can be easily removed from the container without simultaneously removing the compacted refuse.

FIG. 4c shows an insert 151 which may be used to fill the spaces 149 and 150, shown in FIGS. 4a and 4b. When a liner having two removable hinge pins is used, such as in the embodiment of FIGS. 4a and 4b, the insert 151 is attached to each hinge pin (FIG. 4c shows a single insert 151 attached to a single hinge pin 145). When a fixed hinge pin is used, the insert 151 may be removably secured to place by other means, not shown. Inserts 151 serve a dual function, the first of which is to fill the spaces 149 and 150 during filling of the container so that material to be compacted is prevented from falling through spaces 149 and 150 and into the space between liner 140 and container 106. The second function of the inserts 151 is to facilitate removal of a removable hinge pin.

Since the container 106 rests on a strong base of the container holder 107 there is no need to provide a bottom for the removable liner 140. Even when the container 106 is not constructed of very strong material, no damage is inflicted on the container 106 during the compacting process by virtue of the presence of protecting liner 140.

FIGS. 5a and 5b illustrate liner and container configurations for use with disposable bags, such as plastic or paper bags. Referring to FIG. 5a, the container holder 107 has a container 106 inserted therein. Inserted within the container 106 is a disposable bag 152, the upper edges 153 of the disposable bag being turned over the upper edge of the container 106 to keep the bag 152 in place. Inserted within the disposable bag 152 is a liner 140 of the type previously described in conjunction with FIG. 4 or of the type described below in conjunction with FIGS. 6a and 6b. The liner 140 (when of the type shown in FIG. 4) may include removable hinge pins at either or both halves thereof, as discussed in connection with FIG. 4. After the container containing the liner 140 is filled with compacted material and has been ejected down ramp 129 to the disposal station (not shown), the liner is removed by removing one or both of the hinge pins (whichever is applicable) and pulling the liner up and out of container 106. By removing the hinge pins, the liner is loosened from the compacted material therein and is easily removed. Then, the disposable bag 152 is closed, removed from the container 106 and is disposed of.

In order to facilitate removal of the plastic bag from the container 106, the container may be of similar construction as the liner 140. Also, the container holder 107 may be constructed with only three side walls,

thereby facilitating removal of the disposable bag from the container 106 after the container is opened, by merely sliding the bag out. Since the disposable bag rests on the bottom of container holder 107, which is of relatively sturdy construction, it is even possible to use a container 106 which does not have a bottom thereon in this application. Thus, the container 106, in this embodiment, can take the form of two members which are hingedly secured together at their ends, the hinges having removable hinge pins. Such a container could be substantially identical to a liner 140 of FIG. 4 except the container 106 would not include the outwardly flared portion and the flange portion. In this configuration, the container could be round, square or any other convenient shape. Other types of quick release locking mechanisms may be utilized for such a bottomless container in place of hinges with removable hinge pins. Since the outside surface of the container is readily accessible, it is preferable to utilize quick release locking devices in order to permit removal of the disposable bag without the necessity of lifting the bag over the upper edge of the container.

An alternative to the construction shown in FIG. 5a is shown in FIG. 5b. In this alternate construction an integral structure 153, which combines the functions of container 106 and container holder 107, is provided. The operation of this type of configuration is substantially the same as the operation of the configuration shown in FIG. 5a. Structure 153 is provided with a closable opening having a quick release locking mechanism 154, shown schematically. Various known locking devices, such as hinges with removable hinge pins or the locking mechanism of FIG. 7 may be used. Again, after removal of the liner 140 in the above-described manner, either the disposable bag 152 is lifted out of the integral structure 153 or the door, or the like, is opened by means of locks 154 so that the disposable bag 152 can be easily removed from the side, without necessitating lifting of the bag over the upper edge of the integral structure.

FIG. 6 illustrates a portion of the system shown in FIGS. 1-3 further modified in accordance with the present invention. FIG. 6 is similar to FIG. 3 except that the control circuit 2' is slightly modified from the control circuit 2 of the apparatus of FIGS. 1-3. The sensor 113 of FIGS. 1-3, and its associated connections to the control circuit, are eliminated in the embodiment of FIG. 6. In FIG. 6, the same reference numerals are used to designate elements which are identical to those shown in FIGS. 1-3 and which have been previously described. Only a portion of the system is shown in FIG. 6. The remainder of the system is similar to that of FIGS. 1-3 and is not shown in FIG. 6 for the sake of clarity and for ease of description and understanding.

The embodiment of FIG. 6 is operated under the control of a timer (see FIG. 7) and is particularly suitable in applications where the refuse or other material falling in the chute 100 is in accordance with a predetermined predictable pattern. The embodiment of FIG. 6 is particularly suitable for use in multiple dwelling residential buildings wherein the peak periods during which refuse is dropped in the chute 100 are accurately predictable.

The control circuit 2' of the embodiment of FIG. 6 is schematically shown in FIGS. 7a and 7b. FIGS. 7a and 7b make reference to various elements, such as a pressure pump motor, solenoid valves, etc., which are

not specifically shown in the remaining figures. All of these elements are well known in the art and are utilized in conjunction with the elements shown in block schematic form in FIGS. 1-3 and 6. For example, typical valves for operating hydraulic mechanisms of the gates, and/or the ram, which are not specifically shown in the present drawings, are shown, for example, in U.S. Pat. No. 3,481,268, dated Dec. 2, 1969, and issued to H. Price et al.

The control circuitry of FIGS. 7a and 7b is given merely by way of example and it should be clear that various other implementations thereof could be used. For example, electronic controls could be used for various elements and semiconductor electronics could be used in place of the relay and switch elements specifically shown in the drawings.

The operation of the embodiment of FIG. 6 is as follows. The program timer T shown in FIG. 7a is pre-set to turn the compacting apparatus on at predetermined times and maintains the apparatus in an on condition to continuously and repeatedly repeat its cycle for a predetermined period of time at each on-period. For example, the program timer T may be set to turn on at 6:00 p.m. and to keep the apparatus in operation until 8:00 p.m. This is a peak period during which refuse is discharged into the chute 100 when the apparatus is used, for example, in a residential apartment house.

When the apparatus is turned on by the program timer T at a predetermined time, while a container is located below the chute 100, the lower gate 115 is operated to allow refuse located between closed gate 134 and gate 112 to fall into the container. Gate 112 is then closed and the container is moved to the compacting station 3 wherein the material therein is compacted. During this time when the container is moved to the compacting station 3, the upper gate 134 is opened to allow refuse to fall on the closed gate 112. Gate 134 is then closed to prevent an excessive amount of refuse from falling in the container when gate 112 is opened during the next cycle of operation.

If it is determined at the compacting station that the container has room for more refuse, the container is moved back below chute 100 and lower gate 112 opens. Additional refuse falls into the container and gate 112 is then closed. The container is then moved back to the compacting station 3 for compaction of the refuse. This continuous mode of operation continues for the predetermined period of time set by the program timer T. The apparatus operates continuously as described above regardless of whether or not refuse actually falls down the chute. It has been found that this is an advantageous mode of operating the compacting apparatus and, based upon the predictability of refuse falling in the chute 100, reliable and economic operation is achieved. It has been found that even when the apparatus is operated continuously for predetermined periods of time, the percentage of wasted operations (that is, operations when no refuse is present in the chute 100) is not excessive and the apparatus is designed to reliably operate under these conditions.

The embodiment of FIG. 6 could eliminate the necessity for including refuse sensors 113 and 133 which could potentially require excessive maintenance to assure proper operation thereof. However, sensor 133 is preferably retained to operate the system during periods of time that the timer is not operative. This is clearly seen in FIG. 7a.

The control circuitry is shown in detail in FIG. 7a and 7b. The circuit is laid out in such a form that the implementation and understanding thereof should be apparent to one skilled in the art. Therefore, a detailed discussion of all of the individual elements and the interconnections therebetween is omitted. The components of the control circuit of FIGS. 7a and 7b are standard commercially available items.

When compacting system are used with chutes in refuse handling systems, the problem often encountered is that of eliminating vermin from within the chute. It has been found in practice that merely spraying insecticides into the chute is not a suitable means for controlling vermin. In accordance with a further feature of the present invention, a section of the chute above the gate unit 112 of FIG. 1 is lined with fire brick and a burner is installed above the gate to inject flames within the chute. This feature is shown in FIGS. 8a and 8b.

Referring to FIGS. 8a and 8b, the chute 100 is lined with fire brick 155 for a predetermined distance above the gate unit 112. A burner 156 is mounted in the wall of the chute for injecting flames into the chute to rid the system of vermin. The flames produced by burner 156 are generally shown at 157 in FIGS. 8a and 8b. The burner 156, the specific design of which is known in the art, may operate from gas, oil or any other suitable fuel. It has been found in practice that the heat generated by the flames produced by the burner 156 is effective to kill vermin in the chute. The height of the fire brick 155 above the gate 112 will depend upon the size and other characteristics of the particular system in which the compacting system is used. For residential systems, such as in apartment houses, a height of approximately 2-3 feet above the gate unit 112 is adequate.

The burner 156 is coupled to the control circuit 2 which controls the burner 156 to operate at times when refuse is not being fed down the chute 100. In residential dwellings, such as apartment houses and the like, the control circuit 2 will be programmed to operate the burner 156 in the early morning hours.

An advantage of the present invention is that the system may be installed in existing incinerator installations without making major modifications thereto. A further advantage of the described system is that it utilizes a straight-line (rather than curved) container feed arrangement. See, for example, FIG. 2 which shows a top view of an embodiment of the present invention. In this embodiment, the empty containers are stored at platform portion 101 and are moved in a straight line to the refuse receiving station 1. The containers are then moved, also in a straight line, to the compacting station 3 where the refuse is compacted. After compaction, the container is moved, again in a straight line, either back to the refuse receiving station or down the ramp 129 to the disposal station (not shown). Thus, there are no curved paths through which the container must be moved, thereby enabling simpler, and therefore more reliable transporting mechanisms to be used with the system of the present invention.

Instead of chute having a square configuration as shown in FIGS. 1 and 2, chutes of other configuration such as rectangular, circular, oval, etc. can also be utilized.

What is claimed is:

1. Compacting system for compacting material in a container comprising:
a receiving station including a chute for receiving

a gate unit in said receiving station operable for selectively closing and opening said chute for selectively feeding said material to be compacted into said container;

a compacting station including level sensing means for sensing the level of compacted material in said container; and

open-ended transport means between said receiving station and said compacting station for moving said container to said compacting station along a first given path after said gate unit closes, said material in said container being compacted at said compacting station, said transport means moving said container back to said receiving station for receiving further material to be compacted when the level of the compacted material in said container is below a predetermined level, and ejecting said container from said compacting system when the level of the compacted material in said container is above said predetermined level, said transport means further including open-ended means for moving an empty container to said receiving station along a second given path which is independent of said first given path when said first mentioned container is ejected from said compacting system.

2. System according to claim 1, further comprising a funnel shaped unit mounted between said gate unit and said container for directing said material to be compacted into said container.

3. System according to claim 1 wherein said gate unit is operable for opening said chute for a predetermined period of time.

4. System according to claim 1, wherein said transport means includes a platform having means for moving a container thereon.

5. System according to claim 1 including timing means for continuously operating said compacting system including said transport means for a fixed length of time regardless of whether or not material to be compacted is present in said chute.

6. System according to claim 5 wherein said timing means operates said compacting system a number of times per day, each for a fixed length of time.

7. System according to claim 1 wherein said gate unit includes a sensor for indicating that said gate unit is closed, and including alarm means for indicating that said gate unit has not closed after being open for a predetermined period of time.

8. System according to claim 1 further comprising a second gate unit mounted a predetermined distance above said first gate unit.

9. System according to claim 1 wherein said gate unit includes sensing means for indicating the presence of material to be compacted thereon, said gate unit being operable only when material to be compacted is present thereon.

10. System according to claim 8 wherein said second gate unit is maintained closed when said first gate unit is opened.

11. System according to claim 10 wherein said second gate unit includes sensing means for indicating the presence of material to be compacted thereon.

12. System according to claim 1 comprising:
second sensing means located in said chute above said gate unit and coupled to said control means for sensing the amount of material to be compacted lying on said gate when said gate unit is closed;

means responsive to said second sensing means and to said level sensing means at said compacting station for operating said transport means for ejecting a container from said compacting station if the amount of material lying on said closed gate unit exceeds the available capacity of said container, and for moving said container back to said receiving station if said capacity is not exceeded.

13. System according to claim 12 wherein said level sensing means at said compacting station includes a plurality of level sensing switches selectively operable at different levels of compacting of said material, thereby sensing the available capacity of said container.

14. System according to claim 12 wherein said second sensing means comprises a plurality of sensors, each located at different heights above said gate unit for sensing the amount of material to be compacted lying on said closed gate unit.

15. System according to claim 1 further comprising spray means coupled to said control means for spraying said compacted material prior to said container being ejected from said compacting system.

16. System according to claim 1 further comprising a removable liner within said container.

17. System according to claim 16 wherein said liner

is bottomless.

18. System according to claim 16 including a disposable bag interposed between said liner and said container.

19. System according to claim 1 wherein said transport means includes a first transport device for moving said container between said compacting station and said receiving station, and a second transport device for moving said empty container to said receiving station when a full container is ejected from the compacting system.

20. System according to claim 19 wherein said first and second transport devices are oriented substantially perpendicular to each other.

21. System according to claim 19 wherein said first transporting device extends at least from under said receiving station to said compacting station, and wherein said second transporting device extends adjacent to said first transporting device and includes means for sliding an empty container from said second transporting device on to said first transporting device.

22. System according to claim 19 wherein said first and second transporting devices each include drive means having a plurality of container pushing members thereon for moving said containers.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,765,147

Dated October 16, 1973

Inventor(s) Amos D. IPPOLITO, et al

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 9, last line, change "including" to --including--;

after "a chute for receiving" insert

-- material to be compacted, and means for receiving a
container --.

Column 10, line 44, change "system" to --System--;

Column 11, line 12, change "compacting" to --compaction--.

Signed and sealed this 7th day of May 1974.

(SEAL)

Attest:

EDWARD M. FLETCHER, JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents