United States Patent [19]

Moriconi

[11] **3,901,139**

[45] **Aug. 26, 1975**

[54] **AUTOMATIC WASTE COMPACTOR**

[75] Inventor: **Dario J. Moriconi**, Bloomfield Hills, Mich.

[73] Assignee: **McClain Industries Inc.**, Utica, Mich.

[22] Filed: **Oct. 24, 1973**

[21] Appl. No.: **409,248**

[52] **U.S. Cl.** ..... **100/48;** 100/52; 100/53; 100/70; 100/99; 100/215; 100/229 A; 100/269 R

[51] **Int. Cl.**[2] **B30B 15/18**

[58] **Field of Search** ..... 100/48, 53, 70, 229 A, 100/52, 99, 43, 215, 269 R; 53/124 B; 200/61.41, 61.42, 156; 241/36; 192/130, 133; 74/612–615

[56] **References Cited**

UNITED STATES PATENTS

3,352,230	11/1967	Hunnicutt	100/53
3,463,079	8/1969	Corbett	100/229 A
3,547,577	12/1970	Lovercheck	100/70
3,589,277	6/1971	Gray	100/215
3,601,953	8/1971	Boyd	53/124 B
3,613,559	10/1971	Buisson	100/53

Primary Examiner—Billy J. Wilhite
Attorney, Agent, or Firm—Barnes, Kisselle, Raisch & Choate

[57] **ABSTRACT**

A waste compactor comprising a frame, a support on said frame for a disposable container, and a compactor member movable toward and away from the support to compact waste in the disposable container on the support. An access door closes an access opening and is movable into and out of position to permit access and deposition of waste in the container. Means are provided which are responsive to the movement of said access door out of the obstructing position and maintenance of the access door in the unobstructed position for a predetermined period of time to initiate operation of the compactor member toward the support. More specifically, each time the door is opened, the time interval is registered and when the total time accumulated from successive openings exceeds a predetermined time, the operation of the compactor member is initiated. In addition, upon initiation of movement of the compactor member, a safety shield is moved into position to move the hand of an operator, if present, out of the path of the compactor member.

22 Claims, 13 Drawing Figures

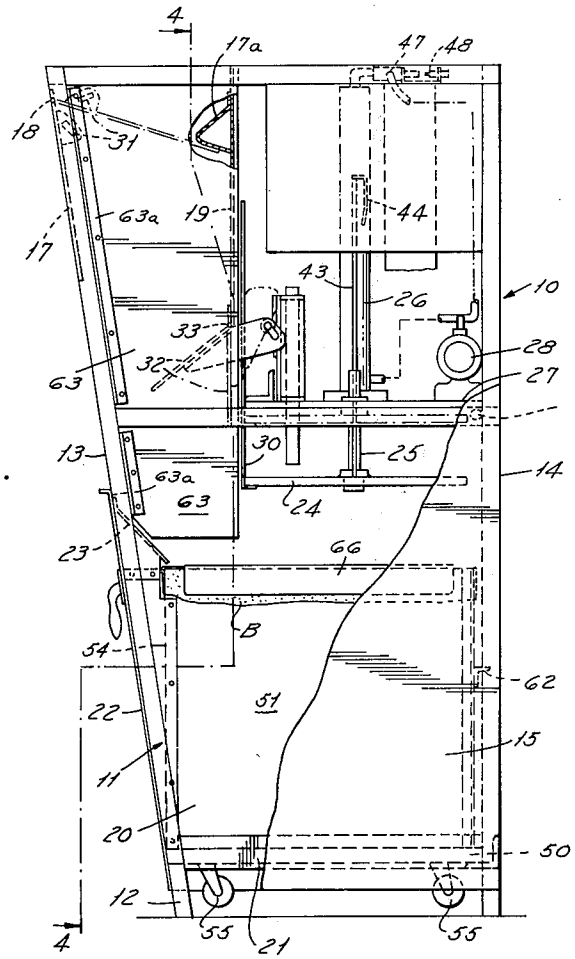
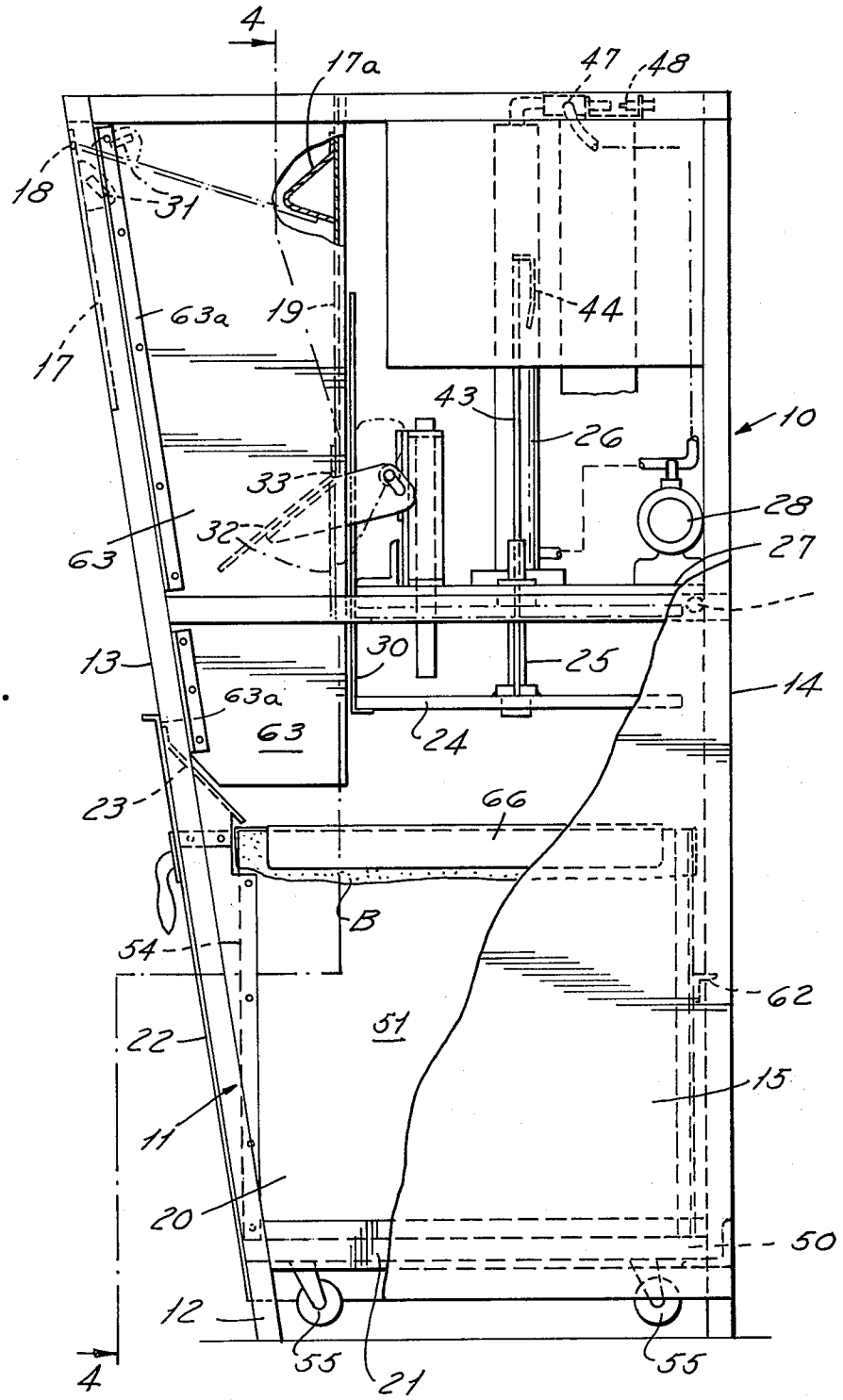


FIG. 1


4
17a
47
48
18
31
63a
19
44
17
43
10
26
33
28
32
27
63
13
30
25
14
63a
63
24
23
66
B
54
62
51
22
15
11
20
50
12
55
21
55
4

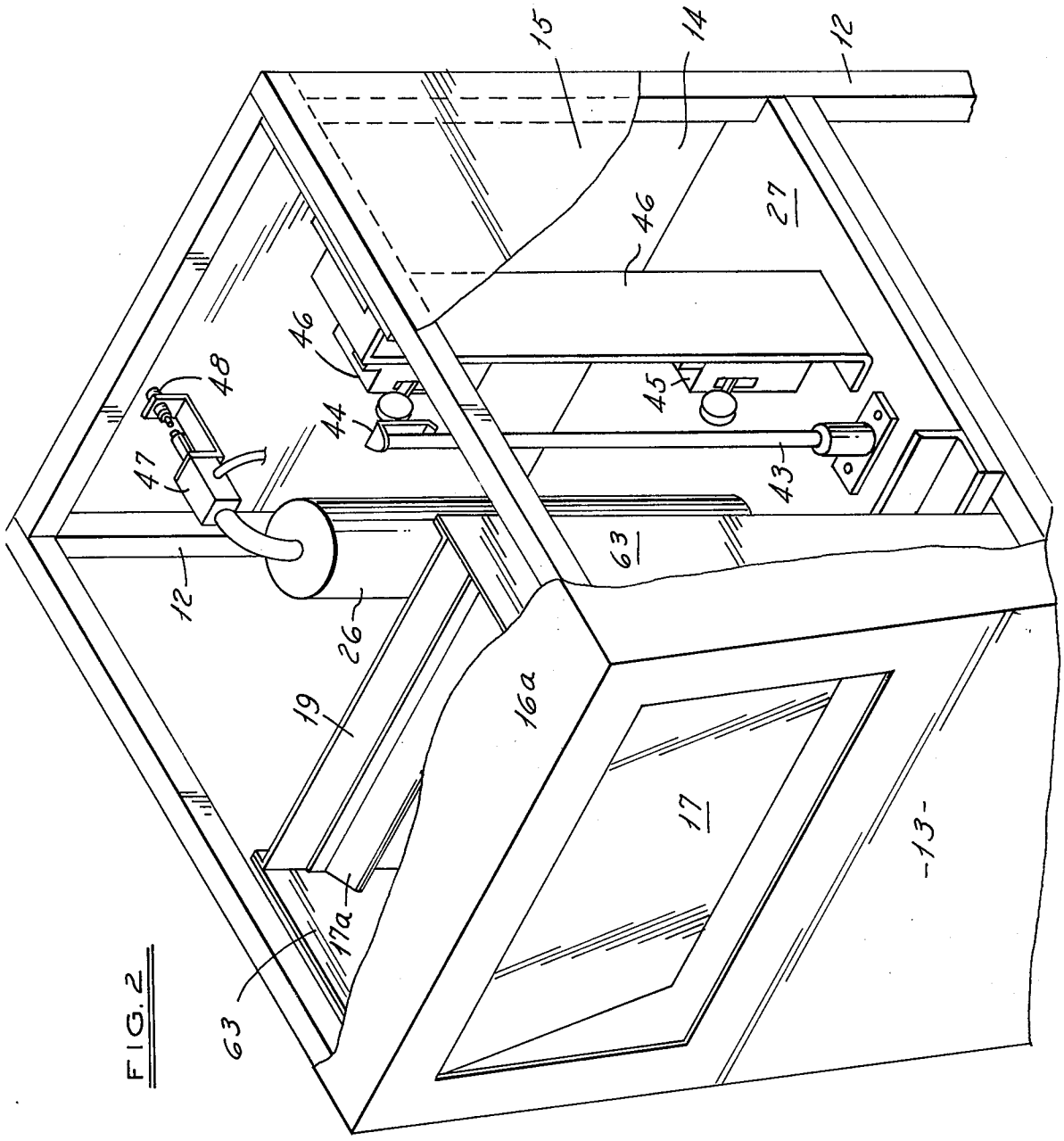


FIG. 2

FIG. 3

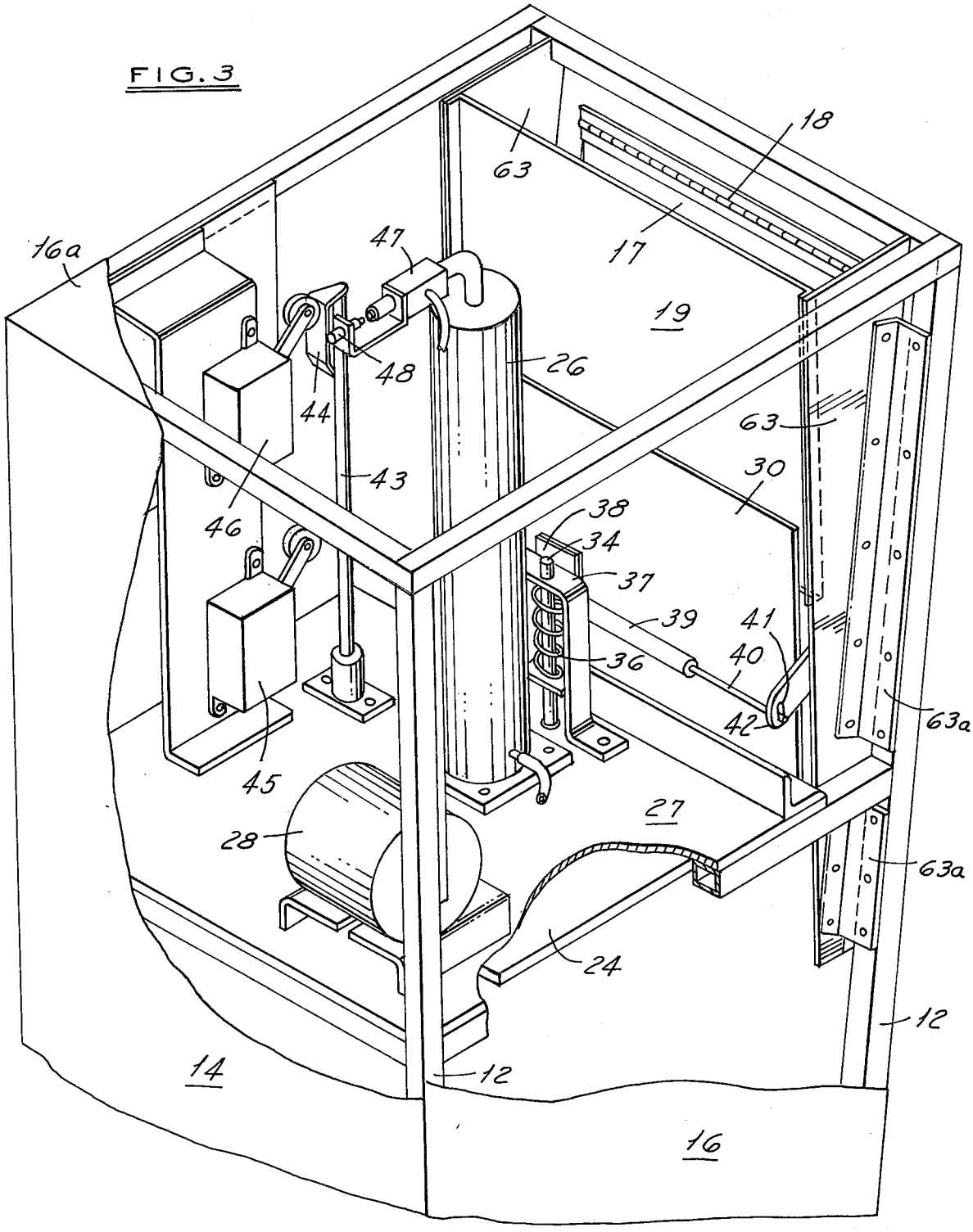

16a
47
63
18
17
19
48
26
44
63
43
30
46
38
34
37
39
41
36
40
42
63a
45
27
28
63a
24
12
14
12
16

FIG. 4

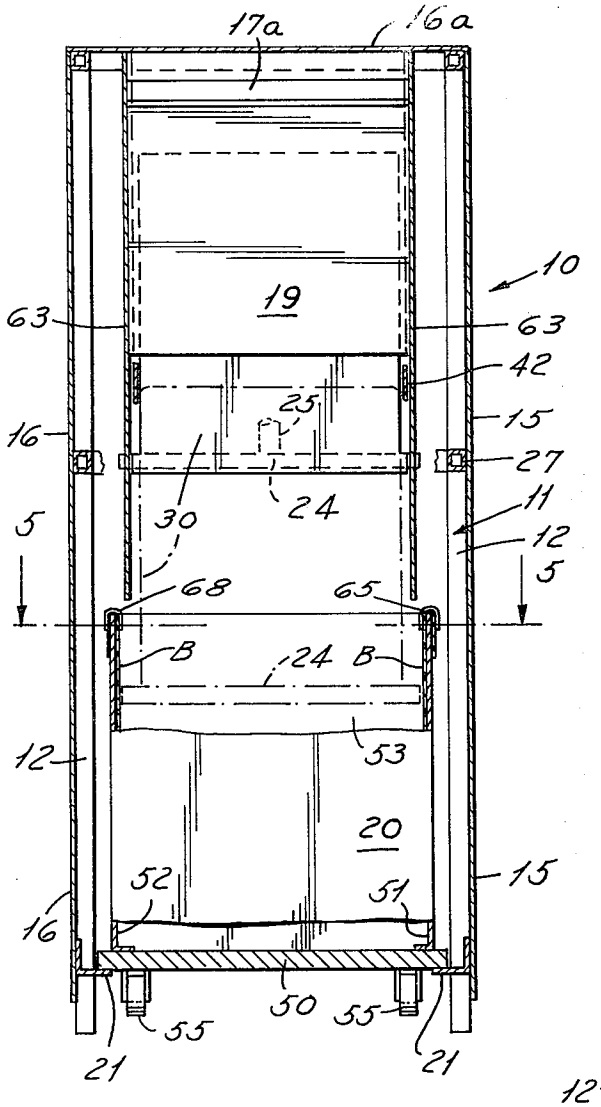

17a
16a
10
19
63
63
42
25
15
16
27
24
11
30
12
5
5
68
65
B
24
B
53
12
20
15
52
51
16
50
55
55
21
21

FIG. 5

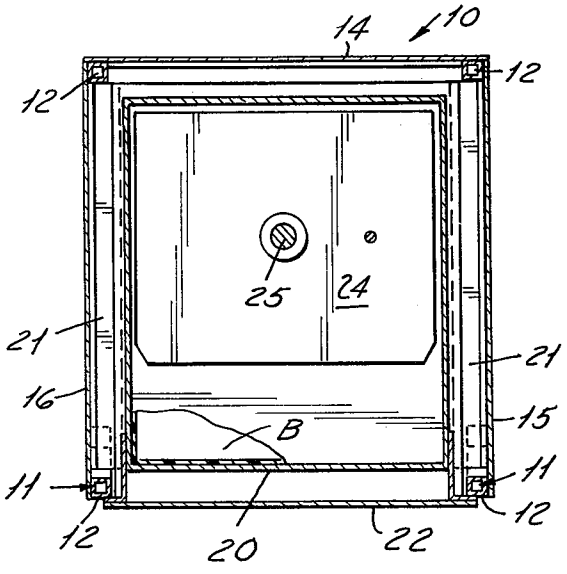

14
10
12
12
25
24
21
21
16
15
B
11
11
12
12
20
22

FIG. 6

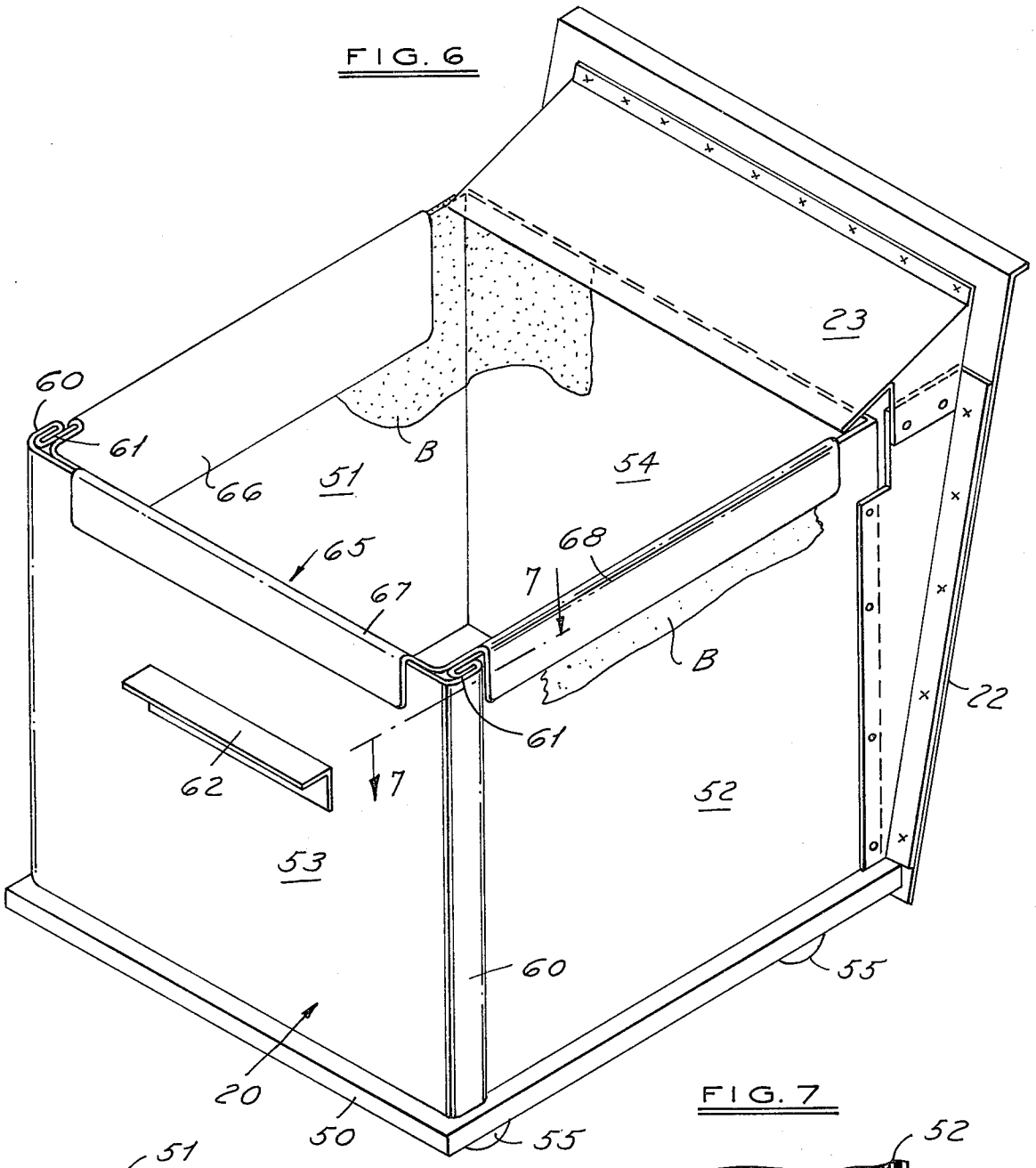

60
61
66
51
B
54
23
65
67
7
68
B
22
61
62
7
52
53
60
55
20
50
55

FIG. 7

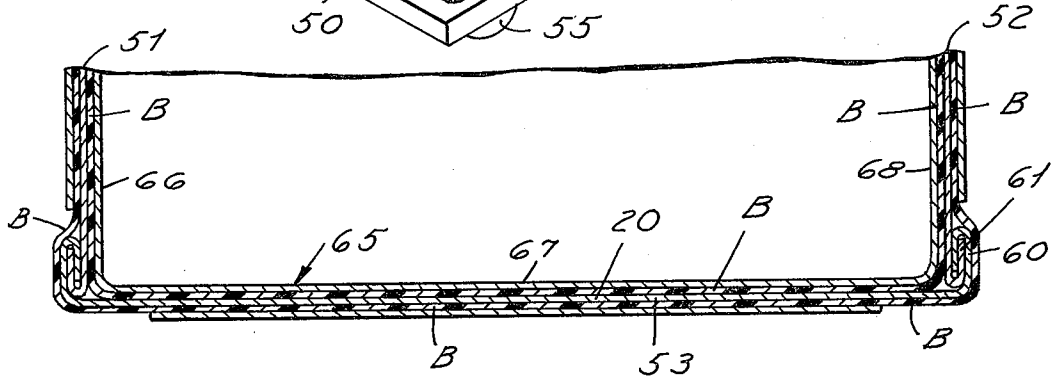

51
52
B
B
B
66
68
61
B
65
67
20
B
60
B
B
53

FIG. 8

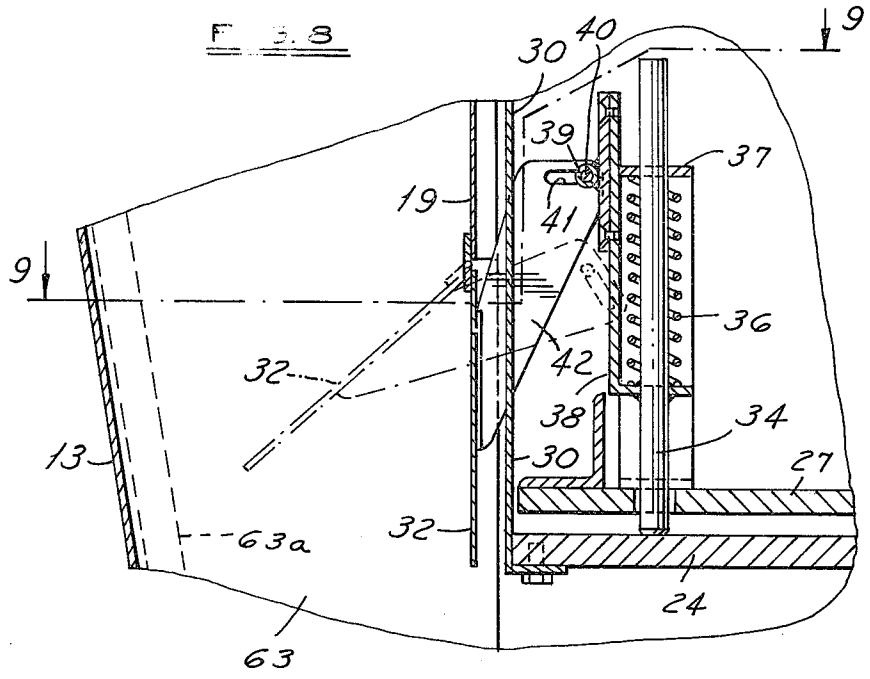

30
40
9
39
37
19
41
9
36
42
32
38
34
13
30
27
63a
32
24
63

FIG. 9

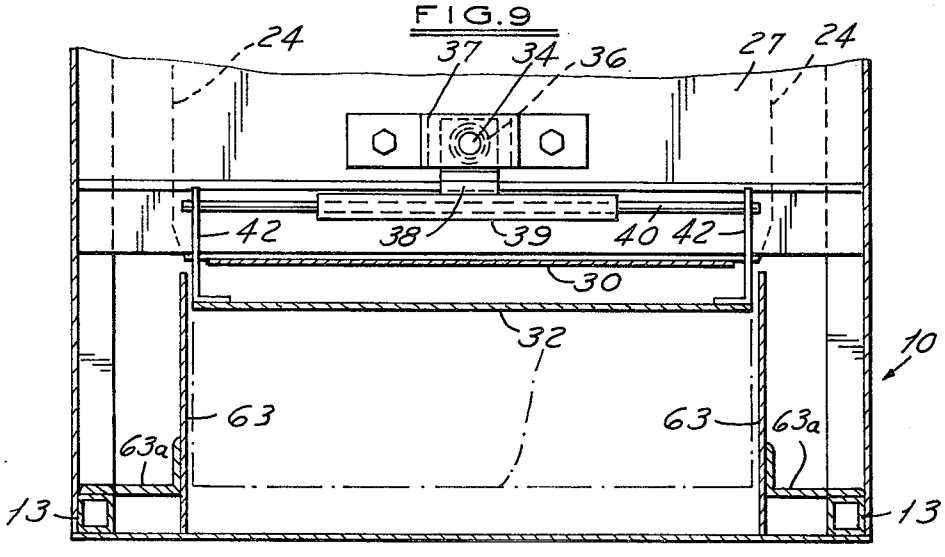

24
37
34
36
27
24
42
38
39
40
42
30
32
10
63
63
63a
63a
13
13

FIG. 10

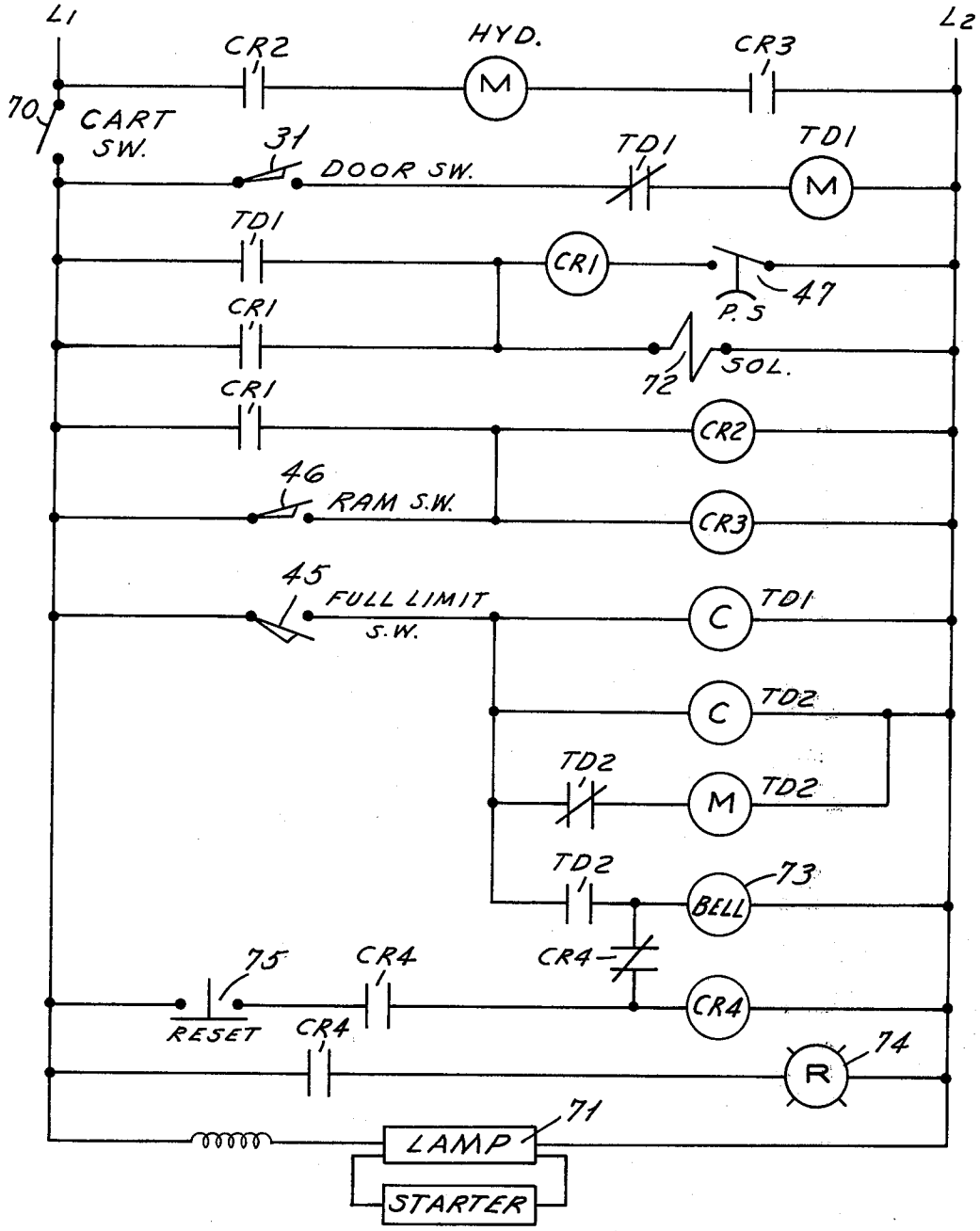

L1
L2
CR2
HYD.
M
CR3
70
CART SW.
31
DOOR SW.
TD1
TD1
M
TD1
CR1
47
P.S
CR1
72
SOL.
CR1
CR2
46
RAM S.W.
CR3
45
FULL LIMIT S.W.
C
TD1
C
TD2
TD2
M
TD2
TD2
73
BELL
CR4
CR4
75
CR4
RESET
CR4
R
74
71
LAMP
STARTER

FIG. 11

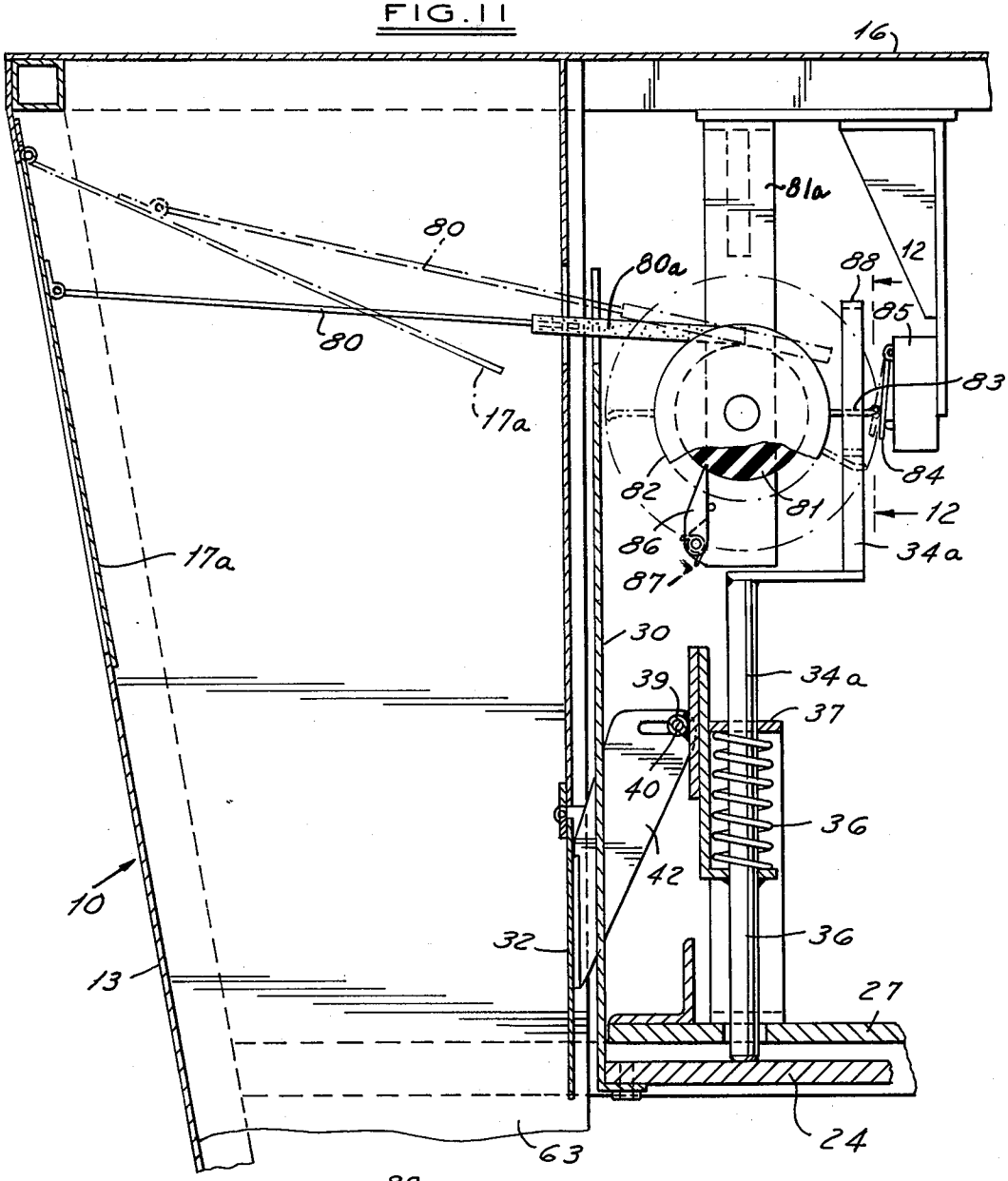
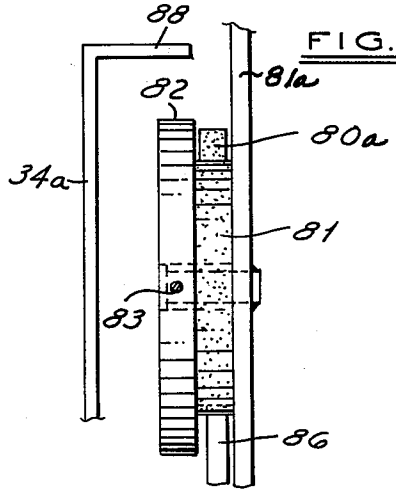

16
81a
80
80a
88
12
85
80
83
17a
84
82
81
12
86
34a
87
17a
30
34a
39
37
40
36
42
10
32
36
13
27
24
63

FIG. 12


88
81a
82
80a
34a
81
83
86

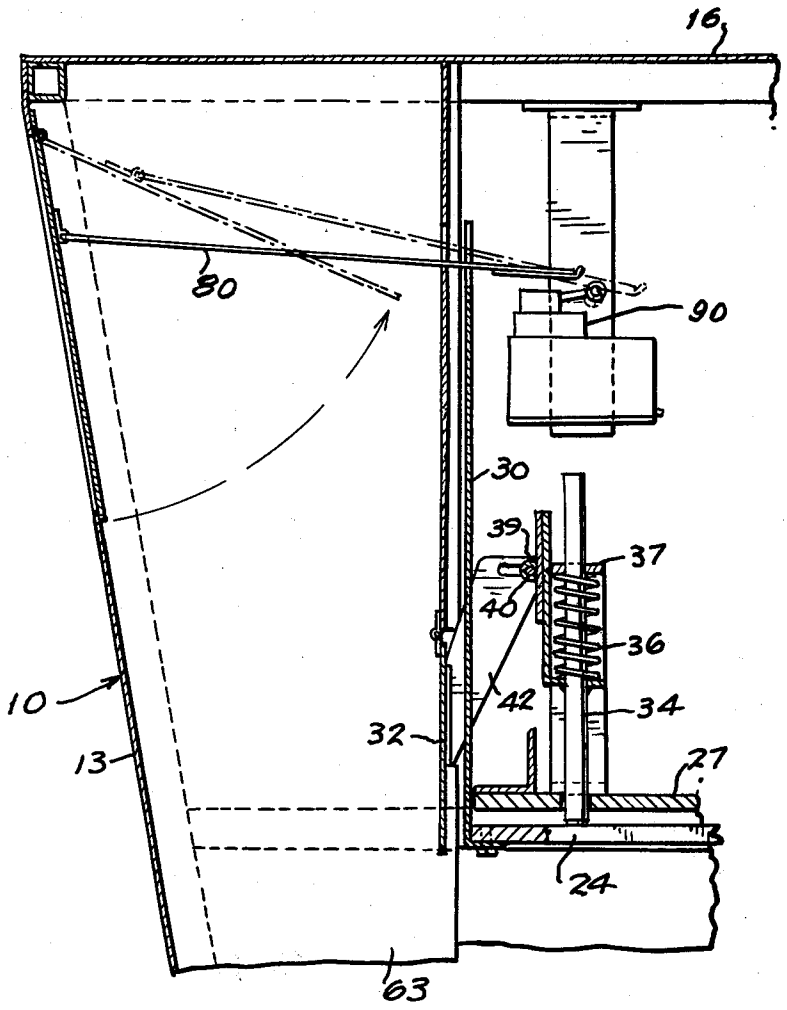


FIG. 13

AUTOMATIC WASTE COMPACTOR

BACKGROUND OF THE INVENTION

This invention relates to compactors.

In waste disposal, it has become common in commercial applications to utilize waste compactors in order to conserve costs of transportation and handling of waste. It has also heretofore been suggested that smaller waste compactors be utilized in commercial installations such as business establishments, restaurants, kitchens and the like. Such compactors customarily utilize a control that must be manually operated or initiated and, as a result, have not achieved any substantial success in use in installations where the customer disposes of the waste such as in quick food service establishments.

Among the objects of the invention are to provide a waste compactor which is automatically operable and does not require initiation manually by an operator; wherein operation of the apparatus is responsive to the extent of the usage; which apparatus is relatively simple and low in cost; which apparatus is safe and can be operated at a low cost and is easily maintained.

SUMMARY OF THE INVENTION

The waste container comprising the invention comprises a frame, a support on said frame for a disposable container, a compactor member, and means for moving said compactor member toward and away from the support to compact waste in the disposable container on the support. A member obstructs the path of the waste to the container and is movable out of said path to permit access and deposition of waste in the container. Means are provided responsive to the movement of the member out of the obstructing position and maintenance of the member in the unobstructed position for a predetermined period of time to initiate operation of the means for moving the compactor member toward the support. More specifically, each time the door is opened, the time interval is registered and when the total time accumulated from successive openings exceeds a predetermined time, the operation of the compactor member is initiated. In addition, upon initiation of movement of the compactor member, a safety shield is moved into position to move the hand of an operator, if present, out of the path of the compactor member.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevational view of a waste compactor embodying the invention, parts being broken away.

FIG. 2 is a fragmentary front perspective view of a portion of the waste compactors, parts being broken away.

FIG. 3 is a fragmentary rear perspective view of the waste compactor, parts being broken away.

FIG. 4 is a sectional view taken along the line 4—4 in FIG. 1, parts being broken away.

FIG. 5 is a sectional view taken along the line 5—5 in FIG. 4.

FIG. 6 is a perspective view of the cart utilized in the apparatus.

FIG. 7 is a sectional view taken along the line 7—7 in FIG. 6.

FIG. 8 is a fragmentary vertical sectional view of a portion of the apparatus.

FIG. 9 is a fragmentary sectional view taken along the line 9—9 in FIG. 8, parts being broken away.

FIG. 10 is a schematic wiring diagram of the apparatus.

FIG. 11 is a fragmentary sectional view similar to FIG. 8 of a modified form of the invention.

FIG. 12 is a fragmentary sectional view taken along the line 12—12 in FIG. 11.

FIG. 13 is a fragmentary sectional view similar to FIG. 11 of a further modified form of the invention.

DESCRIPTION

Referring to FIG. 1, the waste compactor 10 embodying the invention comprises a frame 11 comprising four tubular members 12 with lower ends engaging the floor and panels 13, 14, 15, 16, and a top panel 16a enclosing the frame to form the housing.

An access door 17 is pivoted about a horizontal axis 18 adjacent its upper end and swings inwardly, as presently described, to permit depositing of waste. A stop 17a limits the inward movement of door 17. A vertical wall 19 is spaced inwardly from the panel 13 and guides the waste downwardly to a cart or container 20 that is supported on rails 21 within the frame. The cart 20 is adapted to support a disposable container such as a plastic bag B for receiving the waste. The front panel 22 of the cart 20 is in the plane of panel 13 and closes the front of the compactor when the cart is in position. A deflector 23 on the cart 20 extends downwardly and inwardly to help deflect the waste into the bag, as presently described.

A flat compactor plate 24 is mounted on a shaft 25 of a hydraulic cylinder or ram 26 and is movable downwardly to compact the waste within the bag. Hydraulic ram or cylinder 26 is mounted on an intermediate wall 27 extending horizontally between frame members 12. The wall 27 supports a pump 28 and associated electric motor for driving the pump for supplying hydraulic fluid to the ram or cylinder 26. As the compactor plate 24 moves downwardly, a vertical shield 30 on the compactor plate 24 extends downwardly to prevent waste from falling above the compactor plate 24.

In order to insure that the energization of the compactor and actuation of the compactor plate 24 will occur only when there is a need, a mercury switch 31 is mounted on the access door 17 and functions to complete a circuit, as presently described, to a time delay. When the door 17 is held open for a predetermined interval of time, the hydraulic pump 28 is actuated causing the cylinder 26 to drive the compactor plate 24 downwardly. More specifically, each time the door is opened, the time interval is registered and when the total time accumulated from successive openings exceeds a predetermined time, the operation of the compactor member is initiated.

In order to provide safety in the event that the person depositing waste has inserted his hand deeply into the guideway formed by the inner surface of panel 13 and the vertical wall 19, a flat safety shield 32 is pivoted adjacent its upper end as at 33. Safety shield 32 normally extends vertically out of the path of the trash and is operable upon downward movement of the compactor plate 24 to swing to the position shown in FIG. 1 thereby tending to move the hand, if present, out of the way and insuring that the hand will not be in the path of the compactor plate 24. The length of the shield 32 is such that when in the obstructing position, as shown in FIG. 1 and in broken lines in FIG. 4, a space S is provided between the lower edge of shield 32 and the inner

surface of panel 13. This permits room for the arm of the operator in case the arm is engaged by the edge of the shield 32. In addition, any liquids in trash deposited when the shield 32 is in this position can pass freely down to deflector 23 and into the cart.

The mechanism for operating shield 32 is shown in FIGS. 8 and 9 and comprises a rod 34 that is yieldingly urged downwardly by a spring 36 extending between a bracket 37 fixed to the wall 27 and a movable bracket 38 fixed to the rod 34. A tube 39 extends horizontally from the bracket 38 and an operating shaft 40 extending therethrough has its ends extending into slots 41 on brackets 42 fixed to the safety shield 32. When the compactor plate 24 is moved downwardly, the spring 36 causes the rod 34 to follow moving the bracket 38 downwardly and causing the safety shield 32 to swing to the position shown in FIG. 1 and in broken lines in FIG. 4.

As shown in FIG. 3, an operating rod 43 is movable with the compactor plate 24 and has a cam 44 thereon for actuating a fill switch 45 and a completion of cycle switch 46, as presently described. In addition, a pressure switch 47 is provided and is responsive to a predetermined pressure upon downward movement of the compactor blade to actuate a micro switch 48, as presently described.

Referring to FIG. 6, the cart or container 20 comprises a bottom wall 50, side walls 51, 52, rear wall 53 and front wall 54. The panel 22 extends outwardly and has the deflector 23 covering the space between the panel 22 and the front wall 54. The cart 20 is provided with wheels 55 and the bottom wall is adapted to engage the rails 21 as previously described. As further shown in FIGS. 6 and 7, the rear panel 53 has flanges 60 turned inwardly and engaging the U-shaped flanges 61 on the side walls so that the rear wall 53 can be removed by a vertical movement exposing the bag and permitting its removal laterally without lifting. An angle member 62 fixed to rear wall 53 functions as a handle to facilitate removal and insertion of the wall 53.

As shown in FIGS. 1–4, vertical walls 63 extend inwardly from front panel 13 and are spaced from side panels 15, 16 to guide the trash to deflector 23. Vertical walls extend horizontally beyond wall 19 and vertically to just above the cart 20.

In order to retain the bag B in position on the cart 20, a bag hold down device 65 is provided and comprises a member having three U-shaped interconnected sections 66, 67, 68 which slip over the bag when it is folded over the upper edges of the walls 51–54.

A schematic diagram of the electrical circuit associated with the apparatus is shown in FIG. 10. The power enters on L1 and L2. The cart switch 70 is closed when the cart 20 is in position and the power passes through the cart switch to energize a sanitizer lamp 71. The mercury switch 31 controls time delay TD1. Each time the door is opened, the duration of the opening is registered on the timer of time delay TD1 and when the total time of successive openings reaches a predetermined setting, it energizes coil TD1 closing contacts TD1 in series with relay CR1. When TD1 is energized after a predetermined time delay, it energizes relay CR1 and the solenoid 72 of a valve that controls the flow to ram 26. Relay CR1 also energizes relays CR2 and CR3 which start the motor that drives hydraulic pump 28. The ram 26 starts to move compactor plate 24 down, and when the cam 44 is off the ram limit switch 46, the ram limit switch 45 holds relays CR2 and CR3. When the ram reaches the bottom of the stroke, pressure builds up tripping the pressure switch 47. When this happens, relay CR1 opens and this de-energizes solenoid 71 permitting the valve that controls the flow to ram 26 to return to its original position causing the flow to be such that compactor plate 24 moves upwardly. When compactor plate 24 strikes the limit switch 46, it opens switch 46 and relays CR2 and CR3 are released interrupting the power to the pump 27.

On each cycle of ram 26, when the full limit switch 45 is tripped by cam 44, it resets the clutch on time delay TD1 and also starts the time delay TD2. If the full limit switch 45 is closed longer than the amount of time TD2 is set for, then TD2 will transfer bringing in the signal or alarm bell 73 and relay CR2 lighting signal light 74. When the reset button 75 is pushed, relay CR4 will be de-energized and shut off the bell 73 and light 74.

In operation, the compactor is placed in position and plugged in to a source of current so that the sanitizing lamp is energized. Each time the door 17 is opened to introduce trash, the time interval is registered and when the total time of successive openings exceeds a predetermined setting, the compactor member is operated through one cycle. When the bag B is full as indicated by a predetermined delay in the movement of the compactor member 24, the full signal bell 73 and light 74 are energized. The cart can then be removed and readily emptied by removing the bag hold-down device 65 and wall 53 without lifting the bag. Upon re-insertion of the cart and pressing of the reset, the compactor is ready for re-use by customers or other persons.

If the user places trash in the compactor when the compactor member 24 is operating, the safety shield will prevent the hand of the user from moving into the path of the compactor member. If the compactor member begins to function when the hand of a user is in the compactor, the safety shield will push the hand out of the path of the compactor member.

In the form of the invention shown in FIGS. 11 and 12, the means responsive to successive movement of the access door comprises a device which is actuated each time the door is opened to deposit trash. After a predetermined number of openings, the compactor member is actuated.

More specifically, a lever 80 is pivoted to the rear of the access door 17*a*. The free end of the lever 80 is formed with a weighted rubber portion 80a that engages the periphery of a rubber roller 81 rotatably mounted on a bracket 81a. A second roller 82 is movable with the roller 81 and carries a finger 83. After successive movements of the roller 81, the finger 83 engages the actuator 84 of a micro switch 85 which, in turn, energizes the hydraulic pump to drive the compactor 24 downwardly. An anti-backup finger 86 is yieldingly urged by a spring 87 against the periphery of the roller 81 to prevent retrograde movement of the roller. In order to insure that the finger 83 may not be inadvertently left in engagement with the actuator 84, an extension 34a is provided with a portion 88 to move the finger 83 downwardly out of engagement with the actuator 84 when the compactor 24 is moved downwardly.

In order to utilize the arrangement described, a one-way clutch may be provided between the roller **81** and the roller **82.** Alternatively, as shown in FIG. **13,** the movement of the rod **80** may be registered on a counter **90** so that after a predetermined number of openings of the access door **17***a*, the compactor **24** will be actuated.

I claim:

1. In a waste compactor, the combination comprising

a frame,

a support on said frame for a disposable container,

a compactor member,

means for moving said compactor member toward and away from said support to compact waste in the disposable container on said support,

means defining an access opening to said container on said support,

an access member obstructing said path and movable out of said path to permit access and deposition of waste to said container,

and means responsive to successive movement of said access member out of the obstructing position to initiate operation of said means for moving the compactor member toward said support.

2. The combination set forth in claim **1** wherein said last-mentioned means includes time delay means responsive to maintenance of said member in said unobstructed position for a predetermined period of time.

3. The combination set forth in claim **1** wherein said last-mentioned means is responsive to a predetermined number of movements of said access member.

4. The combination set forth in claim **1** wherein said access comprises an access door pivoted for movement inwardly of said frame.

5. The combination set forth in claim **4** wherein said pivot is adjacent the upper edge of said access door.

6. The combination set forth in claim **1** including means responsive to the movement of the compactor member toward the support to interrupt the path of waste toward said support and move the hand of an operator, if present, out of said path of said compactor member.

7. The combination set forth in claim **6** wherein said last-mentioned means includes a shield.

8. The combination set forth in claim **7** including pivot means for pivoting said shield for movement into and out of the path of the waste.

9. The combination set forth in claim **8** wherein said pivot means comprises lost motion linkage.

10. The combination set forth in claim **1** including means responsive to a predetermined time delay caused by retardation of the movement of the compactor member toward the support to actuate a signal indicating that the container is filled.

11. The combination set forth in claim **1** including switch means operable upon movement of the compactor member to the bottom of its stroke with respect to the support and actuatable to operate said means to reverse the movement of said compactor member.

12. The combination set forth in claim **11** wherein said means for moving said compactor comprises hydraulic means including a valve,

a solenoid,

said solenoid being operable by said pressure switch to cause a reversal of said compactor moving means.

13. The combination set forth in claim **12** including a limit switch operable to de-energize said moving means when the compactor member reaches the original position away from said support.

14. In a waste compactor, the combination comprising

a frame,

a support on said frame for a disposable container,

a compactor member,

means for moving said compactor member toward and away from the support to compact waste in the disposable container on said support,

means defining an access opening to said container on said support to permit access and deposition of waste to said container,

and means responsive to the movement of the compactor member toward the support to interrupt the path of waste toward said support and move the hand of an operator, if present, out of said path of said compactor member.

15. The combination set forth in claim **14** wherein said last-mentioned means includes a shield.

16. The combination set forth in claim **15** including pivot means for pivoting said shield for movement into and out of the path of the waste.

17. The combination set forth in claim **16** wherein said pivot means comprises lost motion linkage.

18. The combination set forth in claim **16** wherein said shield is pivoted adjacent its upper end and extends substantially vertically when the compactor member is in position away from said support.

19. The combination set forth in claim **18** wherein the dimensions of said shield and said compactor are such that a space is provided between the free edge of the shield and the compactor when the shield is in position during movement of the compactor member.

20. The combination set forth in claim **14** wherein said shield and its position, when the compactor member is moving toward said support, is such that any waste deposited during the movement of the compactor member is accumulated on said shield.

21. The combination set forth in claim **1** wherein said last-mentioned means includes means operable after the total time of said successive movements exceeds a predetermined time.

22. The combination set forth in claim **21** wherein said last-mentioned means comprises means for measuring the time of each movement and means for storing each successive time until the total time exceeds said predetermined time interval.

* * * * *