United States Patent [19]

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[54] **COMBINATION CONTAINER AND MATERIAL COMPACTING APPARATUS**

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[52] **U.S. Cl.** ..... **100/100;** 100/229 A; 100/295; 214/505; 214/517; 292/304

[51] **Int. Cl.** **B30b 15/06**

[58] **Field of Search** ..... 214/82; 296/38; 100/229, 100/229 A, 100, 245, 295; 292/221, 229, 304

[56] **References Cited**

UNITED STATES PATENTS

153,349	7/1874	Kirtley	100/229 X
698,506	4/1902	Illingworth	100/229
1,053,795	2/1913	Ellis	296/38
1,088,104	2/1914	Sharp	214/82 X
1,133,254	3/1915	Backus	292/304
3,129,657	4/1964	Farley et al.	100/229 X
3,212,656	10/1965	Kamin	296/38
3,229,618	1/1966	O'Connor	100/229 X
3,229,622	1/1966	French et al.	100/229 X
3,490,631	1/1970	Smith	100/229 U X
3,507,410	4/1970	Liberman et al.	100/229 X
3,511,176	5/1970	Szaj et al.	100/229

FOREIGN PATENTS OR APPLICATIONS

296,165	8/1928	United Kingdom	292/304
1,216,068	4/1960	France	292/304

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[57] **ABSTRACT**

A demountable truck body of the "roll-on/roll-off" type constructed with a false bottom forming a sump for trapping liquid drained from the material loaded in the body and a load material compaction unit associated with the truck body. The compaction unit includes a compacting plate which serves the dual purpose of (1) a compacting element for the compaction unit to compact material into the truck body while it is "set-off" and (2) a door for the charging opening of the truck body after it is filled. The compacting plate is adapted to be alternately removably attached to the compaction unit and to the truck body over the charging opening.

3 Claims, 6 Drawing Figures

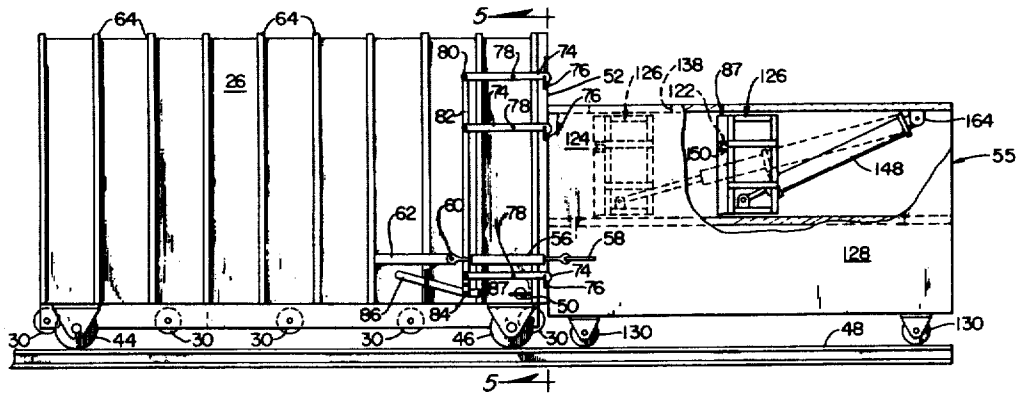


FIG. 1

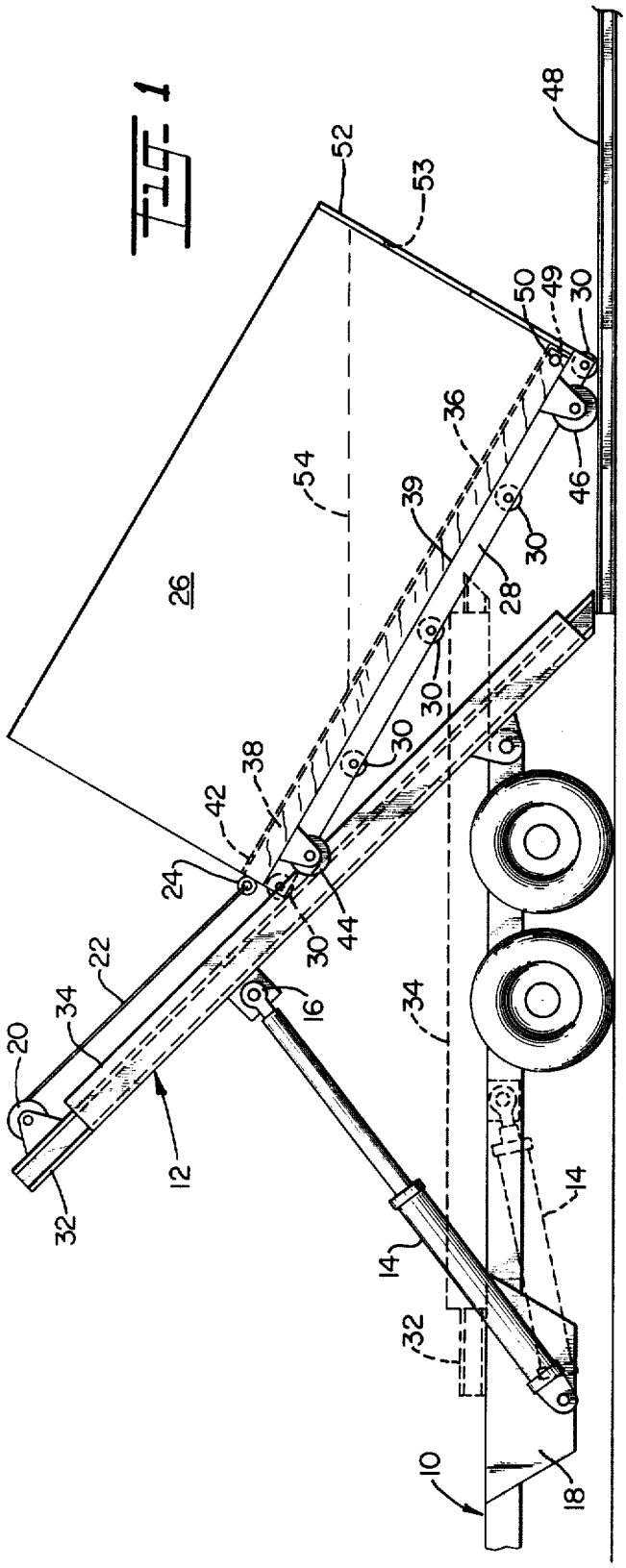
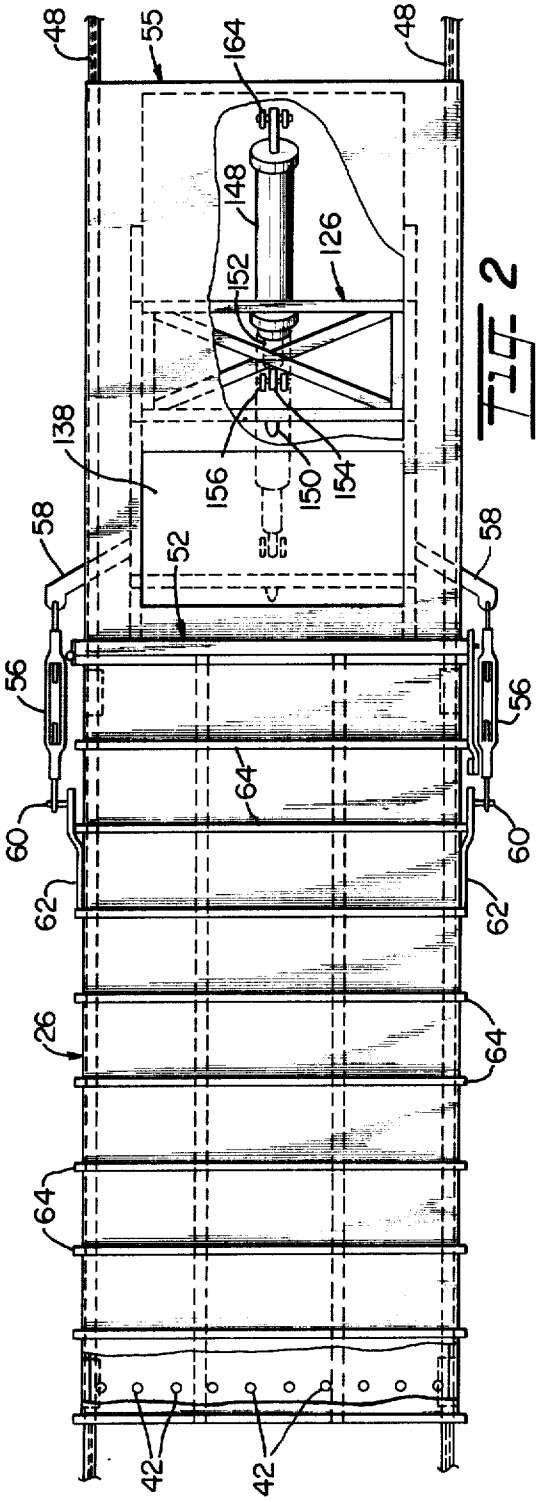


FIG. 2



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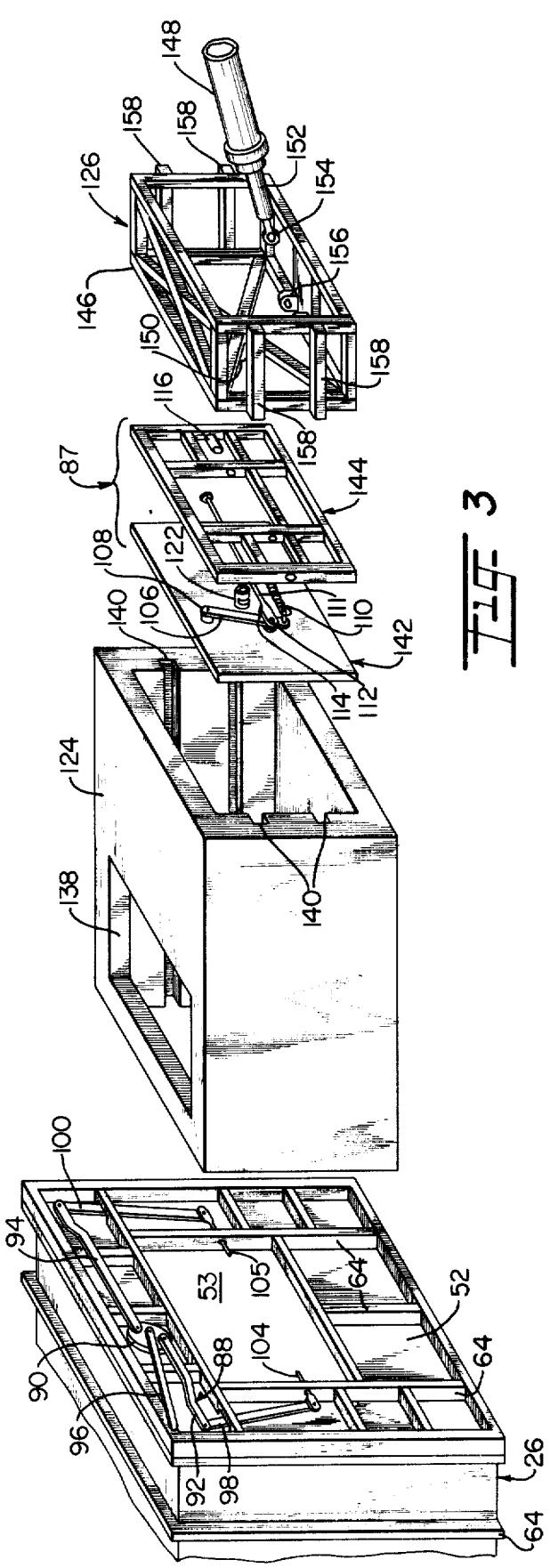
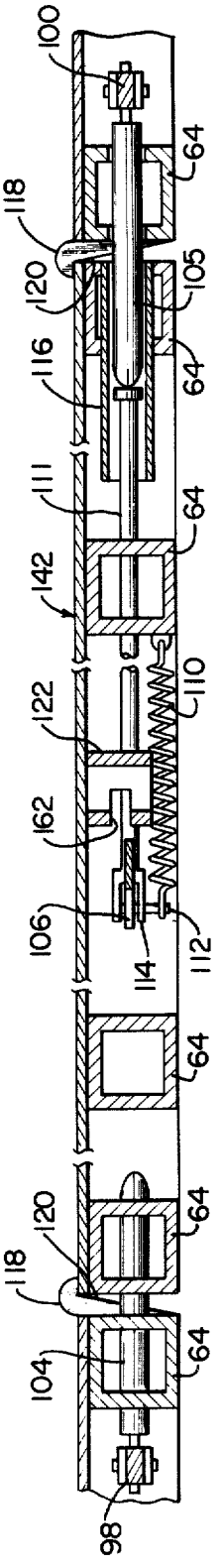


FIG. 3



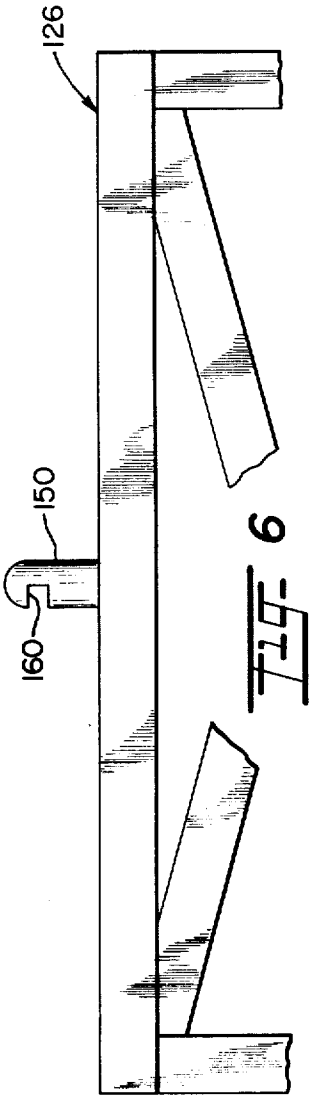


FIG. 6

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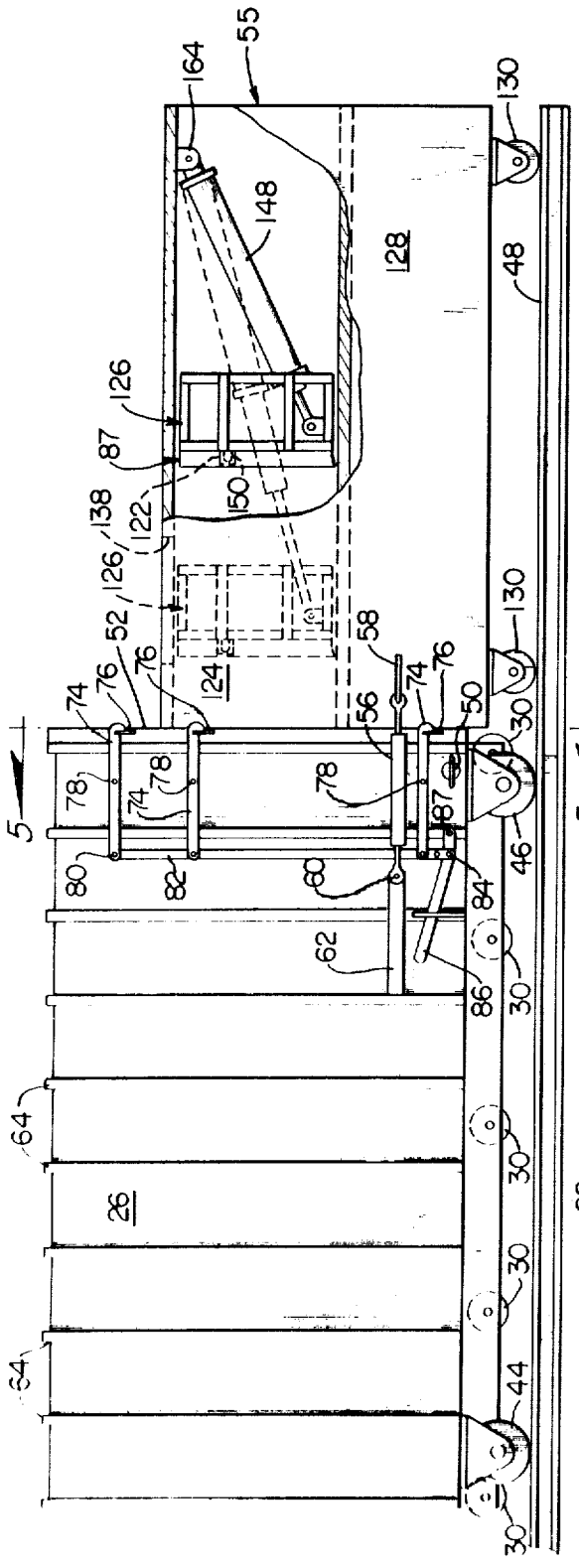


FIG 4

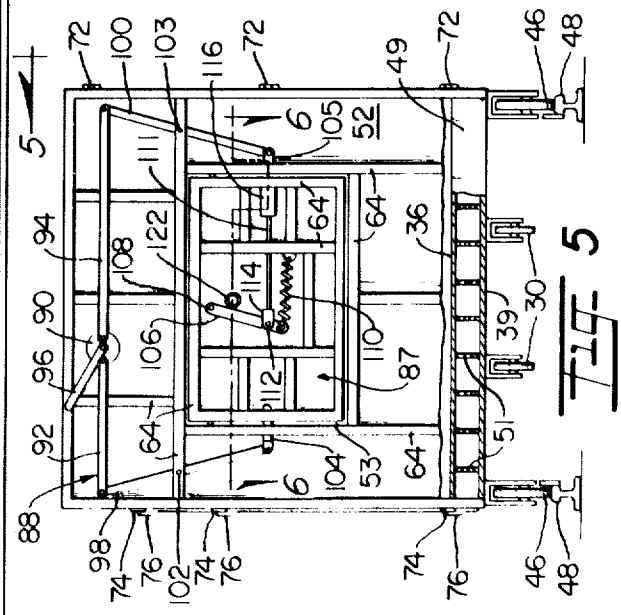


FIG 5

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COMBINATION CONTAINER AND MATERIAL COMPACTING APPARATUS

SUMMARY OF THE INVENTION

This invention relates to demountable or "roll-on/roll-off" truck bodies provided with a sump in the bottom area for trapping liquids draining from the loaded material, and with means for compacting material loaded into the truck bodies.

In order to realize maximum use of expensive trucks, the refuse hauling industry has adopted the use of demountable dump bodies which can be parked for loading at localities from which refuse must be hauled to a dump, and the truck and chassis kept in use while the body is being filled. This permits a large number of demountable dump bodies to be serviced by a single truck. The truck chassis is provided with a tilt frame for loading and unloading the truck body on the chassis.

When a demountable truck body is hauled onto and removed from the chassis, it assumes an angle of 30° – 40° causing liquid drained from the loaded material to flow to the lower internal aft area of the truck body. There it reaches a level at which it flows through the charging opening and escapes around the door. These leakage areas cannot be adequately closed or gasketed in the usual demountable truck body to prevent the escape of these liquids.

Obviously, if maximum efficient use is obtained from the expensive truck and demountable body, the body should be loaded as near to maximum capacity as possible before it is transported to the dump site. A large percentage of refuse is comprised of hollow, frangible articles, such as, pasteboard boxes and like articles, which should be compacted into the loading space of the truck body during loading to prevent waste of space.

Accordingly, it is an object of this invention to provide a demountable truck body in which accumulated liquid drained from material loaded in the truck body is maintained out of contact with leakage areas or in which the contact of the liquid with such areas is reduced to a minimum.

It is another object of this invention to provide an effective means for compacting material into a truck body as it is being filled.

It is still another object of this invention to provide a compaction plate which alternatively functions as a door for the charging opening of the truck body.

The invention will now be described with reference to the accompanying drawings in which:

FIG. **1** is a side elevational fragmentary view of a chassis section and partially schematic showing of a demountable truck body being drawn onto the chassis;

FIG. **2** is a top elevational view of the dump body of the invention with the charging hopper attached and partially cut away at the rear to show internal structure;

FIG. **3** is an exploded view of the charging hopper and compacting mechanism oriented with respect to the aft end of the dump body;

FIG. **4** is a side elevational view of the dump body with the charging hopper attached with an area of the side of the hopper cut away to show internal structure;

FIG. **5** is a section taken on line **5—5** of FIG. **4**; and

FIG. **6** is a section taken on line **6—6** of FIG. **5**.

Referring now to FIG. **1**, there is shown a truck chassis represented generally at **10** provided with a tilt frame **12** rotatably mounted at the rear end of the chassis as shown. The tilt table **12** is rotated by hydraulic cylinder **14** rotatably attached at one end to the bottom of the tilt table by attachment **16** and rotatably attached by its other end to heavy fish plate **18** which is secured to one side of chassis **10**. When the tilt table is in its lowered position hydraulic cylinder **14** will rest along the side of the chassis as shown.

A cable winch **20** is mounted on the front end of tilt table **12** and actuated by conventional power means, not shown, the winch cable **22** being attachable to ring **24** on the front of dump body **26** for hauling the dump body onto or lowering it off of the chassis along the tilt table **12**. The ring **24** and/or other suitable attaching means can also be used to secure the dump body onto the chassis after it has been hauled thereon.

Two channel members **28** extending the length of the dump body are secured to the bottom of the dump body. Ramp castors **30** are rotatably mounted on the channel member **28** and ride in the two tilt frame tracks **32** of the tilt table **12** as the dump body is hauled on and lowered off the tilt table. A track flange **34** is mounted outwardly of each track **32** to insure retention of the dump body **26** on the tracks **32** as it moves over them. Other conventional means, such as skids, can be used for moving the dump body onto the tilt table.

The dump body **26** is of rectangular construction with floor or bottom **36**, sides, front and rear ends and a top. A sump **38** is constructed below floor or bottom **36** by the addition of false bottom **39** to form a shallow longitudinal drain compartment for trapping liquid draining from material compacted into the dump body. When the dump body is set-off on level ground the upper surface of the bottom **36** slopes to the front of the dump body so that liquid from the load will drain through forwardly installed drain holes **42** (FIG. **2**) into sump **38**. The forward sloping of bottom **36** is attained by use of front transporting caster wheels **44** of smaller diameter than rear transporting caster wheels **46**. It may also be attained by constructing the front end of bottom **36** lower than the rear end. The transporting caster wheels **44–46** support the dump body on ground tracks **48**. The sump **38** is sealed at its rear end by wall **49** and is provided with a pipe nipple **50** for draining. The bottom **36** is reinforced by spaced longitudinal beam members **51** (FIG. **5**). The dump body is provided with a rear door **52** for dumping which has a charging opening **53** for compacting material into the dump body. The charging opening is closed with a combination removable door and compaction plate as explained later. The opening for the rear door may be the charging opening thus eliminating a charging opening in the door.

In FIG. **1** the dotted line **54** represents the approximate level which accumulated liquid assumes in the usual detachable dump body without a sump during hauling of the dump body onto a truck chassis. The liquid flows through the charging opening **53** and leaks through the space between the door **52** and the body frame defining the discharge opening. The resulting large leakage area is difficult to close and would require extensive seals. When a combination removable door and compactor plate is used to close the charging opening, as in this invention, it is practically impossible to seal the leakage area between the door and opening. The described sump of this invention traps the drained and accumulated liquid so that there is practically no liquid above the sump when the dump body is in use.

This eliminates the necessity of seals around the discharge opening and eliminates leakage of liquid through the charging opening. Plugged openings can be provided in the end wall **49** for cleaning the sump. The end wall **49** can be eliminated and the aft end of the sump closed by discharge opening door **52** and suitable seals.

The sump body is particularly effective when used in conjunction with a loading ramp having one end elevated, such as the tilt table **12**, as elevation of the front end of the usual demountable body having a charging opening centrally located in the discharge door results in leakage around the charging door, while leakage in this area is eliminated with the sump construction.

In FIG. **2** a compacting unit and support structure represented generally at **55**, is shown secured to set-off dump body **26** by means of turnbuckles **56** on either side secured at one end to compacting unit **55** through trunnions **58** and at the other end to dump body **26** through securing pins **60** supported by trunnions **62** attached to the sides of dump body **26**.

As will be seen from FIGS. **2** and **4** the dump body **26** is reinforced throughout with external hollow rectangular support ribs **64**. The door **52** covering the discharge opening and provided with a charging opening **53** (FIGS. **3, 5**) is conventionally mounted by hinges **72** (FIG. **5**) to the aft end of the dump body. The door is securely closed (FIG. **4**) by latch arms **74** hooking over latch pieces **76** on door **52**. Latch arms **74** are pivotally mounted to dump body **26** by latch arm pins **78**. The latch arms **74** are pivotally mounted at their front ends by link pins **80** to vertical link **82** which is pivotally secured at it lower end by lever pin **84** to door locking and unlocking lever **86** which is secured at its rear end to body **26** by pin **87** so that when lever **86** is raised vertical link **82** moves upwardly to rotate latch arms **74** clockwise to engage latch pieces **76**. Lowering of lever **86** rotates arms **74** in the reverse direction to disengage them from latch pieces **76**.

Referring to FIG. **5**, a combination charging door and compactor plate assembly **87** is removably mounted in charging opening **53** by a pin linkage system represented generally by the numeral **88**. A rotatable mounting plate **90** having push rods **92** and **94** pivotally mounted thereon by their inner end is rotated by handle **96**. Lever arms **98** and **100** pivotally connected by their upper ends to the outer ends of push rods **92** and **94**, respectively, and rotatably mounted by lever pins **102** and **103** to rear door **52** are pivotally connected by their lower ends to locking pins **104** and **105**, respectively, which reciprocate in mating holes in ribs **64** on door **52** and combination compactor and door assembly **87** to lock and unlock charging opening door **87** in the charging opening. The combination compactor plate and charging opening door **87** is comprised of the assembly of compactor plate **142** and its support frame **144** (FIG. **3**), the numeral **87** identifying the assembly when it is used either as a door or compactor plate.

For purposes which will be explained later there is mounted on the combination door and compactor plate assembly **87** a knife latch **106** pivotally mounted by knife latch pin **108** to door **87** with its lower end biased to the right by spring **110** anchored by one end to the lower end of knife latch **106** and by the other end to rib **64** on door **87**. A push rod **111** is pivotally mounted at its inner end by pin **112** and clevis **114** to knife latch **106** with its outer end extending into guide tube **116** on door **87** for reciprocation therein. Door stops **118** (FIG. **6**) having door edge guide surfaces **120** are secured to ribs **64** forming the edges of charging opening **53** (FIG. **3**) by welding. There are four door stops **118** positioned to be contacted by each corner of the packing plate to maintain it in the proper orientation. A slotted tube **122** (FIGS. **3, 5**), for a purpose to be later described, is secured centrally on the outer surface of combination door and compactor plate **87**. After door **87** has been inserted into charging opening **53** with handle **96** moved clockwise to the right with locking pins **104** and **105** correspondingly moved outwardly to their unlocked position, handle **96** is moved counterclockwise to the left to correspondingly move locking pins **104** and **105** inwardly through linkage **88** to their locking position to lock door **87** in place. The free end of locking pin **105** (FIG. **5**) is in contact with the free end of push rod **111** so that as push rod **111** is reciprocated by locking pin **105**, the knife latch is correspondingly rotated left and right around latch pin **108**. Obviously, the construction can be modified so that the other locking pin **104** will actuate the knife latch **106** rather than locking pin **105**.

The compactor or compacting unit and its operation will now be described. Referring to FIG. **3**, the compactor unit comprises a material receiving hopper **124**, a combination charging door and compactor plate assembly **87**, and a guide frame assembly **126**. When the unit is assembled the assemblies **87** and **126** are housed in hopper **124** which is mounted on a support section **128** (FIG. **4**) provided with casters **130** adapted to travel on tracks **48**.

Hopper **124** is of rectangular configuration and is constructed with loading opening **138** and guide channels **140** in the internal surfaces of its sides. The compactor plate assembly comprises compactor plate **142** and support frame **144** to which the compactor plate is secured by welding or otherwise. Guide frame assembly **126** (FIG. **3**) is comprised of guide frame **146**, hydraulic cylinder **148** and locking shaft **150** (FIG. **6**). Guide frame **146** is of reinforced construction and has the forward end of piston **152** of hydraulic cylinder **148** attached to its forward section by a pin (not shown) passing through the hole **154** and the clevis arrangement **156**. Other conventional means may be used to attach the forward end of the telescoping cylinder to the guide frame. Guides or guide rails **158** are attached to the sides of guide frame **146** in positions corresponding to those of guide channels **140** in hopper **124**.

Locking shaft **150** secured to the forward section of guide frame **146** has a slot **160** (FIG. **6**) near its forward end. The shaft **150** is adapted to fit in tube **122** on compactor plate **142** which is provided with a slot **162** (FIG. **6**) corresponding to slot **160**. When the shaft **150** is inserted in tube **122** and the slots **160** and **162** are in register the compactor plate assembly **87** can be locked to guide frame **146** by seating of knife latch **106** in the slots.

When the compacting unit is assembled the guide rails **158** fit in guide channels **140** and the upper end of hydraulic cylinder **148** is secured to the undersurface of hopper **124** by clevis-like attachment **164** (FIG. **4**). The hydraulic cylinder **148** is actuated by conventional power means not shown.

The mounting of dump body **26** and the compacting unit on level rails **48** (FIG. **4**) serves to align the combination interchangeable door and compactor plate **87** in

the charging opening **53** so that locking pins **104, 105** are aligned with corresponding locking holes in the combination door **87** including the alignment of locking pin **105** with tube **116.** It also serves to align combination door **87** into position for locking onto the compactor unit with slotted tube **122** on the door and slotted shaft **150** on guide frame **146** of the compactor (FIG. 3) aligned. It would be extremely difficult to position the heavy dump body and compactor with respect to each other by other means so that the various locking means are properly aligned.

The operation of the compacting unit is as follows: after the demountable body **26** is set off on rails **48** for filling, the compacting unit is secured to it by turnbuckles **56.** At this time the door **87** is secured in the charging opening **53** by the linkage system **88** in the position shown in FIG. **5** with knife latch **106** held clear of tube **122** by push rod **111.** The hydraulic cylinder **148** and its associated control mechanism, to be explained below, is actuated to move guide frame assembly **126** forward and position shaft **150** in tube **122** where it is held by control of the cylinder operation until handle **96** is moved clockwise to withdraw locking pins **104** and **105.** When locking pin **105** moves outwardly to the unlocked position, knife latch **106** will be forced and held into mating slots **160** and **162** by spring **110** thus securely locking the combination charging door and compactor plate assembly **87** to guide frame **146** where it now functions as a compactor plate. The cylinder is then actuated to move the guide frame assembly with the compactor plate assembly attached to the position shown in FIG. **4** aft of loading opening **138,** where it remains ready to compact material placed in the hopper **124** into the dump body **26** through charging opening **53.**

After the demountable dump body **26** is filled the hydraulic cylinder is actuated to position combination door and compactor plate **87** in charging opening **53** where it is maintained under pressure by the hydraulic cylinder and a relief valve arrangement to be explained later until lever **96** can be moved counterclockwise to lock the door **87** in position as previously explained. When locking pin **105** moves inwardly in guide tube **116** to lock the door **87** in the charging opening, push rod **111** is moved to the left to rotate knife latch **106** clockwise out of slots **160** and **162** to unlock shaft **150** from tube **122.** The result is that the assembly **87** is securely locked in opening **53** and the guide frame is unlatched from the assembly **87** so that the dump body can be transported to the dump with the charging opening **53** closed.

The hydraulic cylinder **148,** and consequently, the compactor assembly, is powered by an electrical-hydraulic system. It is a simple, standard hydraulic system consisting of the usual electric motor driven pump, solenoid actuated valve, manual and pressure switches. A manual electric switch actuates the system to cause the hydraulic cylinder to push the guide frame **126** with the compactor plate assembly **87** attached to a forward position in the hopper. Upon completion of this forward stroke during the compacting operation, there is a sudden increase in line pressure which actuates a line pressure switch causing the solenoid valve to operate and reverse the direction of movement of the cylinder by reversing the flow of hydraulic fluid in the cylinder. Thus, the hopper area is cleared and is ready for the deposit of additional materials through loading opening **138** to be compacted into the dump body.

To separate the combination door and compactor plate **87** from the guide frame **146** and lock it in the charging opening **53,** a manual switch is first operated to prevent the solenoid valve from operating so that the cylinder remains extended in the forward position so that the combination compaction plate and door is pushed and held in position in opening **53** against door stops **118** (FIG. **6**) until the operator moves handle **96** counterclockwise to the locking position. As explained above, this action forces the knife latch **106** out of locking position so that the assembly **87** is separated from the guide frame **146.** During this holding operation, the pump continues to operate with the fluid circulating through the relief valve.

I claim:

1. A combination container and load material compacting apparatus therefor comprising: a receptacle having a charging opening therein; a compactor for compacting material into said receptacle; a combination interchangeable door for said charging opening and compactor plate for said compactor; first locking means for locking said combination door and compactor plate in said charging opening; second locking means for locking said plate to said compactor; said first and second locking means operating so that as one moves to its locking and unlocking positions the other moves to its unlocking and locking positions, respectively; said first locking means including locking pins operated by a linkage system and said second locking means including a slotted shaft on said compactor, a slotted tube on said compactor plate and a knife latch adapted to move into locking position in said slots when they are in register and to unlocking position out of said slots.

2. The apparatus of claim **1** including aligned tracks on which said container and said load material compacting apparatus are positioned to provide for alignment of said combination door and compactor plate into locking position with said locking pins aligned with locking holes on said door, and into locking position on said compactor with said slotted shaft and slotted tube in alignment.

3. The apparatus of claim **1** including biasing means for biasing said knife latch into locking position, one of said locking pins on movement to locking position is operative to move said knife latch to unlocking position against said biasing means and upon movement to unlocking position permits said biasing means to move said knife latch to locking position.

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