FOOD WASTE COLLECTION SYSTEM (FWCS)

PATENT APPLICATION

PREPARED : TNG INVENTION

BACKGROUND OF THE INVENTION

Field of the Invention

This invention relates to the new combination of various mechanical systems to enhance the collection of foodwaste for recycling program.

Background Art

OLD WAYS – SMELLY, LABOURIOUS AND UNHYGIENIC
Present simplistic way of food waste collection in a black trash bag and subsequently thrown into a 660-liters rubber maid container creates unpleasant odour and posts a hygiene issue for the handlers. There is a potential spreading of bacteria through the atmosphere and attracts pests such as houseflies, rats and cockroaches to name a few.

In addition, at least six such bins are required to hold the waste and transportation of these bins to the bin centre has to be executed manually at least three times a day by the cleaners posing ergonomic issues to them in view of the bulky and heavy bins. On many occasions due to improperly handling, it topples and results in a messy and smelly situation, attracting even more pest and complaints.

SUMMARY OF THE INVENTION

NEW WAYS - INOVATIVE, PRODUCTIVE, HYGIENIC AND 80% ODOUR FREE

Food waste collector system or FWCS in short is technically and innovatively designed to make the food waste recycling process hygienic and 80% odour free for the environment. It is experienced by many that most, if not all, of the waste collection bin centers and compactors in Singapore are smelly and form a good habitat for pest. This is made worse when food waste brought to a designated collection area for recycling are left unattended overnight. Hence, this invention is proposed to arrest most of the concerns and issues and make food waste recycling sustainable beyond our generation.

How is the food waste collected and stored?

FWCS is a complete food waste recycling solution that will sustain the food waste recycling initiative which shall be propelled into the next generation. Starting from the point of food waste collection at tenanted areas, it would then be transferred to a vacuum tank at the deposit location or presently called the holding area. Finally, the food waste will collected by a specially designed air-tight container truck and sent to IUT recycling plant in Tuas for recycling.

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BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 - Bin collector at the F&B tenanted area (FWBC)

Figure 1 below shows a specially designed container that allows food waste to be thrown in without the use for black bags. A definite "green" step towards eradicating the use of non bio-degradable product and at the same time, it provides financial savings for the tenants. The container comes in different sizes to suit the disposal capacity of the tenants.

FIG. 2 - Pressurized Storage tanker next to/ in the Compactor room (FWPT)

Figure 2 shows a specially designed air-tight container that can hold two tons of food waste and keep a hygienic environment which is free from pest and unwarranted smell. All the tenants need to do is to cart down to the bin collector (FWBC) and connect a hose from the FWPT into a quick coupling at the FWBC

FIG. 3 - Food Waste Collector Truck (FWCT)

Figure 3 shows a specially engineered truck that extracts food waste from the air-tight container effortlessly without polluting the environment with unwarranted smell and residual water waste along the drive way and roads.

TECHNICAL DETAILS OF SYSTEM

FIG. 1

It is a foodwaste bin from F&B tenants with stainless steel liners, the SS container is funneled downward connecting to a 4" ball valve, follow by a 90deg elbow and at the end of the line, is a male quick release coupling. This coupling will mate with the hose connecting up with the female coupling from the collection tank.

FIG. 2

The FWPT is the main foodwaste collection tank which will be situated at the bin centre and with a capacity of 3000litres (can be varied accordingly to the building's requirement). The system is complete with a electrical control panel, sight glass anda 4" intake hose with a female coupling (for connection with the tenants' bin). The tank is interconnected with 2 vacuum pumps in which 1 pump is on duty while the other is on standby. This system is also completed with a common header piping and a filter section.

This tank is a vertical standing tank, which can hold up to 2 tons of foodwaste on a daily basis (varies according to different building) and is coated with anti-rust coating internally. The down port which is a outlet of the foodwaste (connection to the truck) is of 6" internal diameter hose coupled with a ball valve and quick release coupling.

The tank also comes with a 12"x16" inspection hole for maintenance purposes.

FIG.3

This is a truck specially design with technical aspects to cater for foodwaste collection.

Selected vacuum pump are to be used to draw in the foodwaste directly from the 3000litres tank via the down port. Upon collection of foodwaste from various locations, the food waste will then be transported to the recycling plant for processing.

With the ability to open the rear door on the truck, the foodwaste can be easily discharged at the designated area in the recycling plant.

The truck also comes with a 200litres water tank which allow cleaning and flushing of internal tank.

Refer to the specification sheet for details of the system.

FOOD WASTE COLLECTION SYSTEM (FWCS)

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Technical Specification of FWCS

1 no. duty pump, 1 no. standby pump (400v, 3ph, 50Hz) c/w filter/housing
Model: Mink MM 1202 AV AQUA Rotary Claw Dry Running Vacuum Pump
Capacity: 200m3/hr

Electrical control panel c/w all necessary circuit breakers, PLC programming, auto-start/stop, push buttons, timer, vacuum sensor, DOL starter, cabling and accessories

1no. 3000litres vacuum receiver c/w 1no. 4" sight glass, vacuum gauge and a 6" down port (outlet connecting to grease truck)

2" piping interconnecting between vacuum pumps and vacuum tank c/w 2" isolation ball valves, 2" check valves and 2nos vacuum gauge

120lires bin (SS304) c/w 4" ball valves + 4" vacuum hose + ball valve

General Specification of FWCS

Estimated Floor area required :

Footprint of pump double-layer pump rack = 875 x 2018 mm

Diameter of Tank = 1219 mm

Est. distance btw tank &rack = 1000 mm

Est. S/S Dump Tank footprint = 700 x 700 mm (Placed next to 3 m3 Tank)

Therefore Ideal System Footprint = 3094 x 2018 mm

2.Dimension of Tank: Vertical(Standing) Type.

Outer Diameter = 1219 mm

Shell length = 2184 mm

Tip to Tip = 2878 mm

Overall Height = 3128 mm

Material Used = A 36 Mild steel or equivalent.

Thickness of steel = 8 mm.

Inspection Hole = 12" x 16" elliptical man way c/w cover & clamps.

Estimated Total Weight of Whole System = 2058 kg.

Specification of the truck

5000litre vacuum tanker (carbon steel)

With NASH liquid ring vacuum pump model GL-80

Battery drive wash down pump and 200litres of water tank

Working pressure: 1.5bar

Diameter: 1600mm

Length: 3650mm

2 coats of internal and external primer

suction and discharge line c/w steel ball valves, lines are terminated with quick coupling with dust cap

Completed with hoses and accessories

Fully open hydraulic operated rear door

Water tight sealing gasket made of neoprene rubber suitable for wide range of oil and chemical waste.

FOOD WASTE COLLECTION SYSTEM (FWCS)

PATENT CLAIM(S)

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1) The Food Waste Collection System (FWCS) employs the usage of the **enclosed collection tank** which will be able to contain and eliminate bad smell from the waste collection centre, thus maintaining the hygiene and cleanliness of the premises.

2) This system uses the **vacuum process/action** which allows easier and cleaner transferring and containment of foodwaste, thus minimize the laborious manual work by the handler.