United States Patent [19]

Boon

[11] **3,847,293**

[45] **Nov. 12, 1974**

[54] **PNEUMATIC TRASH-GARBAGE PICKUP DEVICE**

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[22] Filed: **Mar. 7, 1973**

[21] Appl. No.: **338,967**

[52] **U.S. Cl.** **214/302,** 15/340, 214/82, 214/83.28, 214/83.3, 214/310, 214/518

[51] **Int. Cl.** **B65f 3/02**

[58] **Field of Search** 214/41, 83.28, 302, 310; 15/340; 302/58

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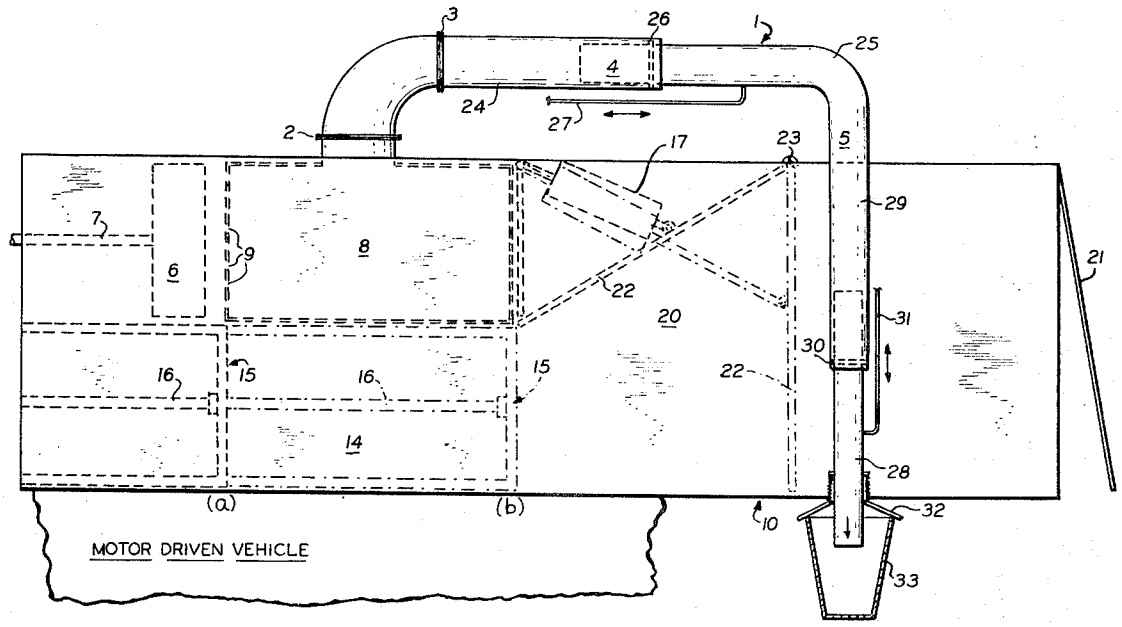
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[57] **ABSTRACT**

This invention pertains to a mechanized mobile pneumatic pickup apparatus for solid waste such as trash and garbage. In essence, the apparatus comprises a unique combination of an automotive truck, a movable flexible intake conduit, compaction means, and pneumatic means for moving trash and garbage from collecting stations through the intake conduit into the truck, all units actuated by a single power source.

7 Claims, 5 Drawing Figures



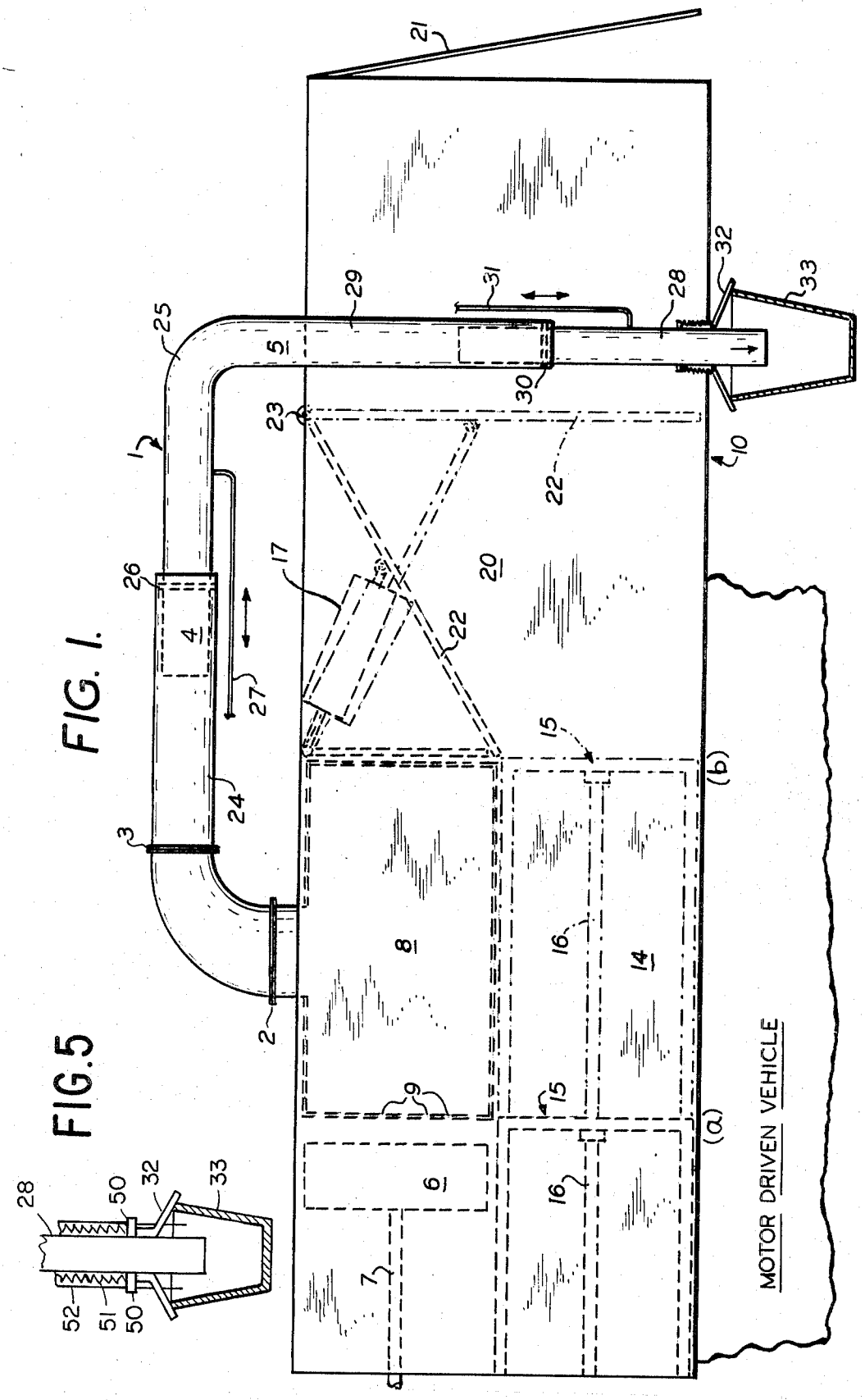

21
29
31
28
32
33
25
5
30
23
1
10
22
26
17
20
4
22
27
15
24
(b)
3
8
16
14
2
9
15
(a)
MOTOR DRIVEN VEHICLE
6
16
7

FIG. 1.

28
50
32
33
52
51
50

FIG. 5

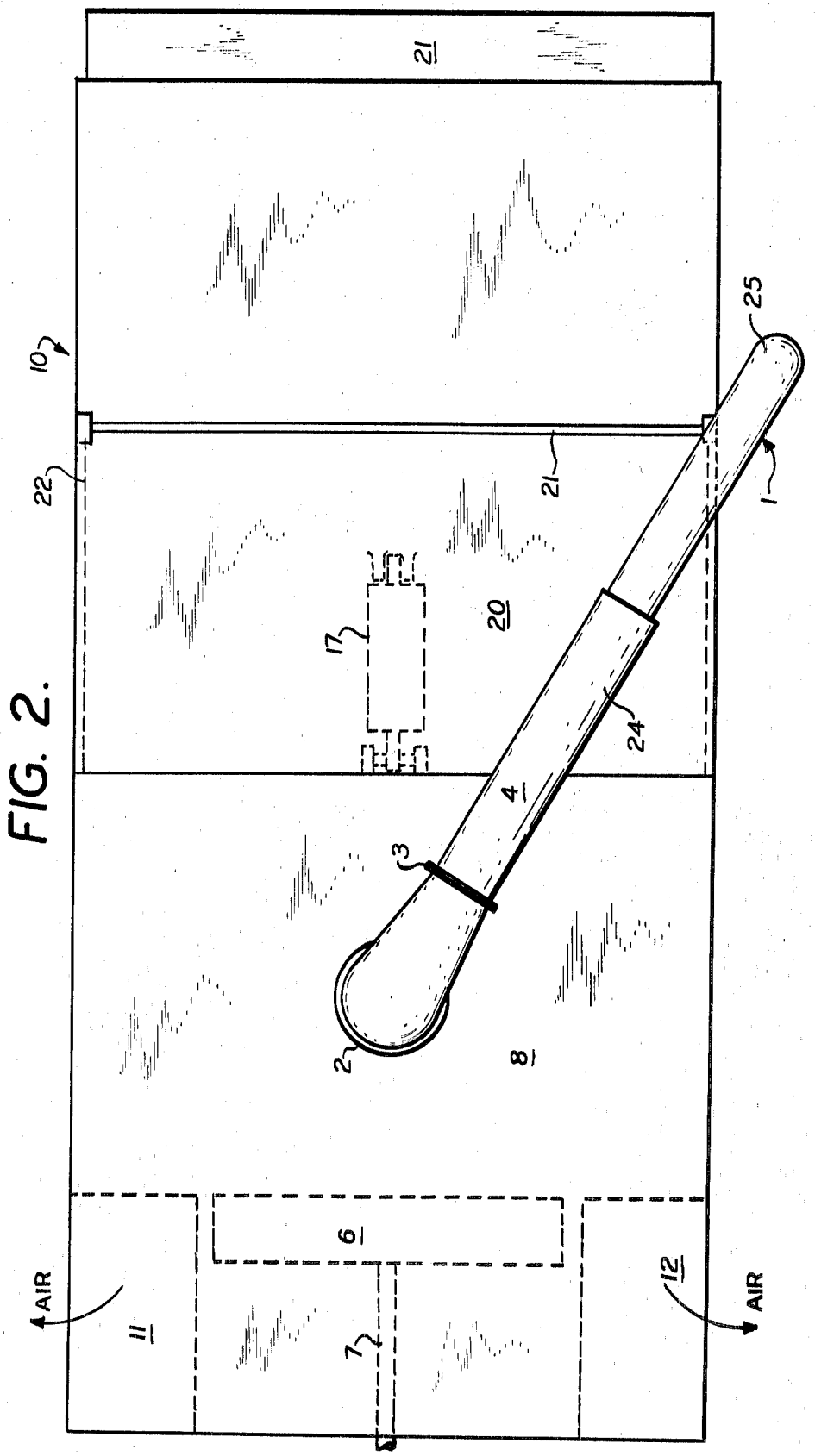


FIG. 2.

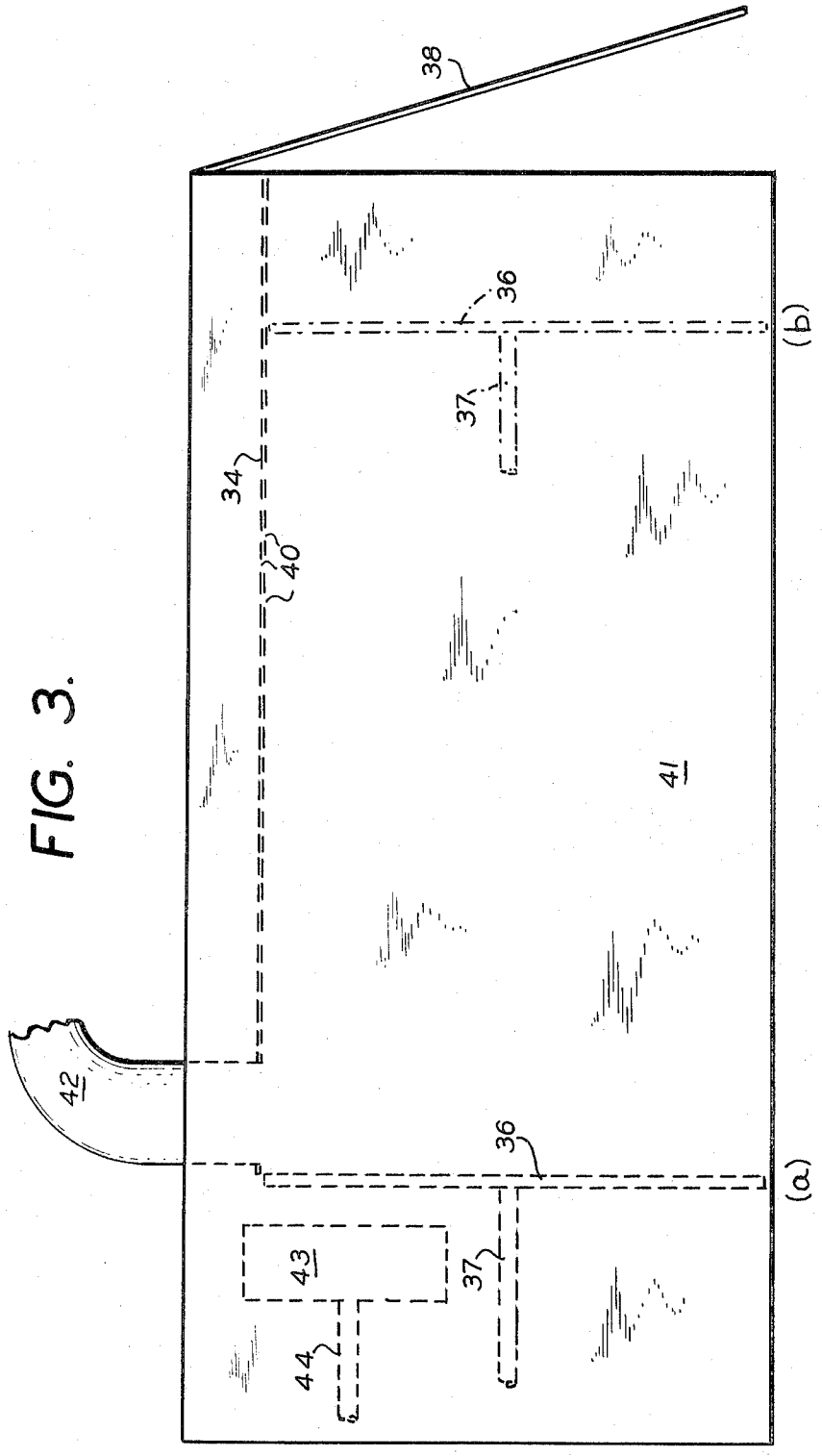
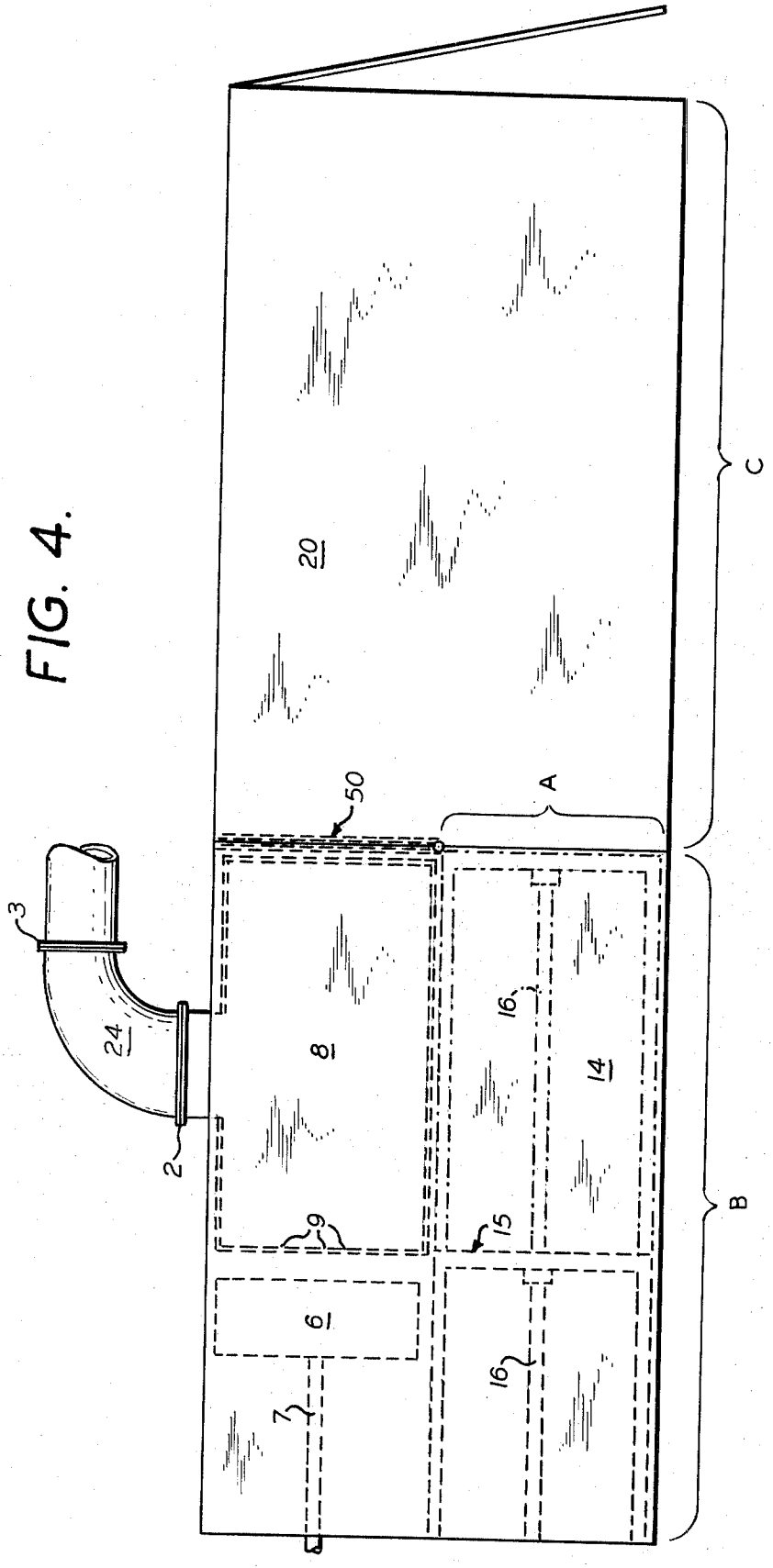


FIG. 3.

FIG. 4.



PNEUMATIC TRASH-GARBAGE PICKUP DEVICE

The present invention is broadly concerned with the more economical and more efficient method for the collection of solid waste such as trash and garbage from collection stations, such as trash and garbage cans positioned at the curbs in residential, industrial and commercial areas. The invention is more specifically concerned with a unique apparatus for collecting trash and garbage which comprises in combination an automotive truck, a movable flexible intake conduit, compaction means and a pneumatic system for passing the trash and garbage from the collecting stations, storage containers, barrels, or any storage units for containing trash, through the conduit to within the truck, all elements preferably being activated by a single power source engine.

It is well known in the art that the collection of solid waste such as trash and garbage require a tremendous amount of man-hours in all segments of trash collection areas. The costs of such collections are soaring and every effort is being exerted to control these rising costs. The present invention is concerned with a unique apparatus which will pneumatically collect the refuse or solid waste from refuse cans or disposable plastic containers, or other containing devices, positioned at a curb line, storage lot, or other collecting point, thus greatly reducing the man-hours required thereby effecting substantial savings in this field.

The present invention may be fully understood by reference to the drawings illustrating one adaptation of the same.

FIG. **1** is a view in elevation, while

FIG. **2** is a top view of the apparatus.

FIG. **3** illustrates another adaptation of the invention.

FIG. **4** illustrates an adaptation wherein the rear storage compartment comprises a removable unit while the mechanized section comprises a permanent fixed unit.

FIG. **5** shows in some detail conventional spring loaded guides which maintain receptacle stability while being unloaded.

Referring specifically to FIG. **1**, apparatus **10** is conventionally mounted on a truck chassis (not shown), motivated by a suitable power engine source (not shown). Apparatus **10** comprises in combination a pick-up conduit **1** which is adapted to rotate about swivel **2** in a horizontal plane, and about swivel **3** in a vertical plane. Pick-up conduit **1** comprises a horizontal member **4** which may be telescopic in construction and a vertical member **5** which is preferably telescopic in construction so as to be readily adjustable to efficiently pick up from receptacles of varying heights.

Horizontal member **4** comprises an inboard section **24** and an outboard section **25.** Section **25** telescopes within section **24** by connecting sealing means **26.** Outboard section **25** is moved by horizontal rod **27** which in turn is activated by suitable means from the control cab.

Vertical member **5** comprises a lower section **28** and an upper section **29.** Section **28** telescopes within section **29** by connecting sealing means **30.** Section **28** is moved by rod or cable **31** which in turn is activated by suitable means from the control cab. Rods **27** and **31** could be replaced by a portable control at or near the nozzle.

A desirable adaptation with respect to lower section **28** is to have spring loaded guides **32** (which exert a downward thrust) seat over the upper edge of trash can **33** to prevent its being sucked upwardly. As the lower end of lower section **28** moves downwardly in receptacle **33** sucking up the trash these guides will move in guide channels along the outer surface of section **28.** Thus, the can or receptacle is held firmly as the lower end of **28** moves downwardly in the can removing the trash.

Apparatus **10** comprises a fan or blower **6** driven by shaft **7** which is driven from a conventional power pack, not shown, which in turn is driven by the power source engine. Fan **6** produces a sufficient vacuum through conduit **1** so as to pneumatically move solid waste from curb containers. through conduit **1** into perforated upper chamber **8.** The conveying air passes through perforations **9** and is removed from the apparatus **10** through filters **11** and **12** (FIG. **2**).

The solid waste may be continually allowed to pass into lower chamber **14** or at periodic intervals by suitable gate control means when the compactor **15** is in position (a). The compactor **15** is activated from position (a) to (b) by means of compactor rod **16** which is driven from the power pack.

Thus, compactor **15** forces and compacts the solid waste in waste storage area **20** for transportation to a suitable disposal area. At the disposal area the solid waste is ejected from storage area **20** by means of ram **22** actuated by piston element **17** which rotates about axis **23.** A preferred adaptation is a structure or mechanism **22** which will move to rear door **21** thereby completely ejecting all trash.

FIG. **2** is a top view of the apparatus shown in FIG. **1** with identical numbers designating identical elements. Filters **11** and **12** are clearly shown.

Referring specifically to FIG. **3**, the solid waste is introduced into waste storage area **41** through conduit **42** by means of blower or fan **43** powered by shaft **44** in a manner as described heretofore. The air passes through perforations **40** in screen **34** and is ejected into the atmosphere or through a filter medium. Plunger **36,** activated by shaft **37** serves to compact the solid waste when it is being loaded by having rear gate **38** securely closed when **36** moves from position (a) to (b) or to any intermediate point. Plunger **36** functions also to unload the solid waste at the disposal area by opening rear gate **38.**

A very desirable apparatus comprises in combination the apparatus described and the use of cans or receptacles having spring loaded hinged lids or tops. Thus the initial vacuum contact will open the lid against the force of the spring or equivalent loaded guides **32** which are to be positioned on the upper side of the can. This permits the insertion of tube section **28** into the can for the removal of the trash or solid waste as described above. Generally the vacuum pressure to open the lid would be about 1/10 to ¼ of the vacuum pressure necessary to remove the trash. The full vacuum pressure of about 30 to 50, inches such as about 40 inch water gauge is attained after the lid is opened. Upon removal of the lower section **28,** the lid under the thrust of the spring, or suitable center balanced lid would automatically close thus greatly increasing the sanitary conditions as compared to open empty trash cans.

Referring specifically to FIG. 4, a modification of the apparatus shown in FIG. 1 is illustrated. The rear compartment **20** (Section C) comprises a removable unit. The mechanical section B comprises a fixed permanent section on the automotive unit. A drop door **50** functions to close off opening A when Section C is removed by a suitable crane or equivalent mechanical means from Section B. An empty second section C' is then mounted for use, while the full section C is transported to the disposal area. This adaptation permits maximum usage of the expensive mechanical equipment thereby securing great economical advantages.

FIG. **5** shows the employment of conventional spring loaded guides in combination with the lower section **28** and the trash can **33** in order to secure rigid can stability while the can is being unloaded. Referring to FIG. **5,** guides **32** of substantial L-shape configuration seat over the upper edge of can **33.** These guides have heads **50** which are vertically movably fixed within guide channels or housings **52.** These housings or guide channels **52** are rigidly affixed to lower section **28** and have slots in their outer faces to permit the housings or guide channels to move downwardly above the horizontal sections of the guides holding the can, when lower section **28** is lowered. Springs **51** within housings **52** are compressed as **28** moves downwardly and thus an increasingly greater downward thrust is exerted on can **33** as **28** moves downwardly which is very desirable.

Thus, the present invention is concerned with a pneumatic pick-up apparatus which comprises in combination a conveying truck, a compactor element, and unloading element, all activated from a single power source. The pick-up conduit is readily adjustable as to position at any point both as to height and location. The invention will secure a dramatic decrease in man-hours required to collect any fixed amount of solid waste thereby decreasing costs of collection, and in addition will be more sanitary.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. Pneumatic pickup apparatus for collecting solid waste and trash which comprises in combination a motor driven vehicle, a body mounted on said vehicle, a pneumatic conveying conduit extending from the top of said body to solid waste positioned outside said body, a fan positioned within said body adapted to exert a vacuum pressure to move said waste to within said body through said conduit, and compaction means within said body to compact said waste, wherein said waste is positioned within a receptacle, wherein said conduit comprises a telescopic horizontal member and a telescopic vertical member, and wherein movable pressure loaded guides are attached to said vertical member by means of guide channels rigidly affixed along the outer surface of said vertical member, said guides adapted to seat rigidly over the top of said receptacle as the lower end of said vertical member moves downwardly into said receptacle.

2. Pneumatic solid waste pickup apparatus for collecting solid waste which comprises in combination a motor driven vehicle, a body mounted on said vehicle and having a forward compartment and a rear compartment, a pneumatic conveying conduit extending from the top of said forward compartment to waste positioned outside said body, and a fan positioned in said forward compartment adapted to exert a vacuum to move said waste inside said forward compartment through said conduit, wherein said waste is positioned within a receptacle, wherein said conduit comprises a telescopic horizontal member, and a telescopic vertical member, and wherein movable spring loaded guides are attached to said vertical member by means of guide channels rigidly affixed along the outer surface of said vertical member, said guides being adapted to seat rigidly over the top of said receptacle as the lower end of said vertical member moves downwardly into said receptacle.

3. Pneumatic solid waste pickup apparatus for collecting solid waste which comprises in combination a motor driven vehicle, a motor mounted on said vehicle and having a forward compartment and a rear compartment, a pneumatic conveying conduit extending from the top of said forward compartment to waste positioned outside said body, and a fan positioned in said forward compartment adapted to exert a vacuum pressure to move said waste inside said forward compartment through said conduit wherein said forward compartment comprises a perforated upper chamber in communication with said conveying conduit adapted to separate the conveying air from the solid waste, and a lower chamber into which the solid waste passes, and a compactor ram which moves horizontally through said lower chamber and forces said solid waste into said rear compartment, and wherein said waste is positioned within a receptacle, wherein said conduit comprises a telescopic horizontal member and a telescopic vertical member, and movable spring loaded guides attached to said vertical member by means of guide channels rigidly affixed along the outer surface of said vertical member, which guides seat rigidly over the top of said receptacle as the lower end of said vertical member moves downwardly into said receptacle.

4. Apparatus as defined by claim **1** wherein said pressure loaded guides are spring loaded.

5. Apparatus as defined by claim **2** wherein openings exist in said compartments permitting passage of solid waste from said forward compartment to said rear compartment.

6. Apparatus as defined by claim **5** wherein doors are provided in the respective compartments to close said openings.

7. Apparatus as defined by claim **6** wherein said rear compartment is characterized by being detachable from said apparatus.

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