United States Patent

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[54] PLANT FOR COLLECTING RUBBISH FROM RUBBISH CHUTES INTO OPEN CONTAINERS

5 Claims, 5 Drawing Figs.

[52] U.S. Cl. **141/80,** 141/255, 141/283, 53/124, 100/45, 100/49, 100/215, 100/223

[51] Int. Cl. **B65b 1/24,** B65b 3/10

[50] **Field of Search** ..... 141/71, 73, 80, 283, 255; 53/Inquired; 100/Inquired, 124(D) Inquired, 49, 215, 223, 45, 98, 189; 198/Inquired; 222/Inquired

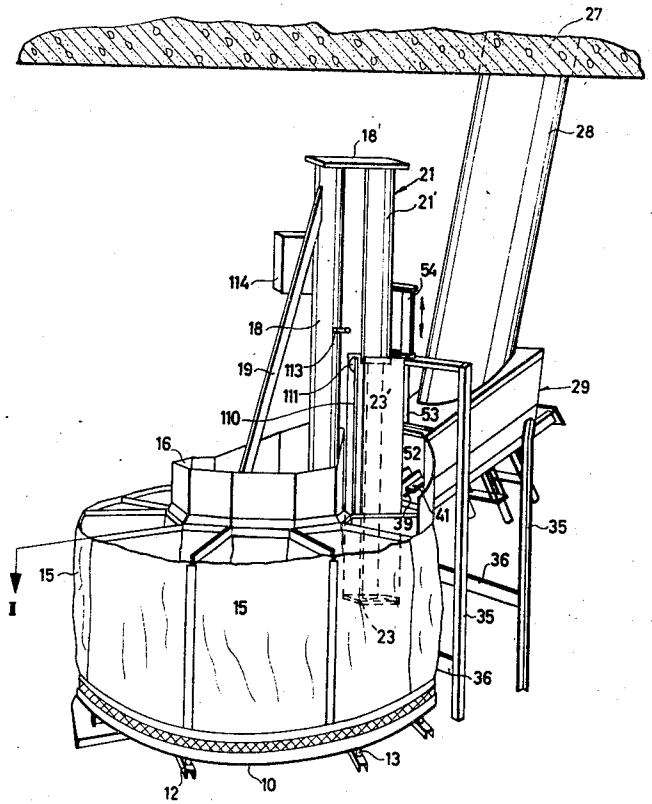
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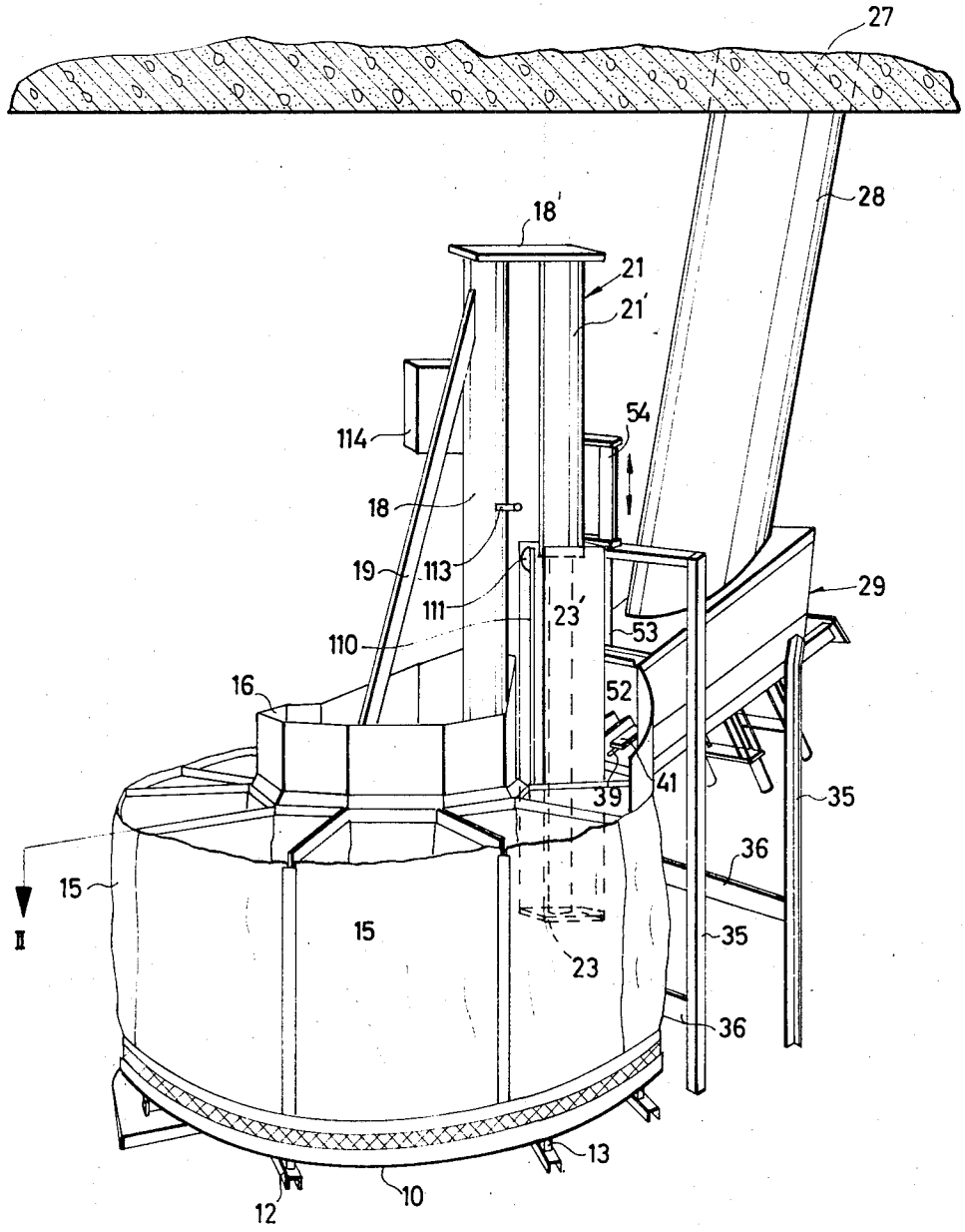
Primary Examiner—Houston S. Bell, Jr.
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ABSTRACT: An apparatus collects garbage and other refuse from a chute through a tube which drops the garbage into one of a number of receptacles arranged in a circle upon a platform which rotates stepwise, preferably automatically. A device compressing the garbage in a receptacle is located above the receptacles and is actuated by a sensing member.



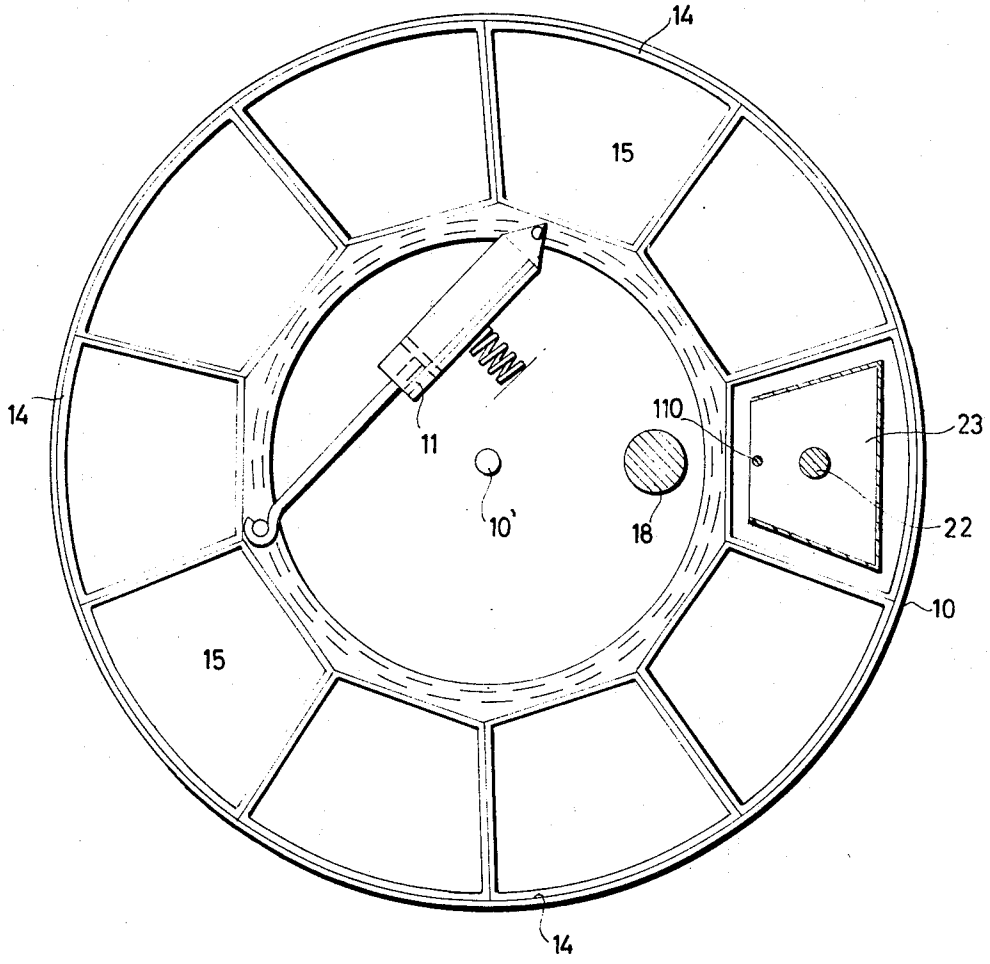
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Fig. 1



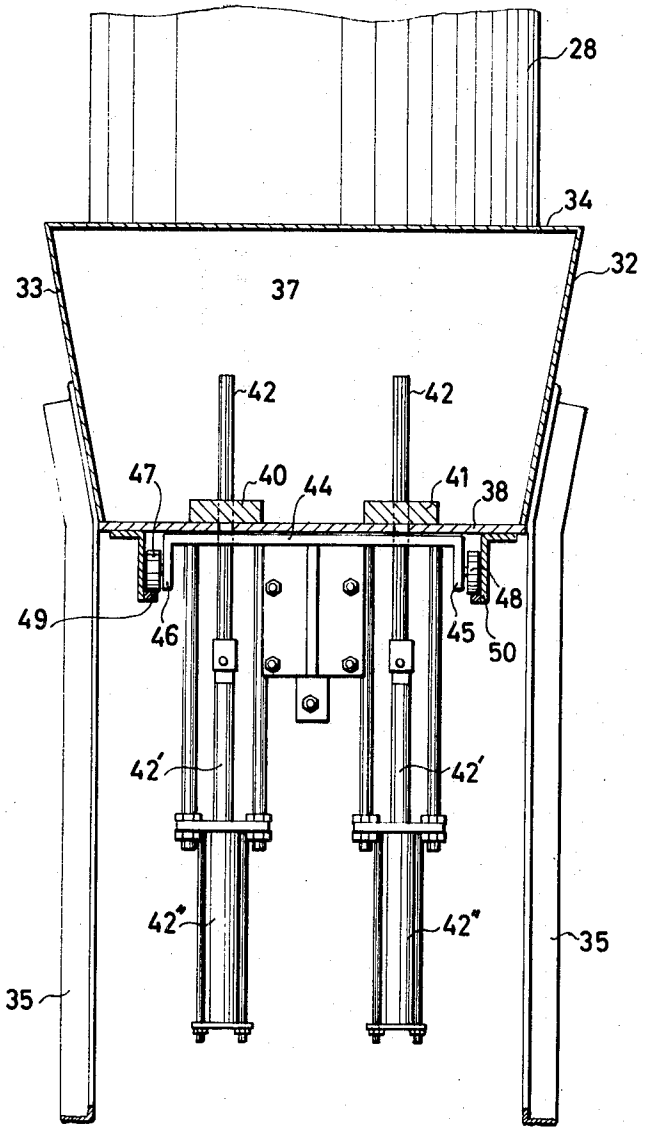
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Fig. 2



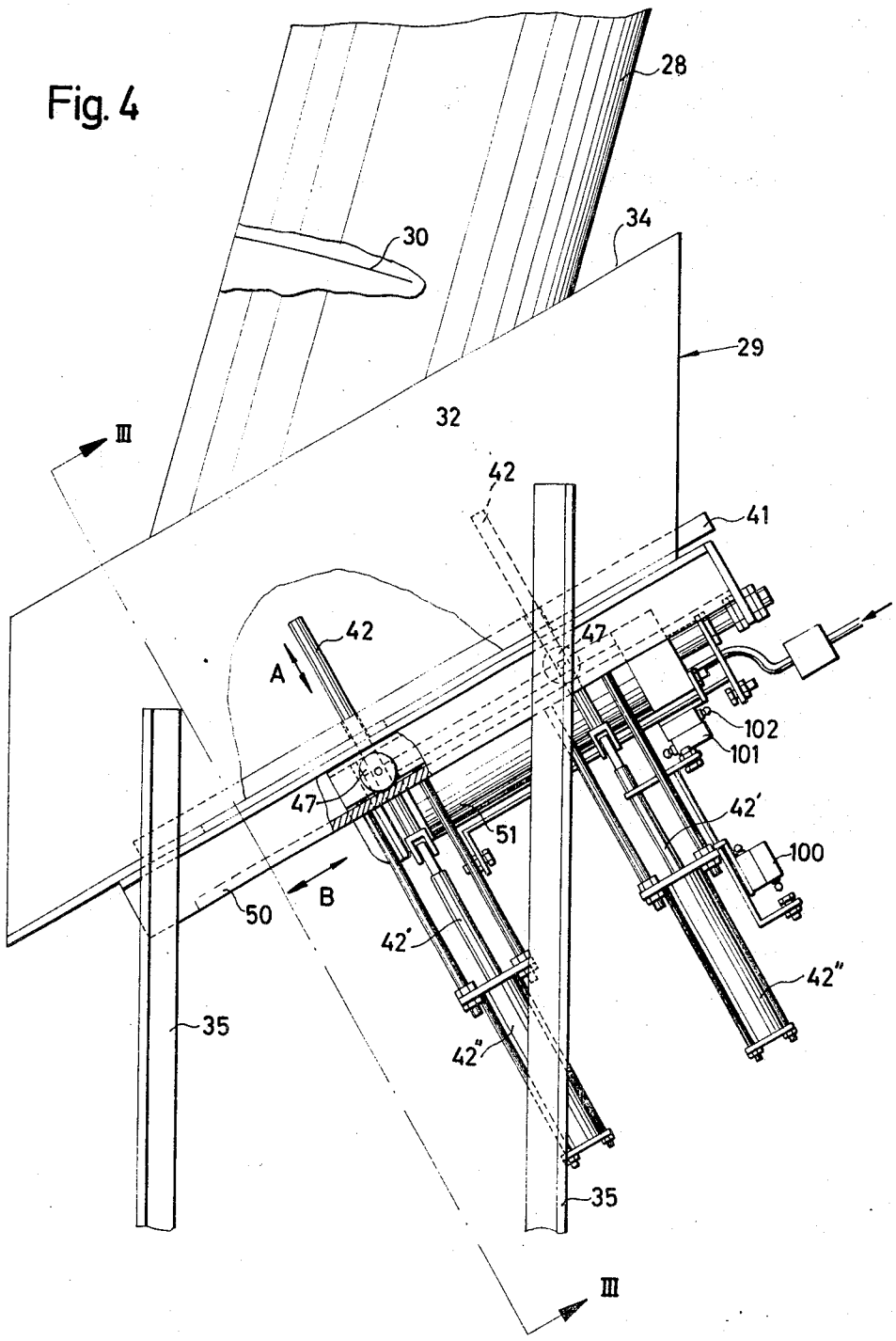
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Fig. 3



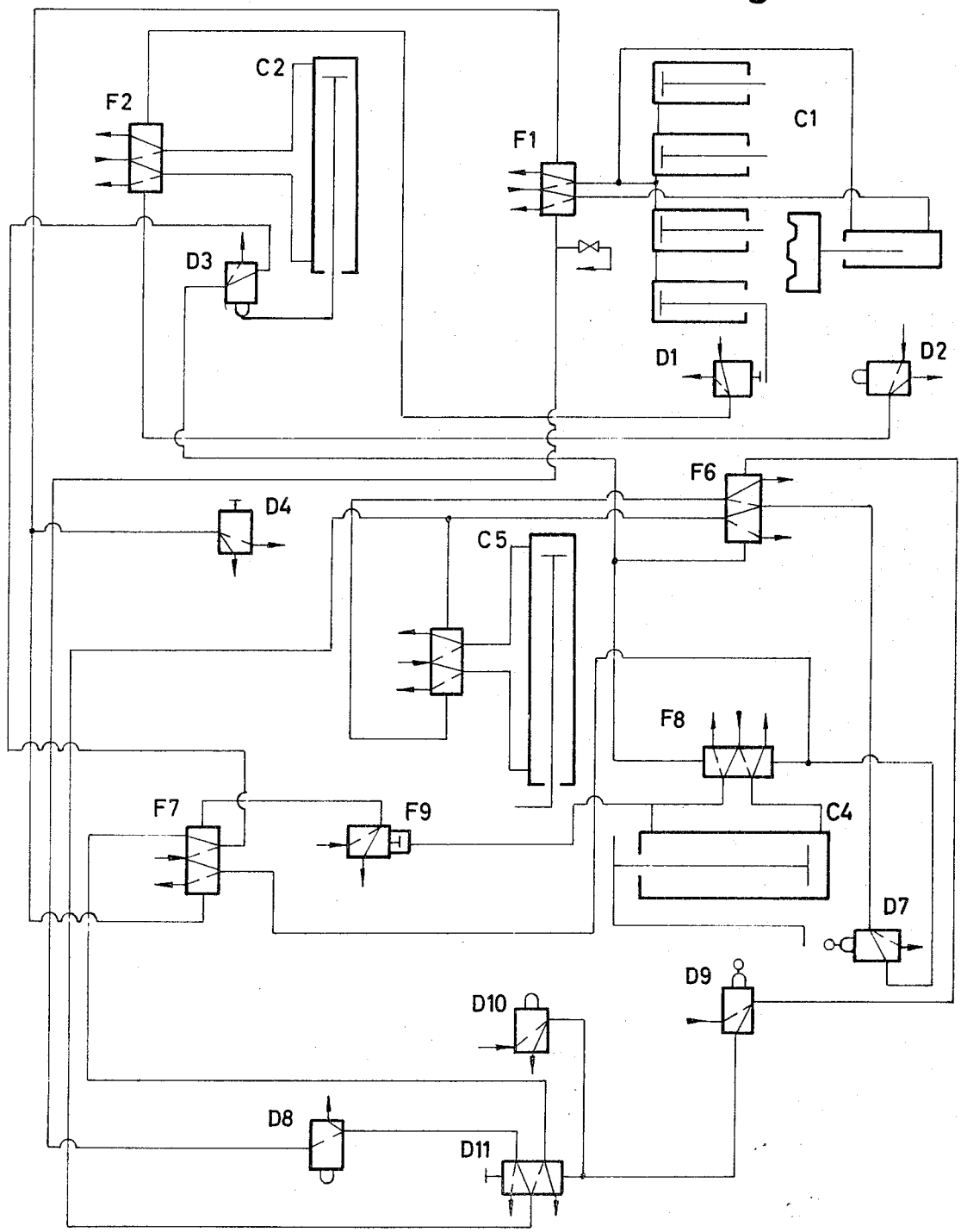
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Fig. 4



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Fig. 5



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PLANT FOR COLLECTING RUBBISH FROM RUBBISH CHUTES INTO OPEN CONTAINERS

The present invention refers to an apparatus for collecting preferably garbage and other refuse from a chute arranged above the same.

To this end the invention has for its object to improve such an apparatus.

Furthermore, the invention has for its object, by means of an auxiliary attachment to increase the capacity of the apparatus and allow its installation in any premises or locality adapted for this purpose.

Still another object of the invention is to create an improved apparatus, which automatically receives garbage and other refuse and compresses the same in a special receptacle, the apparatus when equipped with the auxiliary attachment being able to receive a large quantity of garbage and store the same in a special chute, and continually and automatically feed the garbage from the said chute to the vessels arranged for the same, where the garbage is treated until the chute is empty. When provided with the said attachment the apparatus will, as a unit, have essentially greater capacity, thus making the apparatus well suited to be installed in very high buildings with a substantial quantity of garbage.

With the foregoing and other objects in view, reference is now made to the following specification and accompanying drawings in which a preferred embodiment of the invention is illustrated.

In the drawings:

FIG. 1 is a general view of the apparatus according to the invention.

FIG. 2 shows the rotatable platform seen from the top and illustrates an example of the means for the stepwise turning of the platform.

FIG. 3 is a front elevation of the feeding arrangement of the apparatus.

FIG. 4 is a side elevation of the same feeding arrangement.

FIG. 5 is a circuit diagram, in case the power energy is an air compressor.

In the embodiment here shown as an example of the apparatus according to the invention the power source is assumed to be an air compressor (not shown) of a kind known per se. In case some other means such as an electric motor should be used, it is evident that the means for actuating the apparatus may be varied.

In the embodiment chosen the apparatus according to the invention comprises a platform **10** rotatable about its center **10'** by means of a pneumatic driving device, generally designated **11**. The platform **10** is carried by a number of U-beams **12** provided with setscrews **13** for the adjustment of the platform **10** to uneven ground conditions. The top of the platform **10** carries a number of pockets **14** in which are removably disposed paper or plastic bags **15** serving as receptacles for the garbage, or any other suitable means for the purpose. The bags **15** and the pockets **14** have in cross section the shape of a truncated cone. On the inside of the receptacles **15** and extending above the same there is arranged an annular reject plate **16** extending vertically and serving to prevent garbage from gathering in the annular space **17**. A box for the operating means, such as air valves, is designated **114**.

From the annular space **17** rises vertically a column **18** and a brace **19**. In the column **18** is anchored a horizontal beam **18'** supporting a compression device, generally designated **21**. The compression device is disposed right above a vessel **15** and is in the embodiment illustrated a pneumatic one way cylinder, the cylinder jacket **21'** of which is attached to the lower face of the beam **18'**. The piston rod **22** of the cylinder is at its lower end provided with a relatively thick horizontal disc **23** serving as a press head. As will be seen in FIG. **2** the disc **23** has a shape substantially corresponding to the shape of the bags **15** although of a smaller size. A housing **23'** surrounds the cylinder **21'** at least on three sides and is at its lower edge attached to the press disc **23**.

The compression device **21** as described above may be stationary or displaceably arranged in the horizontal direction

and acts with a vertically directed force whose size and length of stroke is determined by the dimensions of the pneumatic cylinder and operates by means of the press head **23** to compress the contents of the vessel below the head, as will be described hereinafter. By what has been said hereinbefore, it should be evident that the housing **23'** cooperates in the compression cycle and prevents garbage from getting attached to the top face of the disc **23** during the return movement of the piston.

In order automatically to sense the contents of the receptacle whose contents are subjected to the above described compression by means of the compression device **21**, the latter may be provided with a rod **110** arranged movably outside the press cylinder. The upper end of the rod **110** is provided with a cam **111** to actuate a sensing member **113** adjustable vertically on the column **78**. In case the cam **111** should not actuate the sensing member **113** during the compressive phase, this indicates that the vessel **15** contains the proper quantity of garbage. When under these circumstances the compression device **21** has returned from its active position to its end position, the driving device **11** automatically feeds a new receptacle into its proper place. By adjusting the position of the sensing member **113** any desirable filling amount of the receptacle **15** may be set in advance.

The apparatus according to the invention is placed in a special locality wherein the garbage falls down from a chute **27** above the room. To the orifice of the chute is connected one end of a tube **28** having any suitable cross section. The tube **28** serves to lead the garbage to a feed device operationally connect to the apparatus but disposed outside the periphery of the platform **10** and generally designated **29**. The tube **28** is inclining and provided with a sensing member **30** in the shape of a rocker bracket. The other end of the tube **28** is connected to the feed device **29** of a boxlike cross section with diverging side walls **32, 33**. The top **34** is provided with a bore corresponding to the shape of the tube **28**. The boxlike feed device **29** is supported by poles **35** and cross struts **36** and its rear portion is positioned higher than its front portion having an outlet port **37** (FIG. **3**).

The feeding device **29** comprises means for conveying garbage falling down through the chute **27** and the tube **28** to a receptacle **15**. In the embodiment shown the feed device **29** is at its bottom portion **38** provided with two longitudinal grooves at **39** as shown in FIG. **1**. Two longitudinal flat irons **40, 41** are arranged at the inside of the bottom portion **38**. Each flat iron **40, 41** is perforated, the corresponding number of pegs **42** being inserted in the holes. The pegs **42** are in the embodiment illustrated the prolongations of piston rods **42'** of pneumatic cylinders **42''**; this arrangement permits an upward movement of the pegs **42** from an end position in the same plane as the flat irons **40, 41**, with the cylinders **42''** as a power source, to a second end position (FIGS. **3** and **4**) where they project to about half the height of the boxlike housing **32, 33, 34, 38**. The arrow A in FIG. **4** shows the function of the pegs. FIG. **4** also shows valves **100, 101** and **102** of a type known per se and combined with the power sources **42'** and **42''**. The said valves will not be described herein in detail either to their construction or their function, which latter is clearly seen by FIG. **5** and understood by the description relating to the same.

The feed device **29** is completed by a device by means of which the flat irons **40, 41** and the pegs **42** connected to the same can be brought to carry out a displacement in the direction of the outlet port **37**. In accordance with a practical embodiment the said device is a member or carriage **44** of U-shaped cross section, at the downwardly extending legs **45, 46** of which are mounted rotating rollers **47, 48**. The rollers **47, 48** are movable along surface **49, 50**. The pegs **42** also penetrate the carriage **44** and this implies that by adding a power source, for example a pneumatic cylinder **51**, a displacing movement is imparted to the pegs **42** as well as to the flat irons **40, 41** towards the outlet port **37**. The feed device **40, 41** performs an intermittent movement being displaced from a

first end position to a second end position and back again to its initial end position. In this movement the pegs **42** cooperate in the manner described. The arrows **B** symbolize the said feeding movements. The feed device **29** is arranged in such a manner that its outlet port **37** lies slightly above the receptacle **15** and preferably the compression device **21** should have an inactive position above the same receptacle although there may be certain advantages in having a press head oscillating in the horizontal plane.

The outlet port **37** of the feed device **29** is combined with a lid **52**. The lid **52** is provided with means for bringing about an automatic shutting of the outlet port **37**. In the embodiment shown the upper edge of the lid **52** is connected to the piston rod **53** of a pneumatic cylinder **54**, which will thus act as a power source of the lid **52** being normally closed

The apparatus works in the following manner:

Garbage let down through the chute **27** acts on the sensing member **30** in the tube **28**, and then falls down onto the bottom portion **32** of the boxlike feed device **29**. The operation of the sensing member **31** actuates the members **42'** and **42''** and pushes the pegs **42** upwards to the position shown in FIGS. **3** and **4**. After the pegs have reached the said extreme position the member **51** is actuated to bring about the feeding movement of the flat irons **40, 41** towards the receptacle **15**, the closed lid **52** being simultaneously opened by the power source **53, 54**. Then garbage present in the feed device is entrained and, owing to the combination of the feeding movement just described and the inclining position of the device **29**, it falls into the receptacle **15** positioned slightly spaced under the outlet **37**. The feeding movement of the member **51** as described will in its second end position, which is the active end position, act on the power sources **42', 42''** bringing back the pegs **42** into their inactive position. With the pegs **42** in their inactive position, the lid **52** will return to its normal position, *i.e.* shutting the outlet port **37**. By providing the lower edge or the lid **52** with teeth or the like garbage which may have gathered between the lid and the bottom portion **38** may readily be cut off, alternately the press disc **23** may at its side facing the outlet **37** be provided with teeth or the like. When the lid **52** has reached its shutting position, this will initiate the compression cycle of the garbage in receptacle **15** by operating the compression device **21**. Provided the receptacle is not filled, *i.e.* the press head **23** can penetrate a certain minimum distance into the receptacle **15**, the compression device will return to its position of rest after the job has been done. The apparatus is then ready to receive and treat new garbage and other refuse in the manner described hereinbefore.

The accompanying circuit diagram shows the operation of the apparatus described, when the central power source is an air compressor and elucidates the process described hereinbefore.

The valve **D8** is combined with the sensing member **30**, and when the latter is actuated by the garbage falling down through the chute **27** the valve **F1** is actuated bringing the cylinders **C1** of the pegs **42** to move from their inactive end position to their active position. With the pegs **42** in their active position the valve **D2** actuated, which via the cylinder **C2** constituting the power source of the lid **52** brings about the opening of the lid **52**. When the lid has reached its fully open position, the valve **F2** is actuated resulting in the flat irons **40, 41** with the help of the power source being displaced towards the outlet port **37**. With the power source, the cylinder **C2**, in its active end position, the valve **D4** is actuated, which by means of the valve **F1** brings the pegs **42** to return to their inactive position, while the lid **52** will simultaneously via the cylinder **C2** be brought into its closing position. When the pegs **42** have reached their inactive position, the valve **D1** is actuated which via the valve **F2** brings the cylinder **C2** to restore the flat irons **40, 41** to their inactive position. With the cylinder **C2** of the flat irons in the said end position the valve **D3** is activated, which via the valve **F8** imparts a working movement downwards to the press cylinder **C4**. The return movement of press cylinder **C4** is taken care of by the valve **F9**. FIG. **5** also shows valves **F6, F7, F8, F9, D9, D10** and **D11** as well as the cylinder **C5**, which all are provided to operate when the exchange of a filled vessel **15** for an empty one takes place as described hereinbefore. The valve **D7** has a closing function, which in this connection means that the starting impulse **D8** cannot be initiated during the current operational cycle.

By the above it will be seen that the tube **28** as well as the chute **27** above the same may serve as a silo for the garbage, each operation of the sensing member **30** triggering a new operational cycle of the apparatus.

The valve **D11** in FIG. **5** is provided to be actuated from the outside by service staff for starting the operational cycle just described.

I claim:

1. An apparatus for collecting garbage, comprising a chute, a feeding device, a tube extending between said chute and said feeding device for transmitting garbage from said chute to said feeding device, a rotary platform comprising a plurality of pockets, said feeding device being inclined toward said pockets and comprising movable means transferring garbage to said pockets, a sensing member located in said tube, means connected with said sensing member and the first-mentioned means for actuating the first-mentioned means, a compression device movable vertically in and out of any one of said pockets to compress garbage fed into that pocket, means actuating said compression device, means connected with the last-mentioned means and sensing the amount of garbage filling a pocket and means turning stepwise said platform to bring said pockets consecutively into operative position relatively to said filling device and said compression device.

2. An apparatus in accordance with claim **1**, wherein said tube is inclined and has an outlet adapted to be located above any one of said pockets.

3. An apparatus in accordance with claim **1**, wherein the movable means of the feeding device comprise a plurality of gripping pegs and means connected with said pegs and moving them from a lower position to an upper position and vice versa and along said feeding device toward and away from said pockets.

4. An apparatus in accordance with claim **3**, wherein said feeding device further comprises a lid located adjacent said pockets and connected with the last-mentioned means, the last-mentioned means closing said lid when said pegs are in the lower position, the lower edge of the lid when closed cutting off the garbage.

5. An apparatus in accordance with claim **1**, comprising an air compressor operatively connected with means actuating the garbage transferring means and with means rotating said platform.