

May 13, 1958

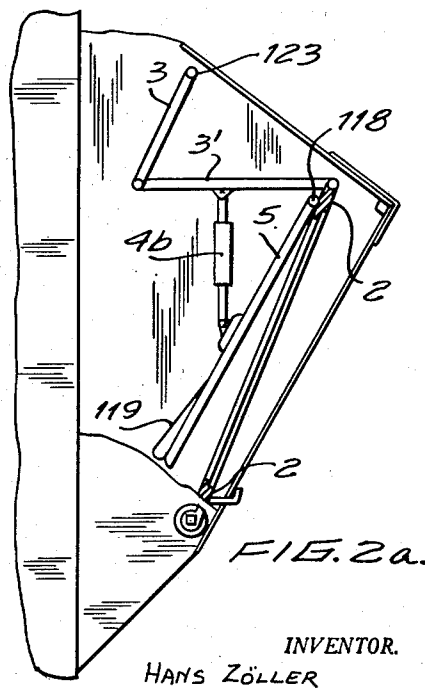
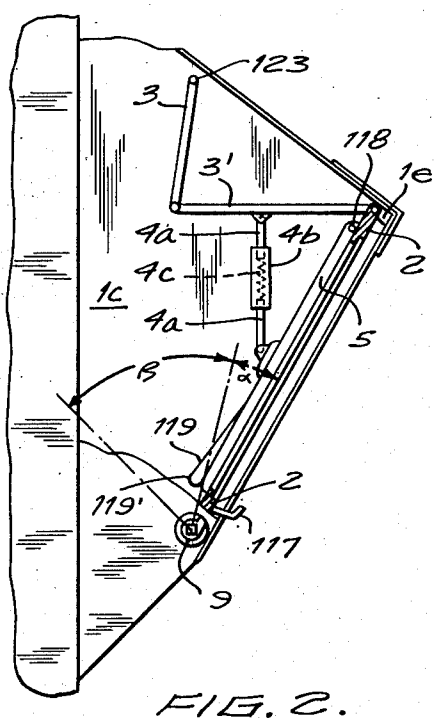
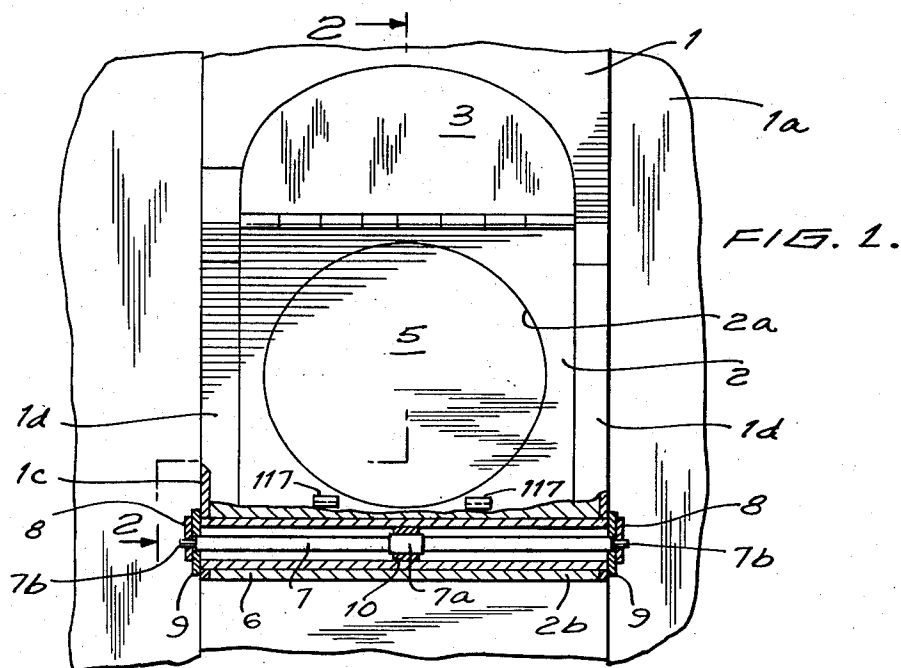
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2,834,490

WASTE DISPOSAL APPARATUS

Filed Oct. 29, 1954

4 Sheets-Sheet 1



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WASTE DISPOSAL APPARATUS

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4 Sheets-Sheet 2

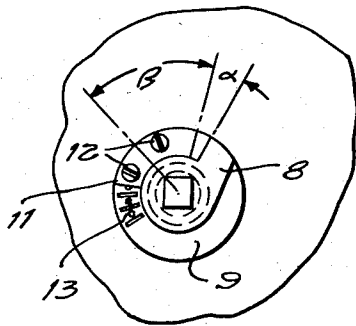


FIG. 3.

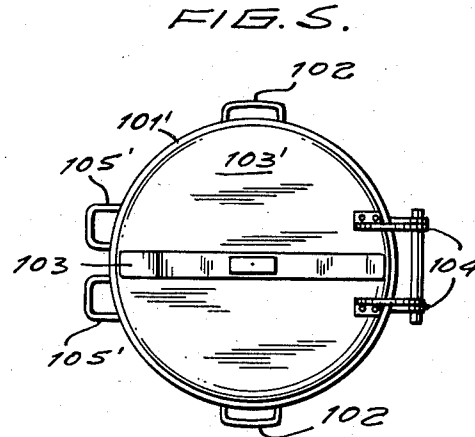


FIG. 5.

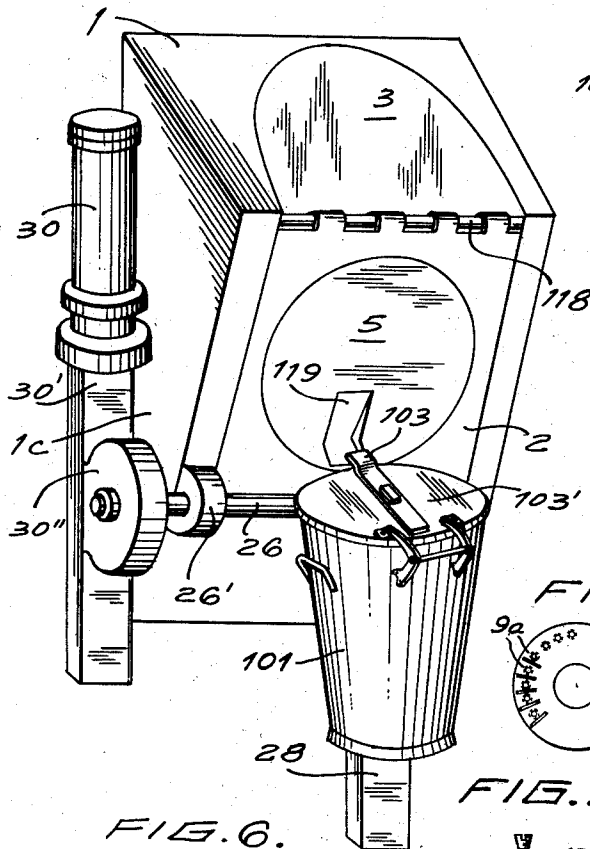


FIG. 6.

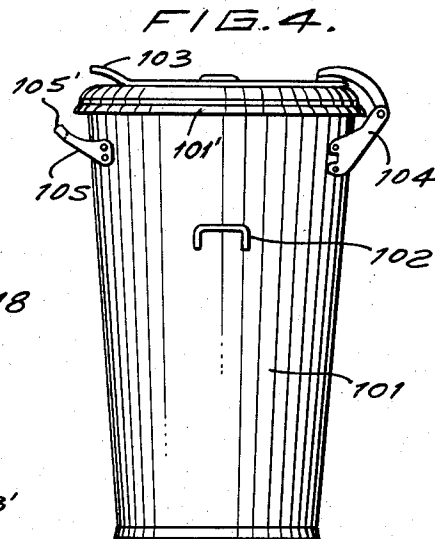


FIG. 4.

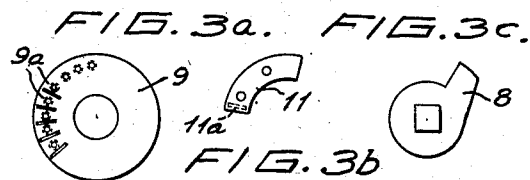


FIG. 3d



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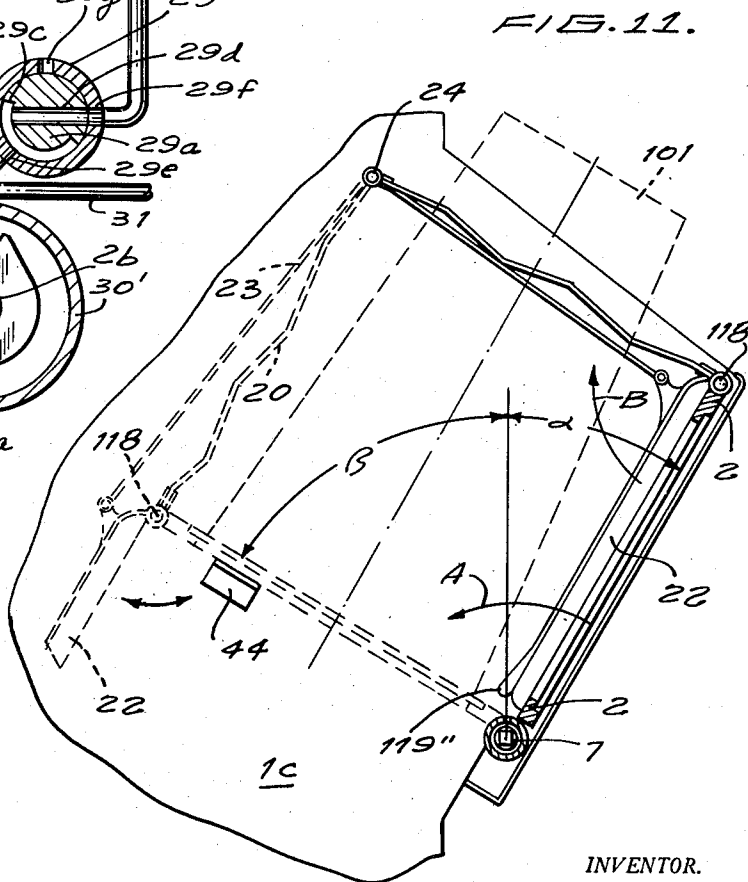
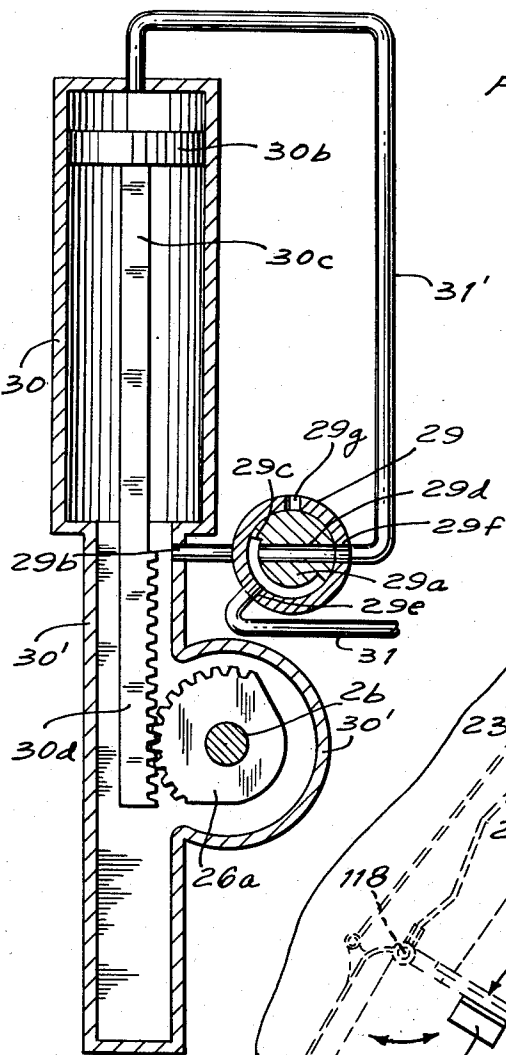
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WASTE DISPOSAL APPARATUS

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4 Sheets-Sheet 3



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WASTE DISPOSAL APPARATUS

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Application October 29, 1954, Serial No. 465,698

Claims priority, application Germany October 29, 1953

16 Claims. (Cl. 214—303)

The present invention relates to a waste disposal apparatus and more particularly to apparatus mounted on a waste disposal truck or located in a waste disposal plant for receiving waste matter from a waste container.

Up to the present time waste disposal apparatus of the above type has had several disadvantages. Thus, the known apparatus is extremely complicated and noisy in operation and is quite bulky. Also, the known apparatus includes members which can cause injury both to the waste apparatus and to the operators thereof if the operators are not careful to operate the apparatus in the proper manner.

One of the objects of the present invention is to overcome the above drawbacks by providing an extremely simple waste disposal apparatus which has the parts thereof located in a minimum of space and out of the way of the waste matter so that the parts of the apparatus cannot become dirty.

Another object of the present invention is to provide a waste disposal apparatus with an exceedingly efficient and simple means for automatically returning the apparatus to its rest position after parts of the apparatus have been moved from their rest position.

A further object of the present invention is to provide a waste disposal apparatus which may optionally be operated either manually or by a power device.

An additional object of the present invention is to provide a waste disposal apparatus with a safety means which prevents power operation of the apparatus until the parts thereof are properly set for power operation.

Also, it is an object of the present invention to provide a waste disposal apparatus with an exceedingly simple means for receiving a waste container and emptying the contents of the same without locking the waste container to the apparatus.

With the above objects in view the present invention mainly consists of a waste disposal apparatus which includes a support means having a pair of substantially parallel mutually spaced side walls. A front plate, through which waste matter enters the apparatus, is formed with a bore passing transversely through the front plate from one side edge thereof to an opposite side edge thereof, and this front plate is located between the side walls of the support means with the side edges of the front plate respectively located next to the side walls, this front plate being carried by the side walls of the support means for turning movement about the axis of this bore. A torsion spring is located in the bore and is connected to the support means and to the front plate for urging the latter to a rest position on the support means. Means are provided to release the connection of the torsion spring from the support means when desired, and a shaft is turnably carried by the side walls beneath the front plate and has an elongated arm fixed thereto and extending therefrom for engaging and turning a container of waste into engagement with the front plate when the shaft is turned. A power means is connected to this shaft for turning the same, and a safety

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means is provided to prevent operation of the power means whenever the torsion spring is disconnected from the support means.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantage thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawings, in which:

Fig. 1 is a fragmentary, partly sectional, elevational view of the rear of a waste disposal truck having the apparatus of the invention mounted thereon;

Fig. 2 is a fragmentary, sectional view taken along the line 2—2 of Fig. 1 in the direction of the arrows;

Fig. 2a shows the structure of Fig. 2 in a different position thereof;

Fig. 3 is a fragmentary view on an enlarged scale of a stop means mounted on the left side wall of the apparatus of Fig. 1 for preventing turning of a torsion spring of the present invention;

Figs. 3a—3d are respectively front views of the components from which the stop means shown in Fig. 3 are formed;

Fig. 4 is a side elevational view of a waste container adapted to be used with the apparatus of the invention;

Fig. 5 is a top plan view of the waste container of Fig. 4;

Fig. 6 is a fragmentary, isometric view of the apparatus of the invention shown in association with a waste container, the structure of Fig. 6 being somewhat different from that of Figs. 1 and 2;

Fig. 7 is an elevational view of a power operated waste disposal apparatus constructed in accordance with the present invention, Fig. 7 being partly in section to clearly illustrate the elements of the structure;

Fig. 8 is a partly sectional and partly diagrammatic fragmentary, side elevational view of the details of the power means of the invention;

Fig. 9 is a fragmentary, diagrammatic, partly sectional view of a different embodiment of a valve means of Fig. 7;

Fig. 10 is a fragmentary, diagrammatic illustration of a third embodiment of this valve means; and

Fig. 11 is a sectional, side elevational fragmentary and partly diagrammatic view of a different embodiment of a waste disposal apparatus constructed in accordance with the present invention.

Referring now to the drawings, Fig. 1 shows a support means 1 of the waste disposal apparatus of the invention mounted on the rear 1a of a motor truck or the like, this rear portion 1a of the motor truck being in the form of a container for waste matter with which the apparatus of the invention communicates. The support means 1 includes a top wall 1b extending across a pair of side walls 1c which are spaced from and parallel to each other. The rear wall of the part 1a of the truck is formed with a cutout which is surrounded by the support 1. The side walls 1c are provided at their front edges with flanges 1d extending toward each other and overlapping the outer side edges of a front plate 2 located between the side walls 1c of the support means 1. This front plate 2 has its side edges located closely adjacent to and in sliding engagement with the walls 1c, respectively.

The front plate 2 is provided with an opening 2a through which waste material enters into the part 1a of the truck, for example, in a manner described below. Furthermore, the plate 2 is formed adjacent its bottom edge with a transverse bore 2b extending through the plate 2 from one side edge thereof to the opposite side edge thereof, and a tube 6 is located within this bore 2b

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and is fixed to the plate 2. The opposite end portions of the tube 6 extend into openings in the side walls 1c, respectively, so that the tube 6 serves to support the plate 2 for turning movement about the axis of bore 2b and tube 6. Instead of being one elongated tube, this tube 6 may be made up of a plurality of tubular sections located in end to end relation in the bore 2b.

A torsion spring 7 extends through the tube 6 and outwardly beyond the walls 1c. At an intermediate portion the torsion spring 7 is provided with a non-circular portion 7a passing through and mating with an opening of a fixing member 10 which is fixed to the tube 6 so that the spring 7 cannot turn with respect to the fixing member 10 and the latter serves to fix the portion 7a of the spring 7 to the plate 2 for turning movement therewith. The free ends 7b of the torsion spring 7 are also non-circular and extend into mating openings of a pair of movable stop members 8, respectively, these movable stop members 8 being fixed to the ends 7b of the spring 7 in any suitable way. Thus, when the front plate 2 turns, the spring 7 and movable stop members 8 will tend to turn with the front plate 2. Between each movable stop member 8 and the side wall 1c adjacent the same is located an annular plate 9, and these plates 9 are respectively fixed to the side walls. Arcuate stationary stop members 11 (Fig. 3) are fixed by the screws 12 to the plates 9 and are located in the path of movement of the movable stop members 8, respectively as is clearly evident from Fig. 3. Thus, referring to Fig. 3 it will be seen that the plate 2 together with the spring 7 and movable stop members 8 can turn together through the angle alpha until the movable stop members 8 respectively engage the stationary stop members 11. Thereafter when the plate 2 is turned further through the angle beta the stop members 8 can turn no further while the portion 7a of the spring 7 is compelled to turn with the plate 2 so that while turning through the angle beta the torsion spring 7 is continually twisted to an increasing extent. This torsion spring 7 may simply be a solid bar of a resilient material.

The plate 9 may be provided with notches 13 (Fig. 3) into which a projection 11a at the end of the stationary stop member 11 may extend so that these notches 13 determine the location of the stationary stop member 11. Suitable threaded bores 9a are provided in ring 9 to receive the screws 12 in any position of the stop member 11, and the notches 13 together with the screws 12 provide a means for adjusting the location of the stationary stop member 11 so that in this way the size of the angle alpha through which the plate 2 turns before tensioning the spring 7 may be adjusted.

Referring to Fig. 2 it will be seen that the plate 2 in addition to being pivoted along its bottom edge to the side walls 1c, is hinged at its top edge to a first cover member 3' which is in turn hinged to a second cover member 3, the latter being pivotally connected at its top edge 123 to the side walls 1c. These plates 3 and 3' extend between and slidably engage the side walls 1c and serve the purpose of maintaining the space between the side walls 1c covered in all positions of the plate 2. A cover plate 5 is pivotally connected at 118 to the rear inner face of the plate 2 above the opening 2a thereof so that in the rest position of the parts shown in Fig. 2, where the plate 2 engages a pair of stops 1e, the plate 5 rests with its entire periphery against the plate 2 and completely closes the opening 2a thereof. A pair of elongated members 4a are pivotally connected to plate 3' and plate 5, respectively, and extend slidably into a tube 4b, the members 4a being interconnected within the tube 4b by a spring 4c.

Adjacent the bottom edge of opening 2a a pair of hooks 117 are fixed to the outer face of the plate 2. Fig. 4 shows a container 101 adapted to be used with the apparatus of the invention, and this container in addition to having a pair of handles 102 to be grasped by the operator when lifting the container 101 is provided with a pair of U-shaped members 105 having portions 105' to

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respectively engage the hook members 117. Thus, the operator merely lifts the container 101 to place the portions 105' on the hooks 117, and in this way the container 101 is suspended from the plate 2. A cover plate is hinged to the container 101 through any suitable hinge means 104, and a projection 103 is fixed to the top face of the cover plate at the part thereof adjacent the members 105.

Referring to Figs. 2, 2a and 6, it will be seen that the cover plate 5 is provided with a recessed pocket 119 covering an opening in the plate 5 and having a rounded bottom 119'. When the container 101 is supported with its members 105 on the hooks 117, the projection 103 is located opposite the recessed socket 119. The operator then turns the container 101 about the portions 105' thereof resting on the hooks 117 until the top of the container 101, in the form of a flange 101' extending outwardly beyond the cover 103', engages the plate 2. The opening 2a is sufficiently large to allow the cover 103' to turn freely on its hinge 104. In other words, when the container 101 engages the plate 2 the top portion of the opening 2a extends freely about the hinge 104 and the flange 101' does not engage the opening 2a about its entire periphery.

When the container 101 is thus turned upwardly into engagement with the plate 2, the projection 103 extends into the recessed pocket 119 of the plate 5. Continued turning of the container 101 then causes the plate 2 to turn in a counterclockwise direction, as viewed in Figs. 2 and 2a, about the axis of bore 6, and after turning through the angle alpha (Fig. 3) the torsion spring 7 will start to become twisted, as described above. As is apparent from a comparison of Figs. 2 and 2a the movement of the plate 2 together with the covers 3 and 3' causes the elements 4a-4c to turn the plate 5 about its pivotal connection 118 to the plate 2 away from the latter, and this movement continues until the plate 2 has arrived at an almost horizontal position with the cover members 3 and 3' located almost in a single plane and forming extensions of each other. The movement of the plate 5 away from the plate 2 causes the tubular portion 119 through its connection with the projection 103 to turn the cover 103' away from the container 101, and thus, the waste matter in the container simply falls into the truck. It will be noted that during this operation there is very little, if any, free space through which dust or the like can escape to the atmosphere.

Having thus emptied the container 101, the operator simply releases the latter and the spring 7 returns the parts to their rest position. The size of the angle alpha is so chosen that the spring 7 can return the parts to a position from which they will automatically return by inertia and gravity. In other words, it can be seen from Fig. 2 that in its rest position the plate 2 tends to turn in a clockwise direction due to its own weight. The spring 7 need only be tensioned sufficiently to return the plate 2 and the container 101 therewith to an almost vertical position, these parts then having sufficient inertia and being aided by gravity to return to their rest position.

It is pointed out that the torsion spring 7 need not be in the form of a bar. Thus, this torsion spring 7 may be made up of a plurality of plate springs which are assembled together to provide the equivalent of an elongated bar.

It will be noted that the above described structure is hand operated. It is also possible to provide a power means for operating the waste disposal apparatus of the invention, and such a power means is shown partly in Fig. 6 where the container 101 is shown suspended from the front plate 2. Thus, it will be noted from Fig. 6 that the side walls 1c are provided with bearings 26' which turnably carry a shaft 26, and this shaft 26 has an elongated rigid arm 28 fixed thereto so that when the container 101 is suspended from plate 2 it extends along the arm 28. A cylinder 30 is provided in its interior with a fluid oper-

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ated piston which is connected to a rack extending into a tubular extension 30' of cylinder 30 and the rack cooperates with a gear sector located in the housing portion 36' of extension 30' and fixed to the shaft 26. Thus, when fluid pressure is applied to the piston in cylinder 30 to move this piston down, the rack and gear sector will turn the shaft 26 so that the arm 28 will turn the container 101 about its portions 105' resting on hooks 117 into engagement with the plate 2 and will then continue to turn the latter in the manner described above. The details of this power means for operating the waste disposal apparatus are shown in Figs. 7 and 8.

Fig. 7 shows a support means 1 substantially identical with that described above and a front plate 2' substantially identical with the front plate 2 described above, the only difference being that the front plate 2' is provided with a handle 2c in the form of a substantially U-shaped member having its free ends fixed to the front face of the front plate 2', and that the means for turnably mounting the front plate as well as for accommodating the torsion spring therein is different. The front plate 2' of Fig. 7 is connected to cover plates 3 and 3' in the same way as the above described embodiment, and the aperture through the front plate 2' is controlled by a cover plate identical with cover plate 5 described above, this front plate 2' having hooks 117 fixed thereto for supporting the container of Figs. 4 and 5 thereon.

Referring to Fig. 7 it will be seen that the left side wall 1c of the support means 1 has a pivot pin 16 fixed thereto and extending into the space between the side walls 1c. The right side wall 1c is formed with an opening through which a bearing member 17 passes, this bearing member 17 being freely turnable on the right side wall 1c of Fig. 7, and elements 16 and 17 are coaxial with each other. The front plate 2' at its lower left corner portion 14, as viewed in Fig. 7, is formed with a bore into which the pivot pin 16 slidably extends, and at its lower right corner portion 15 of Fig. 7 the front plate 2' is also formed with a bore into which the bearing 17 extends. The front plate 2' is thus freely turnable with respect to the pivot pin 16 and bearing 17. A tubular member 21 is fixed to the front plate 2' at the bottom edge thereof and extends between the portions 14 and 15 of front plate 2' so that the tubular member 21 provides the front plate 2' with a third bore portion communicating on the one hand with the bore portion formed in the corner portion 14 of the front plate 2' and on the other hand with the bore formed in the corner portion 15 of the front plate 2'. A torsion spring 7' extends along the interior of the tubular member 21, has a non-circular end portion 125 fixed to the corner portion 14 of the front plate 2', and the opposite end portion of the torsion spring 7' extends into the bearing 17 and a non-circular end 121 of the spring 7' is fixed to the bearing member 17.

This bearing member 17 is formed at its outer right hand end face, as viewed in Fig. 7, with an elongated groove into which a lock member 18 extends. This lock member is in the form of a loop, as is evident from Fig. 7, and the left leg thereof extends into the elongated groove in the right end face of member 17, as viewed in Fig. 7. This lock member 18 is turnably carried by a pivot pin 42 extending through a bore in the top end portion of the lock member 18, as viewed in Fig. 7, and this pivot pin 42 is rigidly fixed to a supporting plate 42' which is fixed to and extends from the outer surface of the right wall 1c of Fig. 7. Thus, when the lock member 18 is in the position shown in Fig. 7 the right end of spring 7' is restrained against turning, and thus when the plate 2' is moved inwardly into the support means 1 the spring 7' will become tensioned. However, it is possible to raise the lock member 18 out of the groove of bearing 17 by turning this lock member 18 in a counterclockwise direction, as shown by the arrow of Fig. 7, about the pivot pin 42. With the parts in this position the bearing 17 will turn together with the plate 2' and there will be no tensioning of the spring 7'.

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The spring 7' of Fig. 7 is much more powerful than the spring 7 of Fig. 1, and a power means is provided to operate the structure of Fig. 7. This power means, shown in Figs. 7 and 8, takes the form of the cylinder 30 fixed by the bracket 30a to the support means 1. As was described above in connection with Fig. 6, a tubular extension 30' extends downwardly from the cylinder 30 and a housing 30'' communicates with the extension 30'. The entire power means is designated with the numeral 27. The shaft 26 and bar 28 also described above in connection with Fig. 6 are shown in Fig. 7. Furthermore, Fig. 8 clearly illustrates the gear sector 26a which is fixed to the shaft 26 as well as the piston 30b slidable within the cylinder 30 and the elongated piston rod 30c which is fixed to the rack 30d which cooperates with the gear sector 26a.

Pressure for operating the piston 30b is derived from a source of compressed air 37a shown diagrammatically in Fig. 7, this source of compressed air being, for example, the same compressed air tank used for the air brakes of the motor truck which carries the structure of the invention. The tank 37a communicates through a conduit 37 with the housing 32 of a valve means. This housing 32 has a pair of flat gaskets or packing rings (sealing rings) 35 and 36 of plastics with a U-formed groove. These gaskets or sealing rings are located in groovings of the housing 32, whereby the outer leg sides of the U-formed rings are sealing the groovings of the housing 32. On the other hand the opposite or inner leg sides of the U-formed rings are sealing the valve member 34a. The conduit 37 communicates with that part of the housing 32 which is located between the sealing rings 35 and 36. A valve operating member 34a is slidably guided by the sealing ring 36 for movement toward and away from the lock member 18, and the top grooved ring 35 is formed with an opening through which the valve operating member 34 extends with clearance in the position of the parts shown in Fig. 7. A valve member 34a having the same size as the opening of the gasket or sealing ring 35 closes this opening by slidably passing through the opening of the sealing ring 35 when the valve operating member 34 is raised in a manner described below, whereby the inner leg side of the U-formed gasket or sealing ring 35 is sealing the valve member 34a. At its top end the valve operating member 34 includes a piston portion 34b, and a spring 33 within the housing 32 urges this piston 34b downwardly as viewed in Fig. 7.

The bottom free end portion 38 of the valve operating member 34 is provided with a bottom conical end which is shown in Fig. 7 located in a V-notch formed in a cam 39 which is fixed to the lock member 18 for turning movement therewith about the pivot pin 42. This cam 39 is provided with a second V-notch 39a for a purpose described below.

Thus, in the position of the parts shown in Fig. 7 the compressed air will flow through conduit 37 and through the ring 35 to the space in the valve housing 32 located above sealing ring 35. A conduit 31 communicates with this space so that the compressed air flows along this conduit 31. As is shown most clearly in Fig. 8, the conduit 31 communicates with a bore formed in a valve housing 29, and a valve member 29a is turnable within the cylindrical housing 29 which is fixed to the extension 30' by a bracket 29b. The valve member 29a is formed with an arcuate groove 29c which communicates with the conduit 31 as shown in Fig. 8, and a bore 29d communicates with the groove 29c and passes transversely through the valve member 29a. The housing 29, in addition to being formed with the bore 29e which communicates with conduit 31 is formed with a bore 29f communicating with a conduit 31' which leads to the top end of the cylinder 30. Furthermore, the housing 29 is formed with a bore 29g simply communicating with the outer atmosphere.

The valve member 29a is fixed at its left end, as viewed in Fig. 7, to a handle 41 accessible to the operator, and

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this handle 41 is formed with an extension 41' located over an elongated member 25 which is fixed to the shaft 26 for rotation therewith and which cooperates with extension 41' in a manner described below.

The above described structure of Figs. 7 and 8 operates as follows:

With the parts in the position shown in Fig. 7, the operator places the container 101 with the waste material therein on the hooks 117, and this container then rests against the rigid arm 28 in the manner shown in Fig. 6. This rigid arm 28, which is fixed to the shaft 26, may be made of one piece of metal or from rigidly interconnected sections, and it will be noted that the arm 28 includes no moving parts and forms a unitary structure. As is evident from Fig. 7 the arm 28 tapers from its end fixed to the shaft 26 toward its free end portion distant from the shaft 26.

With the waste container 101 thus suspended from the hooks 117 and engaging the arm 28, the operator turns the handle 41 downwardly, so that the bore 29d shown in Fig. 8 moves in a clockwise direction, as viewed in Fig. 8, from a position communicating with aperture 29g to a position communicating with aperture 29f, as shown in Fig. 8. Thus, it will be seen that the conduit 31 communicates through the arcuate groove 29c and the bore 29d with the conduit 31' so that the air under pressure flows through the latter conduit into the top end portion of the cylinder 30 and moves the piston 30b downwardly so that the rack 30d and gear sector 26a rotate the shaft 26 so as to raise arm 28 and turn the container 101 about the portions 105' thereof resting on the hooks 117, and this turning continues to place the periphery of the container in engagement with the front plate 2' and to turn this front plate 2' into the support means 1 so as to empty the container in the manner described above in connection with Figs. 1-6. The member 25 extends at such an angle from the shaft 26 that when the container 101 is emptied member 25 has engaged the extension 41' and moved the latter together with the handle 41 through a sufficient angle to locate the bore 29d (Fig. 8) out of communication with the conduit 31', and thus the turning of the shaft 26 is stopped. It will be noted that during this turning of the plate 2' the spring 7' has become tensioned.

The operator, perceiving that the operation has stopped and that the container 101 is empty, now turns the handle 41 upwardly until the bore 29d communicates with the bore 29g, and it will be noticed that in this position of the valve member 29a the arcuate groove 29c no longer communicates with the conduit 31. Instead, in this position, the arcuate groove 29c communicates with conduit 31' so that the compressed air in the cylinder 30 above piston 30b may flow back through the conduit 31' and through the arcuate groove 29c and bore 29d out to the atmosphere through the aperture 29g of the housing 29. Thus, the pressure about the piston 30b is relieved and the spring 7 is now free to return to its unstressed condition so that this spring 7 now turns the plate 2' back toward its original position. The plate 2' once it reaches its vertical position can fall through the rest of its turning movement by gravity, and the container 101 also may turn back to its original position by gravity. The same is true of the arm 28 which turns the shaft 26 and gear 26a so as to move the rack 30d upwardly and urge the piston 30b upwardly. Due to the size of the conduit 31' as well as groove 29c bore 29d and aperture 29g all of the air above the piston 30b cannot escape immediately to the atmosphere, and the resistance to the flowing of air out of the cylinder 30 to the atmosphere cushions the return movement of the parts so that all of the parts return smoothly to their rest position. When this rest position has been reached the operator need only remove the container from the hooks 117, place another container thereon and then again turn

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the valve 41 in the manner described above so as to repeat the above operations.

Under certain circumstances it is desired to move the plate 2' by hand. This is the case, for example, when bulky boxes, shrubberies, or any similar bulky waste material which is not in a container is to be disposed of simply by placing such material by hand through the plate 2' into the waste receiver after plate 2' has been turned inwardly into the support means 1 so as to open the aperture of the plate 2' in the manner described above. In order to enable such operations to take place, the lock member 18 is turned out of the groove in the end face of bearing 17 in the manner described above. Thus, at this time, the plate 2' can be turned without tensioning the spring 7' so that the operator can very easily turn the plate 2' and manually place bulky waste matter into the receiver. The handle 2c is provided for the convenience of the operator so that he may return the plate 2' to its original position when the device is manually operated.

If it were possible for the operator to operate the structure of Figs. 7 and 8 with the compressed air after the above described manual operation and the operator forgot to return the lock 18 to the groove of bearing 17, serious accidents might result. Thus, the air pressure would turn the arm 28 very quickly since the resistance provided by spring 7' would not be present, and the structure of the apparatus might become injured, and, moreover, the operator would not be prepared for such quick operation and might himself be injured. In order to avoid this latter undesirable result, the lock 18 is provided with the above described cam 39. It will be noted from Fig. 7 that when the lock 18 is turned out of the groove of bearing 17 the cam 39 raises the valve operating member 34 against the action of spring 33, and the lower end 38 of valve operating member 34 becomes located in the V-notch 39a. In this way, not only is the lock member 18 maintained in its upper unlocked position, but in addition the valve portion 34a closes the passage through the sealing ring 35 so that the valve is closed in this position of the parts. As a result of this closure of the valve it is impossible for the compressed air to travel through the conduit 31 into the power means, and thus as long as the lock 18 is out of the groove of bearing 17 the operator cannot operate the structure with the compressed air. It is only when the lock 18 is returned to the position shown in Fig. 7 that the passage through the ring 35 is opened and the device can again operate with the compressed air, but under these circumstances the bearing 17 cannot turn so that this spring 7' will become tensioned and will resist the movement of the shaft 26 and the arm 28.

Fig. 9 shows a slight variation where instead of a spring 33 to urge the piston portion 34b downwardly in the housing 32, a conduit 37b leads from conduit 37 to the top end of housing 32 so that the air pressure from the tank 37a is used to maintain the valve operating member 34 in engagement with the cam 39. Thus, with the embodiment of Fig. 9 it is possible to eliminate the spring 33.

Fig. 10 also shows a variation according to which instead of bracket 42', a bracket 42a is fixed to the right side wall 1c of Fig. 7, and this bracket 42a is provided with eyes 42b through which the pin 42 turnably extends, this pin 42 being fixed to the lock 18 in this case. Thus, the pin 42 is turnable together with the lock 18, and this lock 18 operates in the same way as was described above. The pin 42 is fixed to a conical valve member 43 provided with a bore 45, and the conduits 31 and 37 form one continuous conduit. This continuous conduit is formed with a conical bore into which the conical valve member 43 slidably extends so that this valve member 43 is in slidable sealed engagement with the conduits 31, 37 of Fig. 10, and the

conical valve member 43 is formed with a bore 45 located within the conduits 31, 37 of Fig. 10. Thus, in the position of the parts shown in Fig. 10 the conduits 31, 37 are in communication with each other through the bore 45 and the lock 18 is in the groove of bearing member 17 to prevent turning of the latter. When this lock 18 is turned upwardly approximately through 90°, the bore 45 is closed by the surface of conduits 31, 37, and thus conduit 31 no longer communicates with conduit 37 and the power means 27 cannot be operated. In this way the embodiment of Fig. 10 is capable of producing the same results as the valve structure of Fig. 7.

Fig. 11 shows diagrammatically a different embodiment of a structure for maintaining the space between side walls 1c closed while the front plate 2 turns between the side walls 1c. Thus, referring to Fig. 11, it will be seen that the plate 5 is replaced by a plate 22 which is hinged at 118 to the plate 2, and this plate 22 is provided with a member 119' corresponding to and operating in the same way as the tubular member 119, and the plate 22 corresponding to and operating in the same way as the plate 5. Instead of cover plates 3 and 3', an accordion pleated sheet 20 is fixed to the plate 22 at its pivotal connection 118 to the plate 2, and the opposite end of this sheet member 20 is fixed to a tube which is turnable on a rod 24 extending between and fixed to the side walls 1c. In addition, a strong stretchable resilient cord 23 is fixed at one end to the tube which turns on the rod 24 and at its opposite end to the upper portion of the plate 22, in the manner shown in Fig. 11, the resilient cord 23 corresponding to the elements 4a-4c, while the accordion pleated heavy sheet 20 corresponds to the cover plates 3 and 3'. Thus, with the embodiment of Fig. 11 when the plate 2 is turned through the angles alpha and beta in the direction of arrow A to the dotted line position shown in Fig. 11, the plate 22 will turn with respect to plate 2 in the direction of arrow B, and the spring 23 will assist plate 22 in this movement. The sheet 20 moves from the solid to the dotted line position of Fig. 11 so that the space between the walls 1c is maintained closed. Fig. 11 shows diagrammatically a container 101 on the plate 22, and the side walls 1c carry shock absorbers 44 at their inner faces to engage the inner face of plate 2 adjacent its side edges. These shock absorbers 44 may take any form such as simple blocks of rubber and they do not extend into the space between walls 1c through a distance sufficient to engage plate 22 so that the latter is free to turn from the solid to the dotted line position of Fig. 11. When the container 101 is emptied then the spring 7 returns the parts to their original position in the manner described above.

The shock absorbers 44 may be included in the other embodiments of the invention, and instead of an accordion pleated sheet 20, a simple sheet rolled on a spring urged drum may be used. This latter sheet may be similar to a conventional window shade which is drawn upwardly by a spring, and in such a case the free end of the sheet would be connected to the plate 22 adjacent its connection 118 to the plate 2 while the sheet would be wound on a rod located where the rod 24 is located and urged by a spring to wind the sheet on to the rod so that the sheet is rolled off from such a rod against the action of such a spring. In this latter case the cord or cords 23 could be connected directly to the side walls 1c adjacent to the rolled up sheet.

To reduce noise, a rubber ring may be located at the bottom periphery of container 101.

The setting means comprising respectively the adjustable stop member 11 as illustrated in Fig. 2, or the lock member 18 as shown in Figs. 7 and 10 serves to set the torsion springs 7, 7', respectively, to a desired condition.

It will be understood that each of the elements described above, or two or more together, may also find a

useful application in other types of waste disposal apparatus differing from the types described above.

While the invention has been illustrated and described as embodied in manually or power operated waste disposal apparatus, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can by applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention, and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

What is claimed as new and desired to be secured by Letters Patent is:

1. Waste disposal apparatus comprising, in combination, support means including a pair of substantially parallel spaced side walls; a front plate formed with a bore passing transversely therethrough from one side edge thereof to an opposite side edge thereof, said front plate being located between said side walls with said side edges of said front plate respectively located next to said side walls, and said front plate being carried by said side walls of said support means for turning movement about the axis of said bore; straight torsion spring means located in said bore and connected to said support means and to said front plate for urging the latter to a rest position on said support means; and setting means mounted on said support means for setting said torsion spring means to a predetermined condition.

2. Waste disposal apparatus comprising, in combination, support means including a pair of substantially parallel spaced side walls; a front plate formed with a bore passing transversely therethrough from one side edge thereof to an opposite side edge thereof, said front plate being located between said side walls with said side edges of said front plate respectively located next to said side walls, and said front plate being carried by said side walls of said support means for turning movement about the axis of said bore; torsion spring means located in said bore and connected to said support means and to said front plate for urging the latter to a rest position on said support means, said torsion spring means being in the form of an elongated bar; and setting means mounted on said support means for setting said torsion spring means to a predetermined condition.

3. Waste disposal apparatus comprising, in combination, support means including a pair of substantially parallel spaced side walls; a front plate formed with a bore passing transversely therethrough from one side edge thereof to an opposite side edge thereof, said front plate being located between said side walls with said side edges of said front plate respectively located next to said side walls, and said front plate being carried by said side walls of said support means for turning movement about the axis of said bore; and torsion spring means located in said bore and connected to said support means and to said front plate for urging the latter to a rest position on said support means, said torsion spring means being in the form of an assemblage of plate springs.

4. Waste disposal apparatus comprising, in combination, support means including a pair of substantially parallel spaced side walls which are spaced from each other and one of which is formed with an opening passing therethrough; a front plate formed with a bore passing transversely therethrough from one side edge thereof to an opposite side edge thereof, said front plate being located between said side walls with said side edges of said front plate respectively located next to said side walls and with said core aligned with said opening of

said one side wall, and said front plate being carried by said side walls of said support means for turning movement about the axis of said bore; an elongated torsion spring located within and extending along said bore and fixed to said front plate, said torsion spring having a free end portion extending through said opening of said one side wall and outwardly beyond the latter; a movable stop member fixed to said free end portion of said torsion spring for turning movement therewith and located at the exterior of said one side wall; and a stationary stop member fixed to said one side wall at the exterior thereof and located in the path movement of said movable stop member so that said torsion spring will become tensioned when said front plate is turned beyond the position where said movable stop member engages said stationary stop member.

5. Waste disposal apparatus comprising, in combination, support means including a pair of substantially parallel spaced side walls which are spaced from each other and one of which is formed with an opening passing therethrough; a front plate formed with a bore passing transversely therethrough from one side edge thereof to an opposite side edge thereof, said front plate being located between said side walls with said side edges of said front plate respectively located next to said side walls and with said core aligned with said opening of said one side wall, and said front plate being carried by said side walls of said support means for turning movement about the axis of said bore; an elongated torsion spring located within and extending along said bore and fixed to said front plate, said torsion spring having a free end portion extending through said opening of said one side wall and outwardly beyond the latter; a movable stop member fixed to said free end portion of said torsion spring for turning movement therewith and located at the exterior of said one side wall; a stationary stop member fixed to said one side wall at the exterior thereof and located in the path movement of said movable stop member so that said torsion spring will become tensioned when said front plate is turned beyond the position where said movable stop member engages said stationary stop member; and adjusting means for adjusting the position of said stationary stop member on said one side wall.

6. Waste disposal apparatus comprising, in combination, support means including a pair of substantially parallel spaced side walls; a front plate formed with a bore passing transversely therethrough from one side edge thereof to an opposite side edge thereof, said front plate being located between said side walls with said side edges of said front plate respectively located next to said side walls, and said front plate being carried by said side walls of said support means for turning movement about the axis of said bore; an elongated torsion spring extending along the interior of said bore and fixed at one end to said front plate; and releasable connecting means releasably fixing the opposite end of said torsion spring to said support means.

7. Waste disposal apparatus comprising, in combination, support means having a pair of spaced parallel side walls one of which is formed with an opening passing therethrough; an elongated bearing member extending through said opening of said one side wall from the exterior thereof into the space between said side walls; an elongated pivot pin fixed to the other of said side walls, extending therefrom toward said one side wall, and being coaxial with said bearing member; a front plate extending between said side walls and formed with a pair of bore portions into which said pivot pin and bearing respectively extend so that said pivot pin and bearing support said front plate for turning movement with respect to said support means, said front plate being freely turnable about said pivot pin and said bearing member, and said front plate being formed with a third bore portion extending between said pair of bore portions thereof and communicating with said bearing member; an elongated tor-

sion spring extending along said third bore portion, having an end adjacent said pivot pin fixed to said front plate, and having an opposite end extending into and fixed to said bearing member; and means mounted on said one side wall at the exterior thereof adjacent to said bearing member and cooperating with the same for releasably preventing turning movement of said bearing member with respect to said one side wall.

8. Waste disposal apparatus comprising, in combination, support means having a pair of spaced parallel side walls one of which is formed with an opening passing therethrough; an elongated bearing member extending through said opening of said one side wall from the exterior thereof into the space between said side walls, said bearing member being formed at the exterior of said one side wall with a cutout; an elongated pivot pin fixed to the other of said side walls, extending therefrom toward said one side wall, and being coaxial with said bearing member; a front plate extending between said side walls and formed with a pair of bore portions into which said pivot pin and bearing respectively extend so that said pivot pin and bearing support said front plate for turning movement with respect to said support means, said front plate being freely turnable about said pivot pin and said bearing member, and said front plate being formed with a third bore portion extending between said pair of bore portions thereof and communicating with said bearing member; an elongated torsion spring extending along said third bore portion, having an end adjacent said pivot pin fixed to said front plate, and having an opposite end extending into and fixed to said bearing member; and a lock member movably carried by said one side wall for movement into and out of said cutout of said bearing member for releasably preventing turning movement of the latter with respect to said one side wall.

9. Waste disposal apparatus comprising, in combination, support means having a pair of spaced parallel side walls one of which is formed with an opening passing therethrough; an elongated bearing member extending through said opening of said one side wall from the exterior thereof into the space between said side walls, said bearing member being formed in an end face thereof at the exterior of said one side wall with an elongated groove; an elongated pivot pin fixed to the other of said side walls, extending therefrom toward said one side wall, and being coaxial with said bearing member; a front plate extending between said side walls and formed with a pair of bore portions into which said pivot pin and bearing respectively extend so that said pivot pin and bearing support said front plate for turning movement with respect to said support means, said front plate being freely turnable about said pivot pin and said bearing member, and said front plate being formed with a third bore portion extending between said pair of bore portions thereof and communicating with said bearing member; an elongated torsion spring extending along said third bore portion, having an end adjacent said pivot pin fixed to said front plate, and having an opposite end extending into and fixed to said bearing member; and a lock member movably carried by said one side wall for movement into and out of said groove of said bearing member for releasably preventing turning movement of the latter with respect to said one side wall.

10. Waste disposal apparatus comprising, in combination, support means having a pair of spaced parallel side walls one of which is formed with an opening passing therethrough; an elongated bearing member extending through said opening of said one side wall from the exterior thereof into the space between said side walls, said bearing member being formed in an end face thereof at the exterior of said one side wall with an elongated groove; an elongated pivot pin fixed to the other of said side walls, extending therefrom toward said one side wall, and being coaxial with said bearing member; a front plate extending between said side walls and formed with a pair

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of bore portions into which said pivot pin and bearing respectively extend so that said pivot pin and bearing support said front plate for turning movement with respect to said support means, said front plate being freely turnable about said pivot pin and said bearing member, and said front plate being formed with a third bore portion extending between said pair of bore portions thereof and communicating with said bearing member; an elongated torsion spring extending along said third bore portion, having an end adjacent said pivot pin fixed to said front plate, and having an opposite end extending into and fixed to said bearing member; and an elongated lock member turnably carried by said one side wall for movement into and out of said groove of said bearing member for releasably preventing turning movement of the latter with respect to said one side wall.

11. Waste disposal apparatus comprising, in combination, support means having a pair of spaced parallel side walls one of which is formed with an opening passing therethrough; an elongated bearing member extending through said opening of said one side wall from the exterior thereof into the space between said side walls, said bearing member being formed at the exterior of said one side wall with a cutout; an elongated pivot pin fixed to the other of said side walls, extending therefrom toward said one side wall, and being coaxial with said bearing member; a front plate extending between said side walls and formed with a pair of bore portions into which said pivot pin and bearing respectively extend so that said pivot pin and bearing support said front plate for turning movement with respect to said support means, said front plate being freely turnable about said pivot pin and said bearing member and said front plate being formed with a third bore portion extending between said pair of bore portions thereof and communicating with said bearing member; an elongated torsion spring extending along said third bore portion, having an end adjacent said pivot pin fixed to said front plate, and having an opposite end extending into and fixed to said bearing member; a lock member movably carried by said one side wall for movement into and out of said cutout of said bearing member for releasably preventing turning movement of the latter with respect to said one side wall; a shaft turnably carried by said side walls beneath said front plate; an arm fixed to and extending from said shaft so that upon turning of the latter said arm may turn a waste container engaging said arm into engagement with said front plate; power means operatively connected to said shaft so that upon turning of the latter said arm may turn a waste container engaging said arm into engagement with said front plate; power means operatively connected to said shaft for turning the latter; and control means interconnecting said lock member with said power means for preventing operation of the latter when said lock member is out of said cutout of said bearing member and for permitting operation of said power means when said lock member is in said cutout of said bearing member.

12. Waste disposal apparatus comprising, in combination, support means having a pair of spaced parallel side walls one of which is formed with an opening passing therethrough; an elongated bearing member extending through said opening of said one side wall from the exterior thereof into the space between said side walls, said bearing member being formed at the exterior of said one side wall with a cutout; an elongated pivot pin fixed to the other of said side walls, extending therefrom toward said one side wall, and being coaxial with said bearing member; a front plate extending between said side walls and formed with a pair of bore portions into which said pivot pin and bearing respectively extend so that said pivot pin and bearing support said front plate for turning movement with respect to said support means, said front plate being freely turnable about said pivot pin and bearing member, and said front

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plate being formed with a third bore portion extending between said pair of bore portions thereof and communicating with said bearing member; an elongated torsion spring extending along said third bore portion, having an end adjacent said pivot pin fixed to said front plate, and having an opposite end extending into and fixed to said bearing member; a lock member movably carried by said one side wall for movement into and out of said cutout of said bearing member for releasably preventing turning movement of the latter with respect to said one side wall; a shaft turnably carried by said side walls beneath said front plate; an arm fixed to and extending from said shaft so that upon turning of the latter said arm may turn a waste container engaging said arm into engagement with said front plate; fluid pressure means operatively connected to said shaft for turning the latter; conduit means leading to said fluid pressure means for supplying fluid under pressure thereto; a valve in said conduit means for opening and closing the latter; and control means interconnecting said lock member with said valve for closing the latter when said lock member is out of said cutout to prevent operation of said fluid pressure means and for opening said valve when said lock member is in said cutout for permitting operation of said fluid pressure means.

13. Waste disposal apparatus comprising, in combination, support means having a pair of spaced parallel side walls one of which is formed with an opening passing therethrough; an elongated bearing member extending through said opening of said one side wall from the exterior thereof into the space between said side walls, said bearing member being formed in an end face thereof at the exterior of said one side wall with an elongated groove; an elongated pivot pin fixed to the other of said side walls, extending therefrom toward said one side wall, and being coaxial with said bearing member; a front plate extending between said side walls and formed with a pair of bore portions into which said pivot pin and bearing respectively extend so that said pivot pin and bearing support said front plate for turning movement with respect to said support means, said front plate being freely turnable about said pivot pin and said bearing member, and said front plate being formed with a third bore portion extending between said pair of bore portions thereof and communicating with said bearing member; an elongated torsion spring extending along said third bore portion, having an end adjacent said pivot pin fixed to said front plate, and having an opposite end extending into and fixed to said bearing member; an elongated lock member turnably carried by said one side wall for movement into and out of said groove of said bearing member for releasably preventing turning movement of the latter with respect to said one side wall; a shaft turnably carried by said side walls beneath said front plate; an arm fixed to and extending from said shaft so that upon turning of the latter said arm may turn a waste container engaging said arm into engagement with said front plate; fluid pressure means operatively connected to said shaft for turning the latter; valve means carried by said one side wall adjacent said lock member and including an elongated valve operating member extending toward said lock member; cam means carried by said lock member for turning movement therewith and engaging said valve operating member for closing said valve means when said lock member is out of said groove and for opening said valve means when said lock member is in said groove; means co-operating with said valve operating member for maintaining the same in engagement with said cam means; and conduit means communicating with said fluid pressure means for supplying fluid under pressure thereto, said valve means forming part of said conduit means so that said fluid pressure means cannot operate when said lock member is out of said groove.

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14. Waste disposal apparatus comprising, in combination, support means having a pair of spaced parallel side walls one of which is formed with an opening passing therethrough; an elongated bearing member extending through said opening of said one side wall from the exterior thereof into the space between said side walls, said bearing member being formed in an end face thereof at the exterior of said one side wall with an elongated groove; an elongated pivot pin fixed to the other of said side walls, extending therefrom toward said one side wall, and being coaxial with said bearing member; a front plate extending between said side walls and formed with a pair of bore portions into which said pivot pin and bearing respectively extend so that said pivot pin and bearing support said front plate for turning movement with respect to said support means, said front plate being freely turnable about said pivot pin and said bearing member, and said front plate being formed with a third bore portion extending between said pair of bore portions thereof and communicating with said bearing member; an elongated torsion spring extending along said third bore portion, having an end adjacent said pivot pin fixed to said front plate, and having an opposite end extending into and fixed to said bearing member; an elongated lock member turnably carried by said one side wall for movement into and out of said groove of said bearing member for releasably preventing turning movement of the latter with respect to said one side wall; a shaft turnably carried by said side walls beneath said front plate; an arm fixed to and extending from said shaft so that upon turning of the latter said arm may turn a waste container engaging said arm into engagement with said front plate; fluid pressure means operatively connected to said shaft for turning the latter; valve means carried by said one side wall adjacent said lock member and including an elongated valve operating member extending toward said lock member and a pair of grooved sealing rings located about said valve operating member, one of said sealing rings guiding said operating member, said operating member slidably passing the opening of the other sealing ring in one position thereof to close said valve means; cam means carried by said lock member for turning movement therewith and engaging said valve operating member for closing said valve means when said lock member is out of said groove and for opening said valve means when said lock member is in said groove; means cooperating with said valve operating member for maintaining the same in engagement with said cam means; and conduit means communicating with said fluid pressure means for supplying fluid under pressure thereto, said conduit means communicating with that part of said valve means located between said sealing rings so that said fluid pressure means cannot operate when said lock member is out of said groove.

15. Waste disposal apparatus comprising, in combination, support means having a pair of spaced parallel side walls one of which is formed with an opening passing therethrough; an elongated bearing member extending through said opening of said one side wall from the exterior thereof into the space between said side walls, said bearing member being formed in an end face thereof at the exterior of said one side wall with an elongated groove; an elongated pivot pin fixed to the other of said side walls, extending therefrom toward said one side wall, and being coaxial with said bearing member; a front plate extending between said side walls and formed with a pair of bore portions into which said pivot pin and bearing respectively extend so that said pivot pin and bearing support said front plate for turning movement with respect to said support means, said front plate being freely turnable about said pivot pin and said bearing member, and said front plate being formed with a third bore portion extending between said pair of bore portions thereof and communicating with said bearing member;

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an elongated torsion spring extending along said third bore portion, having an end adjacent said pivot pin fixed to said front plate, and having an opposite end extending into and fixed to said bearing member; an elongated lock member turnably carried by said one side wall for movement into and out of said groove of said bearing member for releasably preventing turning movement of the latter with respect to said one side wall; a shaft turnably carried by said side walls beneath said front plate; an arm fixed to and extending from said shaft so that upon turning of the latter said arm may turn a waste container engaging said arm into engagement with said front plate; fluid pressure means operatively connected to said shaft for turning the latter; valve means carried by said one side wall adjacent said lock member and including an elongated valve operating member extending toward said lock member; cam means carried by said lock member for turning movement therewith and engaging said valve operating member for closing said valve means when said lock member is out of said groove and for opening said valve means when said lock member is in said groove; and conduit means communicating with said fluid pressure means for supplying fluid under pressure thereto, said valve means forming part of said conduit means so that said fluid pressure means cannot operate when said lock member is out of said groove, said conduit means also communicating with said valve means for supplying thereto fluid under pressure for maintaining said valve operating member in engagement with said cam means.

16. Waste disposal apparatus comprising, in combination, support means having a pair of spaced parallel side walls one of which is formed with an opening passing therethrough; an elongated bearing member extending through said opening of said one side wall from the exterior thereof into the space between said side walls, said bearing member being formed in an end face thereof at the exterior of said one side wall with an elongated groove; an elongated pivot pin fixed to the other of said side walls, extending therefrom toward said one side wall, and being coaxial with said bearing member; a front plate extending between said side walls and formed with a pair of bore portions into which said pivot pin and bearing respectively extend so that said pivot pin and bearing support said front plate for turning movement with respect to said support means, said front plate being freely turnable about said pivot pin and said bearing member, and said front plate being formed with a third bore portion extending between said pair of bore portions thereof and communicating with said bearing member; an elongated torsion spring extending along said third bore portion, having an end adjacent said pivot pin fixed to said front plate, and having an opposite end extending into and fixed to said bearing member; an elongated lock member turnably carried by said one side wall for movement into and out of said groove of said bearing member for releasably preventing turning movement of the latter with respect to said one side wall; a shaft turnably carried by said side walls beneath said front plate; an arm fixed to and extending from said shaft so that upon turning of the latter said arm may turn a waste container engaging said arm into engagement with said front plate; fluid pressure means operatively connected to said shaft for turning the latter; valve means carried by said one side wall adjacent said lock member and including an elongated valve operating member extending toward said lock member and having a conical free end portion located adjacent said lock member; cam means carried by said lock member for turning movement therewith and engaging said valve operating member for closing said valve means when said lock member is out of said groove and for opening said valve means when said lock member is in said groove, said cam means having a pair of notches into one of which said conical free end portion of said valve operating member extends when said valve means

is open and into the other of which said conical free end portion of said valve member extends when said valve means is closed; means cooperating with said valve operating member for maintaining the same in engagement with said cam means; and conduit means communicating with said fluid pressure means for supplying fluid under pressure thereto, said valve means forming part of said conduit means so that said fluid pressure means cannot operate when said lock member is out of said groove.

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