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Burrows

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(54) **PATHOLOGICAL WASTE DISPOSAL UNIT**

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(76) **Inventor: Bruce Robert Burrows, Kallangur (AU)**

Correspondence Address:
STONEMAN LAW OFFICES, LTD
3113 NORTH 3RD STREET
PHOENIX, AZ 85012 (US)

(57) **ABSTRACT**

A pathological waste disposal unit (10) has a chamber (11) with a closeable cover (16) and a waste outlet (14) connected to a waste sump (20). A carrier (30) for waste bags (40) is mounted on a shaft (31), rotatable by an impellor (30), on which is directed high pressure water from nozzles (150). Water knives (70) cut open the waste bags (40) while the carrier (30) is rotating to release the waste (41) from the waste bags (40), to cause the waste to face the bottom wall (13) of the chamber (11) and flow through the waste outlet (14) to the waste sump (20). Safety interlock means prevent operation of the unit (10) while the cover (16) is raised and the opening of the cover (16) while the unit (10) is in operation.

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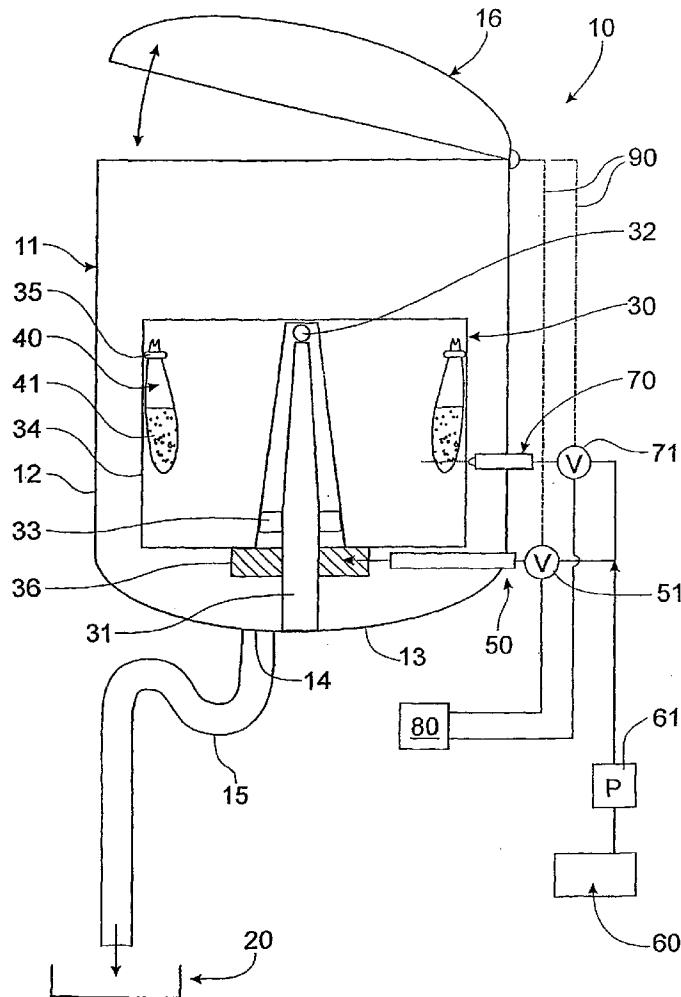
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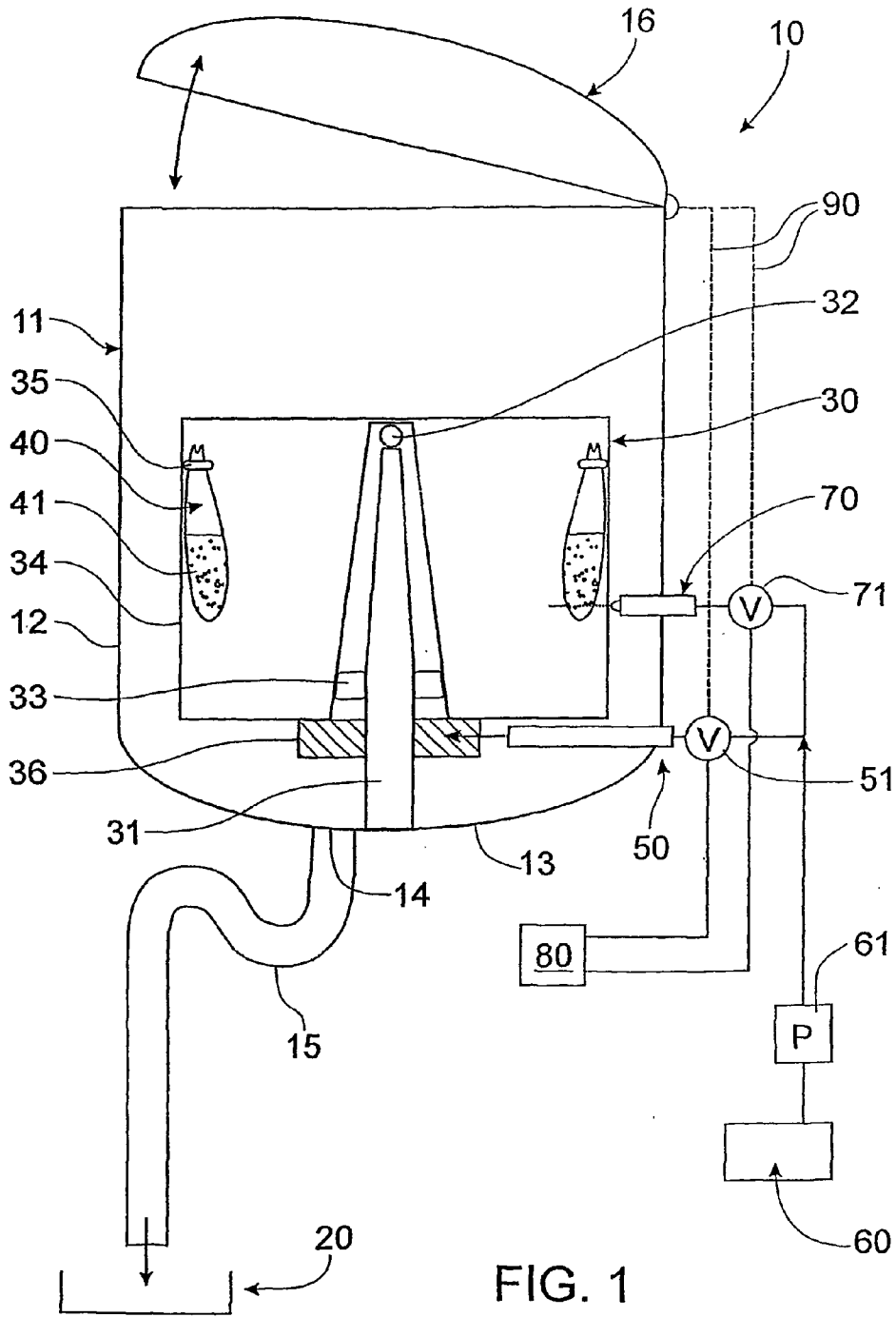


FIG. 1

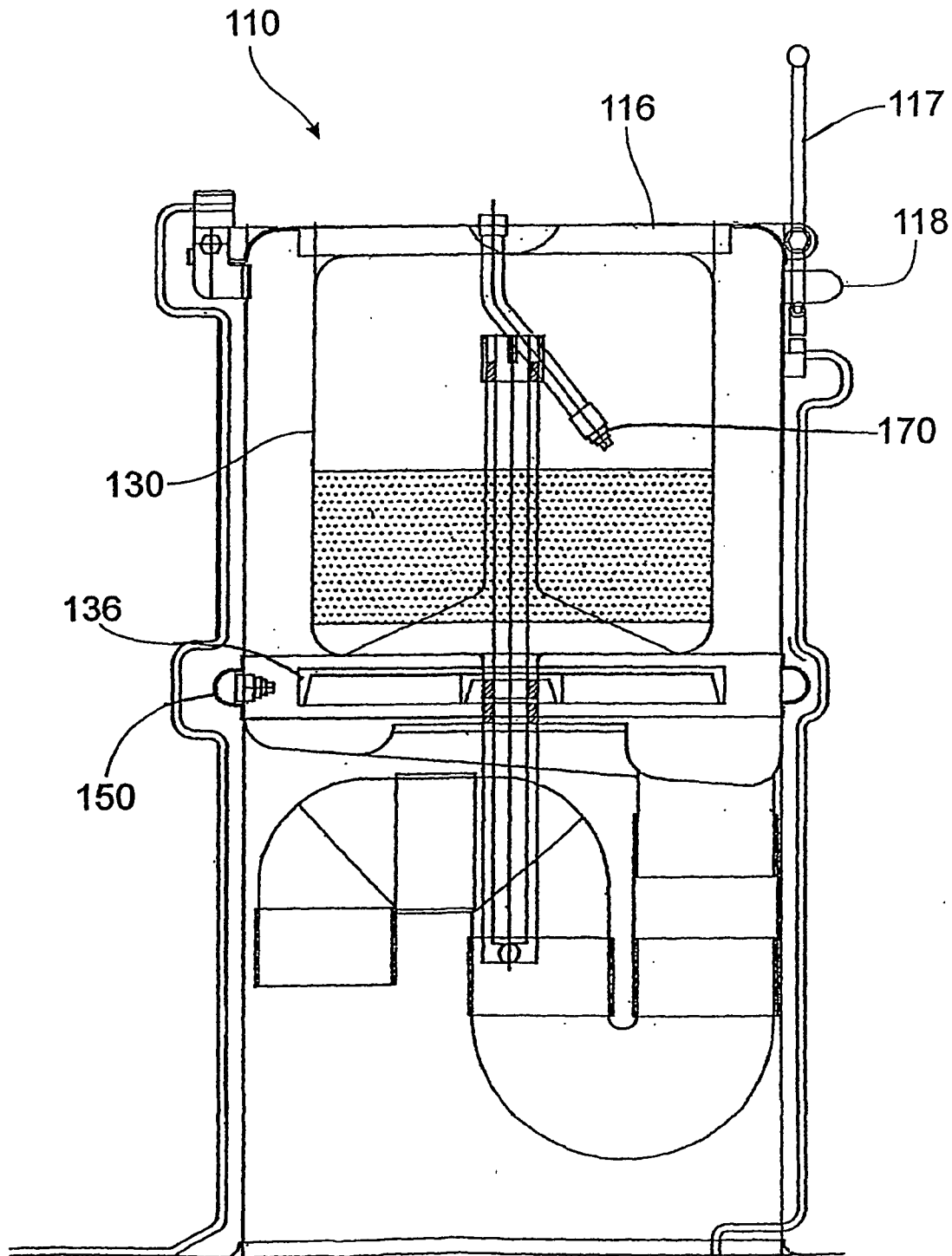


FIG. 2

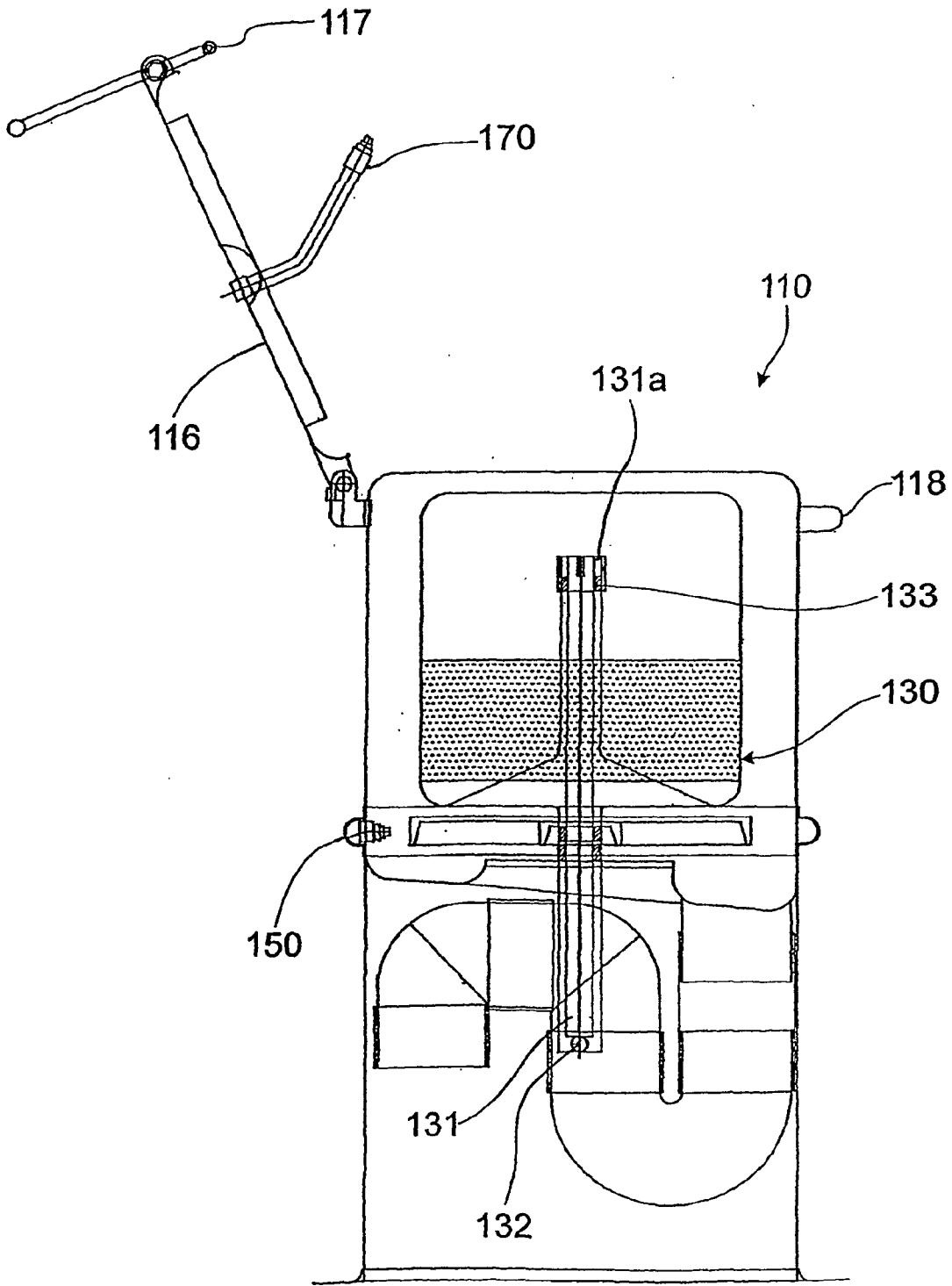


FIG. 3

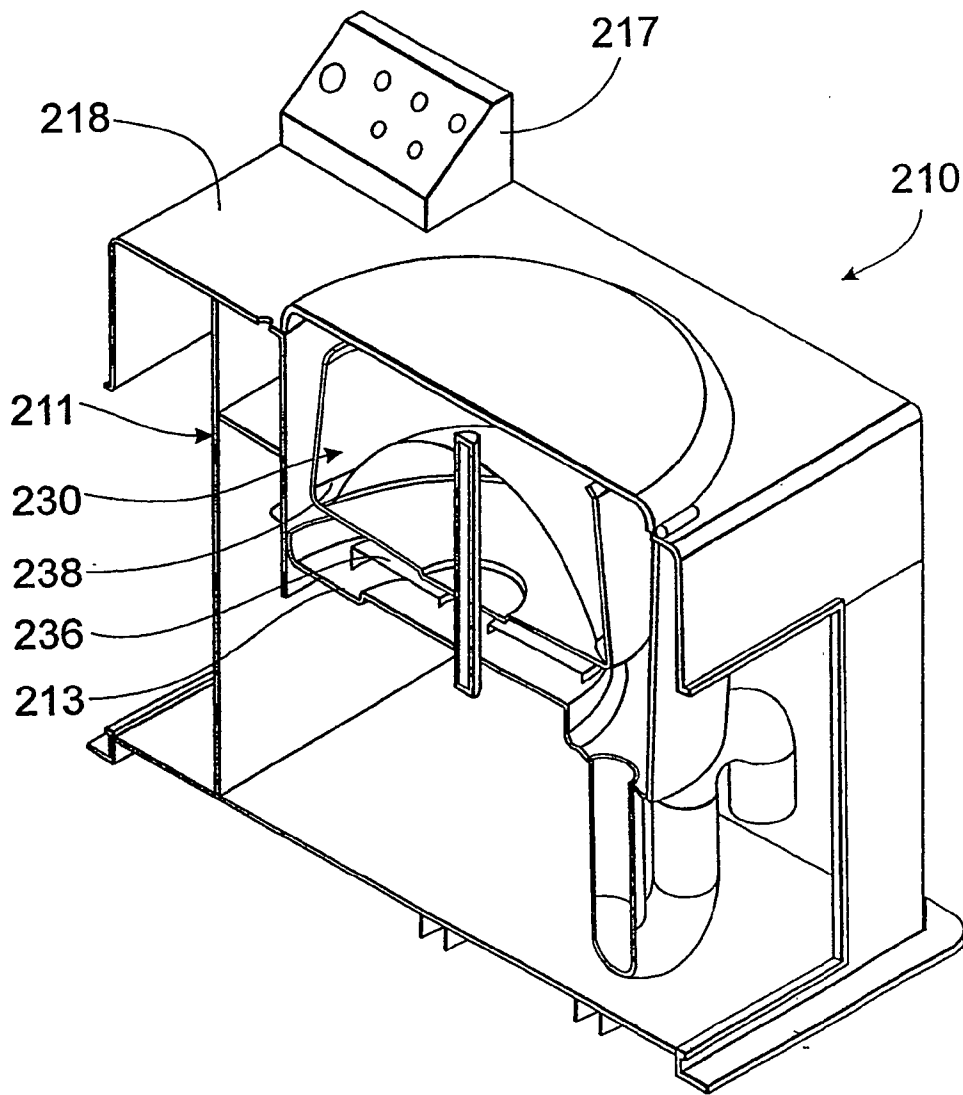


FIG. 4

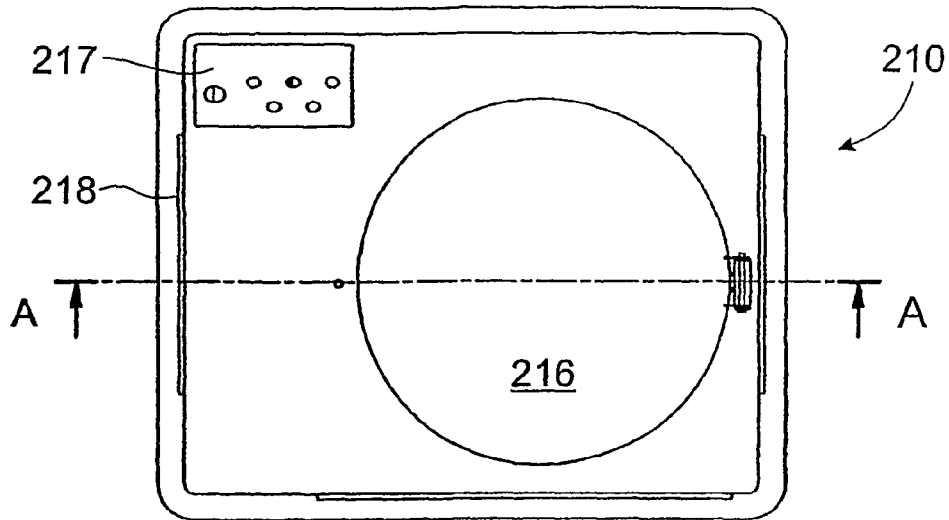


FIG. 5

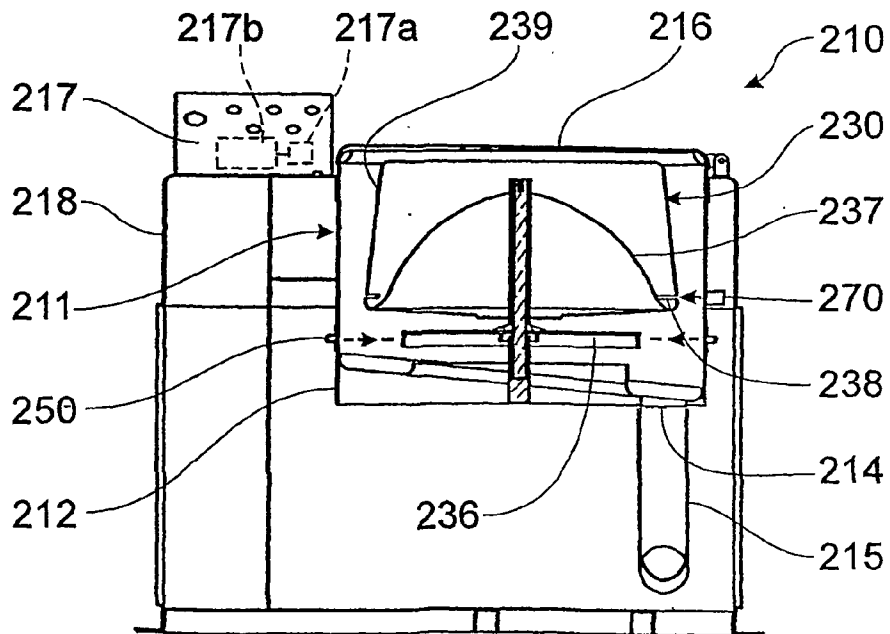


FIG. 6

PATHOLOGICAL WASTE DISPOSAL UNIT

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] THIS INVENTION relates to a pathological waste disposal unit.

[0003] The term "pathological waste" shall be used to include urine, faeces, other body fluids, pus, and other waste and/or infectious materials. While the invention is primarily directed to the disposal of such waste from humans, the waste may be obtained from animals, birds or other living creatures.

[0004] 2. Prior Art

[0005] The use of disposable waste bags, eg., urine bags, colostomy bags and wound drainage bags is increasing throughout Australia and the world. For example, in some geriatric nursing and care institutions, patients are provided with one or more urine collection bags each day.

[0006] The disposal of pathological waste bags is expensive, and the bags are typically dumped in sealed containers, taking up useful waste-fill space. If the bags become damaged, the waste can uncontrollably leech through the soil into water courses or ground water.

SUMMARY OF THE INVENTION

[0007] It is an object of the present invention to provide a pathological waste disposal unit where the collected waste can be easily removed from the bags for (optional) waste treatment.

[0008] It is a preferred object to provide such a unit where the waste bags, when emptied, can be collected for storage or destruction.

[0009] It is a further preferred object of the present invention to provide such a disposal unit where the operator's safety can be ensured to minimise the potential for infection by coming into contact with the waste.

[0010] It is a still further preferred object to provide a unit which can be operated without the need for an electrical power supply.

[0011] Other preferred objects of the present invention will become apparent from the following description.

[0012] In one aspect, the present invention resides in a pathological waste disposal unit including:

[0013] a disposal chamber having a closeable cover;

[0014] a waste bag carrier rotatably mounted in the chamber, having means to support a plurality of disposable waste bags;

[0015] means to rotate the carrier;

[0016] means to release the waste(s) from the waste bags;

[0017] washing means to clean the waste(s) from the waste bags; and

[0018] waste outlet means in the chamber to enable disposal of the waste(s) to a collection location or sump.

[0019] Preferably, the disposal chamber (and the cover) are formed from stainless steel or suitable plastics materials. Preferably, the chamber has a cylindrical side wall and a bottom wall or floor curved, or downwardly convergent, to the waste outlet means. (The waste outlet means may be connected, eg., by an S-trap to a sump, waste collection location or to waste treatment means).

[0020] Preferably, the closeable cover is hingedly mounted on the side wall and incorporates safety operating means which prevent the disposal unit operating while the cover is raised.

[0021] Preferably, the waste bag carrier is rotatably mounted in the chamber, co-axially with the wall, on a support shaft via suitable bearings and/or bushings. A plurality of hook, clip or other support means may be provided on the carrier to releasably support the waste bags.

[0022] The means to rotate the carrier may include an impellor into which is directed one or more jets of high-pressure water via one or more water nozzles. Alternatively, the carrier may be mounted on a shaft, rotatably journaled in the bottom wall of the chamber, and driven, either directly or indirectly, by an electric motor, hydraulic motor, pneumatic motor or the like.

[0023] Means to release the waste from the water bags may include a high pressure water "knife", or knives or one or more retractable mechanical knives, in the chamber, which cut open the waste bags (preferably adjacent the bottom of the bags). The water knife, or knives, are formed by high pressure, concentrated, water jets operable to cut the waste bags.

[0024] The washing means to clean the waste from the waste bags may include one or more water nozzles (eg., the water knife/knives) in the chamber.

[0025] Timer means may control respective valves which control the flow of water to (a) the high pressure nozzle(s) directed at the impellor and to (b) the water knife/knives. Water may be supplied from a source via one or more pressure pumps.

BRIEF DESCRIPTION OF THE DRAWINGS

[0026] To enable the invention to be fully understood, a preferred embodiment will now be described with reference to:

[0027] **FIG. 1** which is a schematic sectional side view of a first embodiment of the disposal unit;

[0028] **FIG. 2** which is a schematic sectional side view of a second embodiment, with the cover closed;

[0029] **FIG. 3** which is a similar view with the cover raised;

[0030] **FIG. 4** is a part-sectional schematic isometric view of a third embodiment;

[0031] **FIG. 5** is a top plan view of the third embodiment; and

[0032] **FIG. 6** is a sectional front elevational view taken on line A-A on **FIG. 5**.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0033] The disposal unit **10**, of the first embodiment shown in **FIG. 1**, is manufactured from stainless steel and

has a disposal chamber **11** with a cylindrical side wall **12** and a (convexly) curved bottom wall **13**. A waste outlet **14**, in the bottom wall **13**, is connected via an S-trap **15** to convey the waste to a collection point or sump **20**. (An annular channel (not shown) in the bottom wall **13** may be connected to the waste outlet **14**.)

[0034] A cover **16** is hingedly mounted on the side wall **12** and is operable to be moved between a raised position to enable the waste bags to be loaded into, or removed from, the disposal chamber **11**, and a closed position during operation of the disposal unit **10**.

[0035] A waste bag carrier **30** is mounted on a central shaft **31** for rotation co-axial with the side wall **12** of the chamber **11**. The carrier **30** is rotatably journalled on the shaft **31** via a ball-bearing **32** and (eg., nylon) bushes **33**.

[0036] The carrier **30** has a frame **34** on which is provided a plurality of hooks, clips, clamps or the like **35** to releasably support disposable waste bags **40** containing the pathological waste **41** (eg., urine and/or faeces).

[0037] The carrier **30** has an impellor (or turbine) **36** mounted co-axially on the underside of the carrier frame **34** and is operably rotated by a high pressure water jet directed onto the impellor **36** via a water nozzle **50**, the nozzle **50** being connected to a water source **60** via a pressure pump **61** and a valve **51**.

[0038] The waste bags **40** are opened by high pressure water jets from one or more water knives **70** provided in the chamber **11**, the knives being connected to the pressure pump **61** via valve(s) **71**. (For a plurality of knives, a single valve can direct flow to a manifold connected to the knives.)

[0039] The respective operations of the valves **51**, **71** are controlled via a timer unit **80**, and the valves **51**, **71** are closed by a safety mechanism **90** which shuts off the valves **51**, **71** whenever the cover **16** is raised. (The safety unit **90** can also be connected to a braking system (not shown) for the carrier **30**.)

[0040] The operation of the disposal unit **10** will now be described.

[0041] The cover **16** is raised and the waste disposal bags **40** (containing the pathological waste **41**) are mounted on the carrier **30** via the hooks or clips **35**.

[0042] The lid **16** is closed, and the timer **80** opens the valve **51** to enable water to be directed onto the impellor **36**, to thereby rotate the carrier **30** at a relatively high rotational speed. The timer **80** also opens the valve(s) **71** on the water knife/knives **70**, which cut open the waste bags **40**, releasing the waste **41**. The combination of the water (from the nozzle **50** and knives **70**) and centrifugal force generated by the rotation of the carrier **30** releases the waste **41** from the bags **40** and causes it to flow onto the bottom wall **13** of the chamber **11**, and then out the waste outlet **14** (via the S-trap **15**) to the collection point or sump **20**. (The waste **41** collected in the collection point or sump **20** may be subject to one or more treatment processes, eg., to enable the water from the waste **41** to be safely returned to a water system.)

[0043] While the carrier **30** may be rotatably mounted on the shaft **31**, and rotated by water pressure on the impellor **36**, the carrier **30** may be mounted on a rotary shaft, journalled in the bottom wall **13** of the chamber **11**, and

driven directly (or indirectly, eg., by belts and pulleys or sprockets and chains) by an electric motor, hydraulic motor, pneumatic motor or the like. With such an arrangement, suitable sealing means must be provided between the rotary shaft and the bottom wall **13** of the disposal chamber **11**.

[0044] As an alternative to the water knife or knives **70**, one or more retractable mechanical knives (not shown), with blades fitted to pneumatic rams at **70**, may be provided in the chamber **11**, to cut open the waste bags **40** to release the waste **41**. Preferably, the mechanical knives will have an interlock which will ensure that they are retracted whenever the carrier **30** is being rotated (and/or when the cover **16** is raised).

[0045] When the cleaning cycle has been completed, the operator can open the cover **16** and remove the (now empty) waste bags **40** from the chamber **11** for suitable disposal. Clearly, the volume of material (ie., the empty waste bags **40**) to be disposed of is much less than with the volume of the full waste bags.

[0046] It will be readily apparent to the skilled addressee that the components of the unit **10** will preferably be manufactured from materials which are not subject to the corrosive effects of the waste and such materials may include stainless steel, other steel alloys, glass reinforced plastics, injection moulded plastics or other plastics materials.

[0047] Where a source of high pressure water is available, eg., from a reticulated supply, the pressure pump **61** may be omitted.

[0048] If a mechanical timer is provided, no source of electrical power is required and the disposal unit **10** may be used in remote locations where resources are limited.

[0049] Referring to FIGS. 2 and 3, the disposal unit **110** of the second embodiment is generally similar to the disposal unit **10** of FIG. 1.

[0050] The water knife **170** is mounted in the cover **116** and is connected to a high pressure pump (not shown). The nozzle **150**, which drives the impellor **136** on the carrier **130**, is connected to the water source via a valve (not shown) which is controlled by the handle **117** which releasably locks the cover **116** closed. The handle **117** also operates a valve (not shown) which isolates the water knife **170** when the cover **116** is raised (see FIG. 3). A solenoid **118** prevents the handle **117** being operated, to open the cover **16**, while the unit **110** is in operation, ie., while the water knife **170** is operating or the carrier **130** is rotating.

[0051] In this embodiment, the carrier **130** is releasably connected to the shaft **131** via a cap **131a**, the shaft **131** being journalled in bushes **133** in the inner side wall of the chamber **111**, the shaft **131** being supported at its lower end on a ball-bearing **132**.

[0052] As the cover **116** cannot be raised while the unit **110** is operating, and the opening of the cover **116** shuts off the valve supplying the water to the nozzle **150** and water knife **170**, maximum operation safety is ensured.

[0053] The solenoid **118** can also be set so that it will not allow the handle **117** to be operated (to open the cover **116**) until a preset time (eg., 2 minutes) after the valves for the nozzle **150** and water knife **170** have been shut off, the allow

the carrier **130** to stop rotating. This avoids the need for a braking mechanism for the carrier **130**.

[0054] Referring to FIGS. 4 to 6 of the third embodiment **210**, the carrier **230** is a drum with a convex bottom wall **237** mounted on the shaft **231**, driven by the impellor **236**. Slots **238** in the side wall **239** allow the water jets from the water knives **270** (within the chamber **211**) to cut open the waste bags (not shown).

[0055] The impellor **236** is driven by the water jets from water nozzles **250** mounted in the side wall **212** of the chamber **211**. The bottom wall **213** of the chamber **211** is formed by an inclined trough to direct the waste/water to a waste outlet **214** and trap **215** to a collection point or sump (not shown).

[0056] As hereinbefore described, the cover **216** has a safety interlock means to prevent operation of the unit until the cover **216** is closed, and prevent the cover from being opened until the wash cycle is completed and the carrier drum **230** is no longer rotating.

[0057] The operation of the unit **210**, including the timer means **217a**, can be controlled by a computer **217b**, and the required cycles selected via a control panel **217** on the top of the unit casing **218**.

[0058] To reduce the cycle time, an extra water nozzle, controlled by a solenoid valve, can be directed at the impellor (or turbine) **36**, **136**, **236** to apply a braking force to the carrier **30**, **130**, **230** when the wash cycle is completed.

[0059] Various changes and modifications may be made to the embodiments described and illustrated without departing from the present invention.

1. A pathological waste disposal unit including:
 - a disposal chamber having a closeable cover;
 - a waste bag carrier rotatably mounted in the chamber, having means to support a plurality of disposable waste bags;
 - means to rotate the carrier;
 - means to release the waste(s) from the waste bags;
 - washing means to clean the waste(s) from the waste bags; and
 - waste outlet means in the chamber to enable disposal of the waste(s) to a collection location or sump.
2. A unit as claimed in claim 1, wherein:
 - the disposal chamber and the cover are formed from stainless steel or suitable plastics materials.

3. A unit as claimed in claim 2 wherein:

the chamber has a cylindrical side wall, and a bottom wall or floor curved, or downwardly convergent, to the waste outlet means.

4. A unit as claimed in claim 3 wherein:

the waste outlet means is connected by an S-trap to a sump, waste collection location or to waste treatment means.

5. A unit as claimed in claim 3 wherein:

the closeable cover is hingedly mounted on the side wall and incorporates safety operating means, such as a solenoid, which prevents the disposal unit operating while the cover is raised, and/or prevents the cover being raised while the disposal unit is operating.

6. A unit as claimed in any one of claims 3 to 5 wherein:

the waste bag carrier is rotatably mounted in the chamber, co-axially with the side wall, on a support shaft via suitable bearings and/or bushings, and a plurality of hook, clip or other support means are provided on the carrier to releasably support the waste bags.

7. A unit as claimed in any one of claims 3 to 6 wherein:

the means to rotate the carrier includes an impellor into which is directed one or more jets of high-pressure water via one or more water nozzles.

8. A unit as claimed in any one of claims 3 to 6 wherein:

the carrier is mounted on a shaft, rotatably journaled in the bottom wall of the chamber, and driven, either directly or indirectly, by an electric motor, hydraulic motor, pneumatic motor or the like.

9. A unit as claimed in any one of claims 1 to 8 wherein:

the means to release the waste from the water bags includes a high pressure water "knife", or knives, or one or more retractable mechanical knives, in the chamber, which cut open the waste bags adjacent the bottom of the bags.

10. A unit as claimed in any one of claims 1 to 9 wherein:

the washing means to clean the waste from the waste bags includes one or more water nozzles in the chamber.

11. A unit as claimed in any one of claims 1 to 10 wherein:

timer means control respective valves which control the flow of water to (a) the high pressure nozzle(s) directed at the impellor and to (b) the water knife/knives.

12. A unit as claimed in claim 10 wherein:

water is supplied from a source via one or more pressure pumps.

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