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VECTOR AND ODOUR CONTROL WASTE WATER OUTLET ✓

The present invention relates to an improved waste water drainage outlet for kitchen or bathroom floors or any other surface where hygiene is important and waste material is washed away and drained off from the surface through the drainage outlet into a drainline to the sewer.

Normal floor waste water outlets used commonly in tropical countries are typically a simple hole the size of the drain pipe with a perforated lid through which the waste water passes. The perforations or slots are sized to allow the entry of waste water but to prevent the entry of waste solids of too large a size which can cause the drain pipe to become blocked. Another consideration in sizing the perforations is to prevent the intrusion of disease bearing vectors such as rats and to a limited extent, vermin, cockroaches and other smaller insects from the sewer into the house.

The perforated lid however has a tendency to become blocked by the larger solids it was designed to retain, especially by hair in bathroom waste water outlets, and needs constant clearing so as to not to interfere with its primary waste water discharge function. Accordingly, it is an object of the present invention to provide an improved waste water drainage outlet that can drain off waste water efficiently with minimal interference from retained solids and yet prevents the intrusion of vectors and vermin.

Well designed waste water drainage outlets have also hereto before used a water trap to prevent the intrusion of odours and dangerous sewer gas such as hydrogen sulphide and methane from the sewer into the house. The water trap is a U-bend immediately below the outlet that retains a pocket of water in the drain pipe to prevent gases

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from passing there through. However, since the water in the water trap is waste water, it can give rise to odours itself, especially when there is an accumulation of decomposing small solids in the U-bend. Furthermore, in tropical countries, Aedes mosquitoes of the type which can cause Dengue Haemorrhagic Fever have been found to breed in the water trap in cases where water is not discharged through the waste water outlet frequently.

Known means to overcome the problem of intrusion of odour from the sewer and to obviate the other problems associated with the water trap can be typically exemplified by the AUTOMATIC SEWER VALVE of UK patent application GB 2143262 A and DRAIN TRAP of UK patent application GB 2144162 A. Both designs use a valve device which is seated on or connected to the drain pipe. In the devices a pivoted valve flap is kept closed against the valve opening by a counterweight, thus preventing the intrusion of vermin and odour into the home. Water discharged through the outlet accumulates above the valve flap until sufficient mass of water has accumulated to overcome the counterweight's leverage and push open the valve to discharge the accumulated water into the drain pipe. However, the use of the counterweight in both designs places not only greater wear and tear on the hinge joints but also increases the number of parts needed in the assembly of the devices. The normally metallic pivot pin and counterweight are also subjected to accelerated corrosion in the humid confines of the drain pipe. Another inherent disadvantage of these devices is that they are sized to fit a particular size of outlet drain pipe and even slight changes in drain pipe sizes will require the use of a correspondingly sized device. Accordingly, it is another object of the present invention to provide an improved waste water drainage outlet which has a device that satisfactorily mitigates the aforesaid disadvantages of the prior designs.



According to the present invention there is provided a waste water drainage outlet comprising an inlet compartment for the entry of waste water, an outlet compartment for the discharge of the collected waste water and a hinged gate device in a rest position sealing the inlet compartment from the outlet compartment wherein the gate device comprises an opening flap movable in one direction from the rest position to allow the unimpeded discharge of waste water from the inlet compartment to the outlet compartment; the opening flap being prevented from moving in an opposite direction from the rest position to prevent the intrusion of odour and vermin from the outlet compartment into the inlet compartment.

Preferably the inlet compartment comprises a hinged lid having slots therein for the entry of waste water into the inlet compartment; the outlet compartment comprises a hinged cover and an outlet, and the opening flap of the gate device comprises a pivot pin; wherein the hinged lid; hinged cover and opening flap are all supported by and rotate about the pivot pin.

Advantages of a single pivot pin include the waste water outlet being easy to assemble and production costs being kept low. There is provided a single pivot pin for all of the three hinged panels, namely the inlet compartment's slotted lid, outlet compartment's maintenance cover and the one-way gate device's flap. To allow the easy changing of any of these panels should the need arise, there is provided a catch at the pivot pin hinge which when depressed will allow the removal of the pivot pin from its hinge. The catch can be optionally secured.

Preferably the outlet compartment comprises means for attaching drain pipes of varying diameters to the outlet; said means comprising multiple bottom circular rims and removable panels in the outlet



compartment, wherein each rim and panel corresponds to a different diameter of drain pipe, the size of the outlet being selectable by the removal of one or more of the removable panels.

5 Thinner punch out panels in the side wall of the outlet compartment allow the easy and neat connection of smaller drain pipes from wash basins and air conditioner units which can share the same waste water outlet as is commonly practised in some Asian countries.

10 Preferably the outlet compartment comprises a removable basket covering the outlet having radial slots of differing size located therein, such that the diameter of the outlet may also be altered by rotating the radial slots of the removable basket relative to slots in a base of the outlet compartment.

15 In this invention, the removable basket when nested in different alternative orientation over the outlet compartment's base will change the diameter of the waste water outlet through a juxtaposition of the radial slots on both the base and the removable basket and thus vary
20 the waste water outlet size to be used with various outlet drain pipe sizes.

It is desired that the removable basket comprises linear slots in one or more sides of the basket to allow waste water to continue to pass
25 through the basket when a base of the basket is blocked.

There are other features of this invention which will become apparent from the following description of the preferred embodiment of the present invention and described, by way of example only, and with
30 reference to the accompanying drawings of which:-

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Figure 1 is an isometric exploded view of the improved waste water drainage outlet of the present invention;

Figure 2 is a sectional view of the same when assembled;

Figure 3 is a plan view of the same with the hinged panels and removable basket removed;

Figure 4 is a close up isometric view of the pivot pin hinge and catch; and

Figure 5 shows three alternative positions of the removable basket nested over the outlet compartment's base.

With reference to Figure 1 the present invention comprises a rectangular box (1) open at its top with a surrounding rim (2) along a top edge of the box (1) that is sloped inwards. The box lid comprises an inlet compartment (3) for the entry of waste water and suspended solids, an outlet compartment (4) for the discharge of the collected waste water adjacent to the inlet compartment (3), and a one-way gate device (5) between the inlet compartment (3) and outlet compartment (4) to prevent the intrusion of odours and vectors from the outlet compartment (4) into the inlet compartment (3). Over the top of inlet compartment (3) is a hinged lid (6) with large slots for the entry of waste water. Side walls (20) of the inlet compartment (3) are joined to a sloping base (7) which slopes downwards towards an opening (8) on a side of the inlet compartment (3) which defines the boundary between the inlet compartments (3) and the adjoining outlet compartment (4). The plane of the opening (8) lies at an angle from the vertical and the opening (6) is bounded on three of its sides by edges (21) of the side walls (20) and an edge (22) of the base (7). A fourth, uppermost, edge of the opening (8) is defined by the plane of the rim (2). The one-way gate device (5) comprises an opening flap (10) and a pivot pin (9). The pivot pin (9) is supported at both its ends on the rim (2), from the pin is hinged the opening flap (10) and lid (6) with the pin's axis along the along the



flap's top edge. The opening flap (10) is able to swing about the pivot pin (9) but is normally in contact with the edges (21) of the side walls (20) and the edge (22) forming a fluid-tight seal over the opening (8), due to the flap's self weight against the inclined edges (21, 23) of the opening (8). The gate device (6) separates the inlet compartment (3) from the outlet compartment (4). Waste water entering the inlet compartment (3) accumulates and quickly builds up sufficient force to push open the opening flap (10) of the gate device (5) which swings out of contact with the edges (21, 22) of the opening (8) allowing the water and suspended solids to discharge into the outlet compartment (4). When the water has been discharged the cover flap (10) will swing back to its resting position under the action of gravity against the opening (8), covering and sealing it, thus preventing the intrusion of vermin and odour from the outlet compartment (4) into the inlet compartment (3).

15

The outlet compartment (4) has a hinged maintenance cover (11) over it , a base (25) with a circular sloping surface dipping towards a circular outlet (12). On the base (25) are multiple bottom circular rims (13) with removable panels (26) over circular slots (27). Removal of these panels will allow easy connection to outlet drain pipes of various sizes to the corresponding bottom circular rim provided. Nested over the said base (25) is provided a removable basket (14) with perforations (20) capable of retaining a substantial amount of solids in between removals while still allowing the efficient discharge of waste water through the side perforations (28) as the accumulated retained solids build up in the base of the basket (14). The removable basket (14) when nested in alternative orientations (15, 16) over the outlet compartment's base will also change the diameter of the waste water outlet opening through a juxtaposition of the circular slots (27) of different radius on both the said base (25) and the removable basket (14) and thus enable the waste water outlet to be used with various outlet drain pipe sizes.

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5 Additional drain pipes, such as wash basins or air conditioner units, may be connected to the waste water outlet by means of removing panels (29) in the side walls of the box (1). The panels (29) may be constructed as thinner sections of the box (1) that may be punched out if required and to which a conventional drain pipe may be attached. The panels (29) may be in the side walls of the inlet or outlet compartments (3, 4).

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**CLAIMS**

1. A waste water drainage outlet comprising an inlet compartment for the entry of waste water, an outlet compartment for the discharge of the collected waste water and a hinged gate device in a rest position sealing the inlet compartment from the outlet compartment, wherein the gate device comprises an opening flap movable in one direction from the rest position to allow the unimpeded discharge of waste water from the inlet compartment to the outlet compartment; the opening flap being prevented from moving in an opposite direction from the rest position to prevent the intrusion of odour and vermin from the outlet compartment into the inlet compartment.

2. A waste water drainage outlet as claimed in Claim 1 wherein the inlet compartment comprises a hinged lid having slots therein for the entry of waste water into the inlet compartment; the outlet compartment comprises a hinged cover and an outlet, and the opening flap of the gate device comprises a pivot pin; wherein the hinged lid, hinged cover and opening flap are all supported by and rotate about the pivot pin.

3. A waste water drainage outlet as claimed in Claim 1 or Claim 2 wherein the outlet compartment comprises means for attaching drain pipes of varying diameters to the outlet; said means comprising multiple removable panels in the outlet compartment, wherein each panel corresponds to a different diameter of drain pipe, the size of the outlet being selectable by the removal of one or more of the removable panels.

4. A waste water outlet as claimed in any preceding claim wherein the outlet compartment comprises a removable basket covering the outlet having radial slots of differing size located therein, such that the diameter of the outlet may be altered by rotating the radial slots of the





removable basket relative to slots in a base of the outlet compartment.

5. A waste water outlet as claimed in Claim 4 wherein the removable basket comprises linear slots in one or more sides of the basket to allow waste water to pass through the basket when a base of the basket is blocked.



**ABSTRACT****VECTOR AND ODOUR CONTROL WASTE WATER OUTLET**

5

An improved waste water drainage outlet comprising an inlet compartment (3) for the entry of waste water, an outlet compartment (4) for the discharge of the collected waste water and a hinged gate device (5) in a rest position sealing the inlet compartment from the outlet compartment wherein the gate device comprises an opening flap (10) movable in one direction from the rest position to allow the unimpeded discharge of waste water from the inlet compartment to the outlet compartment; the opening flap being prevented from moving in an opposite direction from the rest position to prevent the intrusion of odour and vermin from the outlet compartment into the inlet compartment.

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(Fig. 1)

(1)

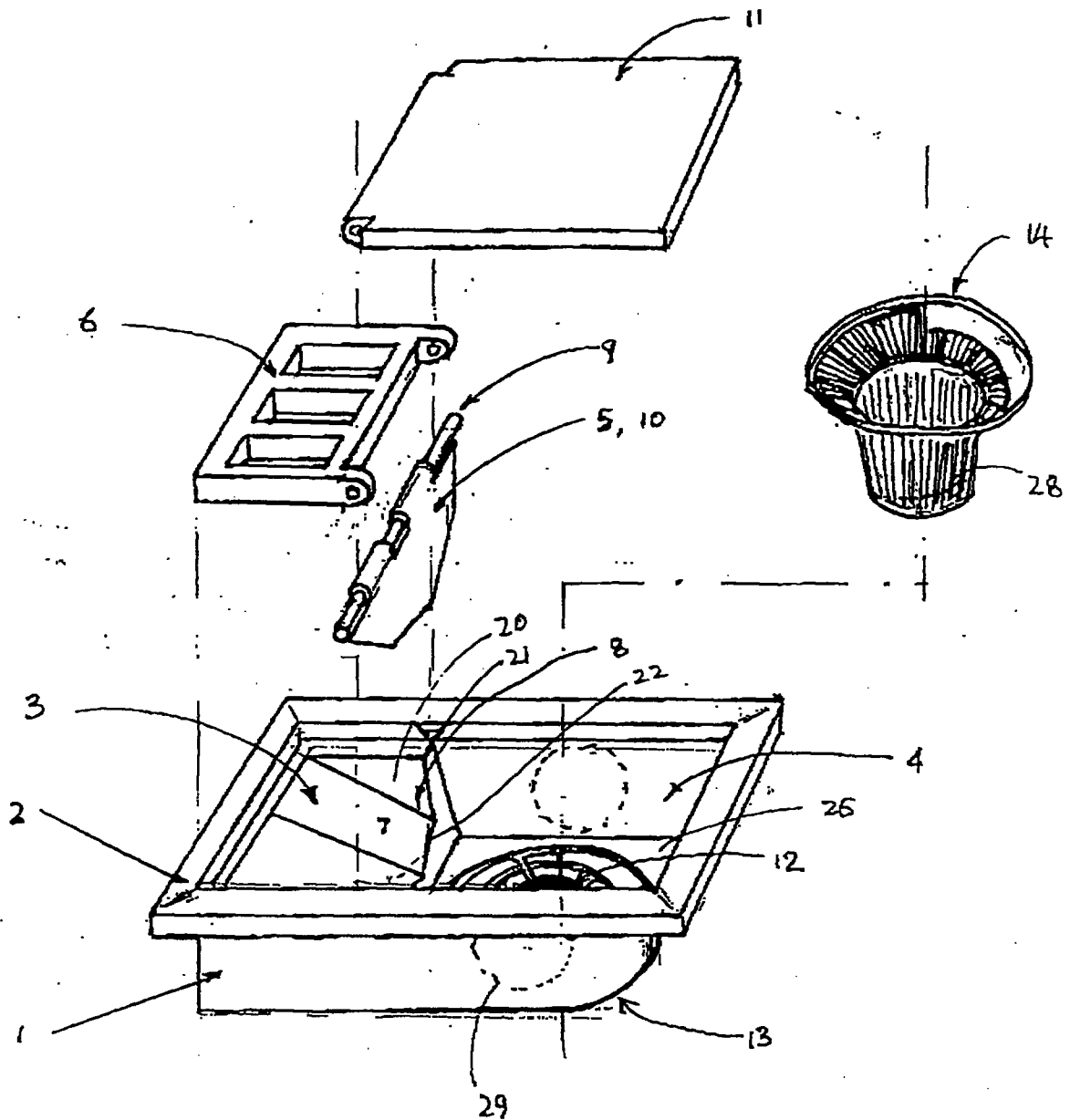


FIG 1

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(2)

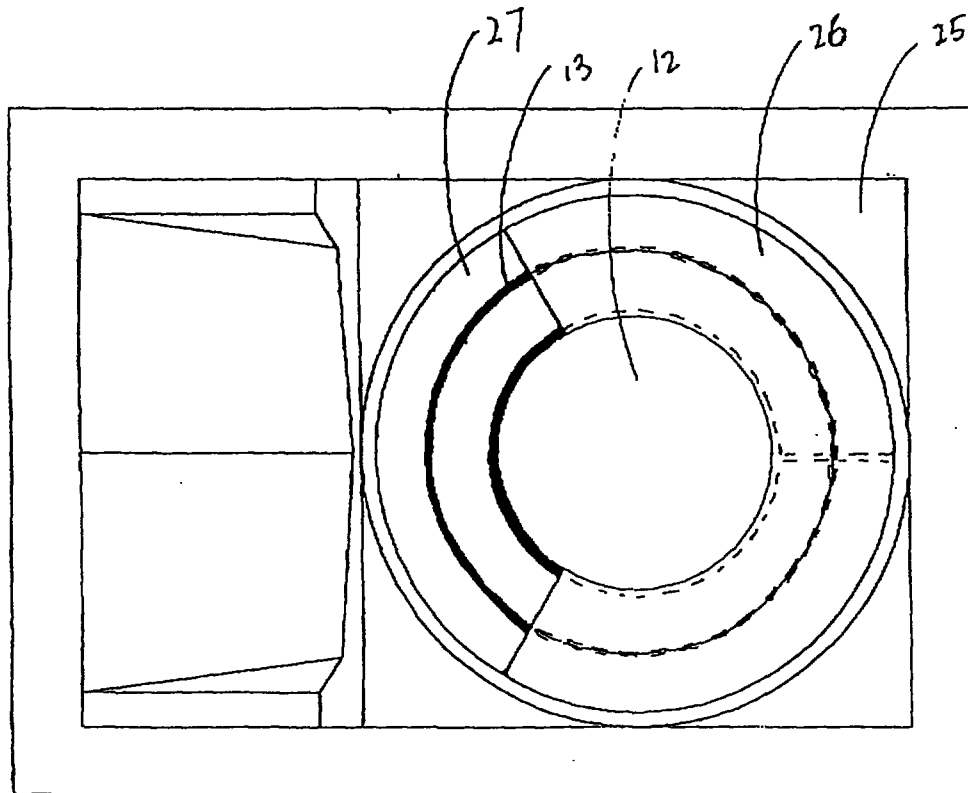


FIG. 3

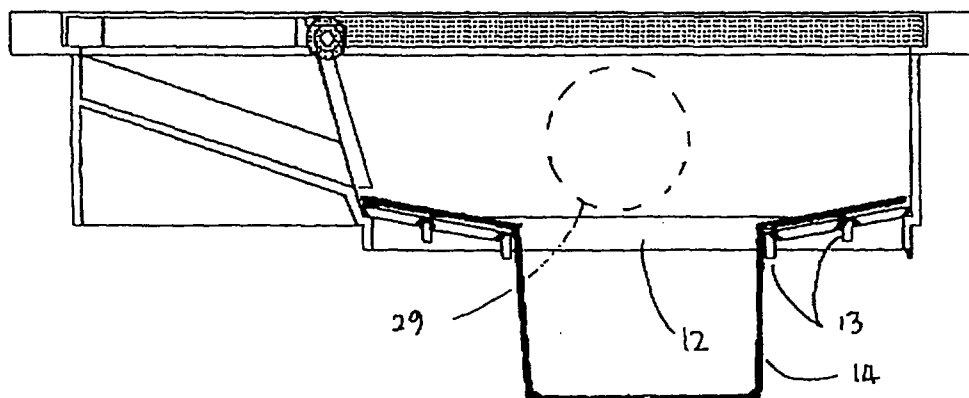


FIG. 2

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(3)

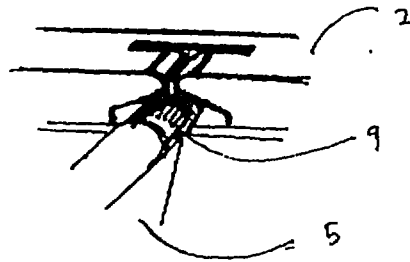
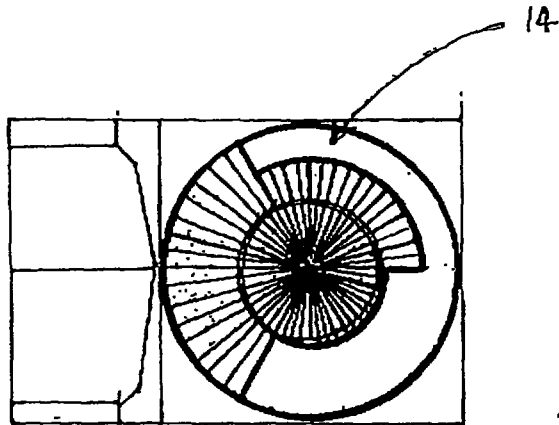


FIG 4

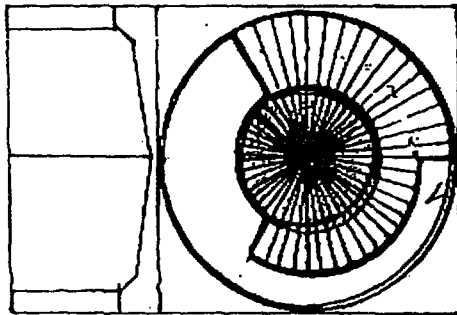
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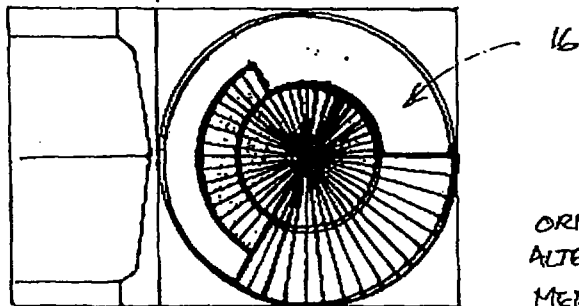
(4)



ORIENTATION
ALTERNATIVE 1
BIGGEST OUTLET SIZE



ORIENTATION
ALTERNATIVE 2
SMALLEST OUTLET SIZE



ORIENTATION
ALTERNATIVE 3
MEDIUM OUTLET SIZE

FIG. 5

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VECTOR AND ODOUR CONTROL WASTE WATER OUTLET

The present invention relates to an improved waste water drainage outlet for kitchen or bathroom floors or any other surface where hygiene is important and waste material is washed away and drained off from the surface through the drainage outlet into a drainline to the sewer.

Normal floor waste water outlets used commonly in tropical countries are typically a simple hole the size of the drain pipe with a perforated lid through which the waste water passes. The perforations or slots are sized to allow the entry of waste water but to prevent the entry of waste solids of too large a size which can cause the drain pipe to become blocked. Another consideration in sizing the perforations is to prevent the intrusion of disease bearing vectors such as rats and to a limited extent, vermin, cockroaches and other smaller insects from the sewer into the house.

The perforated lid however has a tendency to become blocked by the larger solids it was designed to retain, especially by hair in bathroom waste water outlets, and needs constant clearing so as to not to interfere with its primary waste water discharge function. Accordingly, it is an object of the present invention to provide an improved waste water drainage outlet that can drain off waste water efficiently with minimal interference from retained solids and yet prevents the intrusion of vectors and vermin.

Well designed waste water drainage outlets have also hereto before used a water trap to prevent the intrusion of odours and dangerous sewer gas such as hydrogen sulphide and methane from the sewer into the house. The water trap is a U-bend immediately below the outlet that retains a pocket of water in the drain pipe to prevent gases

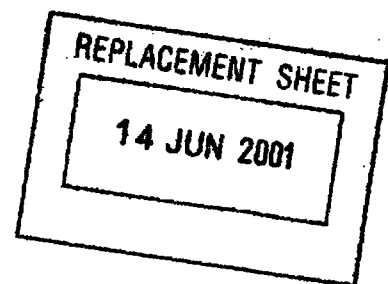
14 JUN 2001

from passing there through. However, since the water in the water trap is waste water, it can give rise to odours itself, especially when there is an accumulation of decomposing small solids in the U-bend. Furthermore, in tropical countries, Aedes mosquitoes of the type which can cause Dengue Haemorrhagic Fever have been found to breed in the water trap in cases where water is not discharged through the waste water outlet frequently.

Known means to overcome the problem of intrusion of odour from the sewer and to obviate the other problems associated with the water trap can be typically exemplified by the AUTOMATIC SEWER VALVE of UK patent application GB 2143262 A and DRAIN TRAP of UK patent application GB 2144162 A. Both designs use a valve device which is seated on or connected to the drain pipe. In the devices a pivoted valve flap is kept closed against the valve opening by a counterweight, thus preventing the intrusion of vermin and odour into the home. Water discharged through the outlet accumulates above the valve flap until sufficient mass of water has accumulated to overcome the counterweight's leverage and push open the valve to discharge the accumulated water into the drain pipe. However, the use of the counterweight in both designs places not only greater wear and tear on the hinge joints but also increases the number of parts needed in the assembly of the devices. The normally metallic pivot pin and counterweight are also subjected to accelerated corrosion in the humid confines of the drain pipe. Another inherent disadvantage of these devices is that they are sized to fit a particular size of outlet drain pipe and even slight changes in drain pipe sizes will require the use of a correspondingly sized device. Accordingly, it is another object of the present invention to provide an improved waste water drainage outlet which has a device that satisfactorily mitigates the aforesaid disadvantages of the prior designs.

To be inserted at page 2 of the Specification line 25 as indicated by ^

The above problem can be obviated by using valve flap with no counterweights as exemplified by the German patent DE 3590717A1 and the USA patent 1,211,966. However the common problem of maintaining the built-in valve flap remains due to the difficulty to gain access to or to change the valve flap.



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5 According to the present invention there is provided a waste
water drainage outlet comprising an inlet compartment for the entry of
waste water, an outlet compartment for the discharge of the collected
waste water and a hinged gate device in a rest position sealing the inlet
compartment from the outlet compartment wherein the gate device
comprises an opening flap movable in one direction from the rest
position to allow the unimpeded discharge of waste water from the inlet
compartment to the outlet compartment; the opening flap being
prevented from moving in an opposite direction from the rest position to
10 prevent the intrusion of odour and vermin from the outlet compartment
into the inlet compartment.

15 Preferably the inlet compartment comprises a hinged lid having
slots therein for the entry of waste water into the inlet compartment; the
outlet compartment comprises a hinged cover and an outlet, and the
opening flap of the gate device comprises a pivot pin; wherein the
hinged lid; hinged cover and opening flap are all supported by and
rotate about the pivot pin.

20 Advantages of a single pivot pin include the waste water outlet
being easy to assemble and production costs being kept low. There is
provided a single pivot pin for all of the three hinged panels, namely the
inlet compartment's slotted lid, outlet compartment's maintenance cover
and the one-way gate device's flap. To allow the easy changing of any
25 of these panels should the need arise, there is provided a catch at the
pivot pin hinge which when depressed will allow the removal of the pivot
pin from its hinge. The catch can be optionally secured.

30 Preferably the outlet compartment comprises means for attaching
drain pipes of varying diameters to the outlet; said means comprising
multiple bottom circular rims and removable panels in the outlet

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compartment, wherein each rim and panel corresponds to a different diameter of drain pipe, the size of the outlet being selectable by the removal of one or more of the removable panels.

5 Thinner punch out panels in the side wall of the outlet compartment allow the easy and neat connection of smaller drain pipes from wash basins and air conditioner units which can share the same waste water outlet as is commonly practised in some Asian countries.

10 Preferably the outlet compartment comprises a removable basket covering the outlet having radial slots of differing size located therein, such that the diameter of the outlet may also be altered by rotating the radial slots of the removable basket relative to slots in a base of the outlet compartment.

15 In this invention, the removable basket when nested in different alternative orientation over the outlet compartment's base will change the diameter of the waste water outlet through a juxtaposition of the radial slots on both the base and the removable basket and thus vary
20 the waste water outlet size to be used with various outlet drain pipe sizes.

It is desired that the removable basket comprises linear slots in one or more sides of the basket to allow waste water to continue to pass
25 through the basket when a base of the basket is blocked.

There are other features of this invention which will become apparent from the following description of the preferred embodiment of the present invention and described, by way of example only, and with
30 reference to the accompanying drawings of which:-

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Figure 1 is an isometric exploded view of the improved waste water drainage outlet of the present invention;

Figure 2 is a sectional view of the same when assembled;

Figure 3 is a plan view of the same with the hinged panels and removable basket removed;

Figure 4 is a close up isometric view of the pivot pin hinge and catch; and

Figure 5 shows three alternative positions of the removable basket nested over the outlet compartment's base.

With reference to Figure 1 the present invention comprises a rectangular box (1) open at its top with a surrounding rim (2) along a top edge of the box (1) that is sloped inwards. The box lid comprises an inlet compartment (3) for the entry of waste water and suspended solids, an outlet compartment (4) for the discharge of the collected waste water adjacent to the inlet compartment (3), and a one-way gate device (5) between the inlet compartment (3) and outlet compartment (4) to prevent the intrusion of odours and vectors from the outlet compartment (4) into the inlet compartment (3). Over the top of inlet compartment (3) is a hinged lid (6) with large slots for the entry of waste water. Side walls (20) of the inlet compartment (3) are joined to a sloping base (7) which slopes downwards towards an opening (8) on a side of the inlet compartment (3) which defines the boundary between the inlet compartments (3) and the adjoining outlet compartment (4). The plane of the opening (8) lies at an angle from the vertical and the opening (6) is bounded on three of its sides by edges (21) of the side walls (20) and an edge (22) of the base (7). A fourth, uppermost, edge of the opening (8) is defined by the plane of the rim (2). The one-way gate device (5) comprises an opening flap (10) and a pivot pin (9). The pivot pin (9) is supported at both its ends on the rim (2), from the pin is hinged the opening flap (10) and lid (6) with the pin's axis along the along the

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flap's top edge. The opening flap (10) is able to swing about the pivot pin (9) but is normally in contact with the edges (21) of the side walls (20) and the edge (22) forming a fluid-tight seal over the opening (8), due to the flap's self weight against the inclined edges (21, 23) of the opening (8). The gate device (6) separates the inlet compartment (3) from the outlet compartment (4). Waste water entering the inlet compartment (3) accumulates and quickly builds up sufficient force to push open the opening flap (10) of the gate device (5) which swings out of contact with the edges (21, 22) of the opening (8) allowing the water and suspended solids to discharge into the outlet compartment (4). When the water has been discharged the cover flap (10) will swing back to its resting position under the action of gravity against the opening (8), covering and sealing it, thus preventing the intrusion of vermin and odour from the outlet compartment (4) into the inlet compartment (3).

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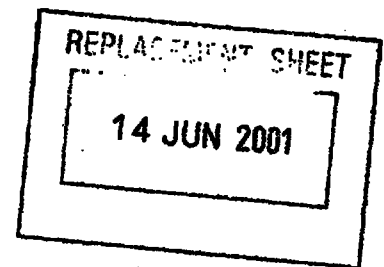
The outlet compartment (4) has a hinged maintenance cover (11) over it, a base (25) with a circular sloping surface dipping towards a circular outlet (12). On the base (25) are multiple bottom circular rims (13) with removable panels (26) over circular slots (27). Removal of these panels will allow easy connection to outlet drain pipes of various sizes to the corresponding bottom circular rim provided. Nested over the said base (25) is provided a removable basket (14) with perforations (20) capable of retaining a substantial amount of solids in between removals while still allowing the efficient discharge of waste water through the side perforations (28) as the accumulated retained solids build up in the base of the basket (14). The removable basket (14) when nested in alternative orientations (15, 16) over the outlet compartment's base will also change the diameter of the waste water outlet opening through a juxtaposition of the circular slots (27) of different radius on both the said base (25) and the removable basket (14) and thus enable the waste water outlet to be used with various outlet drain pipe sizes.

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5 Additional drain pipes, such as wash basins or air conditioner units, may be connected to the waste water outlet by means of removing panels (29) in the side walls of the box (1). The panels (29) may be constructed as thinner sections of the box (1) that may be punched out if required and to which a conventional drain pipe may be attached. The panels (29) may be in the side walls of the inlet or outlet compartments (3, 4).



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CLAIMS

5 1. An improved waste water drainage outlet comprising an inlet compartment (3) with hinged lid with slots (6) for the entry of waste water, an outlet compartment (4) with hinged cover (11) for the discharge of the collected waste water and a gate device (5) with a hinged opening flap (10) in a rest position sealing the inlet compartment (3) from the outlet compartment (4) wherein the hinged lid (6), hinged cover (11) and hinged opening flap (10) are all supported by and rotate about a common
10 pivot pin (9).

2. A waste water drainage outlet as claimed in claim 1 wherein the outlet compartment (4) can be attached to drain pipes of varying diameters through multiple bottom circular rims (13) with removable
15 panels (26) in the outlet compartment (4), wherein each panel corresponds to a different diameter of drain pipe, the size of the outlet being selectable by the removal of one or more of the removable panels

3. A waste water outlet as claimed in any preceding claim wherein the
20 outlet compartment comprises a removable basket (14) covering the outlet having radial slots of differing size located therein, such that the diameter of the outlet may be altered by rotating the radial slots of the



removable basket (14) relative to slots in the base of the outlet compartment (4).

- 5 4. A waste water outlet as claimed in Claim 3 wherein the removable basket (14) comprises linear slots in one or more sides of the basket to allow waste water to pass through the basket when a base of the basket is blocked.

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REPLACEMENT SHEET

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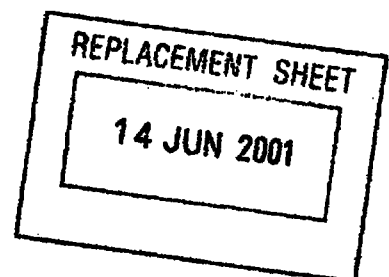
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* C L N S *

ABSTRACT**VECTOR AND ODOUR CONTROL WASTE WATER OUTLET**

An improved waste water drainage outlet comprising an inlet compartment (3) with hinged lid with slots (6) for the entry of waste water, an outlet compartment (4) with hinged cover (11) for the discharge of the collected waste water and a gate device (5) with a hinged opening flap (10) in a rest position sealing the inlet compartment (3) from the outlet compartment (4) wherein the hinged lid (6), hinged cover (11) and hinged opening flap (10) are all supported by and rotate about a common pivot pin (9).



REPLACEMENT SHEET
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(1)

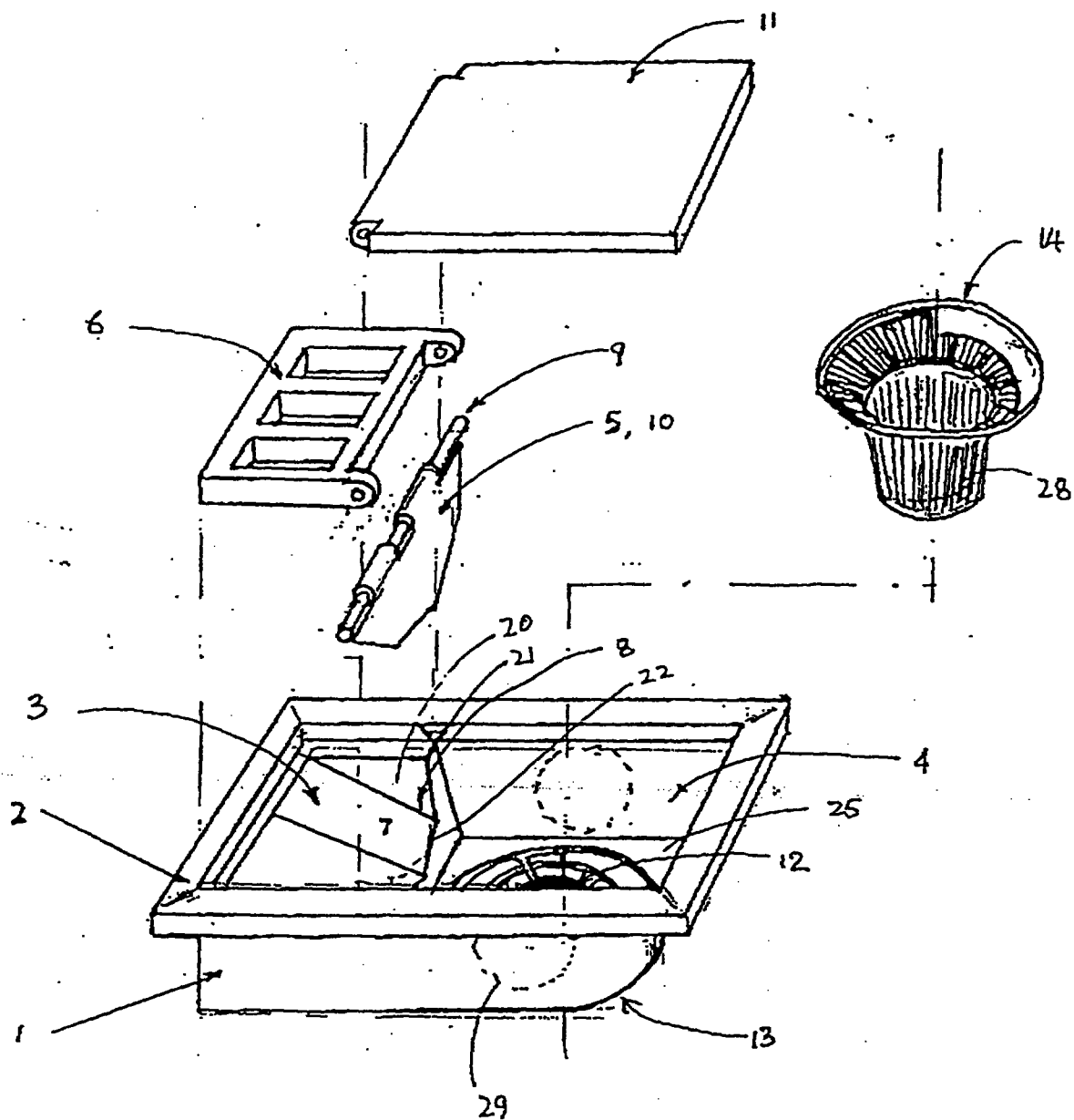


FIG 1

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(2)

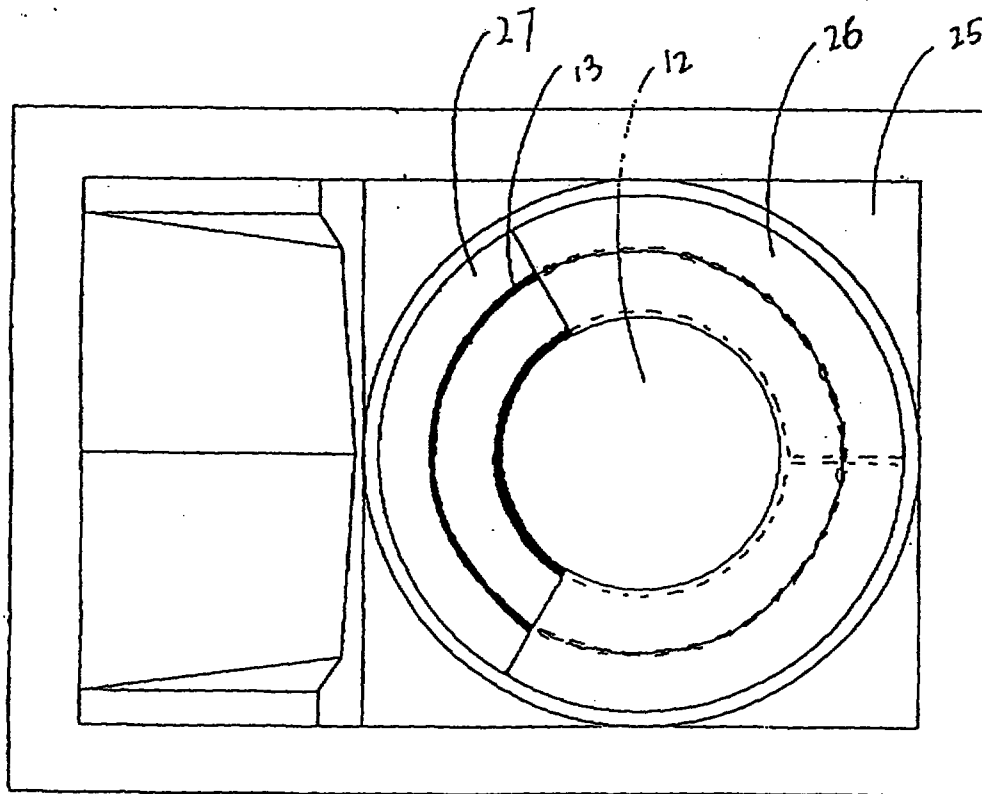


FIG. 3

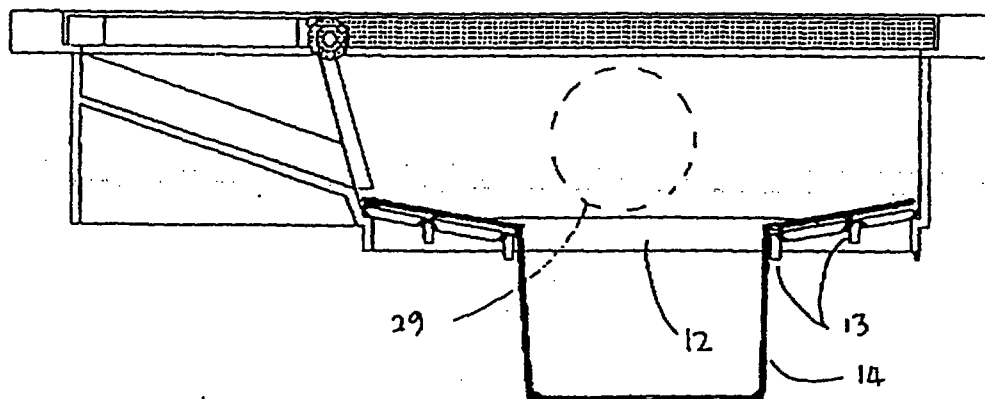


FIG. 2

(3)

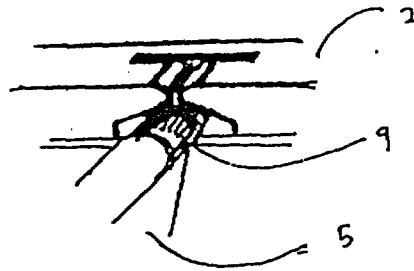
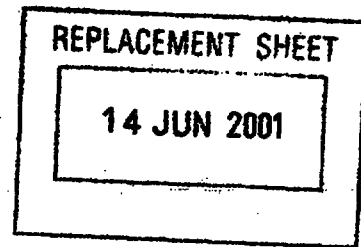
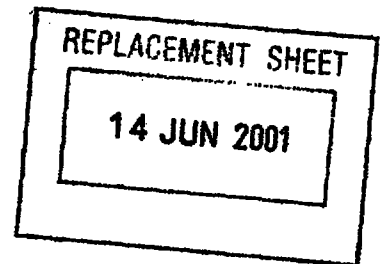
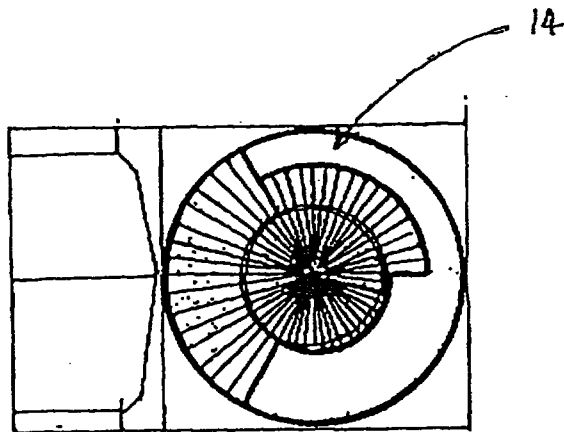


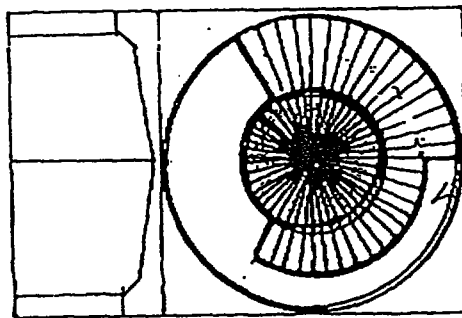
FIG 4



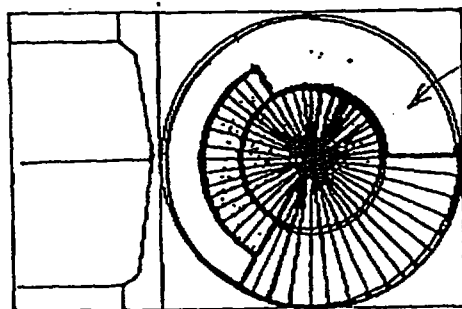
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ORIENTATION
ALTERNATIVE 1
BIGGEST OUTLET SIZE



ORIENTATION
ALTERNATIVE 2
SMALLEST OUTLET SIZE



ORIENTATION
ALTERNATIVE 3
MEDIUM OUTLET SIZE

FIG. 5