

**SHREDDER DEVICE INTENDED TO BE CONNECTED TO A TOILET
BOWL**

The present invention relates generally to macerators
5 for toilet or WC devices, said macerators being used to
dilacerate solid matter and to allow for the outlet of
the WCs through small diameter piping.

As is known per se, such a device comprises a tank into
10 which is poured the content of the WC bowl when
flushing the system and into which is also poured, in
certain cases, the outlet from a wash basin and/or from
a shower or from a bath tub. An evacuation pump sucks
the content of the tank through a dilaceration means
15 placed at the bottom of a basket and discharges it
toward the evacuation piping. The dilaceration means is
generally a cutter revolving in front of a grill. A
pressure switch is used to detect the water level in
the tank in order to start up the evacuation pump, via
20 a microswitch, when the tank has to be emptied.

The problem encountered with such devices is that of
their repair when the tank evacuates badly. An
evacuation fault has three main causes: a fault with
25 the pump motor power supply which is provided by a
capacitor, a pump motor failure of the microswitch, or
clogging of matter around the dilaceration cutter
preventing it from revolving.

30 It is then necessary to have access to the capacitor,
to the microswitch and/or to the dilaceration means.

Numerous arrangements have been proposed since these
devices have been in existence. Originally the pump
35 motor and its electric power supply were placed outside
the tank while the pump and the dilaceration means were
at the bottom of the tank. Servicing in case of
failures of the electrical power supply or of the motor

was easy but offered little safety, particularly for children. The access to the bottom of the tank to repair the pump or the dilaceration cutter was not easy and the assembly was rather unattractive.

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In the more recent devices, a motor/pump/dilaceration means assembly is made watertight and positioned in the tank, waterproof power supply wires passing through the wall of the tank to connect the motor to the power supply circuit. Similarly, the microswitch and the capacitor are housed in the pressure switch whose interior can be accessed only via the membrane of the pressure switch which is naturally placed at its bottom part. In order to further improve the safety of the assembly, a lid is secured to the tank by strong snap-fitting means.

The drawback with such a device is that it requires servicing by a professional for any repair, the assembly housed behind the WC bowl being barely accessible and requiring some experience to unclick the lid.

The present invention proposes a macerator device arranged so as to allow for easy maintenance, possibly by a nonprofessional, in the case of the more commonplace breakdowns of this appliance.

To this end, the invention provides a macerator device intended to be connected to a WC bowl, which consists of a tank into which are brought the water and the matter from said WC bowl and in which is placed a motor equipped on its top part with a dilaceration means included in a basket and at its bottom part with a pump, said motor connected to a capacitor and a microswitch being started up by a pressure sensitive switch controlling the microswitch, and the microswitch/ capacitor/pressure switch assembly forming

a control module, which control module is situated under an access hatch provided in the lid of said tank and sealed by a removable cover, the microswitch and the capacitor being accessible at the top part of the control module, and/or the motor/pump/dilaceration means assembly is situated under an access hatch provided in the lid of said tank and sealed by a removable cover.

10 The macerator device according to the present invention therefore has three embodiments:

1) a first embodiment in which the control module is situated under an access hatch provided in the lid of said tank and sealed by a removable cover, the microswitch and the capacitor being accessible at the top part of the control module

2) a second embodiment in which the motor/pump/dilaceration means assembly is situated under an access hatch provided in the lid of said tank and sealed by a removable cover, and

3) a third embodiment in which the control module is situated under an access hatch provided in the lid of said tank and sealed by a removable cover, the microswitch and the capacitor being accessible at the top part of the control module, and the motor/pump/dilaceration means assembly is situated under an access hatch provided in the lid of said tank and sealed by a removable cover.

30 In the case of the third embodiment, the microswitch/capacitor/pressure switch assembly forming a control module and the motor/pump/dilaceration means assembly are advantageously arranged in the tank on either side of the link pipe to the WC bowl.

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The macerator device may also have the following characteristics

- the access hatch or hatches are defined by a vertical cylindrical skirt including a shoulder and are sealed by a removable cover, for example screwed to the lid of the tank.
- 5 - the access hatch to the dilaceration means is fitted with an additional lid mounted in a leaktight manner in said access hatch, for example the additional lid is screwed to the shoulder of the vertical skirt defining said
10 access hatch.
- the control module is equipped at its bottom end with a membrane which, under the pressure of the water rising in the tank, raises a rod which actuates the microswitch placed at the
15 top part of the control module.
- the capacitor is housed in a recess of the control module.

This makes it possible, by removal of said cover or
20 covers, to access the active parts susceptible to servicing, without dismantling the WC bowl or the snap-fitted lid. The present invention will now be described in detail with reference to the following figures:

25 Figures 1A and 1B are schematic front and plan views of a macerator device according to the prior art.

Figure 2A is a schematic front view of the interior of a macerator device according to the first embodiment of
30 the invention.

Figure 2B is a schematic plan view of the interior of the macerator device of Figure 2A.

35 Figure 3A is a schematic front view of the interior of a macerator device according to the second embodiment of the invention.

Figure 3B is a schematic plan view of the interior of the macerator device of Figure 3A.

Figure 4A is a schematic front view of the interior of a macerator device according to the third embodiment of the invention.

Figure 4B is a schematic plan view of the interior of the macerator device of Figure 4A.

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In all the figures, the same reference numbers are used to designate identical elements in the prior art and in the present invention.

15 In the prior art, the motor/pump/dilaceration means assembly is placed facing the pipe 101 for the arrival of the matter and the water from the WC bowl while the control module is placed to the side. This control module consists of a pressure switch 50 equipped at its
20 bottom part with a membrane 51 which is fixed to the pressure switch by a seal 52 and which, under the pressure of the water rising in the tank, raises a rod which actuates the microswitch contained in the pressure switch and which is not visible in Figures 1A
25 and 1B. The motor 3 is also connected to a capacitor housed in the pressure switch 50 and not visible in Figures 1A and 1B.

For space-saving reasons, the pressure switch has an
30 elliptical section, which has the effect of making it more difficult to produce the leaktight fixing of the membrane 51 and the fitting of a seal 52 of the same section.

35 The macerator device according to the present invention comprises a tank 1 of generally parallelepipedal form sealed by a lid 2 attached to the tank 1 by snap-fitting means 110 borne by the tank 1. These snap-

fitting means are strong and can be undone generally only by a professional equipped with appropriate tools.

As is known per se, the tank includes a pipe 101 of
5 relatively large dimension for the arrival of the
matter and of the water from the WC bowl, a pipe 102
connected to the outlet of a bidet or of a shower, a
pipe 103 connected to the outlet of a wash basin and a
pipe 104 connected to a controlled mechanical
10 ventilation device.

There now follows a detailed description of the third
embodiment of the invention, by referring to Figures 4A
and 4B, the first and second embodiments constituting
15 only variants of this third embodiment in which the
position of the control module and of the motor/pump/
dilaceration means assembly is immaterial although
these means are represented in the figures as centered
on the link pipe 101 to the WC.

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In the case of this embodiment, the control module 10
and the motor/pump/dilaceration means assembly 3, 7, 5,
6 are placed on either side of the link pipe to the WC
bowl, which makes it possible to give the pressure
25 switch a cylindrical section and to use the membrane of
circular section which is easier to fit and which gives
a better leaktightness.

A motor 3 equipped at its base with a pump 7 at the
30 bottom of the tank 1 is placed, for example, to the
left of the orifice 101 bringing matter and water and
is topped by a perforated basket 4 in the bottom of
which is mounted a dilaceration means consisting of a
cutter 5 and a centrifuge hub 6. The pump 7 is
35 evacuated via a pipe 110. The electrical links between
the outside and the motor are neither represented nor
described because they are known to those skilled in

the art. Those between the motor and the pump are not represented but will be described later.

5 A capacitor 12 and a microswitch 11 are placed in a control module 10 to the right of the orifice 101 bringing matter and water.

10 It is understood that the position of the control module 10 and of the motor/pump/dilaceration means assembly may be reversed without affecting the present invention.

15 This control module 10 is equipped at its bottom end with a membrane which, under the pressure of the water rising in the tank, raises a rod which moves in a chimney 10A and which actuates the microswitch 11 placed at the top part of the module 10. The motor is also connected to the capacitor 12 placed in a cylindrical housing 13 attached to the chimney 10A of the module 10. The capacitor and microswitch are used to start the motor. The electric wires connecting the microswitch and the capacitor to the motor are housed in a watertight sheath with a length greater than the distance between module and motor so as to enable the module 10 to be removed if necessary from its position defined hereinbelow.

30 The module 10 is held in place by its positioning under a shoulder 22 of a cylindrical vertical wall 20 defining an access hatch in the lid 2. This access hatch is sealed by a cover 8 fixed by a screw or any other fixing means easy to implement. By removing the cover 8, access to the microswitch 11 and to the capacitor 12 is possible.

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The access hatch to the motor/pump/dilaceration means assembly is defined by a cylindrical vertical wall 21 including a shoulder 23. It is sealed by a cover 8a

fixed by a screw or any other fixing means easy to implement and is also sealed by a lid 9 fixed in a leaktight manner to the shoulder 23 to avoid leaks through the cover 8a.

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The operation of the system is conventional: when the water from the WC, from the bidet, from the shower or from the wash basin enters into the tank 2, it acts on the membrane which, by rising, actuates the microswitch
10 which starts up the motor. The pump sucks the water and the matter and passes them through the cutter 5 and through the perforated basket 4 and then evacuates them through the pipe 110.

15 Breakdowns of such a system are mainly of three kinds:

- failure of the microswitch 11
- failure of the capacitor 12
- the presence of an obstruction or of a mass of hair-type matter in the perforated basket 4
20 preventing the cutter 5 from revolving.

The device according to the third embodiment of the invention makes it possible to have access through the covers 8 and 8a to the microswitch 11 and to the
25 capacitor 12 on the one hand and to the perforated basket 4 and to the dilaceration means 5, 6 on the other hand. The devices according to the first and the second embodiments allow access to only one or other of these two assemblies 11, 12 and 4, 5, 6.

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Once the cover 8 is open, the user can replace the microswitch 11 or the capacitor 12.

After opening the cover 8a and then the lid 9, fixed
35 for example by screwing, respectively to the lid 2 of the tank 1 and the shoulder 23 of the vertical wall 21, the user has access to the basket and can remove an obstruction or the mass of hair-type matter from it.

To avoid injuring the user, the lid 9, for example colored red, is advantageously marked with warnings of the type: "Open only after shutting off the electrical
5 power supply".

According to another characteristic of the invention, the non-return valves 105 and 106 with which the pipes bringing the outlet water from a wash basin and/or from
10 a shower or from a bath tub are provided, are arranged in the inlet pipes 102 and 103, outside the tank 1. Conventionally, the non-return valves of the inlet pipes are arranged at the junction of the tank and of the pipes, inside the tank, and are accessible only
15 from inside the tank. The valves 105 and 106 are mounted in the pipes 102 and 103. In the present invention, the pipes 102 and 103 are short pipes coupled by threaded parts to the outlet pipes from the washbasin and/or from the shower or bath tub (not
20 represented). By dismantling these couplings, the user has access to the non-return valves either to replace them or to remove an object which might obstruct them or jam them in the open or closed position.

25 The macerator device according to the present invention therefore offers great ease of intervention on the elements which are the cause of the most commonplace breakdowns, without the need for a professional.

CLAIMS

1. A macerator device intended to be connected to a WC bowl, which consists of a tank (1) into which are brought the water and the matter from said WC bowl and in which is placed a motor (3) equipped on its top part with a dilaceration means (5, 6) included in a basket (4) and at its bottom part with a pump (7), said motor (3) connected to a capacitor (12) and a microswitch (11) being started up by a pressure sensitive switch controlling the microswitch, and the microswitch/capacitor/pressure switch assembly forming a control module (10), macerator device characterized in that the control module (10) is situated below an access hatch provided in the lid (2) of said tank and sealed by a removable cover (8) and the microswitch (11) and the capacitor (12) are accessible at the top part of the control module (10), and/or the motor/pump/dilaceration means assembly (3, 7, 5, 6) is situated below an access hatch provided in the lid (2) of said tank and sealed by a removable cover (8a).

2. The device as claimed in claim 1, characterized in that, in the case where the control module (10) and the motor/pump/dilaceration means assembly are both situated below an access hatch sealed by a removable cover (8a), they are arranged in the tank (1) on either side of the link pipe (101) to the WC bowl.

3. The macerator device as claimed in claim 1 or 2, characterized in that each access hatch is defined by a vertical cylindrical skirt (20, 21) including a shoulder (22, 23) and is sealed by a removable cover (8, 8a).

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4. The macerator device as claimed in claim 3, characterized in that the removable cover (8, 8a) is screwed to the lid (2) of the tank (1).

5. The macerator device as claimed in any one of claims 1 to 4, characterized in that the access hatch to the dilaceration means (5, 6) is fitted with an additional lid (9) mounted in a leaktight manner in said access hatch.

6. The macerator device as claimed in claim 5, characterized in that the lid (9) is screwed to the shoulder (23) of the vertical skirt (21) defining said access hatch.

7. The macerator device as claimed in any one of claims 1 to 6, characterized in that the module (10) is equipped at its bottom end with a membrane which, under the pressure of the water rising in the tank, raises a rod which actuates the microswitch (11) placed at the top part of the control module (10).

8. The macerator device as claimed in claim 7, characterized in that the capacitor (12) is placed in a cylindrical housing (13) attached to the control module (10).

9. The macerator device as claimed in any one of claims 1 to 8, characterized in that the pipes (102, 103) bringing the waste waters from a wash basin, from a shower or from a bidet are provided with check valves (105, 106) mounted outside the tank (2).