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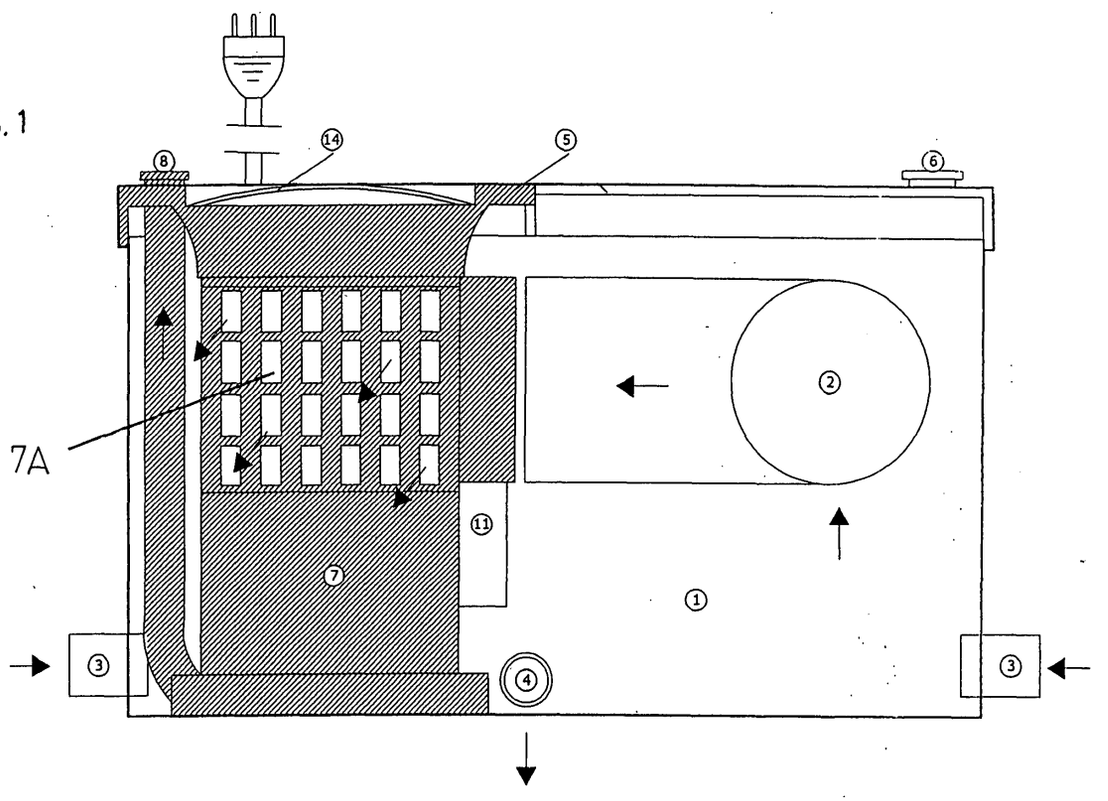
(54) Apparatus for crushing and pumping sewage and wastewater equipped with removable engine

(57) This invention consists of a crushing apparatus including an engine for crushing and pumping sewage that is connected to a removable lid and is immersed into a tank, in the portion opposite to the conduit connected to the toilet, so that it can be easily raised and removed. The lid includes also an area for the electric connections of the engine. In this way, the user can drain the tank and then remove the engine and proceed without any problem with the maintenance of the same tank.

FIG. 1



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Description

Technical Field

[0001] The subject of the present invention is an apparatus for crushing and pumping sewage and wastewater, where the mechanisms for crushing, pumping and controlling, immersed into the tank collecting the water coming from the toilet and the other hygienic-sanitary facilities, are arranged in such a way as to be easily removed in the case of necessary operations of maintenance and/or restoration of their functionality, in ideal hygienic conditions.

Background art

[0002] Thanks to their convenient usefulness, the sanitary facilities equipped with apparatus for crushing and pumping sewage and wastewater are more and more widespread. Furthermore, the most effective kind of apparatus, which is also the one mainly found on the market and used, includes a crushing and pumping engine "dipped" into the water to be treated. This water mostly contains human excreta, toilet paper and other waste material that can cause malfunction or clogging in the crushing and pumping apparatus, with the consequent need to clean, carry out periodically maintenance, repair and/or replace the same apparatus.

[0003] Currently, in order to work on this apparatus, it's necessary to drain sewage and wastewater from the collecting tank and from the toilet possibly connected to it, then it's necessary to disconnect and dismantle the same toilet, the pipes collecting the water coming from the several sanitary facilities and other possible utilities, as well as the pipes for flushing the same water. This operation, absolutely complicated and awkward considering the composition of the sewage, currently needs the help of a plumber or qualified technician provided with suitable tools, thus involving time and economic drawbacks for the final user, as well as risks of accidents (cuts, abrasions, infections, etc.)

Disclosure of invention

[0004] The subject of this invention is an apparatus for crushing and pumping sewage and wastewater, after flushing the water out by means of suitable systems and devices for hermetic drainage already on the market. The mechanisms for crushing, pumping and controlling are arranged in such a way as to be easily removed, thus preventing the operator from having direct contact with the treated materials and completely avoiding any risk of accidents (cuts, abrasions, infections, etc.)

[0005] In practice, said apparatus permits, in the case of necessary maintenance or failure, to remove the crushing and pumping engine from the tank collecting the sewage, thus avoiding the disconnection of the toilet and the pipes collecting and flushing the water.

[0006] In this way, the help of a plumber or qualified technician, provided with suitable tools, is no more necessary.

[0007] Actually, after the flushing of the water, the final user can personally remove the crushing and pumping engine and directly proceed cleaning the mechanisms or sending the same engine to a qualified assistance service, in a short time and without any risk of accidents.

[0008] Reduced to its essential structure, a crushing and pumping apparatus, according to the present invention, comprises:

- a tank (1) collecting the water coming from the conduit (2) connected to the toilet and/or the conduits (3) connected to other facilities, provided with a lid (4) necessary to drain the same tank;
- an engine for crushing and pumping the sewage (7), equipped with a reducer-filter (7A), placed in a side portion of the tank, opposite to the hole of the conduit (2) connected to the toilet;
- a lid (5), placed and firmly fixed over said engine equipped with filter (7, 7A), connected to a discharge channel (8), a pneumatic caisson (11), the manostat (10), the condenser (12) and the electric connections (13), so that by raising the lid, all these components raise.

[0009] The lid (5) is hermetic and removable and can take any shape sufficient to cover only the portion of the tank where the engine is located, while the other portion is covered by a fixed lid (5A) or can constitute integral part of the same collecting tank.

[0010] In a practical solution, the removable lid is equipped with a handle (14) in order to facilitate the raising of the lid and then the removal of the engine with the other components connected to it.

[0011] The lid, as well as the crushing and pumping engine, can be placed on the left or right portion of the tank, anyway opposite to the conduit (2) connected to the toilet.

[0012] Said lid (5) includes an area (9) for the manostat (10), the condenser (12), the electric connections (13) and the possible devices for warning by visual and/or sound signals of possible mistakes of positioning or bad seal between the lid (5) and the whole unit of the tank (1).

[0013] Inside the tank (1), we find the crushing and pumping engine (7) including a reducer-filter (7A), the discharge channel (8) to the branch sewer and a pneumatic caisson (11) connected with the manostat (10).

[0014] Conveniently, all the following components form a single body: the lid (5), the crushing and pumping engine with the reducer-filter (7, 7A), the discharge channel (8), the pneumatic caisson (11) and the area (9) including the manostat (10), the condenser (12), the electric connections (13) and the possible devices for warning by visual and/or sound signals of possible mistakes of positioning or bad seal between the lid (5) and

the whole unit of the tank (1); said single body can be completely removed from the tank, after the disconnection of the electrical system, which is possible simply removing a normal electric plug from the relative socket.

[0015] Conveniently, the conduit (2) is connected to the crushing and pumping engine (7, 7A), being attached by contact to the perimeter of the respective openings, so that the sewage passes from the one to the other and the engine (7, 7A) can be raised and removed without any interference with the conduit (2).

[0016] Conveniently, the discharge channel (8) is integrated to the crushing and pumping engine (7, 7A) while its external part will be then connected to the discharge pipes by means of any known system. Before raising the lid (5) and removing all the components fixed to it, it's necessary also to divide the discharge channel from the discharge pipe it is connected to.

[0017] Conveniently, the conduit of this crushing apparatus connected to the toilet is placed on the left or right side of the tank, while the crushing and pumping engine (7, 7A) is located at the opposite side of the tank, so that it can be easily removed from its place. In this way, the user will find easier to work on the tank and carry out maintenance of the elements it contains, since they can be easily reached.

[0018] Thus, considering the manufacturing characteristics of this apparatus, whenever necessary, the user disconnects the electrical system, drains the tank by means of the lid (4) for the flow of the water, removes the fasteners between the lid (5) and the tank (1), without disconnecting the toilet and all the other pipes, then proceeds simply removing from the top the whole crushing and pumping engine (7), with no need to use complicated and expensive tools, no need of assistance from qualified technicians, and no risk of accidents.

Brief description of drawings

[0019] What we have previously described can be better understood by referring to the enclosed drawings, given as practical examples of the invention, but not to be considered restrictive.

- Fig. 1 shows a front section view of the apparatus.
- Fig. 2 shows a back section view of the apparatus.
- Fig. 3 shows a front section schematic view of the apparatus, with the detail of the crushing and pumping engine removed from the collecting tank.
- Fig. 4 shows a top view of the apparatus with lid and Fig. 5 shows a top view of the apparatus without lid.
- Fig. 6 shows a schematic view of the apparatus fitted and connected to hygienic-sanitary facilities.

[0020] With reference to said figures, the crushing and pumping apparatus of the present invention consists of a tank (1) collecting the water coming from the conduit (2) connected to the toilet, from the conduits (3) connected to other facilities, and from the lid (4) necessary to drain the same tank. A portion of said tank is covered at the top by a hermetic and removable lid (5), equipped with a handle (14), of suitable shape and size. The tank also includes an air valve (6).

[0021] This removable lid (5) can be placed on the left or right portion of the tank, anyway opposite to the conduit (2) connected to the toilet.

[0022] Said lid (5) includes an area (9) for the manostat (10), the condenser (12), the electric connections (13) and the possible devices for warning by visual and/or sound signals of possible mistakes of positioning or bad seal between the lid (5) and the whole unit of the tank (1).

[0023] Inside the tank (1), we find the crushing and pumping engine (7) including a reducer-filter (7A), the discharge channel (8) to the branch sewer and the pneumatic caisson (11) connected with the manostat (10).

[0024] The whole crushing and pumping engine with the reducer-filter (7-7A), including the discharge channel (8), the pneumatic caisson (11) and the manostat (10), are appropriately fixed to the lid (5) and form with it a single body.

[0025] Therefore, whenever necessary, the user disconnects the electrical system, drains the tank by means of the lid (4) for the flow of the water, removes the fasteners between the lid (5) and the tank (1), without disconnecting the toilet and all the other pipes, then proceeds simply removing from the top the whole crushing and pumping engine (7), with no need to use complicated and expensive tools, no need of assistance from qualified technicians, and no risk of accidents.

Claims

1. Crushing and pumping apparatus **characterised in that** it comprises:

   - a tank collecting the water coming from the conduit connected to the toilet and/or the conduits connected to other facilities, provided with a lid necessary to drain the same tank;
   - an engine for crushing and pumping the sewage, equipped with a reducer-filter, placed in the left or right portion of the tank, opposite to the conduit connected to the toilet;
   - a lid, placed and firmly fixed over said engine equipped with filter, connected to a discharge channel, a pneumatic caisson, the manostat, the condenser and the electric connections, so that by raising the lid, all these components raise.

2. Apparatus as claimed in claim 1, **characterized in that** the lid (5) is hermetic and removable and covers only the portion of the tank where the engine is located, while the other portion is covered by a fixed lid or can constitute integral part of the same col-

lecting tank.

3. Apparatus as claimed in claim 2, **characterized in that** the lid is equipped with a handle (14) in order to facilitate the raising of the lid and then the removal of the engine with the other components connected to it.

4. Apparatus as claimed in claim 1, **characterized in that** the lid, as well as the crushing and pumping engine, can be placed on the left or right portion of the tank, anyway opposite to the conduit connected to the toilet.

5. Apparatus as claimed in claim 1, **characterized in that** said lid (5) includes an area (9) for the manostat (10), the condenser (12), the electric connections (13) and the possible devices for warning by visual and/or sound signals of possible mistakes of positioning or bad seal between the lid (5) and the whole unit of the tank (1).

6. Apparatus as claimed in claim 1, **characterized in that** inside the tank (1) we find the crushing and pumping engine (7) including a reducer-filter (7A), the discharge channel (8) to the branch sewer and a pneumatic caisson (11) connected with the manostat (10).

7. Apparatus as claimed in claim 1, **characterized in that** all the following components form a single body: the lid (5), the crushing and pumping engine with the reducer-filter (7, 7A), the discharge channel (8), the pneumatic caisson (11) and the area (9) including the manostat (10), the condenser (12), the electric connections (13) and the possible devices for warning by visual and/or sound signals of possible mistakes of positioning or bad seal between the lid (5) and the whole unit of the tank (1); said single body can be completely removed from the tank, after the disconnection of the electrical system.

8. Apparatus as claimed in claim 1, **characterized in that** the conduit (2) is connected to the crushing and pumping engine (7, 7A), being attached by contact to the perimeter of the respective openings, so that the sewage passes from the one to the other and the engine (7, 7A) can be raised and removed without any interference with the conduit (2).

9. Apparatus as claimed in claim 1, **characterized in that** the conduit connected to the toilet is placed on the left or right side of the tank, while the crushing and pumping engine (7, 7A) is located at the opposite side of the tank, so that it can be easily removed from its place.

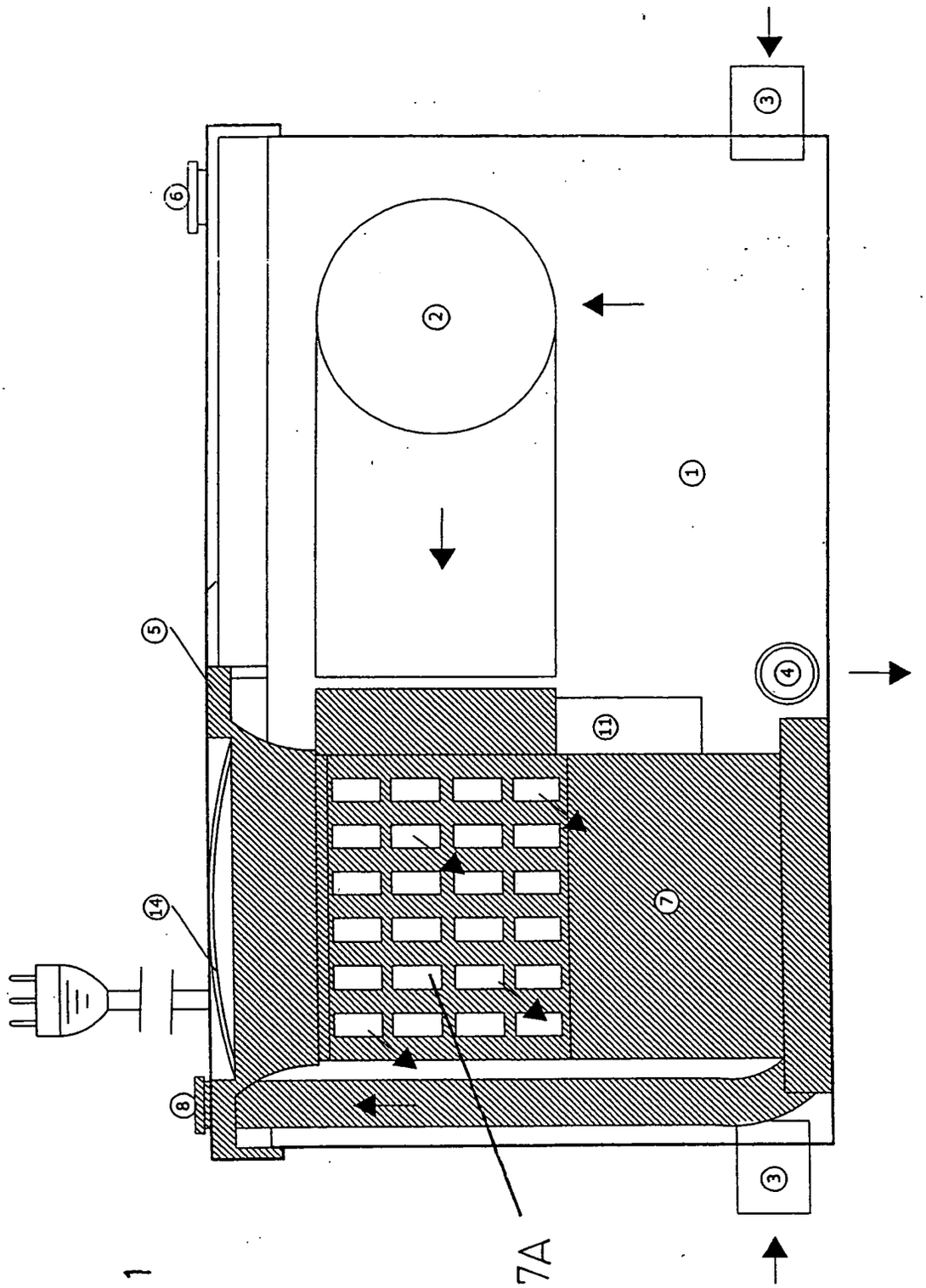

FIG. 1

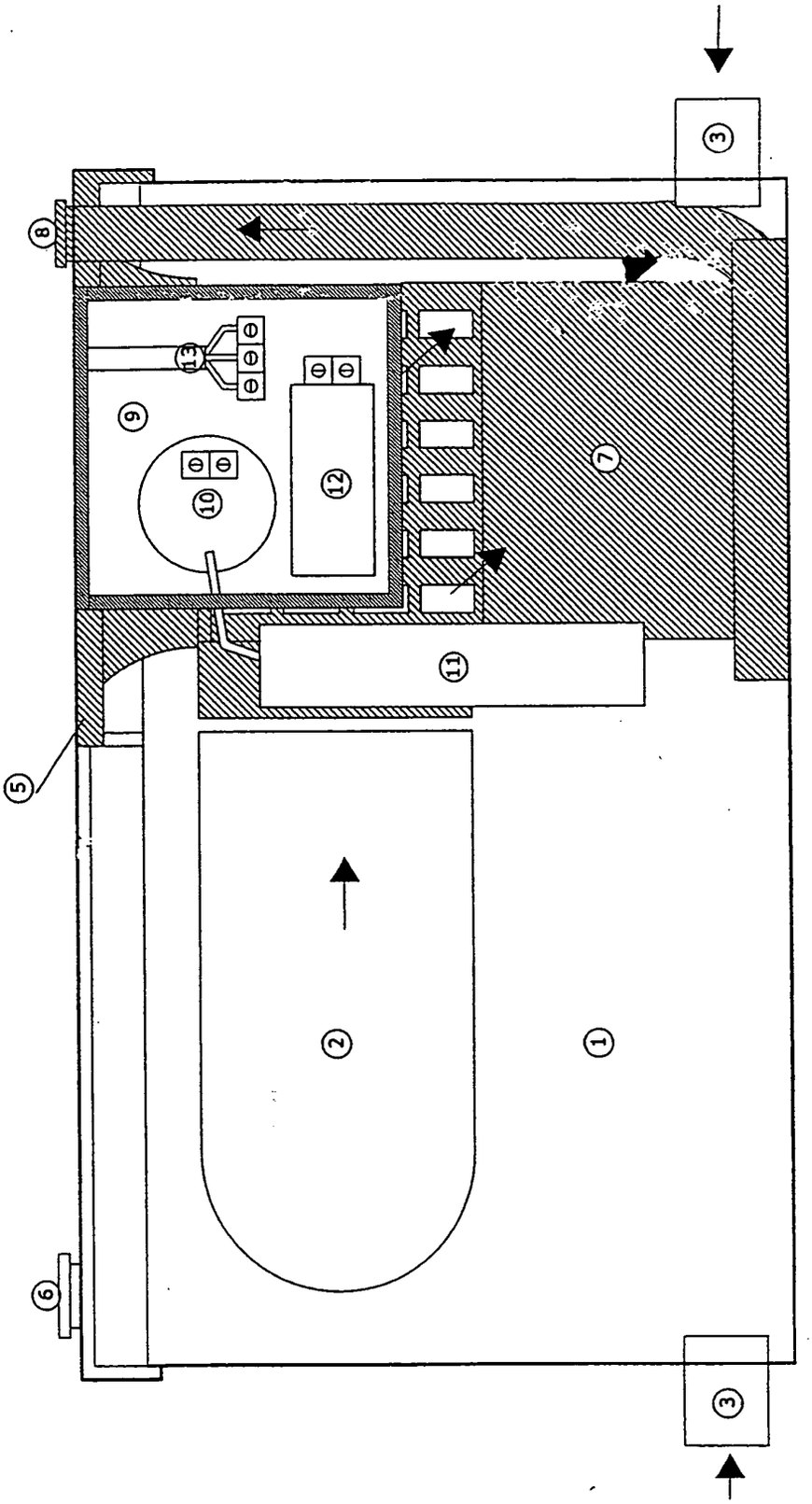

FIG. 2

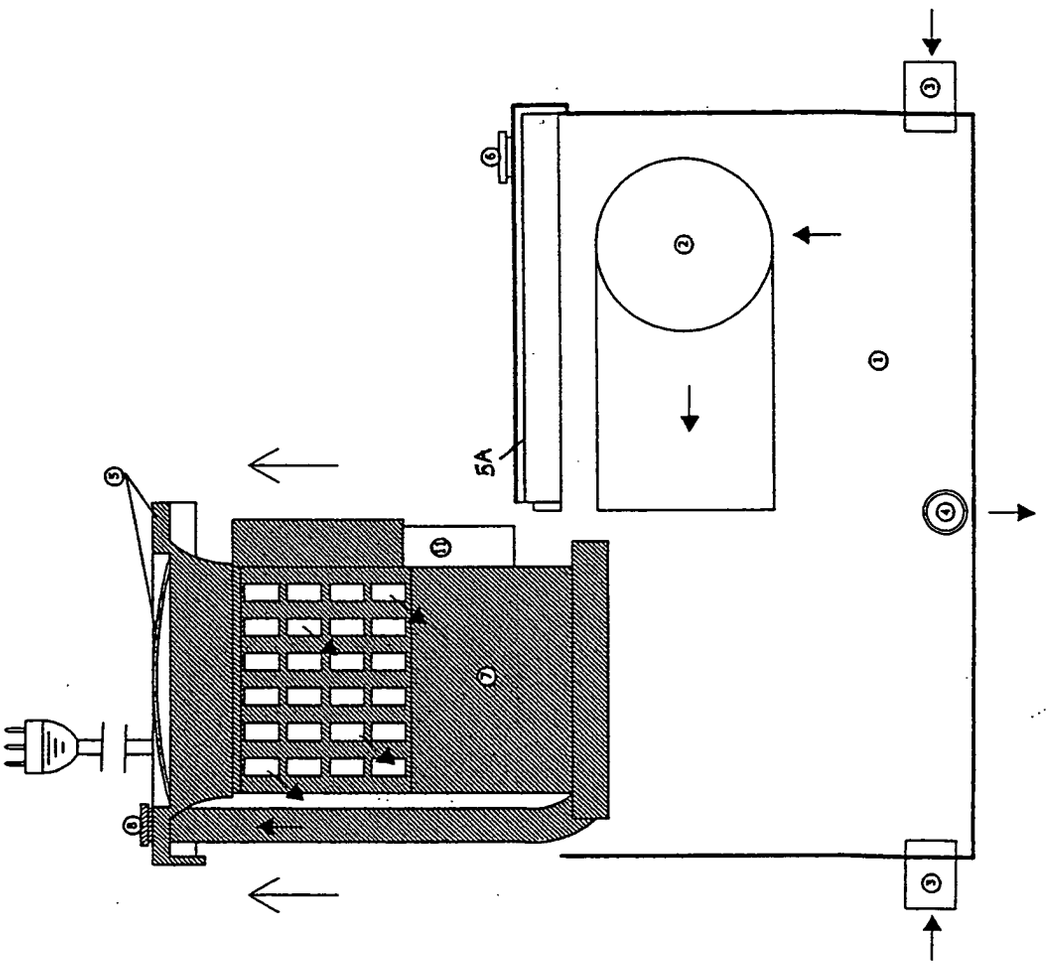

FIG. 3

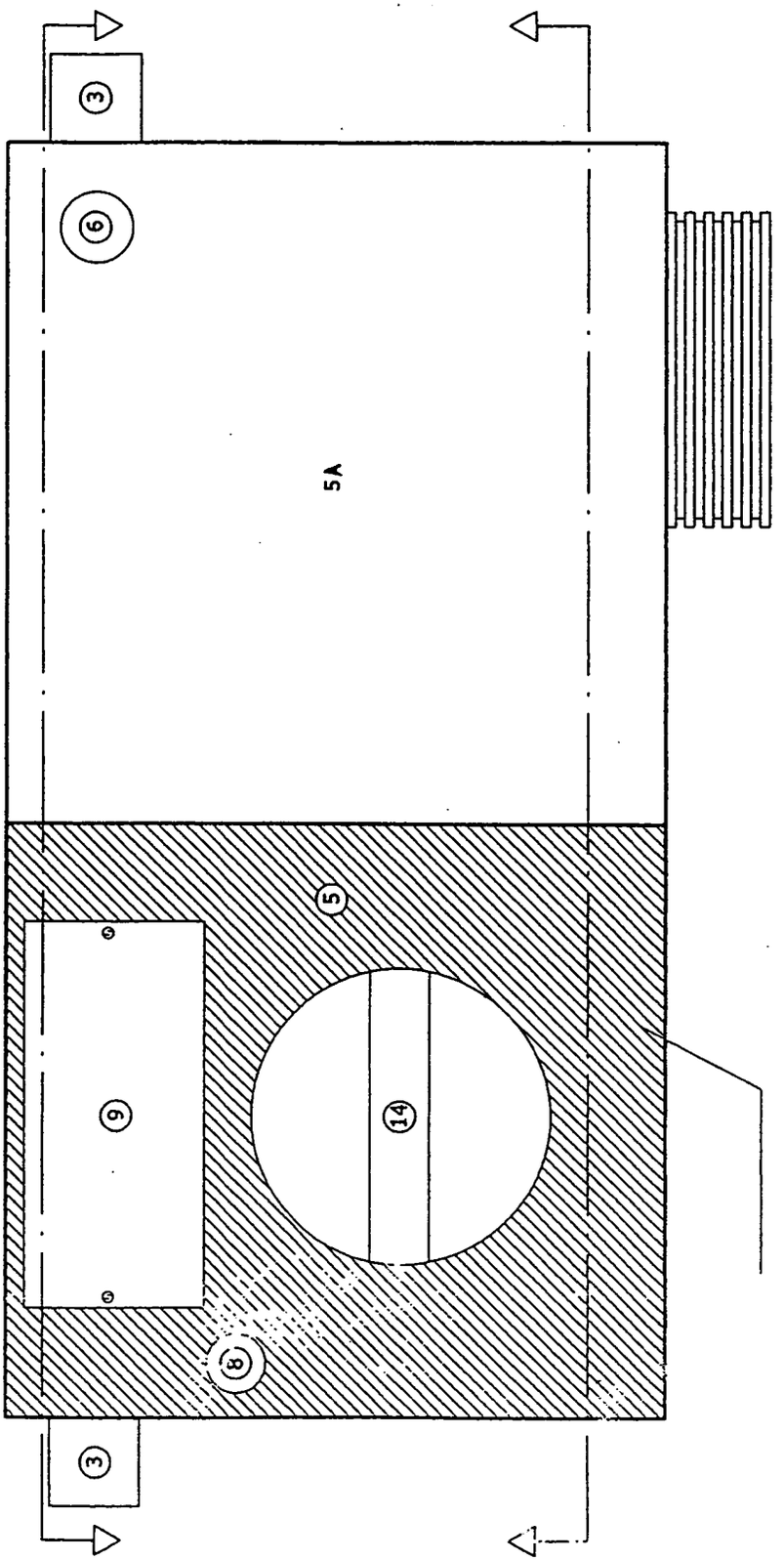

FIG.4

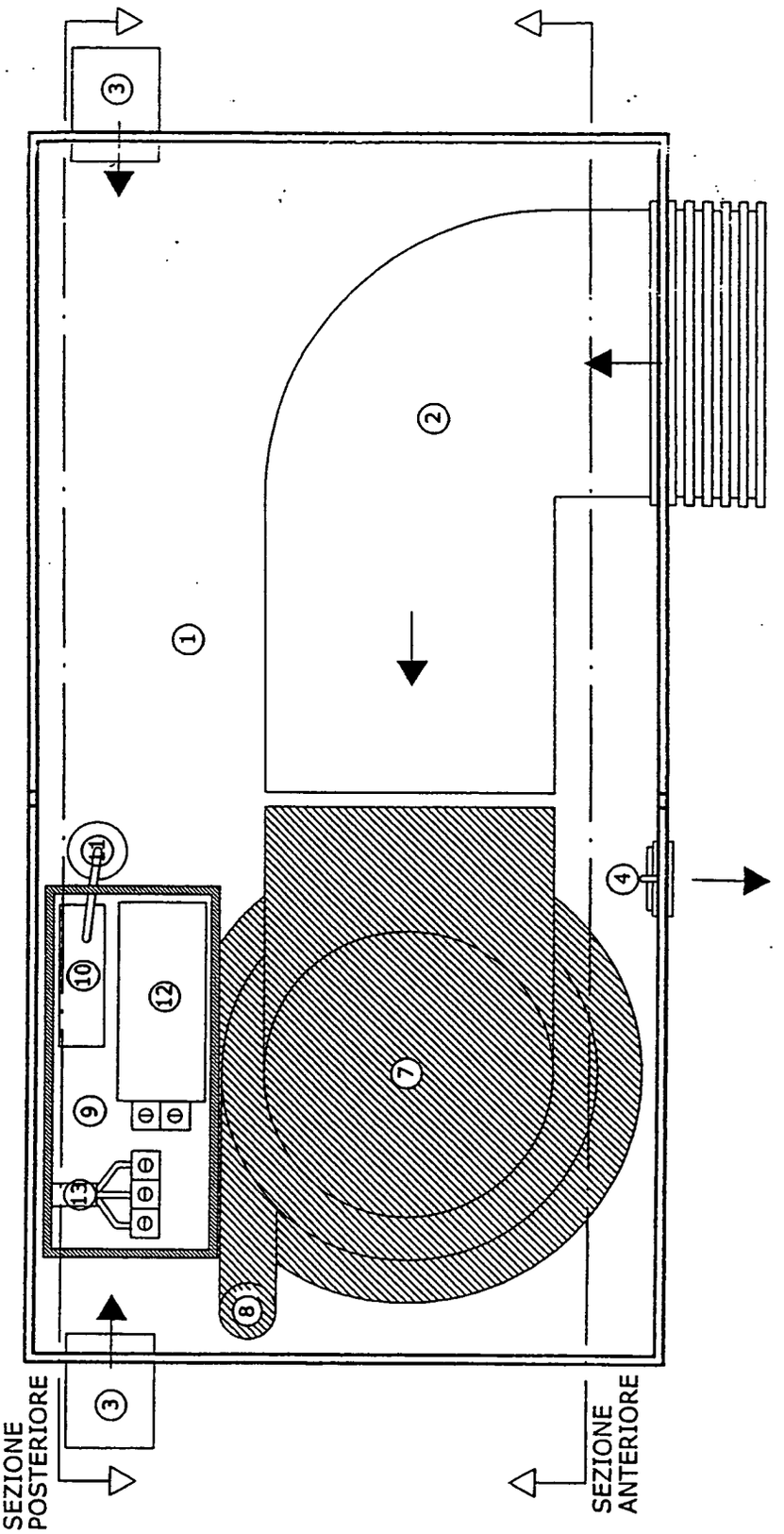

FIG. 5

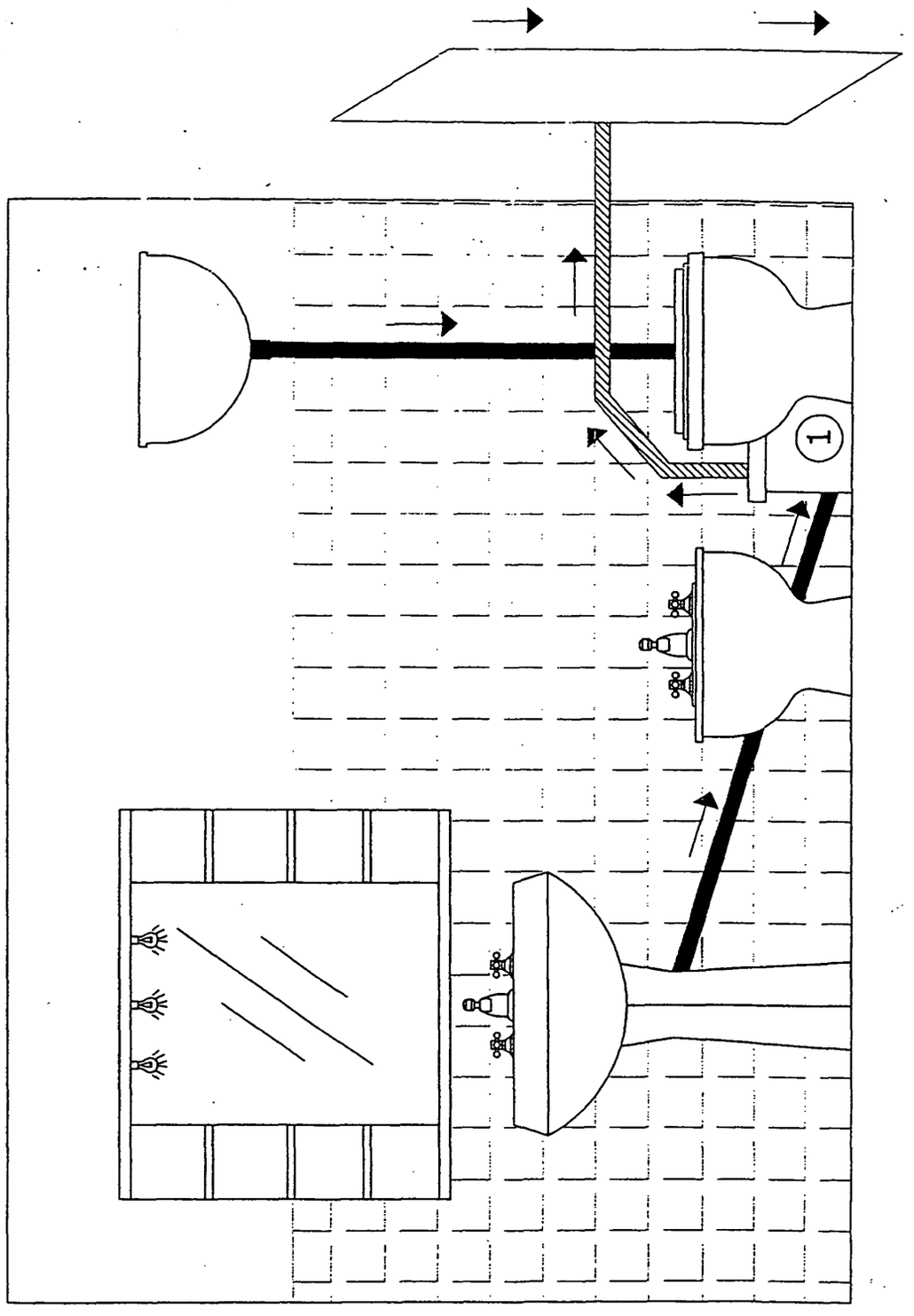

FIG. 6