

PROCESS AND MACHINE FOR THE TREATMENT OF WASTES

OBJECT OF THE INVENTION

As expressed in the title of this specification, the present invention consists of a machine for the treatment
5 of wastes by means of compaction or solidification by means of a color coded binder in accordance with the type of waste. In other words, a new process and suitable machine are combined to carry out the process, which may be for domestic or industrial use.

10 Due to the fact that the XXI century will be the century concerned with the environment, and that it is not possible to maintain the rate of destruction of the ecosystem in order to produce raw materials, nor is it possible to incinerate all wastes due to the contamination
15 this would produce, it is necessary TO REDUCE WASTES, TO REUSE WASTES AND TO RECYCLE WASTES.

The process that is going to be described and the appropriate machine for this purpose, are based on a totally innovative concept and it proves to be very
20 advantageous in many senses, given that it allows WASTES TO BE REDUCED, REUSED AND RECYCLED. The process is easy to use and also causes a reduction of containers on thoroughfares and in the service cost for the government.

BACKGROUND OF THE INVENTION

25 As background and without trying to make an exhaustive list of all possible wastes and concentrating on urban wastes as an example for the description of the application of this new process and machine, we can state the following background:

30 Nowadays urban wastes tend to be placed by users or people who produce wastes, in containers or vessels generally owned by the city government. These wastes, after they are picked up by the corresponding garbage collectors, may have two destinations:

35 - Destruction or incineration (traditional garbage

dumps)

- Transfer to so-called "transfer" plants. These plants may have two basic activities:

5 . Compacting wastes and packing them for their subsequent transfer to a waste incinerator.

10 . Collecting mixed wastes and trying to select the wastes usable for subsequent reuse or recycling and the non-usable ones compacting them for their subsequent destruction in an incinerating plant, or in a controlled dump.

15 Presently there is also a tendency to request the collaboration of citizens to make a previous selection of wastes, in such a way that they may be treated more easily in the plants of destination, or even so that they may be recycled, such as in the case of specific containers for paper, glass, batteries, cans, etc.

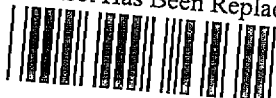
20 This collaboration becomes difficult because it has to combine ease for the user, so that it is effective, the availability on thoroughfares and the cost that the Government may assume.

DESCRIPTION OF THE INVENTION

25 In broad outline, the process for the treatment of wastes, that comprises the object of the invention, as well as the machine whereby said process is carried out, are based on a new concept which comes from the idea that the entire process of selection and compaction of wastes is done by user himself, at the place where the wastes are produced and using for this purpose the machine which will be like another electrical appliance in homes, restaurants, cafeterias, etc.

30 In this way countless advantages are obtained, since the wastes leave the place of production already prepared, without producing bad smells for users or on thoroughfares, preventing pollution by waste putrefaction, being easily storable by users as well as of the new containers on

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thoroughfares, reducing up to one-fourth the volume of wastes and allowing selective garbage collection, which would involve a drastic reduction of all costs of the municipal services or of the government, and in general of the entire waste collection process and subsequent treatment thereof.

As it has already been indicated above, waste selection is done by the person himself who produces the same, that is to say, it is done in the home of the user himself, in bars, restaurants, industry, etc. For this purpose, a multiple container, with various individual vessels or ones separated by partitions, is used, in such a way that the wastes may be deposited selectively; for example, paper, glass, cans, organic wastes, plastic, tetrabrik, etc.

Subsequently, as the vessels of the container become filled, with the already classified wastes, they are emptied into the tank of the machine that will be described hereinafter and that comprises the object of the present invention, for treatment thereof according to the type of deposited waste.

The machine is comprised of a loading tank wherein the pre-selected wastes are deposited. For this purpose it has a cover in the top part, through which the wastes are inserted and it is closed during the process.

One of the side walls of this tank is formed by an attack plate or surface of a horizontal cylinder that advances pressing the contents of the tank and thus producing the first pressing of the wastes horizontally.

Afterwards, another smaller plate cylinder that operates vertically, produces a second pressing so that the wastes remain converted into a compact and dehydrated briquette, in the event that the wastes had any liquid or were wet.

For this purpose, the base of the tank is provided

with holes that communicate with a collector and its corresponding drain in order to evacuate the liquids that may be produced during the successive pressings. Said collector has some showers connected to a water tank and
5 another disinfectant tank for cleaning and periodic disinfecting of the surface thereof, as well as of the tank.

A hand selector has also been provided for in order to choose the operating pressure of the cylinders in terms of
10 the type of wastes to be treated.

The briquette thus formed is diverted by means of the action of the vertical cylinder itself, towards a bottom chamber, which takes place once the bottom of the tank that is materialized by a movable plate, has been moved by means
15 of the action of another cylinder, in order to allow the briquette to come out. This chamber is provided with heating means, generally resistors that are automatically connected when the briquette enters the chamber.

A binder, which may be of any type of resin or any
20 other suitable binder, is injected onto the briquette in this heating chamber, through some injection channels and simultaneously a dye is injected, in such a way that the binder and the dye combine. The dye is of a different color depending on the type of waste, in accordance with a
25 previously established color code.

Once the binder and the dye have covered the entire surface of the briquette, the heating means are disconnected in order to allow polymerization and solidification thereof.

30 The binder as well as the different dyes are contained in some suitable tanks, placed in the body of the machine, taking advantage of unused hollow spaces.

Then, the cylinder withdraws, making the movable plate retract in order to place it in its initial position, that
35 is to say, placing again under the loading tank, the

collector and the heating chamber, over the opening for ejection of the briquettes. Each one of the briquettes is pushed by one or several chambers, that operate vertically, producing their fall by gravity to a storage chamber
5 provided for in the base of the machine, from where they will be removed at the opportune moment so as to be subsequently transferred to some collective selective residue containers, which upon the waste briquette being color coded, will allow storage thereof inside the public
10 container in a classified manner, making it possible to maintain this pre-classification in the rest of the chain with the advantages that this involves.

The color coded collective waste containers, as well as the conveyance that intervenes up to the transfer
15 plants, may include classified storage, equipping the corresponding spaces inside the container or inside the conveyor tank.

All of the movements are preferably of electric or hydraulic drive, although they may indistinctly be of
20 pneumatic or mechanical drive.

Likewise, all the movements are perfectly synchronized in accordance with a programmed sequence, for which there are controls, meters, sensors, etc. and their corresponding control panel.

25 There are also doors for access to the inside for the cleaning and maintenance of the different mechanisms.

The fact that the thrust plates of the different cylinders, with which the pressing chamber is closed, may take on different surface shapes in order to also act as a
30 mold for the briquettes, so that different shapes - spherical, cylindrical, prismatic, etc., although the rectangular parallelipiped shape has been advantageously preferred because it is the simplest and most easily stackable for storage of briquette, may be conveniently
35 obtained, should also be pointed out.

As one can see, the process set forth has countless advantages within the chain of production, collection and treatment of wastes, contributing to improve the present-day processes and systems that intervene in the elimination and recycling of wastes.

This arrangement achieves a series of advantages, among which we can cite the following:

- It reduces wastes up to 25% of the present volume, in places of waste production, and therefore on thoroughfares or places used for this purpose.
- The machine is totally hygienic, given that the binder forms an insulating and waterproof layer, avoiding wetness, smells and pollution, as the wastes do not contact with oxygen that starts the putrefaction process.
- Likewise, the liquids in their initial, non-polluting state, are neutralized in their expulsion path through the drain, avoiding their chemical alteration and subsequent pollution.
- The selective color coded collection allows briquettes of different types of wastes to be grouped together, permitting in a simple and low cost manner, the reuse and recycling of wastes.
- It is very ecological, given that it will reduce emissions to the atmosphere coming from incinerating plants and smells coming from composting plants. It will reduce the problems of sealing dumps and the problems derived from gases in the same.
- It allows effective and efficient waste management.
- It permits the normalization of the waste management policy given that the different present-day social, economic, political factors, etc. are causing a lack of a uniform environmental policy.
- Reduction of the high present costs in the waste collection and treatment chain.
- It allows for users' awareness and permits their

cooperation in collective responsibility of the environment.

To provide a better understanding of the features of the invention and forming an integral part of this specification, some sheets of drawings in whose figures with an illustrative and non-restrictive manner, the following has been represented, are attached hereto:

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a general schematic view of the machine for the treatment of wastes, object of the invention.

Figure 2 is a schematic raised side view of the same machine.

Figure 3 is a side view of figure 2.

Figure 4 is a plan view of what which has been shown in figure 2.

Figure 5 shows a series of schematic views with respective operating sequences.

Figure 6 is a raised longitudinal section of the same machine for the treatment of wastes and particularly of the section related to the compacting chamber.

Figure 7 is a plan longitudinal section of the top fixed plate, under which the movable plate slides.

Figure 8 is a plan longitudinal section of the bottom plate, above which the movable plate moves.

Figure 9 is a raised longitudinal sectioned view of the movable plate.

Figure 10 is a top plan view of the same plate as in figure 9.

Figure 11 is a raised side view of the liquid collector.

Figure 12 is a raised view of the heating chamber for solidification of the briquettes.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Making reference to the numbering used in the figures, we can see how the process for the treatment of wastes,

which the invention proposes, may be carried out in a machine whose structural and functional characteristics we can see outlined in the different drawings. As we have said above, the wastes are classified in a multiple
5 container which is not represented in the figures. Subsequently they are emptied into the tank of the machine for the treatment of wastes which is described hereinafter.

This machine is generally referred to as number (1) and the tank or chamber where the wastes (2) are introduced
10 is referred to as number (3). In figure 2, the volume occupied by the wastes (2) coincides with that of the chamber (3). Reference (4) designates the loading cover of the compacting chamber, which is to be kept closed while the machine is operating.

15 The wall of the chamber or tank (3) is formed by a plate (5) connected to the horizontal chamber (6), with which the first pressing stage is achieved (also see step a) of figure 5).

Reference (7) of this figure 2 designates the
20 vertical hydraulic cylinder, to whose rod is integral the plate (8) with which the vertical compacting is achieved to form briquettes (9) (see figure 5).

Figures 2 and 3 also show the electric motor (10) that puts into operation the pump of the hydraulic circuit
25 driving the different cylinders. Reference (11) marks the location of the hydraulic plant.

The base of the tank of the compacting chamber (3) (fig. 10) forms part of the movable plate (12) whose geometry is seen more clearly in figure 9. This movable
30 plate includes in the top part, a series of through holes (13) of the liquids or juices that can be produced during the successive pressings, which are collected in the collector (14) (see figures 5 and 6). In figures 6 to 12 one can see how the movable plate (12) moves by the action
35 of the hydraulic cylinder (15), duly guided between the top

(16) and bottom (17) fixed plates. The top plate (16) has a front window (18) and a rear one (19), the dimensions of this window (18) being the ones that correspond to the vertical cylinder (7) plate (8) and the formed briquette (9) will pass through the window, as shown in sequences b) and c) of figure 5.

On its part, the bottom fixed plate (17) also has a window (20) in its rear part, for the exit of the briquette (9) towards the storage area, as shown in step d) of figure 5.

After the horizontal pressing (step a) of figure 5) and also the vertical pressing (step b) of figure 5) have taken place, the cylinder (15) driving the movable plate (12) pushes it moving it horizontally from its initial position (step c), in such a way that under the base of the tank (3) is located the chamber (21) contained in the movable plate (12), towards which is transferred the briquette (9) by means of the vertical thrust of the hydraulic cylinder (7), as is shown in step c) of figure 5. The heating means that automatically turn on when the briquette (9) enters into it, are found in this chamber (21). Reference (22) designates the channels for injection of the binder on the briquette (9), as well as of the dye that is combined with the binder.

The dye is of a different color, depending on the type of wastes, according to a previously established color code.

Once the binder and the dye have coated the complete surface of the briquette, the heating means disconnect in order to facilitate polymerization and solidification thereof.

Finally, in step d) of figure 5, when the hydraulic cylinder (15) withdraws, making the movable plate (12) drawback to place it in its initial position, the heating chamber (21) locates itself over the ejection opening (20)

of the formed briquette (9). Each one of these briquettes is pushed at the right moment, by one or several vertical action pushing elements (23), producing the fall thereof by gravity to a storage chamber (24) provided in the base of the machine (see figure 2).

If desired, the briquette (9) may pass from the tank or chamber (3) to the movable plate (2) by means of the thrust of the cylinder (7) itself, once the base of the movable plate has moved sideways, opening an outlet hole for the briquette thrust by the cylinder (7) itself in a second movement. Thus the briquette always follows a vertical path. Cylinders (15) and (23) are eliminated.

Making reference again to figures 3 and 4, we can see the dye compartments referred to as number (25) and the binder compartments referred to as number (26). The disinfectant is located in compartment (27) of the machine.

We can see that the collector (14) linked to the movable plate (12) has mounted showers (28) connected to respective water and disinfectant tanks, for the periodic cleaning and disinfecting of the inside surface of the compacting chamber or tank (3).

Reference (29) of figure 9 designates the heating resistors of the chamber (21), it also being possible to see these resistors in figures 5 and 6.

CLAIMS

1.- Process for the treatment of wastes, by means of compacting and solidifying by means of a color coded binder in accordance with the type of waste, through a machine in which the wastes previously selected by the user himself are introduced, and stored in a classified manner in a multiple container that forms a body separated from the machine, characterized in that it consists of: 1) separately compacting the wastes of each type forming briquettes with the shape of the compacting chamber: spherical, cylindrical, prismatic, etc.; 2) injecting a binder substance, such as a resin or the like upon the briquette, and simultaneously a dye whose color adapts to a previously established color code for each type of waste; 3) after the pertinent polymerization and solidification, the briquettes pass to a storage chamber for their subsequent transfer to collective containers and in a color classified manner.

2.- Machine for the treatment of wastes, wherein the previously selected wastes placed in multiple containers, are compacted and molded into briquettes (9), characterized in that it is comprised of a loading tank (3) in which the pre-selected wastes (2) are deposited, poured through a top mouth sealable with a cover (4), one of the side walls being defined by a plate (5) of a horizontal cylinder (6) that compresses the wastes, thus producing a first pressing; afterwards another vertical cylinder (7) placed at the top, drops to press the wastes and convert them into a compact and dehydrated briquette (9) upon evacuating the liquid through the holes (13) provided for in the base, the liquid being collected in a collector (14) toward a drain, there being a third horizontal cylinder (15) that moves the movable plate (12) that constitutes the bottom of the compacting chamber (3) so that the briquette (9) drops to a bottom compartment linked to said plate (12) and provided



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with heating means (29) in order to maintain a binder, such as a resin or the like, and a dye injected onto the briquette (9) in optimum conditions, the third cylinder (15) finally withdrawing so that the movable plate (12) once again acquires the initial position under the chamber or tank (3) and the briquette (9) remains located opposite an outlet (20) where a pusher (23) diverts it to the storage place (24).

3.- Machine for the treatment of wastes, according to claim 1, characterized in that the collector (14) is linked to the sliding plate (12) and located under it, being provided with some water ejecting showers or nozzles (28) and disinfectant (27) for periodic cleaning.

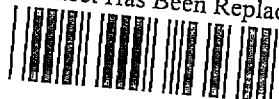
4.- Machine for the treatment of wastes, according to claim 1, characterized in that the hydraulic cylinders (6, 7, 15, 23) are of adjustable pressure depending on the type of wastes to be compacted.

5.- Machine for the treatment of wastes, according to claim 1, characterized in that the binder and dye combination completely cover the briquette (9) thus formed after polymerization and solidification, and the dye being of different shades according to a previously established color code in accordance with the type of compacted wastes.

6.- Machine for the treatment of wastes, according to the above claims, characterized in that the pressure surfaces of the plates (5, 8) of cylinders (6, 7), in combination with the movable plate (12) of the bottom of the chamber or tank (3), in the area occupied by the holes (13), are flat or have a suitable concave shape in order to achieve the convenient geometry for the briquettes (9) with a spherical, cylindrical, prismatic shape, etc.

7.- Machine for the treatment of wastes, according to claim 1, characterized in that the binder as well as the different dyes, are contained in some suitable tanks (25, 26) located in the body itself of the

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machine(1).

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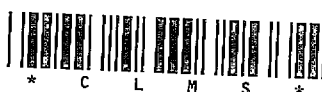
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