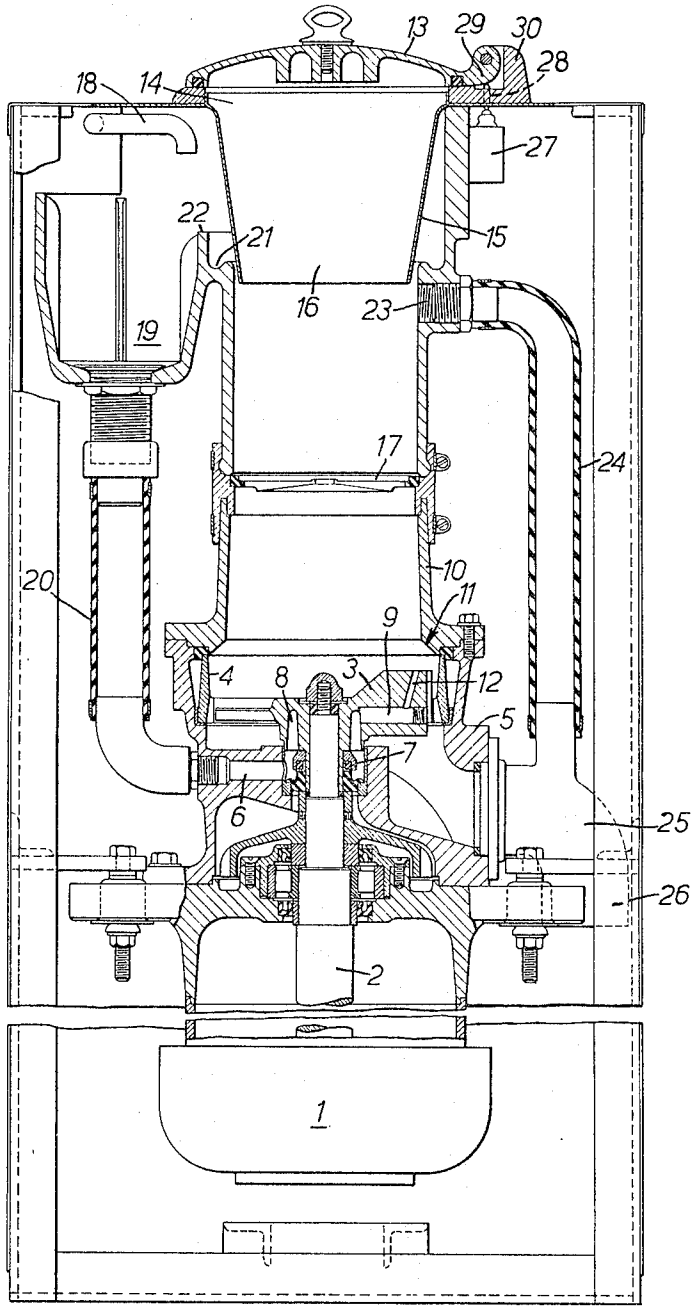
Dec. 13, 1966 T. C. R. SHEPHERD 3,291,399

WASTE DISPOSAL APPARATUS

Filed Dec. 19, 1963



Thomas Cropper Ryley Shepherd
INVENTOR

BY

Keith, Isaac, Byrne, Des Marais & Chandler

ATTORNEY

United States Patent Office 3,291,399 Patented Dec. 13, 1966

3,291,399

WASTE DISPOSAL APPARATUS

Thomas Cropper Ryley Shepherd, Arbour Hill House, Ross-on-Wye, England

Filed Dec. 19, 1963, Ser. No. 331,796
Claims priority, application Great Britain, Dec. 21, 1962, 48,367/62
5 Claims. (Cl. 241—36)

This invention concerns waste disposal apparatus and relates more particularly to the disposal of fibrous waste material such as sanitary towels.

The invention concerns apparatus of the type comprising a rotary impeller which co-acts with a set of stationary teeth, the impeller being rotatably driven by an electric motor which is normally inoperative and is started immediately after the introduction of the article to be comminuted and upon closing a cover which gives access to the apparatus (the material to be comminuted being introduced through a mouth normally closed by the cover) the arrangement being that the material is comminuted between the rotating impeller and the stationary teeth and is carried away therefrom to drain.

According to this invention apparatus having a chute or duct down which the articles fall into the comminuting apparatus is characterised in that the action of closing the cover starts the electric motor and initiates a supply of water to the apparatus, the water being directed therethrough as two streams one of which flows downwardly of the chute towards the impeller and the other of which is supplied to the impeller and is discharged therefrom under centrifugal force to flow over the lower part of the chute and over the stationary teeth.

It is a feature of this invention that there is an overflow outlet from the chute or duct which communicates with the drain outlet so that water in the chute or duct can not exceed a specified level.

According to a feature of the invention there is provided means temporarily to break the fall of the material before reaching the apparatus. As a consequence of the break in the free fall of the material to be comminuted there is provided a longer interval of time during which the motor is permitted to gather speed so that when the article reaches the impeller it is ensured that it can not stop the motor.

According to a feature of this invention the stream of water flowing downwardly of the chute is delivered to the chute from above the means for breaking the free fall of the article to be comminuted. In this way the article becomes wetted (at least in part) while upon said fall-breaking means and thus reaches the impeller at least partly wet. It may be arranged that the additional weight of the article due to the water taken up is sufficient to deform or deflect said means and thereby move the article downwardly towards the impeller.

According to a further feature of the invention the electric motor is controlled by a time-switch device in conjunction with a motor-starting switch means actuated by the cover referred to so that when the cover is opened the motor is rendered inoperative and so that when the cover is closed the motor is operative for a predetermined time during which the article is comminuted and discharged to drain.

A practical application of the present invention will now be described by way of example only with reference to the accompanying drawing which is a longitudinal section of a waste disposal apparatus for the disposal of sanitary towels.

Referring to the drawing: the apparatus comprises an electric motor 1 having a vertical, upwardly-directed driving shaft 2 on the upper end of which is mounted an impeller 3 which co-acts with a ring of stationary teeth 4 carried by an impeller casing 5. Water is supplied to the comminuting apparatus through a channel 6 and passes therefrom around a seal 7 for the shaft 2 and thence through the impeller by ducts 8, 9. A vertical chute 10 extends upwardly from the casing 5 to which it is suitably secured by bolts as shown. The bottom edge of the chute 10 is outwardly flared, as at 11, where it joins the casing 5 and it is arranged that an upwardly directed jet of water discharged from the impeller through opening 12 the water entering the opening 12 from the duct 9 under centrifugal pressure impinges against the flared portion 11 and is deflected thereby in an inward and downward direction. The water from opening 12 is also directed with some force through the spaces between teeth 4 and over the teeth effectively to wash away comminuted material from the teeth.

A hinged lid or cover 13 is provided to close a mouth 14 leading into the chute 10. Extending downwardly within the chute from the mouth 14 is a conical tubular guide member 15 the lower end 16 of which is spaced radially from the wall of the chute by a small amount. The chute, around the lower end 16, is formed with an annular ring 21 of channel cross section.

A slightly conical disc 17 of resilient material e.g. rubber or a synthetic resin material is located beneath the lower edge 16 of the member 15. The disc 17 is slit radially at a number of angularly-spaced places to provide resilient fingers. The radially outer end of each slit terminates closely adjacent the wall of the chute in an axial hole which is slightly larger than the slit. The disc 17 is clamped between two parts of the chute as shown in the drawing. Water is supplied (e.g. from mains) by pipe 18 to a chamber 19 near the upper end of the chute 10. The supply pipe 18 is spaced above the chamber so that the water falls from the pipe into the chamber and there is no direct contact between the pipe and the chamber. A pipe 20 extends from the bottom of chamber 19 and communicates with the channel 6. It is apparent therefore that water supplied by the pipe 18 to the chamber 19 flows downwardly through the pipe 20 and into the channel 6. Water from the channel 6 passes around the seal 7 and into the impeller to be discharged through the opening 12.

The chamber 19 is formed with a dam 22 which rises above the channel-section ring 21 the arrangement being that water supplied to the chamber 19 flows over the dam 22 into the channel 21 and thence through the angular space between the lower edge 16 of the member 15 and the case 10. It is apparent that the channel 21 is of relatively small cross-sectional size with the result that water rapidly overflows from the ring 21 and down the inner wall of the chute 10 to the disc 17. The ring 21 ensures that water is substantially uniformly distributed around the inner wall of the chute 10. The water flowing down the interior of the chute 10 passes over and around disc 17 and thereafter downwardly of the inner wall of the chute 10 into the casing 5.

An outlet 23 from the chute 10 is immediately beneath the lower end 16 of the member 15. The outlet communicates by way of a pipe 24 with a connector 25 secured by the casing 5 and having a connection 26 leading to drain.

The connection 26 constitutes the drain outlet from the comminuting apparatus and through which the pulverized or mascerated towel material is discharged from the apparatus.

The water chamber 19 may incorporate any known or convenient means for supplying detergents, disinfectants, deodorants or other substances to the water in the chamber.

The hinged cover 13 actuates an electric switch device

27. To this end the switch device 27 comprises an actuator rod 28 which engages with a cam-like portion 29 of a lug by which the cover 13 is pivotally secured to a casing or frame member 30. The switch 27 is in the circuit supplying motor 1 and also in a circuit of a solenoid-actuated valve controlling the supply of water to pipe 18. It is arranged that when cover 13 is closed the electric motor 1 is brought into operation and water is supplied to the apparatus by pipe 18. However, the switch 27 is in series with a further switch (not shown) which in known manner is actuated by the pressure of the water supply to maintain said pressure switch closed while water is being delivered to the apparatus. It will therefore be appreciated that upon closure of cover 13 the motor 1 cannot be brought into operation unless water is available.

The switch device 27 incorporates a time-delay device whereby the switch 27 is opened, to stop the electric motor 1, after a specified interval of time following closure of the cover 13.

In use: the hinged cover 13 is raised and a sanitary towel is dropped into the member 15. The latter directs the towel downwardly on to the disc 17 and generally centrally thereof.

The cover is immediately closed and to this end it may be spring-urged. At any rate upon closure of the cover 13 the switch device 27 is actuated and at the same time water is supplied by the pipe 18 to chamber 19 and thence to the ring 21 and the interior of the casing 10. At the same time water is delivered to the channel 6 and thence to the impeller as described. The motor 1 is started. Water from the chamber 19 passes directly to the comminuting apparatus through channel 6 and simultaneously to the ring 21 and overflows therefrom down the inner wall of the chute. The water which flows down the wall of the chute passes over the finger assembly 17 and thereby wets the towel resting thereon. The water passes through the slits and the holes in the disc 17 to the lower part of the chute. The free fall of the towel is broken by the resilient fingers and this affords time for the motor 1 to bring the impeller 3 to a predetermined speed before the sanitary towel engages with the impeller. The towel is delivered in a wet condition to the impeller and is comminuted. Comminuted material thrown up from the impeller on to the wall of the chute 10 is washed downwardly into the apparatus by the water flowing down the inner wall of the chute 10 from ring 21. This water also flows over the resilient finger assembly 17 and washes comminuted material therefrom. The water supplied to the comminuting apparatus through channel 6 carries comminuted material inwardly and downwardly on to the impeller and washes over the impeller. Additionally the water streams through the interteeth spaces of ring 4 thereby cleaning the ring. The water flowing down chute 10 from the ring 21 as well as the water supplied directly to the comminuting apparatus through the channel 6 washes comminuted material out of the apparatus and into the connector 25 and thence to the drain outlet 26.

As indicated above the motor 1 is in operation for a predetermined time during which a sanitary towel can be completely comminuted and carried to drain e.g. for a period of say 30 seconds.

While the apparatus is in use if a second sanitary towel is to be disposed of the same procedure is followed. However, when the cover 13 is opened the motor 1 is stopped. Upon the second sanitary towel being dropped into the chute and the cover closed the sequence of operations described above is recommended.

While it is preferred that a resilient finger assembly 17 is provided this is not essential.

If due to some mishap the supply of water is maintained and the apparatus becomes inoperative (e.g. because it is jammed with a large number of sanitary towels delivered in too rapid succession) the water collected within the apparatus will overflow through the outlet 23 and pipe 24 to the drain without the water level reaching above the member 15.

I claim:

1. Waste disposal apparatus comprising a casing defining a chamber therein, a set of stationary teeth within the casing, a rotary impeller within the casing which co-acts with said set of teeth, an electric motor to drive the impeller, a chute extending into said chamber and having an upper inlet opening through which the waste material to be disposed of is introduced to the apparatus, said chute extending from said opening downwardly to the casing, a closure for said opening, a switch means actuated by closing of the closure, means for supplying water to the apparatus, electrically-actuated valve means to control the supply of water to the apparatus, a circuit incorporating said switch means and the electric motor, so that the motor is started when the cover is closed, a circuit incorporating said switch means and the electrically-actuated valve means so that water is supplied to the apparatus when the cover is closed, duct means for conveying water supplied to the apparatus to said chamber, the chamber having a wall over which the water from the chamber spills into a shallow channel around the chute to flow down the interior wall thereof and a conduit for conveying water supplied to the apparatus to the impeller which has water passages therethrough and a water-discharge opening which directs water under centrifugal force to flow over the lower part of the chute and over the stationary teeth.

2. Apparatus as claimed in claim 1 including an overflow outlet from the chute communicating with the drain outlet so that water in the chute cannot exceed a specified level.

3. Apparatus according to claim 1, including means located within the chute and placed below said channel for breaking free fall of the article to be comminuted.

4. Apparatus as claimed in claim 1, wherein the electric motor is controlled by a time-switch device.

5. Apparatus as claimed in claim 1 in which an overflow outlet from the chute communicates with the drain outlet said overflow outlet being immediately below the shallow channel.

References Cited by the Examiner

UNITED STATES PATENTS

2,676,759	4/1954	Strehlow	241—32.5
2,753,121	7/1956	Elfenbein	241—32.5
2,850,244	9/1958	James	241—46
2,876,953	3/1959	Shepherd	241—38

WILLIAM W. DYER, JR., *Primary Examiner.*

H. F. PEPPER, *Assistant Examiner.*