Aug. 14, 1962 A. C. NOWLIN 3,049,306

SEWAGE GRINDING DEVICE

Filed June 5, 1961 2 Sheets-Sheet 1

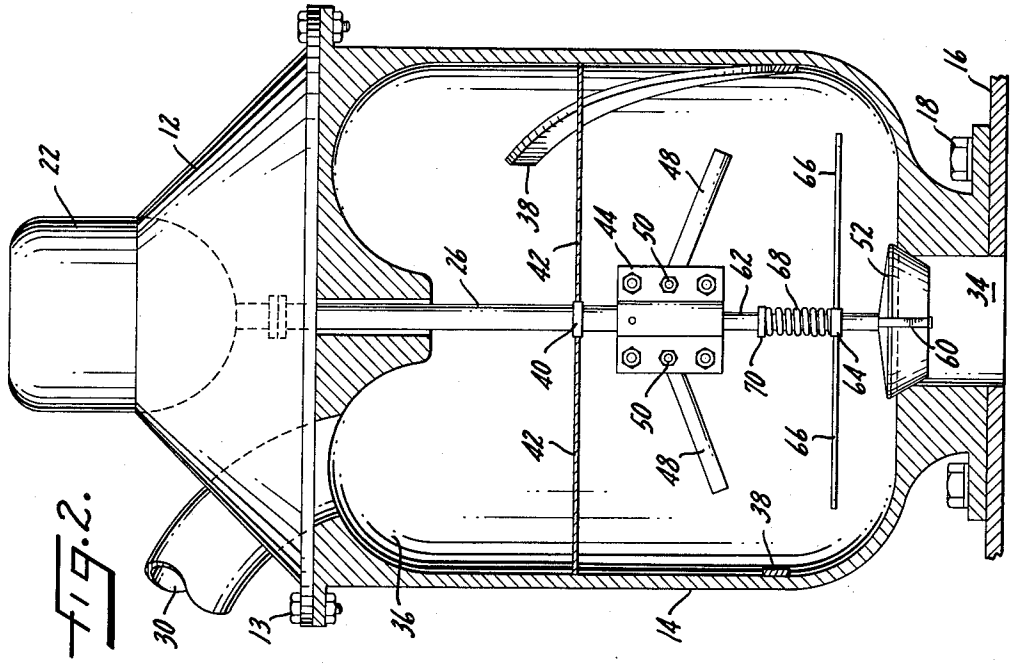


FIG. 2.

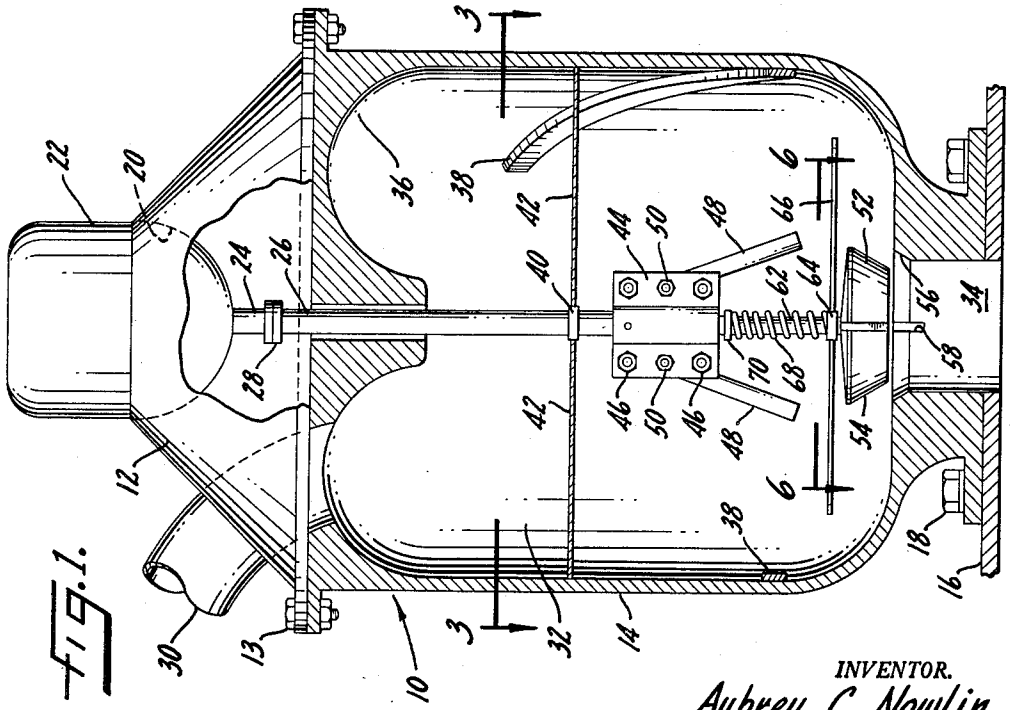


FIG. 1.

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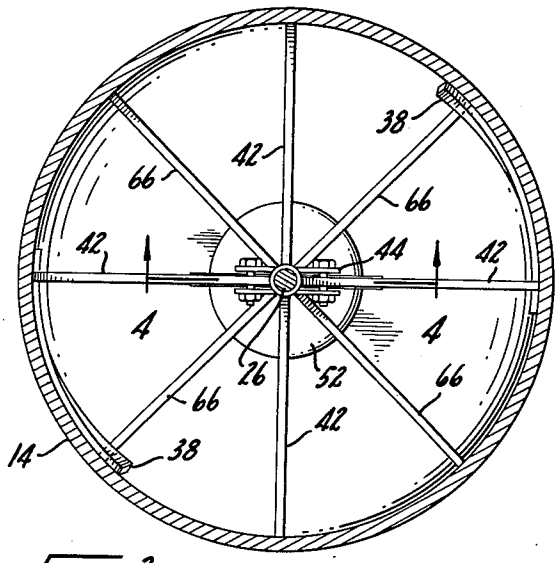


Fig. 3.

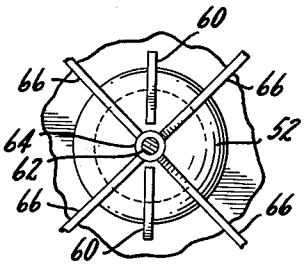


Fig. 6.

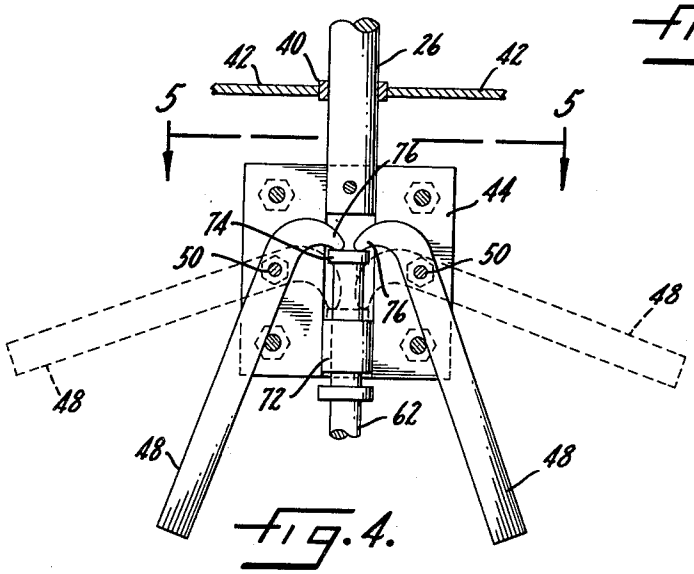


Fig. 4.

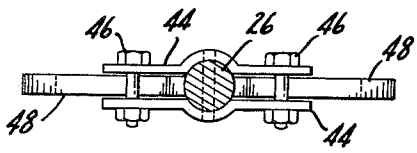


Fig. 5.

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United States Patent Office 3,049,306
Patented Aug. 14, 1962

3,049,306

SEWAGE GRINDING DEVICE

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Filed June 5, 1961, Ser. No. 114,921
4 Claims. (Cl. 241—46)

This invention relates to a sewage grinding device, and in particular to a sewage grinding device which may be used on boats or other marine craft.

A primary purpose of the present invention is a sewage grinding device of the type described having improved means for closing the discharge outlet upon actuation of the unit.

Another purpose is a sewage grinding device of the type described in which the discharge outlet is closed by a plug moved by centrifugal force.

Another purpose is an improved sewage grinding device of the type described which is compact and efficient.

Another purpose is a sewage grinding device of the type described which has a minimum number of moving parts and accordingly requires little maintenance.

Other purposes will appear in the ensuing specification, claims and drawings.

The invention is illustrated diagrammatically in the following drawings wherein:

FIGURE 1 is a section through the device of this invention showing the grinding blades in the power off position;

FIGURE 2 is a section, similar to FIGURE 1, showing the grinding blades in the power on position;

FIGURE 3 is a section along plane 3—3 of FIGURE 1;

FIGURE 4 is a section along plane 4—4 of FIGURE 3;

FIGURE 5 is a section along plane 5—5 of FIGURE 4; and

FIGURE 6 is a section along plane 6—6 of FIGURE 1.

A generally upright housing 10 may include an upper somewhat conical cover 12 and a somewhat cylindrical body 14 secured to the cover by bolts 13 or the like. The body 14 may be secured to a suitable base plate 16 by bolts 18 or the like.

Seated within a somewhat spherical opening 20 at the top of the housing 10 is a drive means indicated generally at 22. The drive means may be a conventional electric motor or a gasoline engine. An electric motor is preferred as it may be run from the electric power on the boat. The motor 22 has a motor shaft 24 which is coupled to a main drive shaft 26 through a coupling 28.

The housing 10 may include a sewage inlet 30 in the form of a pipe or the like which extends into a grinding chamber 32. A sewage discharge outlet 34 may be formed at the bottom of the grinding chamber, as will be described in detail hereinafter.

The grinding chamber 32 may be generally cylindrical in form with a somewhat cylindrical channel 36 extending annularly about the top. Along the sides of the housing, I may provide a plurality of generally spiral-like ribs 38 which are effective to direct the sewage and material within the grinding chamber in a generally upward path. The grinding blades described hereinafter will grind the material within the chamber and direct it toward the outside. The ribs then will direct this material in an upward path toward the top. The cylindrical channel 36 is effective to direct the sewage back down again along the center line of the housing and toward the grinding blades.

The drive shaft 26 may extend generally centrally into the grinding chamber 32 and may be supported within the chamber by a bearing or the like 40. The bearing 40 may be supported from the sides of the housing by rods

or strips 42. A pair of generally parallel plates 44 may be clamped about the lower end of the drive shaft 26 by means of bolts 46 or the like. Mounted between the plates 44 are a pair of grinding blades 48 which are pivotally attached to the plates 44, as at 50. In the at rest or power off position of FIGURE 1, the blades tend to lie along the drive shaft 26 or form a small acute angle with the shaft. The blades are stationary and hence will hang down from their pivot points. However, when the shaft 2 6is rotated, the blades move to the grinding position of FIGURE 2. The blades will move by centrifugal force until they extend outwardly from the rotating shaft and plates. The two positions of the blades are clearly shown in FIGURE 4.

I may provide a discharge plug 52 which is in alignment with the discharge opening 34. The plug 52 preferably has a slanted side 54 which mates with a slanted side 56 at the upper end of the discharge opening. I may also provide grooves 58 spaced about the upper end of the discharge opening, which are adapted to mate with tongues 60 or the like projecting outwardly from the plug 52. The tongue and groove arrangement provides a means for aligning the plug with the discharge opening. Although I showed two tongues and two grooves, I may have more or less.

A non-rotating shaft 62 may project upwardly from the top of the discharge plug 52 and may be supported within the chamber 32 by means of a bearing 64 and rods or support strips 66. Although the shaft 62 does not rotate, it does move up and down, as will be described hereinafter. The bearing 64 and the rods or strips 66 support the shaft 62 so that it is concentric with the rotating shaft 26.

I may provide a coil spring 68 which is wound about the shaft 62 and is bottomed on bearing 64. The spring is attached to a stop 70 fixed on an upper portion of the shaft 62. In the expanded condition, as shown in FIGURE 1, the spring is effective to draw or urge the plug 52 away from the discharge opening. In other words, the discharge plug will normally be away from the opening and will be held in that position by the spring 68.

Mounted within the cylindrical opening between the plates 44 is a bearing 72 which rotates with the plates, but permits the shaft 62 to reciprocate. Mounted at the upper end of the shaft 62 is a bearing 74 which is adapted to be in contact with a somewhat hooked end 76 of the blades 48 and to rotate with the blades. As shown in FIGURE 4, the spring 68 is effective to move the shaft 62 upwardly when the blades 48 are in the power off position of FIGURE 1. This position is shown in full lines in FIGURE 4. When power is supplied to the device, the shaft 26 rotates and the blades 48 are gradually moved upward to the grinding position, shown in dotted lines in FIGURE 4 and in full lines in FIGURE 2. As the blades move to the grinding position, the hooklike ends 76 of the blades contact the bearing 74 and force the shaft 62 downwardly. The shaft 62 will be forced downward against the action of the spring 68 until the plug 52 is seated in and closes the discharge opening.

The use, operation and function of the invention are as follows:

Shown and described herein are improvements in sewage grinding devices and in particular improvements in a small grinding device for use on boats or other marine craft. In operating the device, sewage enters through the inlet 30 and is discharged, after being treated, through the outlet 34. Simultaneously with the grinding operation, the sewage may also be chlorinated. As soon as the motor 22 starts the grinding device, the centrifugal force of the grinding blades moving to the up or grinding position is effective to close the discharge outlet 34. In other words, once sewage has been fed into the device

and is being ground, the discharge outlet is closed until the sewage has been completely treated. It is important to have an automatic means for closing the discharge outlet upon actuation of the grinding blades.

The incoming sewage will be directed down toward the grinding blades. The whirling blades will mash and break up the sewage within the housing and will direct the sewage toward the outside of the grinding chamber or toward the ribs **38**. The ribs **38** which may have a somewhat spiral-like form will direct the sewage upwardly along the outside of the housing and into the somewhat annular channel **36** at the top. The channel is designed to take the sewage coming up along the outside of the wall and direct it downward toward the grinding blades. In other words, the sewage is continually recirculated within the grinding chamber through the action of the ribs **38** and the shape of the channel **36**.

Of importance is the positive operating means for closing the discharge plug. As soon as the motor **22** is started and the blades are rotated, they will move to grinding position through the action of centrifugal force. The ends of the blades are in contact with the plug shaft **62** and are effective to lower the shaft or move it toward the discharge outlet. The spring **68** normally maintains the discharge plug away from the outlet, whereas the force of the moving baldes tends to push the plug down into the outlet.

Whereas the preferred form of the invention has been shown and described herein, it should be realized that there are many modifications, substitutions and alterations thereto within the scope of the following claims.

I claim:

1. A sewage grinding device for use on boats or the like including a generally upright housing defining a sewage grinding chamber, a sewage inlet adjacent the top of the housing and a sewage discharge outlet at the bottom of the housing, both in communication with said chamber, a rotatable drive shaft extending generally centrally within said chamber and toward said discharge outlet, a drive motor for rotating said shaft, a pair of generally parallel plates attached to said shaft and a pair of sewage grinding blades pivoted on said plates, said blades assuming a position generally along said shaft when stationary and moving outwardly from said shaft when rotated, a plug for said discharge outlet, spring means normally urging said plug away from said discharge outlet, said blades having portions thereof which are effective, upon movement of said blades to the grinding position, to urge said plug into the discharge outlet against the action of said spring means, and spiral-like ribs positioned about the inside surface of the housing, said ribs being effective to direct the material in the chamber in a generally upward path.

2. The structure of claim 1 further characterized in that said blades have portions thereof positioned between said generally parallel plates, a shaft on said plug extending between said plates, movement of said blades outwardly from the shaft to the grinding position causing the portions of said blades between said plates to contact the plug shaft and to move the plug shaft downwardly toward the discharge opening.

3. The structure of claim 2 further characterized in that said spring means includes a spring wound about said plug shaft and normally urging said plug and plug shaft upwardly.

4. The structure of claim 1 further characterized by and including guide means on the discharge opening and plug for aligning the plug with the discharge opening.

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