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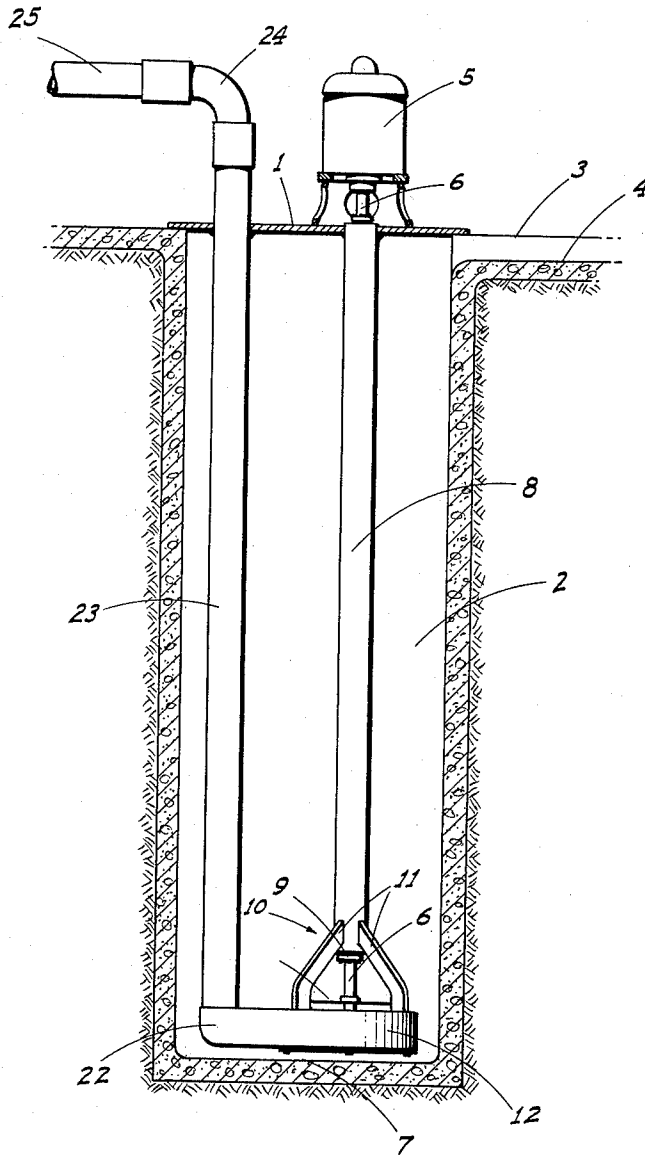
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2 Sheets-Sheet 1

Fig. 1



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Fig. 2

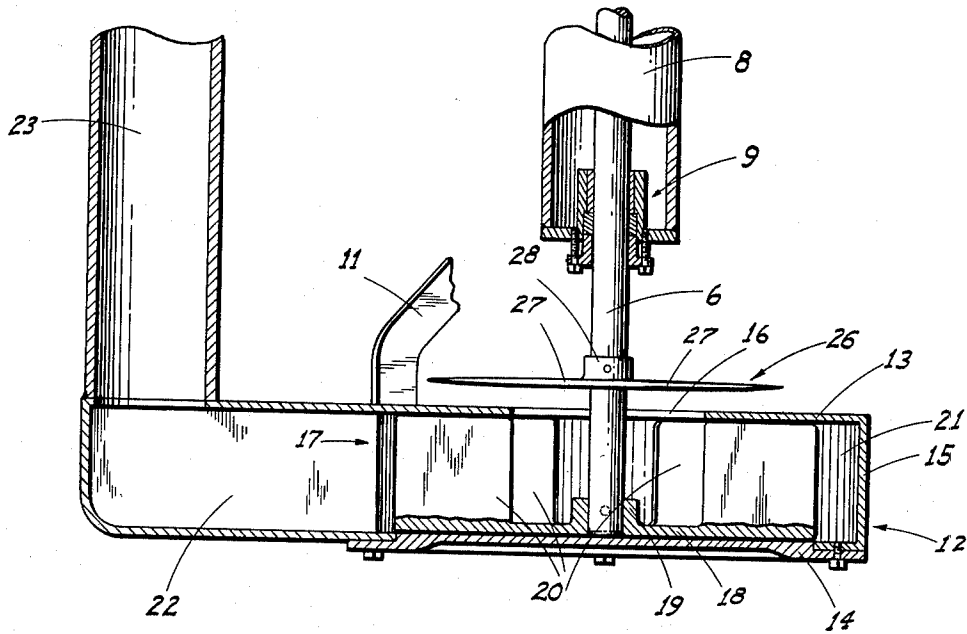


Fig. 3

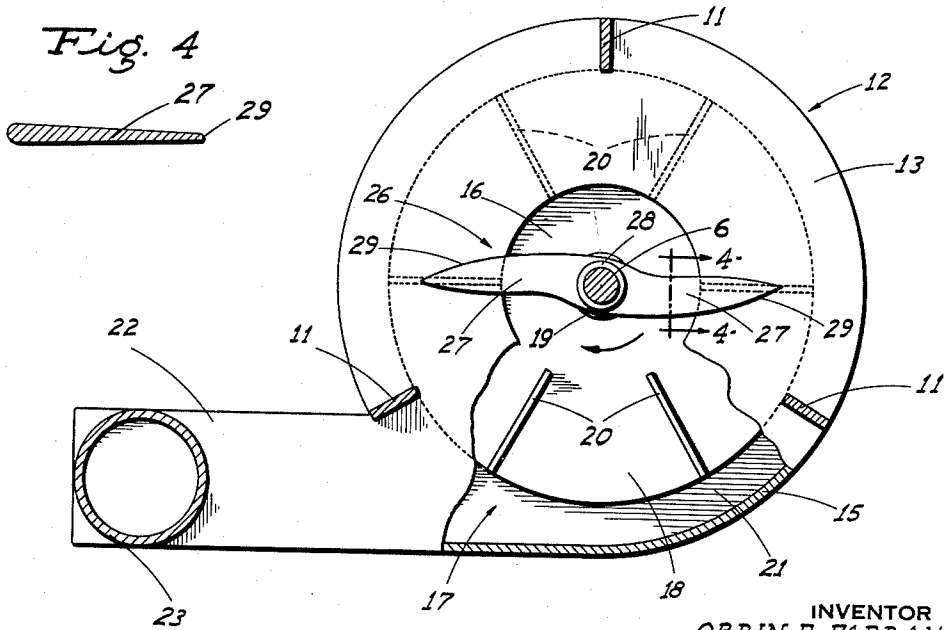


Fig. 4



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1 Claim. (Cl. 103—111)

This invention relates in general to an improvement in pumps, particularly a pump adapted for the discharge of watery material or slurry from a sump.

In the cleaning of dairy barns it is the practice to flush— with a substantial quantity of water—the manure, together with straw, sticks, mud, and other foreign substances, along a trough or gutter, whence it discharges into a relatively deep well or sump.

A pump is used in such sump to force-feed the slurry out through a pipe line.

The present invention is directed to, and it is a major object to provide, an improved pump for this purpose.

Another important object of the invention is to provide a pump, for use in a sump, and for the above purpose, which has relatively high capacity, and is provided with a novel rotary cutter, effective to chop or comminute the foreign substances carried into the sump by the water, and before such substances reach the pump, with possible deleterious effect.

In other words, the rotary cutter assures that the foreign substances cannot enter the pump to clog or damage it.

An additional object of the invention is to provide a pump, of the type described, which is constructed for mounting in a sump as a unit; the entire pump mechanism being suspended from a top plate which covers the sump at the upper end. With such arrangement the pump can be readily placed in the sump for use, or removed therefrom for servicing, maintenance, or repair.

It is also an object of the invention to provide a pump which is designed for economical and ready manufacture.

A still further object of the invention is to provide a practical, reliable, and durable pump, and one which will be exceedingly effective for the purpose for which it is designed.

These objects are accomplished by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claim.

In the drawings:

Fig. 1 is an elevation of the pump as suspended in a sump for use.

Fig. 2 is an enlarged fragmentary sectional elevation of the pump assembly.

Fig. 3 is an enlarged sectional plan, of such pump, taken on line 3—3 of Fig. 1.

Fig. 4 is a sectional view taken on the line 4—4 of Fig. 3.

Referring now more particularly to the characters of reference on the drawings, the pump assembly comprises a cover and supporting plate 1 adapted to overlie the upper end of a relatively deep sump 2 in a dairy barn or the like; material being flushed by water into such sump from the floor 3 through a trough or gutter 4 opening into such sump directly below the plate 1.

An electric motor 5 is mounted on the plate 1 and is connected to a drive shaft 6; such drive shaft depending vertically from the electric motor 5 into the sump 2,

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terminating adjacent but short of the bottom 7 of said sump.

Except for a lower end portion thereof, the drive shaft 6 is surrounded, in protective relation, by a suspension tube 8; such suspension tube being fixed, at its upper end, to—and depending from—the plate 1.

At the lower end of the suspension tube 8, and at such other points as may be required, the shaft works through a bearing and seal unit, the lowermost one of the same being indicated at 9.

At its lower end the suspension tube 8 is fitted with a downwardly projecting spider 10, which spider is comprised of a plurality of circumferentially spaced, downwardly and outwardly inclined spider legs 11.

At their lower ends the spider legs 11 turn vertical and are fixed, in symmetrical relation, to the top of a relatively shallow, horizontally disposed, circular pump housing 12; such pump housing including a top plate 13, a removable bottom plate 14, and a side wall 15.

The top plate 13 is formed with a circular central opening 16 of substantial diameter, but which diameter is considerably less than that of the circular pump housing 12.

The immediate lower end portion of the drive shaft 6 is disposed within the confines of the circular pump housing 12, and is there fitted with a circular, vertical-axis impeller, indicated generally at 17. The impeller 17 comprises a bottom disc 18 secured to the shaft 6 by means which includes a hub 19; the disc 18 being disposed to run directly above the bottom plate 14, as shown.

A multiplicity of circumferentially spaced, radial pump vanes 20 are fixed on, and upstand from, the bottom plate 14; such pump vanes extending inwardly from the periphery of the disc 18 and terminating at their inner ends at substantially the periphery of the circular opening 16. The vanes 20 are of a height such that they terminate at their upper edges very close to the top plate 13.

It is to be noted that the impeller 17 is of lesser diameter than the pump housing 12, whereby to form an annular passage 21 all about such impeller within said housing.

At one point in the circumference thereof, the circular housing 12 is formed with a tangential outlet 22, and a riser pipe 23 extends upward from said outlet through the cover and supporting plate 1, being fixed to the latter.

Above the plate 1 the riser pipe 23 leads into an elbow 24 which connects with a pipe 25 leading out of the dairy barn to a suitable point of discharge.

Within the spider 10, the shaft 6 is fitted with an opposed-blade, rotary cutter 26, which cutter includes blades 27 which project in opposition from a hub 28. As shown, the blades 27 not only taper in plan from the hub 28 radially outwardly, but also such blades taper in transverse section toward the leading edge 29, whereby such leading edge is relatively sharp.

When the above described pump is in operation, the water and foreign substances flushed thereby into the sump 2 are force-fed by the impeller 17 into the tangential outlet 22, thence flowing upwardly in the riser pipe 23 and out through the discharge pipe 25.

The water and foreign substances therein gains access to the pump housing 12 only through the central opening 16 after flowing through the spider 10. As the cutter 26 is rotating rapidly above but relatively close to the central opening 16, the foreign substances in the water are effectively chopped or comminuted before such substances pass through the central opening 16 into the impeller 17. As a consequence the central opening 16 is not jammed and the impeller 17 is not clogged or damaged by such substances. The pump thus may run at full efficiency without impairment from the foreign substances carried in the water.

As the rotary cutter 26 works within the spider 10, with the blades 27 passing not too distant from the

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lower end portions of the spider legs 11 (see Fig. 2), such legs serve as anvils or abutments against which foreign substances, such as twigs, may be broken under the impact of such blades.

Whenever it may be necessary to remove the pump from the sump 2, this can be readily accomplished by detaching the discharge pipe 25 and then drawing the entire structure by a lift or hoist out of said sump.

From the foregoing description it will be readily seen that there has been produced such a device as substantially fulfills the objects of the invention, as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claim.

Having thus described the invention the following is claimed as new and useful, and upon which Letters Patent are desired:

A pump for use in a sump comprising a housing having a horizontal flat upper face, a circular intake opening in said face and a discharge opening from the side of the housing, a vertical axis impeller in the housing, an upstanding impeller-drive shaft projecting into the housing through the opening, a fixed member above and spaced from the housing face and providing a bearing for the shaft, a spider connecting said member and the housing

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and having circumferentially spaced vertically extending legs upstanding from the upper face of the housing, and a horizontal rotary cutter fixed on the shaft within the spider adjacent the upper face of the housing, the rotary cutter having substantially radial blades the tips of which move in a path sufficiently close to the adjacent portion of the spider legs that the latter provide stationary abutments cooperating with the tips of the blades; the periphery of the intake opening lying a considerable distance radially inward from the lower end of the spider legs.

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