

[54] **AGITATOR ASSEMBLY FOR SAND TANK**

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[56] **References Cited**
UNITED STATES PATENTS

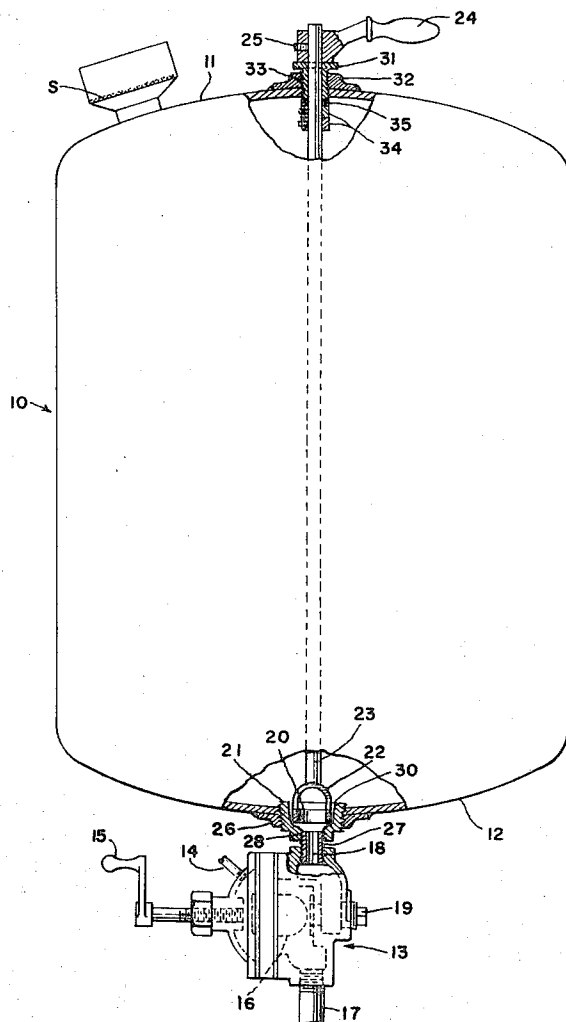
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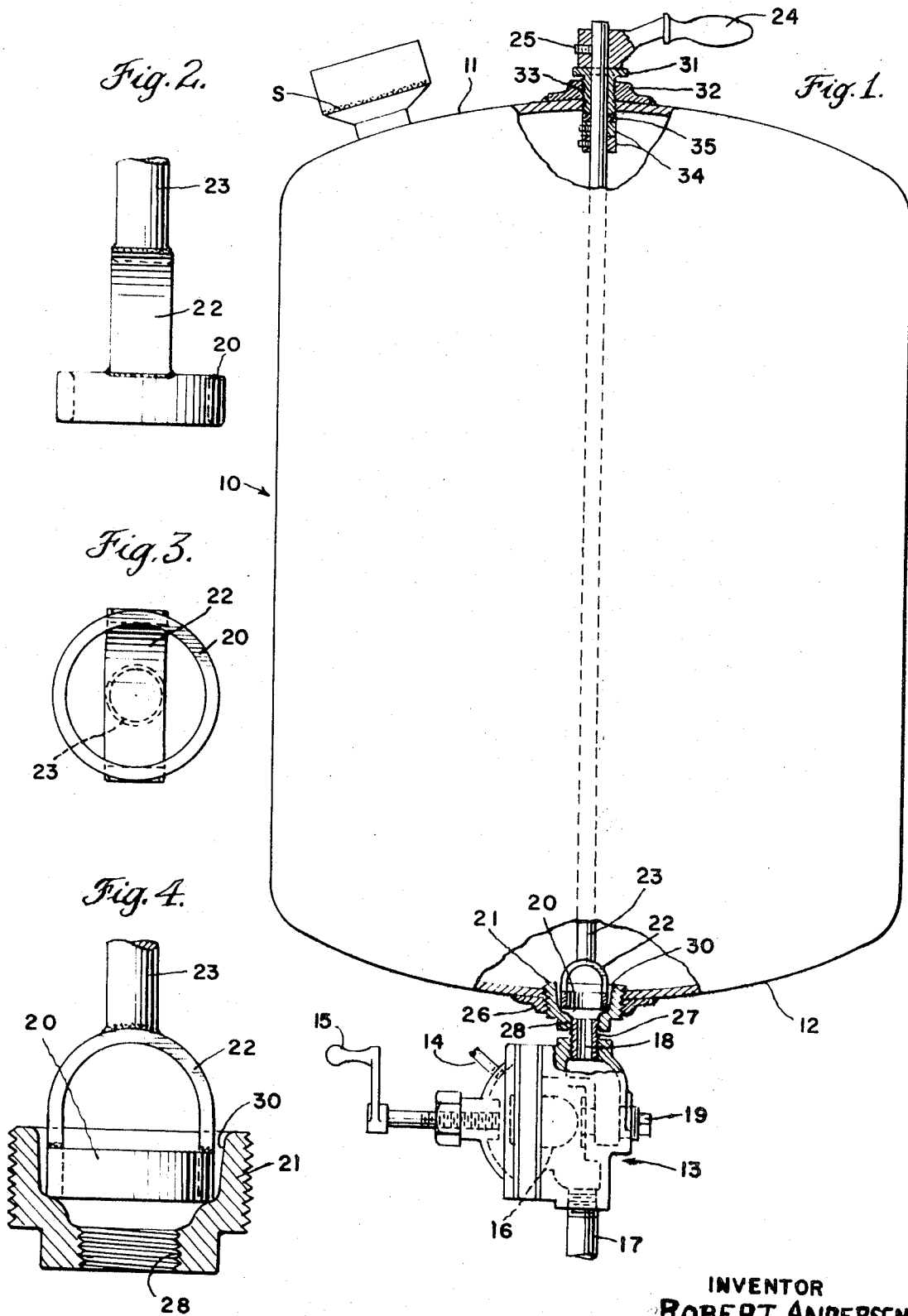
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[57] **ABSTRACT**

A device to remedy the clogging of sand in the tank of sand blasting equipment. An outlet funnel having an inner cup-like configuration is mounted in a discharge opening at the bottom of the sand tank. It delivers to a flow control device wherein air picks up sand and feeds it to a delivery hose. A cylindrical ring element, secured to the arms of a yoke, nests in the cup-like funnel. The yoke merges above the ring into a central vertical stem, which rises through the body of sand in the storage vessel, and passes through a pressure-tight gland in the top of the tank. A handle on the projecting end of the stem permits free rotation in place, and limited up-and-down movement against resilient packing in the gland, so that the yoke, on agitation, will free clogged sand blocking the outlet.

5 Claims, 4 Drawing Figures





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AGITATOR ASSEMBLY FOR SAND TANK

This invention relates to sand blasting equipment, and is particularly concerned with roadable apparatus, wherein sand is carried in a tank which can be moved from place to place, as contrasted with industrial installations where the sand blasting unit is a part of the structure of the plant.

The primary purpose of the present invention is to provide a simple but completely effective device to remedy clogging which frequently occurs at the bottom discharge opening of the sand tank. This clogging may be due to the presence of a foreign object, such as a piece of wire which passes lengthwise through the screen, but lodges crosswise of the outlet. More commonly, it is due simply to the tendency of sand to pack down under pressure, specifically under the weight of the body of sand in the upper part of the tank. The sand seems to have a tendency to arch over the discharge opening, so as to form a sort of dome consisting entirely of sand, which becomes more and more tightly packed with continued vibration transmitted through the apparatus as a whole, until it becomes necessary (1) to relieve pressure within the apparatus; (2) to remove the clean-out plug in the lower flow control assembly; (3) to insert a probe through this plug into the sand outlet from the tank, and break down the obstructing dome; (4) remove the probe and replace the clean-out plug; and (5) reestablish pressure throughout the unit.

Time and motion studies, in an effort to discover the reason for abnormally high costs in the operation of sand blasting equipment, reveal that this problem of clogging occurs fairly frequently, and requires shutting down the apparatus for several minutes every time that it occurs. The primary purpose of this invention is to provide a simple, rugged, and effective agitator assembly, which can be activated as soon as any stoppage occurs, without relieving pressure or disturbing clean-out plugs. This is the primary objective of the present invention.

Incidental considerations include the following: Since the device must work in an environment of sand which may or may not be wholly dry, it must be so formed as to withstand service under peculiarly difficult conditions. The simplicity and strength of the assembly, at the discharge opening of the tank, are notable examples of rugged but effective mechanism. The other end of the assembly, from which it is manually operated, includes a simple and effective pressure-tight seal which still permits free rotation of the agitator operating rod, and permits limited jiggling, in an up-and-down direction, without loss of any air pressure which may build up within the tank.

How these and other objects which are incident to the invention may be attained is best understood by reference to the accompanying drawing, which, together with the description that follows, illustrates a preferred embodiment of the invention. In the drawings:

FIG. 1 is an elevational view, partly in section, of sand blasting apparatus embodying the present invention;

FIG. 2 is a fragmentary elevational view of an agitator constructed according to the invention;

FIG. 3 is a bottom view of FIG. 2; and

FIG. 4 is a side elevational view of FIG. 2, illustrating the agitator applied to the cup-like funnel.

Referring now to FIG. 1, a tank 10 of the type usually employed for holding sand in movable sand blasting

systems is here illustrated. Its top 11 and bottom 12 are slightly domed in shape. Below the tank a mixing unit is somewhat diagrammatically indicated at 13. This unit is entirely conventional. Of present importance is the fact that it contains an air inlet 14, and the usual parti-globular valve disc 16 of neoprene or the like which is opened or closed by the valve stem 15. This mixing unit is connected to the bottom of the sand tank through the passage 18, which discharges into the upper end of the unit. The discharge of air and sand to the operating nozzle (not shown) occurs through the hose 17 at the bottom of the mixing unit 13. A clean-out plug 19 is located in a wall of the unit.

In the lower inverted-dome closure 12 for the tank a cup-like funnel 21 is installed. The outer wall of this funnel is preferably threaded, to make engagement with corresponding threads in an opening through the tank bottom. Within the cup-shaped funnel 21 an annulus or ring 20 is positioned. This is a section of a right cylinder, having a wall thickness of about three-sixteenths inches. It is welded along the upper surface of the annulus to the ends of the arms of a yoke member 22. The yoke merges into a vertical rod 23, to which it is secured, preferably by welding.

The rod 23 rises through the body of sand which is present in the tank 10, and projects above the domed top 11. At its upper end it carries an operating handle 24, which is secured to the end of the rod by any convenient means, such as the set screw 25.

The parts of the agitator assembly which engage the top and bottom of the tank are kept in pressure-tight connection therewith. The arrangement employed at the bottom of the tank includes threading a welding flange 26 onto the projecting threaded end of the funnel 21, and welding it in place.

The arrangement employed at the upper part of the tank for ensuring pressure-tight connection is as follows: The opening in the domed top is threaded, and a bushing 31 is screwed into this opening, and a spud 32 is internally threaded as at 33 to engage the bushing 31. Before completing the installation of the spud and bushing, it is desirable to pin a couple of spacing collars 34, 34 to the shaft 23, with a packing ring 35 of substantial thickness and made of resilient material positioned between the upper collar and the lower end of the bushing 31. The pressure of the bushing against the packing ring ensures a pressure-tight connection at this point, and tightening the spud will ensure firm engagement between the tank and the bushing.

The cup-shaped funnel 31 is internally threaded as at 28 (see FIG. 4) to make engagement with a nipple 27 which is threaded into the upper end of the mixing chamber 13. It is this nipple which provides the channel 18 for feeding sand into the mixing chamber.

The portion of the wall 30 of the inner surface of the funnel 21 which engages the annulus 20 is shown as frusto conical. It could, if desired, be cylindrical in form, but the frusto-conical shape is preferred, because that aids in guiding the bottom end of the agitator into the desired position within the funnel.

When the device is in use, arcing or clogging of the discharge orifice 18 can be rectified by rotation of the handle 24 which will usually dislodge anything capable of passing through the screen S when the tank is initially filled with sand. It will also usually suffice to break down any impacting which may occur in the body of the sand, causing it to arch over above the out-

let opening. If rotation of the agitator is not sufficient, it is possible to increase the effect by lifting on the handle, thus raising the yoke slightly against the resilience of the packing 35.

In actual operation, using the most modern equipment, there is a safety control line, in addition to the hose 17, connected to the sand blasting nozzle. The nozzle is capable of delivering a blast only so long as the operator keeps pressure on the trigger, by means of his hand. As soon as he becomes aware of a reduction in the amount of sand leaving the blasting nozzle, he releases the trigger, and back pressure in the safety control line immediately warns an attendant back at the compressor that the line is not functioning. The attendant then seizes the handle 24 and twists it once or twice, following which flow again resumes. The resultant interruption is a matter of only a few seconds, whereas in prior operation, relieving pressure, removing the plug, probing, and restarting often required several minutes.

I claim:

1. In sand blasting equipment of the type in which sand is supplied directly from a closed vessel serving as a storage tank to a feed control unit located outside of said vessel, the combination of a rod mounted in the top of said vessel and having means outside the vessel to rotate it and means inside the vessel to limit its upward movement; a cup-like funnel at the bottom of the vessel discharging from the interior of said vessel to said feed control unit; an annulus position within said

cup-like funnel and configured to nest therein; and a yoke on the lower end of said rod, the tip ends of which yoke are functionally integral with said annulus.

2. In sand blasting equipment of the type in which sand is supplied directly to the sand blast feed control unit from a closed vessel, the provision of an agitator assembly comprising a bushing mounted in an upper wall of said vessel, an operating rod journaled in said bushing, and means on the rod outside the vessel for rotating the rod; a cup-like funnel in a bottom wall of said vessel through which sand is supplied to said feed control unit; an annulus supported in said funnel and having an outer surface adapted to fit rotatably therein, and yoke means having at least two divergent legs on the lower portion of said rod with their tips welded to said annulus.

3. Apparatus as set forth in claim 2 wherein the upper portion of said rod passes through a packing ring of resilient material below said bushing, and a collar element is pinned to the rod below said resilient packing ring, whereby the rod may be given limited vertical movement.

4. Apparatus as set forth in claim 2, wherein the cup-like funnel has an inner diameter approximately double that of the opening into said feed control unit.

5. Apparatus as set forth in claim 3, wherein a spud is used to consolidate the union between the surface of the vessel and the bushing.

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