July 13, 1943. J. W. RASMUSSEN 2,324,425

SAND BLASTING MACHINE, EQUIPMENT, AND THE LIKE

Filed Jan. 9, 1943

Fig. 1.

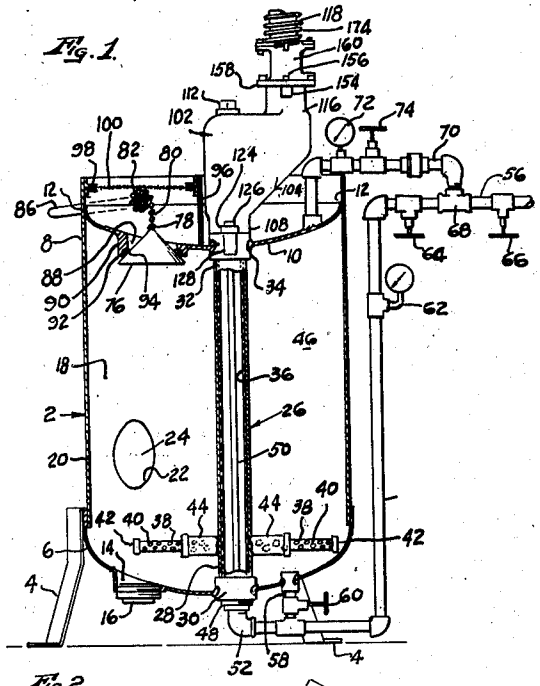


Fig. 3.

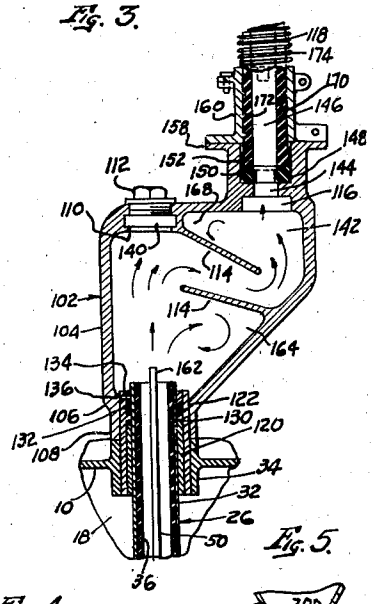


Fig. 5.

Fig. 2.

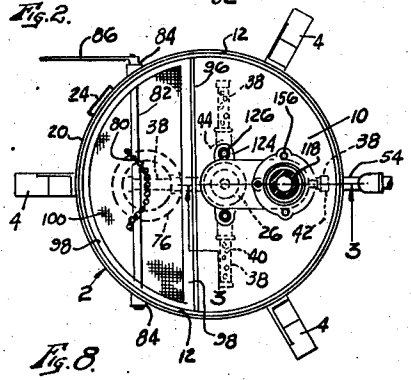
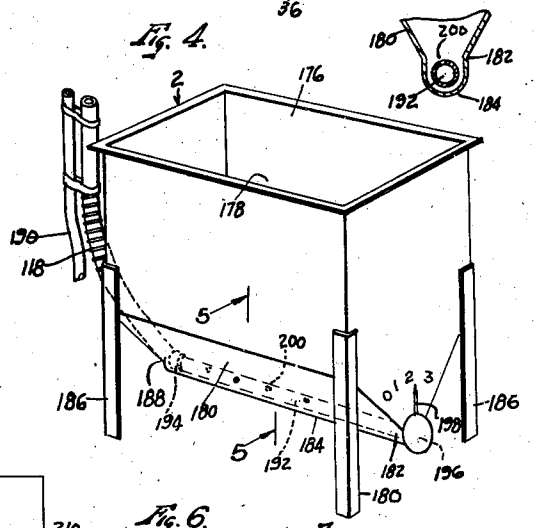


Fig. 8.

Fig. 4.



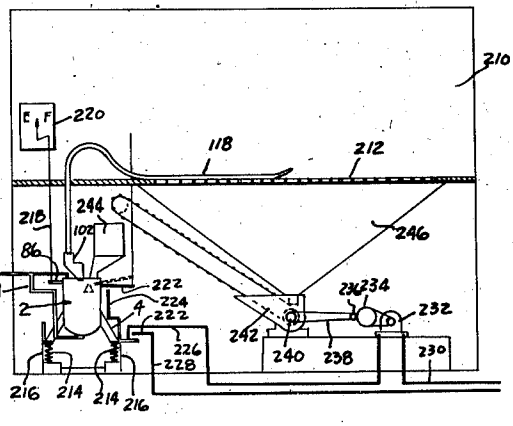


Fig. 6.

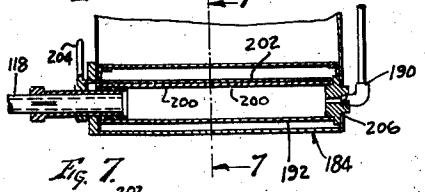
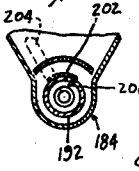


Fig. 7.



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SAND BLASTING MACHINE, EQUIPMENT, AND THE LIKE

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5 Claims. (Cl. 51—12)

My invention relates to sand blasting equipment and apparatus and more particularly to tanks and containers which are of special construction and which are adapted for mixing the sand, or suitable abrasive material, or steel shot with a suitable quantity of air and to deliver such mixture at a pressure and velocity which may be required for blasting the surface of material requiring such application.

Accordingly, an object of my invention is to provide a suitable tank or container which is adapted for holding and for receiving therein a quantity of sand or of other suitable material most applicable for blasting, said tank having a suitably arranged central passage such as a tube, adapted for conveying a mixture of air and sand therethrough, having in addition a suitable mixing chamber adapted for mixing and neutralizing the fluid pulsations caused by irregular pick-up of material through said central passage, also having a set of suitably arranged pipes adapted for delivering and controlling the air passage into said tank and said central passage, so that a uniformity of air pressures and air velocity may be maintained and controlled during the operation of the apparatus.

Another object of my invention is to provide said tank with a central passage means to which a set of suitably arranged pipes are connected, each of which being provided with a series of air holes adapted for drawing a quantity of sand and air therethrough and in addition having a suitable control means covering said pipes for controlling the quantity of air and sand mixture which may pass therethrough and thereby preventing an over-load of sand during the operation of the apparatus.

Another object of my invention is to provide said apparatus with suitable means adapted for loading sand into the tank, also for automatically loading said sand when it is used out during the sand blasting operation of the plant.

The above and further objects and advantages of my device as will hereinafter more fully appear, are attained by the construction described in the specification and illustrated on the drawing forming a part of my application.

Reference is had to the accompanying drawing in which similar reference characters denote the similar parts.

In the drawing Fig. 1 is the cross sectional view of the tank showing the central passage, the mixing chamber, including the air inlet connecting pipe together with its gauges and valves, also showing means for loading the sand into said tank.

Fig. 2 is the top view of the tank showing the mixing chamber and the loading means in position.

Fig. 3 is the vertical sectional view of the mixing chamber slightly enlarged, showing the baffle plates in position.

Fig. 4 shows a perspective view of a tank having an open top and a sand feed control means, same being shown in a modified form.

Fig. 5 is a fragmentary sectional view of the sand feed control taken on the line 5—5 of the Fig. 4.

Fig. 6 is a fragmentary sectional view of the sand feed control shown in another modified form.

Fig. 7 is a fragmentary sectional view of the sand feed control taken on the line 7—7 of the Fig. 6.

Fig. 8 shows diagrammatical view of the sand blasting plant, showing an automatic control of the sand feed apparatus in to the tank.

Describing my invention more in detail, said invention comprises a tank, generally designated by numeral 2 having a set of suitable supporting members 4 which are attached thereto at the bottom section 6 and having its top section 8 provided with an inverted tank end member 10 which is welded in place at the edges 12 and slightly lower than the tank edge, as shown.

Said tank 2, at said bottom section 6 is provided with a suitable opening 14 which is enclosed by means of a screw plug 16 so as to permit the cleaning and draining of the tank contents and also for making any repairs or adjustments within the interior 18 of said tank 2, while in close proximity thereabove and in the tank wall 20 a suitable opening 22 is provided which is also enclosed by means of a suitable plug member 24 so that any repairs, adjustments or assembly of the parts may be made therein as in practice may be found required and advisable.

Interiorly within said tank 2 a suitable central passage or pipe connection 26 is placed, which extends upwardly its entire length and which, at the bottom end 28 is connected to a central boss member 30 while its upwardly extending end 32 protrudes through the top boss member 34 which is disposed within said inverted tank end member 10, the purpose and operation of which will be presently described.

Said central passage 26, at its internal side, is lined through its entire length with a suitable rubber lining 36 in order to prevent the wear of

its wall surface, while its bottom end 28 is provided with a plurality of cross pipes 38, each of which inter-connects said pipe member 26 and each of them is provided with a plurality of holes 40 which may vary in size and in number as may be required.

Each of said pipes 38 has its outer end enclosed by means of a suitable cap member 42 and each of the outer pipe surfaces are covered with a suitable flexible tube or a suitable rubber pipe 44, so that same may be rolled or slipped on or off, and in this manner exposing any desired number or sizes of holes 40 through which the sand 46 may be drawn in and causing same to flow and enter into said central passage 26.

For adjusting a position of said rubber pipes 42, either one of said openings 14 or 22 may be used and thereby covering or uncovering as many holes as may be required so that the best volume for sand blasting and the best results may be thus obtained.

Said boss member 30 is also provided with a suitable plug member 48 which has a pipe member 50 leading through the entire length and the center of said central passage 26, as shown in Figs. 1 and 3, of which the opposite end thereof connects with an air inlet pipe 52 which connects with a vertical air pipe 54 and the air conduit pipe 56.

Said air inlet pipe 52 is provided with a suitable pipe connection 58 which connects said tank 2 at the bottom section 6 and having a regulating valve 60 connected thereto as shown, while said vertical pipe 54 is provided with an air gage 62 for checking the air pressure entering the bottom of said tank 2, and in addition, said air conduit pipe 56 is provided with a pair of valves 64 and 66 which are for controlling said air pressure when entering the system of the apparatus.

In between said valves 64 and 66, said conduit pipe 56 is provided with a suitable connection 68 which connects the pipe member 70 and which also connects with the inverted tank end member 10, having in addition a suitable gauge 72 and a valve 74 which are for controlling the air flow while entering said tank 2 from the top and above the level of the sand 46 when disposed within said tank 2 and thereby permitting the air to seep through said sand to the bottom, thus preventing its bridging around said pipes 38.

It may also be noted that the internal air pressure supports and holds in place the cone member 76 which comprises a suitable apex 78 to which a suitable chain member 80 is connected and which is wrapped around a cross shaft member 82, the ends of said shaft are disposed within suitable bearings 84 at the tank edges 12 and having one of its extended ends provided with a suitable lever or a handle 86 which is adapted for lowering and raising said cone member 76 into its place.

Said cone member 76 may be of any desired design as in practice may be most desirable, however, in construction, it must be of sufficient size in order to permit a reasonable large amount or a quantity of sand to pass quickly through and into said tank 2 when loading same, and also to hold it tight in place and its opening 88 of which, its underside 90 is provided with a collar 92 having a suitable recess for holding a gasket member 94 in place and therefore permitting said cone member 76 to bear there-against when held in place by means of said chain 80 and supported in its position by means of said handle 86 and also when the internal air pressure is applied thereto.

For preventing any foreign matter such as gravel or the like other than the sand or suitable material to pass into said tank 2, a suitable cross plate member 96 is placed as shown in Figs. 1 and 2, to which a set of angle members 98 are attached and which are for the purpose to hold a suitable screen member 100 in place.

The top boss member 34 which extends over the surface of said tank end member 10 is provided with a suitable mixing chamber 102, comprising a housing 104, see Fig. 3, which has its lower end 106 provided with a suitable boss 108 and having directly thereabove a recess 110 which is enclosed at the outer side by means of a plug member 112, also within said chamber 104 a pair of baffle plates 114 are oppositely positioned as shown, which are for guiding the passing fluids and then for leading same to the exhaust end section 116 and to the hose 118 which is connected thereto.

In order to hold said pipe 26 in its proper position, said boss member 34 is provided with a suitable tubing member 120 and which is held in place in any manner most adaptable in practice, having its end 122 extending upwardly for engaging the hole of the boss member 108.

Then to fasten said mixing chamber 102 in its place, said boss member 108 is provided with a pair of sidewardly extending lugs 124, see Fig. 2, each of which is provided with a bolt 126 and which are screwed into suitably threaded bosses 128 at each side of said boss member 34, as shown in Fig. 1.

To prevent the air, which is under pressure within said tank 2 from escaping around said pipe 26, said tubing member 120 is provided with a suitable collar 130 forming a ledge for holding in place a suitable packing 132, whereabove a collar member 134 is positioned having a suitable cross pin member 136 adapted for holding same in place, as shown in Fig. 3.

In this manner said mixing chamber 102 is held firmly in place, allowing the mixture of air and sand to pass thereto and blowing against the resilient cushion 140 which is disposed within said recess 110 whereupon said blast is diverted in between said baffle plates 114 then flowing into the chamber 142 and then leading to the passage 144 of said exhaust end section 116 and finally to the passage 136 of said hose member 118.

In order to hold said hose member 118 in its proper position, said mixing chamber 102 is provided with a suitable recess 148 at the exhaust end section 116, wherein a suitable cushion collar 150 is placed against which the end 152 of said hose 118 rests, while at the outside, said end section 116 is provided with a pair of bosses 154, see Figs. 1 and 2, which are provided with suitably threaded holes and for receiving therein suitable bolts 156 and which are for holding in place the flange member 158 of the hose clamping member 160 which grips the end 152 of said hose member 118 when in position.

It may be noted that the air under pressure may be permitted to flow into said tank 2 through the pipe 56 and be regulated as to the required pressure by means of said valves 64 which will cause said air to flow into said pipe 50 and emitting at the end 162, thus causing a vacuum to be formed within said pipe 26.

Said vacuum is supported therein by the flow of the air passing through the pipe 58 and the volume thereof is regulated by means of the valve

60 for allowing a uniform flow of the air to pass through the holes 40 of the cross pipe member 38 and thus drawing the sand into said pipes 38 wherefrom the air and sand mixture flows into said center pipe 26.

Obviously it may be noted that the flow of the air and sand mixture may not at all times be uniform which is due and is caused by an irregular flow of said sand around and into said cross pipes 38, therefore said mixing chamber 102 overcomes the irregularity of the fluid flow through the apparatus by allowing the air flowing at high pressure through the pipe 50 to expand at the cavities 164 and 168 and thereby equalizing the flow of fluids when passing through the passage member 144 and into said hose member 118.

In order to hold said hose member 118 in its proper position the internal section 170 of said clamping member 160 is provided with a plurality of circular ridges 172, so that when clamped over the hose surface, said ridges 172 will grip it in place and thereby will prevent same from slipping out of its position, also, to prevent said hose 118 from breaking at its clamping section when held by said clamping member 160, the outside surface of said hose is provided with a suitable coiled spring support 174 having one end secured to said clamping member 160 and thus adding considerable resiliency to said hose member when same is in use.

In the Fig. 4 said tank 2 is shown in its modified form, comprising a rectangular shell 176 having an open top section 178 and having its bottom section 180 tapered toward the center 182 which terminates with a suitable trough 184.

Said shell 176 is supported in its position by means of a set of suitable uprights 186 which hold said trough 184 at a required height, of which, the end section 188 is provided with a suitable hose member 118 including an air hose 190 for drawing the sand out of of said tank 2, while the flow of said sand is controlled by means of a suitable controlling pipe member 192 which lies parallel with said trough 184 and which is mounted within a bearing 194 having its end protruding through the end 196 to which the indicator member 198 is attached and which indicates the position of said pipe 192 so that the position of the holes 200, see Fig. 5, may be maintained in order to draw the sand therethrough when the apparatus is in its operation.

The Figs. 6 and 7, show the trough 184 in a modified form which comprise an adjustably mounted fluid flow regulator 202 and which is positioned over said pipe 192 and directly above said holes or apertures 200, which may be slot or any other opening as in practice may be most desirable, the position of which is controlled by means of a lever 204 so that a required amount of sand may pass therethrough, also, said pipe 192 is provided with a suitable hose 118 connected thereto at one end while an air inlet pipe is connected at the opposite end as at 206 for providing an air inflow into said apparatus.

In the Fig. 8 is shown a diagrammatical front view of the entire sand blasting apparatus which is automatic in its operation and which is disposed within a suitable room or an enclosure 210 having a floor or a platform 212 upon which the workmen operate during the operation of said apparatus.

In order to load said tank 2 automatically with a suitable quantity of sand, the supports 4 are mounted upon a set of suitable resilient members 214 which are held within suitable housings 216. The handle 86 which controls the opening and closing of the passage 88 in said tank 2 is provided with an upright rod extension 218 which leads upwardly and to a point above the platform 212, where it is connected to an indicating device 220 which has a marker for indicating the position of said tank 2 and thereby indicating when said tank is full or empty.

Whenever said indicator 220 shows that said tank 2 is empty and said tank is lifted upwardly supported by said springs 214 the lever 222 causes a contact with a rod member 224 which close the electrical circuit flowing through the line 226 and 228 including the line 230 which connects with the electrical motor 232.

Said motor 232 operates a gear reduction device 234 including a pulley 236 which is provided with a belt 238 for engaging the pulley 240 of the loading conveyor 242, and which in operation supplies the sand to the hopper 244 and the tank 2, while said conveyor 242 is supplied with said sand from the bin member 246 which receives the sand from the upper floor or platform 212 when the apparatus is in operation.

While I have thus described my invention with great particularity it will be clear that the same may be modified throughout a wide range.

I accordingly do not propose to be limited to the exact details of construction hereinshown on the drawing and described in the specification but reserve the rights in practice to make the necessary changes and modifications therein, which may come within the scope of the appended claims.

I claim as my invention:

1. A sand blasting apparatus of the class described comprising a tank, a central tubular passage means in said tank, a set of cross pipes connecting the bottom section of said central passage means, a mixing chamber connecting the upper end of said central passage means and disposed upon the top section of said tank, a high pressure air conduit tube passing through said central passage means and terminating within the intake end of said mixing chamber, and an air conduit pipes connecting said high pressure air conduit tube including said central passage means and said tank, for supporting the air flow therethrough and for drawing and for forcing a quantity of sand through said mixing chamber.

2. In a sand blasting apparatus of the class described comprising a tank means, a tubular passage longitudinally mounted in said tank, a set of cross pipes disposed at the bottom section of said tubular passage, a plurality of holes in each of said cross pipes, a covering means adjustably disposed over each of said cross pipes for controlling the passage of sand through said holes, a high pressure air conduit pipe passing through said tubular passage of said tank for creating a vacuum therein and in said set of cross pipes for drawing a quantity of sand therethrough, a set of air conduit pipes connecting said tank means and said tubular passage, a fluid mixing chamber means connected to the upper end of said tubular passage for mixing the sand and air passing therethrough from said tank means, substantially as described.

3. In a sand blasting apparatus adapted for drawing and for forcing a quantity of sand therethrough, comprising in combination, a mixing chamber means connected to the outlet end of said sand blasting apparatus, a set of baffle plate means in said mixing chamber means for mixing and for diverting the flow of air and sand passing

therethrough and for neutralizing the ununiform pulsations of the air and sand mixtures which pass out of said sand blasting apparatus, and an exhaust means in said mixing chamber means for directing the mixed fluids passing out of said mixing chamber means.

4. In a sand blasting apparatus of the class described a tank means, an end closure means enclosing each end of said tank means a central tubular passage means longitudinally mounted in said tank and connecting each of said end closure means, a set of cross pipe means connecting said tubular passage means and disposed in close proximity to the bottom closure means of said tank, a plurality of holes in each of said cross pipe means, means covering each of said cross pipe means for controlling the fluid flow through said holes, a pair of hand hole means in said tank for adjusting the position of said last mentioned means over each of said cross pipe means, a sand loading passage means in the upper closure means of said tank, a cone member means disposed in said sand loading passage means, controlling means connected to said tank means for controlling the position of said cone member means within said sand loading passage means, a screen means disposed over said sand loading passage means and connected to the upper edge of said tank for controlling the quality of sand passing therethrough, a high pressure tube in said central tubular passage for drawing said sand through said cross pipe means, a mixing chamber means connected to the upper end of said central tubular passage means for mixing the air and sand passing therethrough, and a set of air conduit pipes connecting said high pressure tube and said central tubular passage including said tank for providing fluidal velocity for said sand blasting apparatus.

5. In a sand blasting apparatus of the class described comprising a tank, a central passage mounted in said tank and connecting both ends thereof, a set of cross pipes disposed within said tank and at the bottom section of said central passage, a plurality of holes in said set of cross pipes, an adjustable covering means slidably disposed over each of said cross pipes for controlling the quantity of sand passing from said tank and into said central passage, a high pressure air pipe in said central passage for drawing a quantity of sand through said central passage, a set of air conduit pipes connected to said tank and said central passage, a set of valves connecting said air conduit pipes for regulating the air flow through said sand blasting apparatus, substantially as described.

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