

E. E. ROTHCHILD.
SAND BLAST MACHINE.
APPLICATION FILED JULY 28, 1921.

1,433,302.

Patented Oct. 24, 1922.
2 SHEETS—SHEET 1.

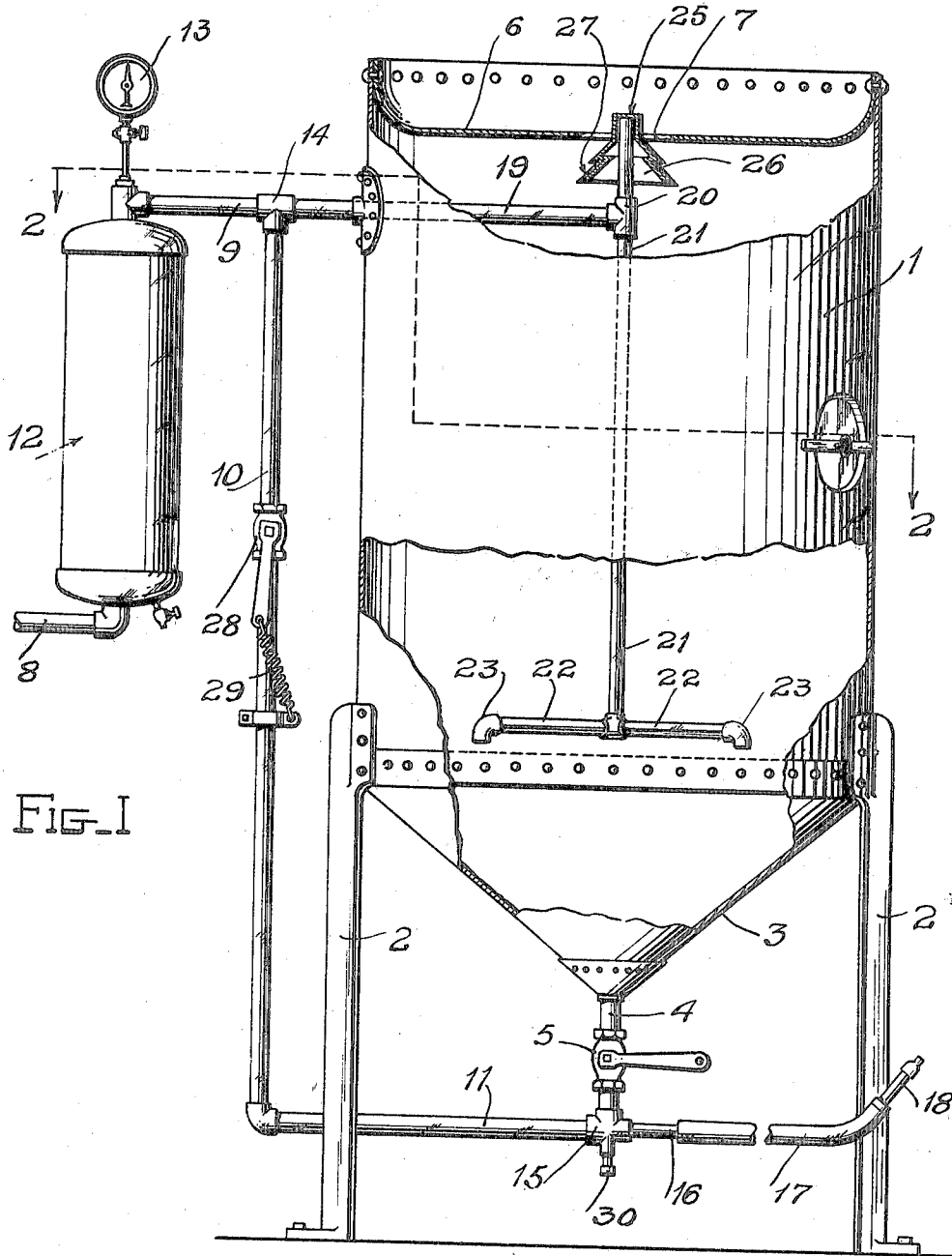


FIG. I

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FIG. 2

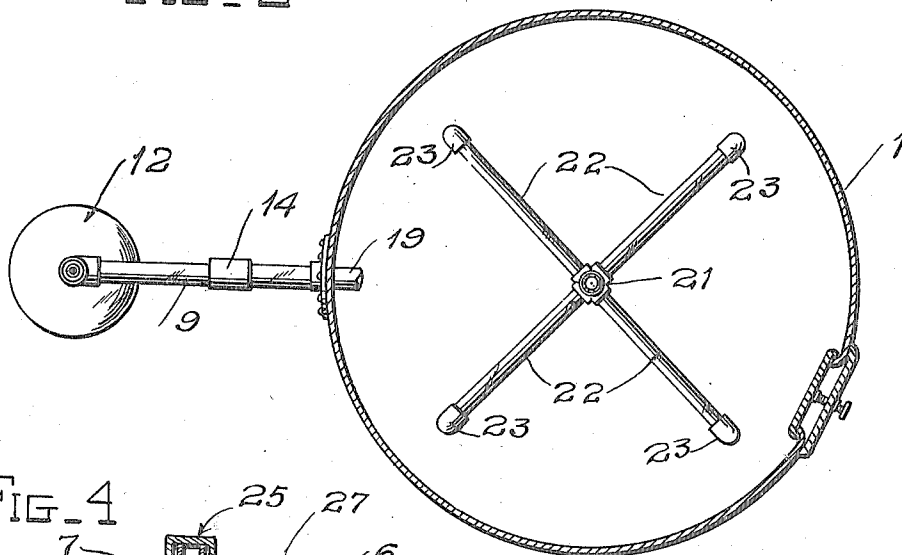


FIG. 4

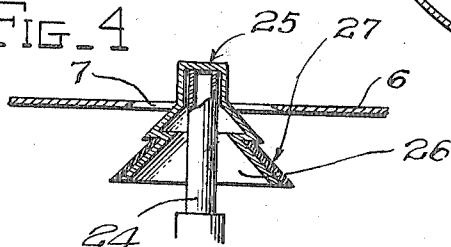


FIG. 3

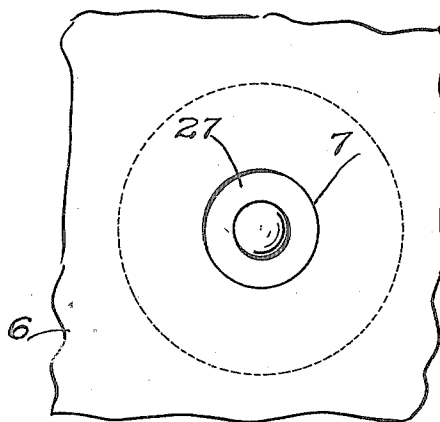
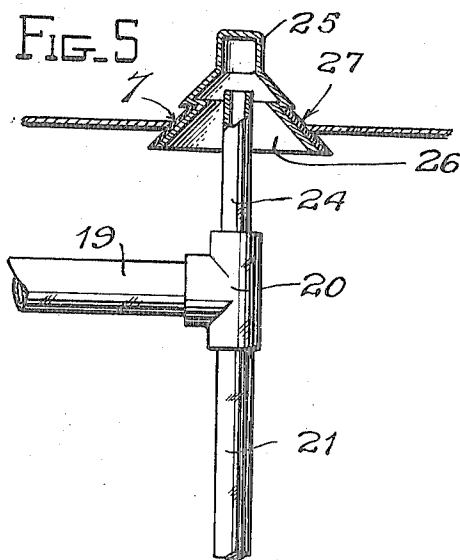


FIG. 5



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UNITED STATES PATENT OFFICE.

EDWIN E. ROTHCHILD, OF NEW YORK, N. Y.

SAND-BLAST MACHINE.

Application filed July 28, 1921. Serial No. 488,072.

To all whom it may concern:

Be it known that I, EDWIN EMANUEL ROTHCHILD, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Sand-Blast Machines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in direct pressure sand blast machines and has for its principal object to provide a novel arrangement of parts for effectively discharging the sand with practically no danger of clogging, this result being obtained by agitating the sand in the sand tank by air pressure and simultaneously forcing downwardly on the sand by pressure in the upper end of the tank.

A further object of the invention is to provide a novel form of self-closing valve for closing the sand inlet opening of the sand tank as soon as the air pressure is turned on, provision being made whereby there is no possibility of the sand running down the air supply pipe and into the usual water separator with which that pipe is provided.

The sand from the sand tank is discharged into a main air pressure line which is equipped with the usual or any preferred discharge hose, and an additional object of the invention is to provide means whereby all of the air pressure may be excluded from this main air line and directed only into the tank, in case any clogging should take place.

Still another object is to provide for the formation of an air cushion at the point where the sand tank discharges into the main air pressure line, which cushion has a tendency to increase the force with which the sand is discharged through the hose.

With the foregoing in view, the invention resides in the novel construction and association of parts hereinafter described and claimed, the descriptive matter being supplemented by the accompanying drawings.

Figure 1 is a side elevation partly in section showing a sand blast machine constructed in accordance with my invention.

Figure 2 is a horizontal sectional view as indicated by line 2—2 of Fig. 1.

Figure 3 is a partial plan view.

Figures 4 and 5 are detail sectional views

showing the operation of the sand inlet valve.

In the drawings above briefly described, the numeral 1 designates a vertically elongated sand tank supported on appropriate legs 2 and having a funnel shaped lower end 3 from which a vertical sand discharge pipe 4 depends, said pipe being provided with a suitable valve 5 for controlling the rate of discharge. The upper end 6 of the tank 1 is depressed to form a hopper into which the sand is poured, said depressed end being provided with a central opening 7 through which the sand flows into the tank 1. The opening 7 is controlled by a novel form of valve hereinafter described.

The numerals 8, 9, 10 and 11 designate several reaches of a main compressed air line which includes a suitable water separator 12 whose upper end is equipped with a pressure gauge 13. The reach 9 extends horizontally from the upper end of the separator 12 and is connected by a T-coupling 14 with the reach 10 which extends down the exterior of the tank 1, being in communication at its lower end with the reach 11 which extends horizontally under the tank 1 and is connected by a T-coupling 15 with the pipe 4. The pipe 4 enters the upper end of the coupling 15, the pipe 11 enters one side of said coupling, and a sand and air discharge pipe 16 leads from said coupling directly opposite the pipe 11, pipe 16 being connected with the usual hose 17 which is provided with an appropriate nozzle 18, the latter being preferably formed of well known pipe connections. By reference to Fig. 1, it will be seen that the pipes 4 and 11 are of uniform diameter (preferably one inch), while the pipe 16 is of smaller diameter (preferably $\frac{3}{4}$ of an inch). By this proportion of parts, an air cushion is formed in the connection 15 which tends to increase the force with which the sand is discharged.

Extending horizontally from the T-coupling 14 through one side of the tank 1 is the horizontal reach 19 of a branch air line, the inner end of said reach 19 being provided with a T-coupling 20 by means of which a vertical pipe reach 21 is connected thereto, the reach 21 being extended downwardly to the lower end of the tank 1 and being there provided with radiating air discharge arms 22 which are in most instances equipped

with downturned elbows 23, so as to discharge air into the sand in the tank and effectively agitate such sand to prevent clogging and cause free discharge through the pipe 4. Rising from the T-coupling 20 into the opening 7 is a relatively short branch 24 having an open upper end over which a dome-like sleeve 25 is loosely fitted, the lower end of the sleeve being provided with a lateral inclined flange 26 adapted to close the opening 7 when the valve 25-26 is raised by air pressure from the branch pipe 24. The lower part of the flange 26 is provided with an appropriate gasket 27 for air tight contact with the upper end wall 6 of the tank 1.

When filling the tank 1, the sand is poured onto its depressed upper end 6 and since the valve 25-26 is then open as shown in Fig. 1, the sand runs through the opening 7 and fills the tank. When the air pressure is now turned on through the piping, air is discharged from the branch pipe 24, from the elbows 23, and from the nozzle 18. The air from the pipe 24 immediately forces the valve 25-26 upwardly to closed position so that the air pressure from said pipe thereafter acts downwardly on the sand in the tank 1, and the pressure from the elbow 23 so agitates and loosens the sand in the lower end of the tank as to cause it to be effectively fed through the pipe 4 into the coupling 15, from which it is carried through the pipe 16 and hose 17 by the blast of air within the main pipe line. In case of any slight impediment in the pipe 4, all pressure may be momentarily cut off from the reach 10 of the main pipe line and directed through the piping 19-24-21, so as to blow the obstruction loose, this operation being possible due to the provision of a suitable valve 28 in the reach 10. Since this valve is to remain closed only momentarily, it is preferably provided with a spring 29 which quickly moves it to open position as soon as released.

In case manipulation of valve 28 does not loosen the impediment in the pipe 4, a wire may be inserted upwardly through an opening in the coupling 16, which opening is normally closed by a screw plug 30.

Heretofore, the prevailing obstacle to effective and economical sand blast operation has been that the sand discharge opening becomes easily clogged, causing the operator to lose time in relieving the machine of the obstruction. This is caused principally by the air pressure being only on top of the sand in the tank, thereby packing said sand to such an extent as to prevent its free discharge. This condition also causes the formation of an air hole through the center of the body of sand in the tank, requiring the operator to shut off the air and re-fill the tank before the latter has

been discharged of half its contents, it being then necessary to shake the heavy tank before the caked sand is loosened. By the use of my invention, all of these difficulties are effectively overcome.

A further feature of advantage, is that by employing the general relation of parts herein shown, there is no possibility whatever of any sand running down the piping into the water separator 12, when filling the tank 1, as often happens with certain forms of air blast machines now in use. The tank of my machine can thus be filled to the maximum without encountering the difficulties now met with in a number of other machines.

By the general construction and arrangement disclosed, the abrasive action of the sand at 30 to 40 pounds air pressure has been found to be as effective as in other machines requiring fifty to sixty pounds of pressure. The economical advantages of the improved machine are therefore apparent and in this connection, attention is invited to the fact that well known pipe connections are used throughout so that there will be no difficulty in obtaining any necessary parts for making repairs.

Since excellent results have been obtained from the details disclosed, they are preferably followed, but it is to be understood that within the scope of the invention as claimed, numerous changes may be made. Furthermore, while I have herein referred to "sand," it is to be understood that this term is intended to cover any abrasive, such as shot, chilled shot, grit and flint shot, etc.

I claim:

1. A sand blast machine comprising a sand tank having a sand inlet opening in its upper end and a sand outlet pipe depending from its lower end, a main compressed air pipe line extending down the outside of said tank and under the latter, said sand outlet pipe discharging into said pipe line, a branch line from said main line extending into the upper portion of the tank and then extending downwardly therein, the lower end of said branch line having radiating air discharge arms, a short open-ended branch rising from said branch line into said sand inlet opening, and a dome-like valve for said opening fitting loosely over said short branch.

2. A structure as specified in claim 1, together with a cut-off valve in said main line.

3. A machine of the character described comprising a sand tank having a sand inlet opening in its top, a fluid pressure supply line having an open upper end extending upwardly into said opening, a hood upon said pipe end having a flared skirt reduced in diameter at its lower end, an abrupt shoulder being formed at the juncture of the two diameters, and a yieldable band

surrounding said reduced skirt end and bearing against said shoulder, said band being adapted to engage the wall of said opening when said hood and skirt are raised
5 by fluid pressure from said pipe line.

4. The combination with a sand tank having a discharge opening in its lower end; of a fluid pressure supply line extending downwardly into said tank and having radi-
10 ating pressure discharge arms, the latter being provided with downwardly directed nozzles at their free ends.

5. In combination with a sand tank of a sand blast apparatus, having a sand in-

let opening in its top and an outlet in its 15 lower end; an upwardly closing valve for said sand inlet opening, sand agitating means in the tank including a nozzle for directing fluid under pressure into the sand, and fluid pressure supply piping common 20 to both said agitating means and said valve, being active to close the latter and to thereafter supply pressure to the tank above the sand, as well as supplying pressure to the agitating means. 25

In testimony whereof I have hereunto set my hand.

EDWIN E. ROTHCHILD.