July 24, 1923.

1,462,786

D. P. CLEVELAND

SAND BLAST MACHINE

Filed March 20, 1922

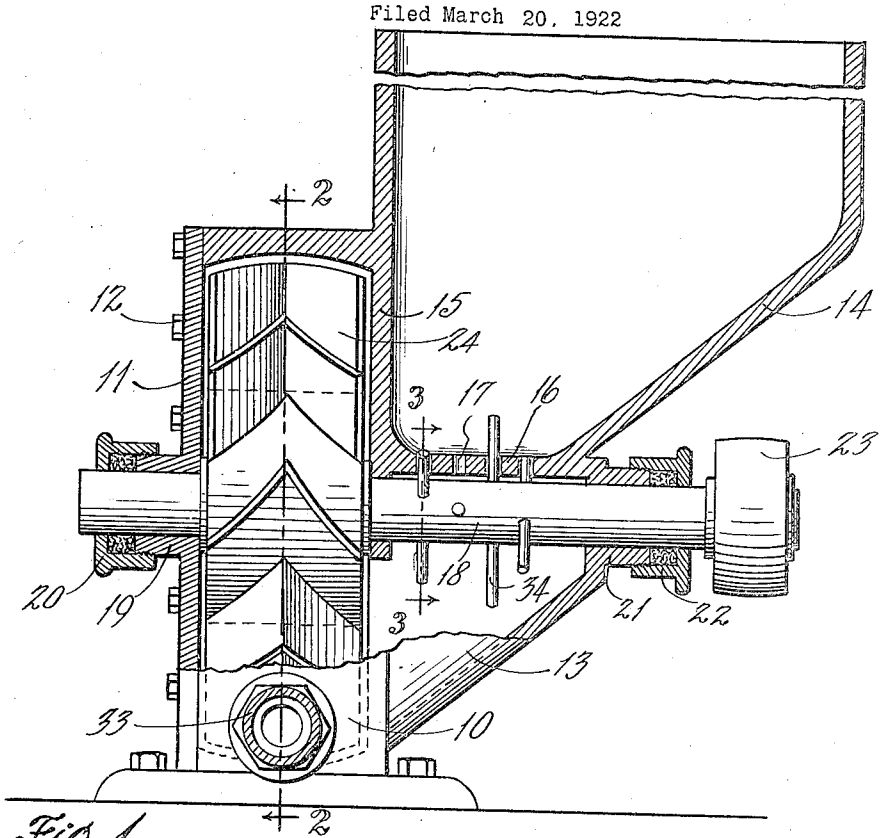


Fig. 1

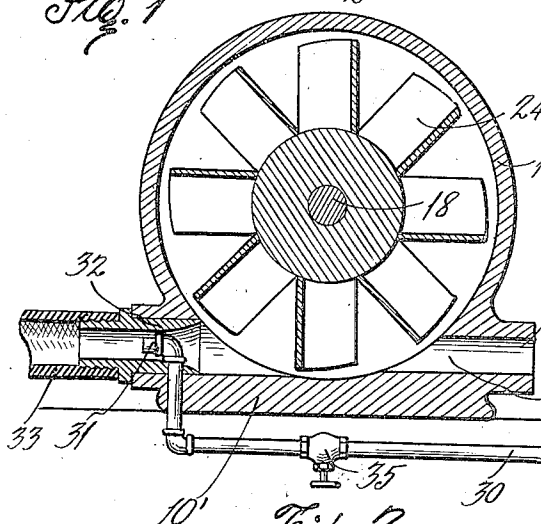


Fig. 2

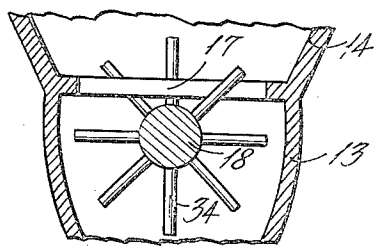


Fig. 3

Inventor

D. P. Cleveland

By Jackson & Jackson

Attorneys

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UNITED STATES PATENT OFFICE.

DAVID P. CLEVELAND, OF DALLAS, TEXAS, ASSIGNOR OF ONE-HALF TO J. A. BERGFELD, OF DALLAS, TEXAS.

SAND-BLAST MACHINE.

Application filed March 20, 1922. Serial No. 545,008.

To all whom it may concern:

Be it known that I, DAVID P. CLEVELAND, a citizen of the United States, residing at Dallas, in the county of Dallas and State of Texas, have invented certain new and useful Improvements in Sand-Blast Machines, of which the following is a specification.

This invention relates to new and useful improvements in sand blast machines.

The invention contemplates a machine adapted to deliver a blast of sand for treating the surfaces of various objects or for removing the finish therefrom; and has for its primary object the provision of means which obviate the necessity of drying the sand or breaking it up before placing the same in the machine.

Another object resides in the provision of an agitating device co-operating with a turbine, whereby the sand is thoroughly broken up and dried in the machine before being discharged.

Another feature resides in a by-pass air line for creating a vacuum in the discharge line and thereby promoting the blast.

A construction designed to carry out the invention will be hereinafter described together with other features of the invention.

The invention will be more readily understood from a reading of the following specification and by reference to the accompanying drawings, in which an example of the invention is shown and wherein:

Fig. 1 is a side elevation of a machine constructed in accordance with my invention, and being partly in section to show internal parts,

Fig. 2 is a vertical sectional view taken on the line 2—2 of Fig. 1, and

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 1, showing the agitating device.

In the drawings the numeral 10 designates a substantially drum-like housing which is provided with a removable plate 11 secured thereto by screws 12 or the like. The lower portion of the housing opposite the plate is inclined rearwardly to form a chute 13, above which said housing merges into a hopper 14, the wall 15 forming a barrier between the hopper and the said housing. The hopper is separated from the chute 13 by a bottom 16 in which is provided a plurality of transverse slots 17 spaced apart and parallel to each other.

A shaft 18 extends thru the housing and the said chute 13, one end being journaled in a bearing 19 in the center of the plate 11 and provided with a packing box 20. The other end is supported in a bearing 21 and extends thru a packing box 22, so that a pulley 23 may be mounted thereon.

A turbine composed of a plurality of radial vanes 24 is mounted on the shaft 18 so as to revolve in the housing 10. The said vanes are preferably bent transversely in the middle so as to be angular or V-shaped in construction, the extreme outer edges of the same being curved slightly inwardly of the angle, as is best seen in Fig. 2. The lower portion of the housing 10 forms an air channel 25 which is substantially tangential to the path of the turbine. As is best shown in Fig. 2, one end of the said channel is open forming a mouth 26 into which a stream of air may be directed from a nozzle 27 in alinement therewith. The nozzle is in close proximity to the mouth of said channel and forms a part of an air line 28 which may be connected with any suitable source of compressed air, as is obvious. A control valve 29 is also included in said line to regulate the flow of air thru said nozzle. It will be readily seen that a stream of air discharged from the nozzle 27 under pressure will strike the concave or inner side of the vanes 24 and thereby drive the turbine together with the shaft 18.

A by-pass air line 30 extends from the line 28 and enters the opposite end of the channel 25 thru the base 10′ of the housing. The said line 30 is provided with an outwardly directed jet 31 at right angles thereto, which together with a sleeve 32, composes a nozzle to which the discharge line is connected. As is obvious, the said sleeve is mounted in the end of the said channel concentrically to the jet 31, and has a flaring inner end; a flexible conductor such as rubber hose 33 being connected to the outer end of said sleeve and forming the discharge line.

Projecting radially from the shaft 18 is a plurality of fingers 34 arranged in staggered relation and constituting an agitating device. As will be best seen in Fig. 3, said fingers are adapted to pass thru the slots 17, in the bottom of the hopper when the said shaft is rotated. The sand in the hopper will be thereby agitated and broken up, as is evident.

In operation sand is placed in the hopper 14, and the valve 29 is opened so as to direct a stream of air under high pressure against the blades 24, thus revolving the turbine and the shaft 18. The fingers 34 passing thru the slots 17 break up the sand in the bottom of the hopper so as to admit the same into the chute 13 thru said slots. The sand admitted is thus delivered into the channel 25 where it is further agitated by the blades 24. The action of the revolving turbine together with the stream of air under high pressure from the nozzle 27 dries the sand before it is discharged thru the nozzle at the opposite end of the said channel. In order to promote the blast in the discharge line, a control valve 35 in the by-pass line may be opened, thus creating a vacuum in the sleeve 32, as is obvious. A suitable nozzle may be provided at the outer end of the hose 33, and it is evident that a high pressure blast of sand will be delivered therefrom.

It is pointed out that a machine constructed in accordance with the invention obviates the necessity of treating the sand before placing it therein. Sand in the bottom of the hopper is broken up primarily by the fingers 34 and admitted thru the slots 17. When coming in contact with the revolving turbine and air the said sand is further broken up and dried, as has been clearly set forth.

If at any time it is found desirable to drive the turbine and shaft by power other than the air pressure, it is obvious that said power may be transmitted by means of a belt and the pulley 23.

Various changes in the size and shape of the different parts as well as modifications may be made, without departing from the spirit of the invention.

What I claim, is:

1. In a sand blast machine, a hopper, a turbine, a housing enclosing the turbine, said housing having means for admitting a fluid under pressure for driving said turbine, means co-operating with said turbine for agitating the sand in the hopper and causing the same to precipitate into said housing, and means for discharging said fluid and sand from said housing.

2. In a sand blast machine, a turbine, a housing enclosing the turbine and having a chute extending from one side, a hopper arranged above the chute and being separated therefrom by a bottom, said bottom being provided with a plurality of elongated slots, said turbine being mounted on a shaft having one end extending thru the said chute, means on the shaft adapted to pass thru the said slots and agitate the sand when the said shaft is revolved, means for admitting a fluid under pressure for driving said turbine, and means for discharging said fluid and sand from the housing.

3. In a sand blast machine, a turbine, a housing enclosing the turbine, and having an air channel in its lower portion tangential to the path of the turbine, means for delivering sand into the housing, means for directing a fluid under pressure into one end of the said channel for driving the said turbine, and means at the opposite end of the channel for discharging said sand and fluid.

In testimony whereof I affix my signature.

DAVID P. CLEVELAND.