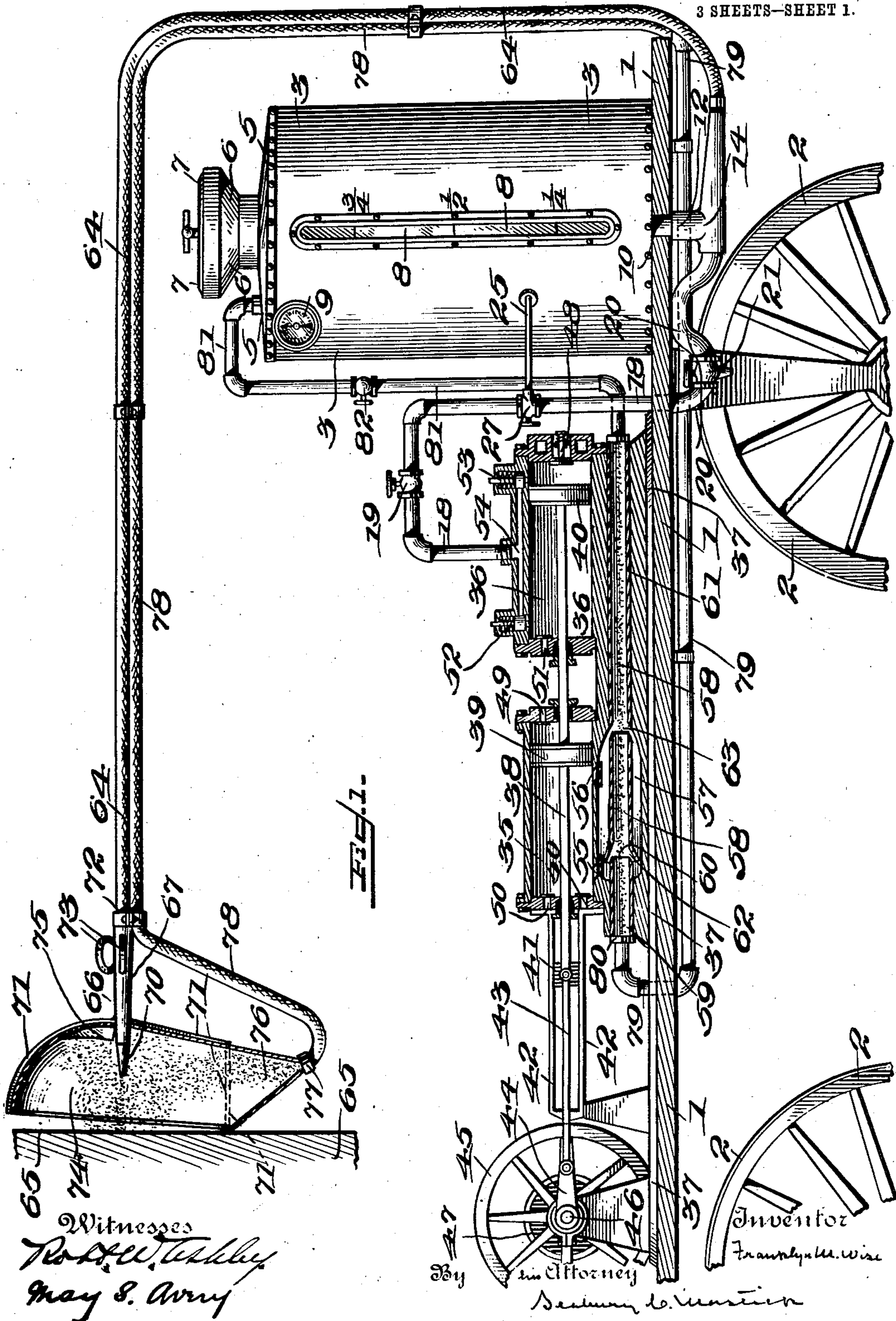


No. 847,270.

PATENTED MAR. 12, 1907.

F. M. WISE.
SAND BLAST APPARATUS.
APPLICATION FILED NOV. 23, 1905.

3 SHEETS—SHEET 1.

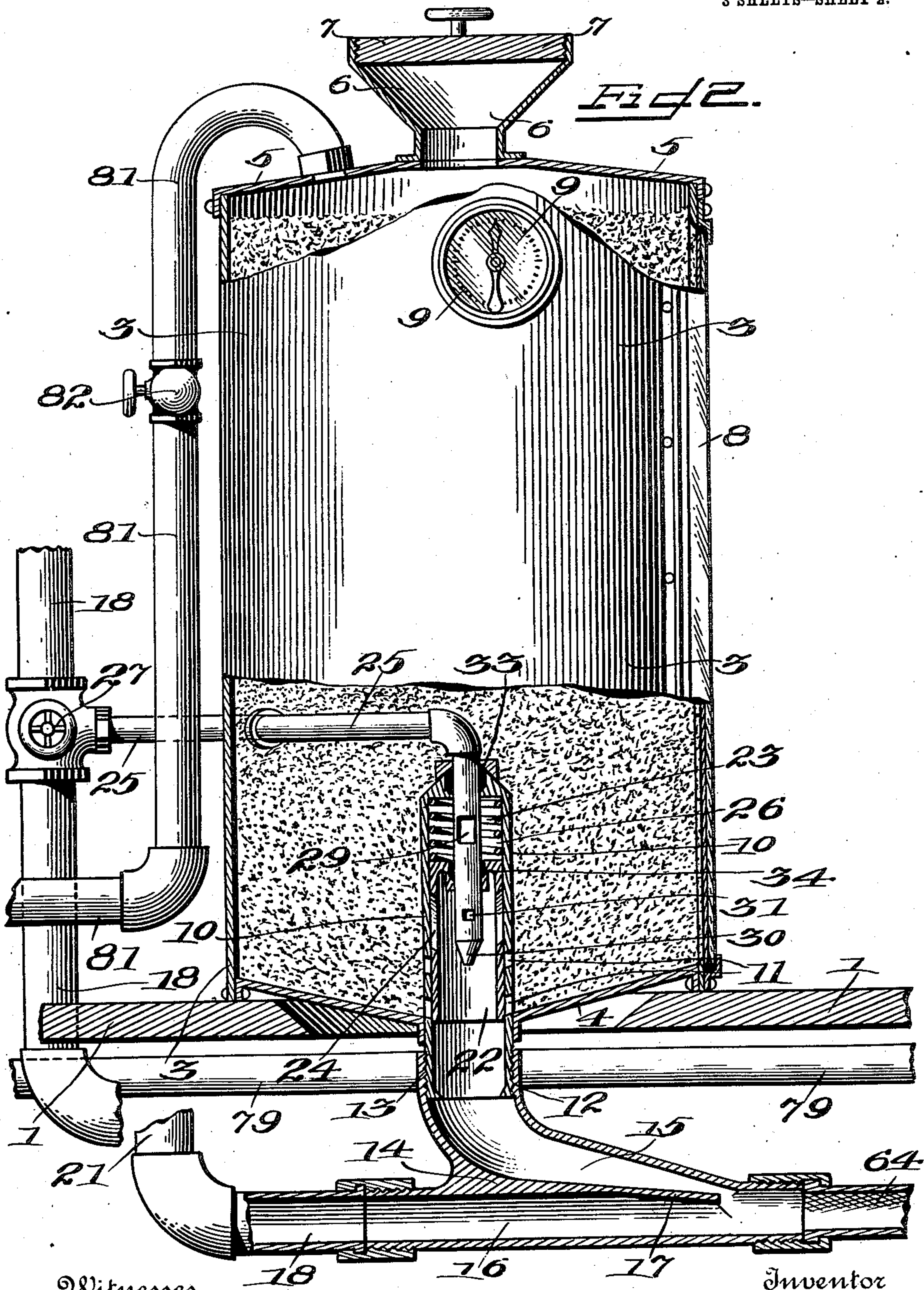


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3 SHEETS—SHEET 2.



Witnesses
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May S. Amy

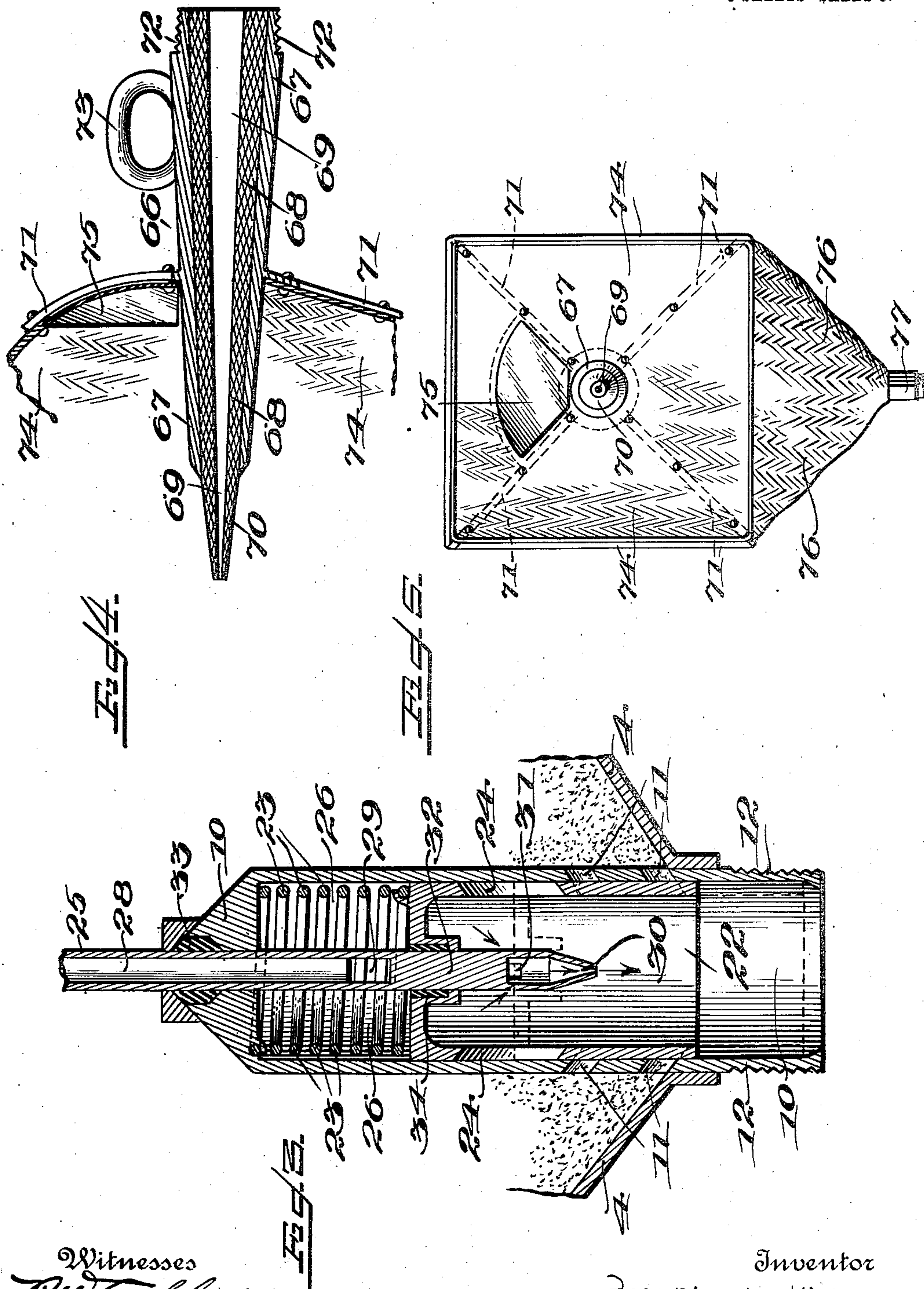
Inventor
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

FRANKLYN M. WISE, OF NEW YORK, N. Y., ASSIGNOR TO AMERICAN DIAMOND BLAST COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

SAND-BLAST APPARATUS.

No. 847,270.

Specification of Letters Patent.

Patented March 12, 1907.

Application filed November 23, 1906. Serial No. 288,641.

To all whom it may concern:

Be it known that I, FRANKLYN M. WISE, a citizen of the United States, residing in the borough of Manhattan, city, county, and State of New York, have invented certain new and useful Improvements in Sand-Blast Apparatus, of which the following is a specification.

My invention relates to improvements in sand-blast machines of that class particularly adapted for cleaning the surfaces of stone, metal, wood, &c., and has as its object the providing of means for automatically controlling the discharge of sand from the reservoir, means for collecting and returning the sand used to the reservoir, and means for operating the air compression and suction pumps.

In the following I have described, in connection with the accompanying drawings, one form of device illustrating my invention, the features thereof being more particularly pointed out hereinafter in the claims.

In the drawings, Figure 1 is a side elevation, partly in longitudinal section, of a sand-blast machine illustrating one form of my invention, the respective parts thereof being adapted to be fastened to the platform of a wagon. Fig. 2 is a side elevation of the sand-containing reservoir and its connections, parts being broken away. Fig. 3 is a vertical sectional view of the valve controlling the admission of sand into the mixing-chamber. Fig. 4 is a longitudinal sectional view of the sand-discharge hose-nozzle and the sand-collector, parts being broken away; and Fig. 5 is a front elevation of the collector and nozzle.

Similar numerals of reference indicate similar parts throughout the several views.

1 designates a wagon-platform suitably mounted on wheels 2.

3 is a sand-containing reservoir, preferably of sheet metal, provided with a concave-shaped bottom 4 and a cover or lid 5. Access to the sand-reservoir in order to replenish it with sand is provided for by means of a hopper 6, said hopper having an air-tight cover 7.

A graduated gage or sight 8 may be provided at one side of the reservoir 3 in order to permit the inspection of the contents thereof. A suitable pressure-gage 9 may be provided to indicate the air-pressure in said reservoir.

10 is a valve-casing, preferably centrally located in the sand-reservoir, having a series of vertically-arranged apertures 11 therein. Valve-casing 10 extends below the bottom 4 of the sand-reservoir, and has formed thereon threads 12, adapted to receive the threaded portion 13 of the mixing-chamber 14, said mixing-chamber comprising a sand-passage 15 and a compressed-air passage 16, separated from each other by a deflector-plate 17.

18 is a pipe connecting the mixing-chamber 14 with the compressed-air supply, said connection being adapted to be controlled by a valve 19. To draw off what little moisture that may be in the air before it reaches the mixing-chamber, a gooseneck-bend 20 is provided, having a draw-off pet-cock 21.

To regulate the admission of sand to the mixing-chamber, valve-casing 10 is provided with a vertically-adjustable valve, said valve comprising a plunger-head 22, adapted to be held closed by means of a retraction-spring 23, said plunger-head being provided with apertures 24, which apertures when the valve is open register with apertures 11 in the valve-casing 10.

25 is a pipe through which air under pressure is admitted into chamber 26 in the valve-casing 10, as hereinafter set forth, said pipe 25 being adapted to be controlled by means of a valve 27. Pipe 25 is extended downward into valve-casing 10 by means of a suitable extension acting as a slide-bearing for plunger-head 22 and comprising a tubular portion 28, having an outlet-port 29 into chamber 26, and a discharge-jet 30, having a port 31, acting as an inlet-port from chamber 26 when plunger-head 22 is in its lowest position. Tubular portion 28 and jet 30 are separated by a solid portion 32, as shown. Outlet-port 29 is adapted to admit sufficient air from pipe 25 into chamber 26 to force the head 22 downward, causing apertures 24 in the plunger-head to register with apertures 11 in valve-casing 10 and permitting sand to flow from reservoir 3 into the mixing-chamber 14, forming at this point a secondary mixing-chamber. When plunger-head 22 is in this position, port 31 will admit sufficient air from chamber 26 into discharge-jet 30 to tend to force the sand flowing from the sand-reservoir downward into mixing-chamber 14. In order to hold pipe 25 in the valve-casing 10 and make chamber 26 air-tight, a stuffing-

box 33 is provided, through which said pipe passes. A stuffing-box 34 is provided to prevent air from entering plunger-head 22 from chamber 26, except through port 31, as described.

An engine comprising cylinders 35 and 36 is mounted upon a suitable base-plate 37, said base-plate 37 being adapted to be fastened to the platform of the wagon.

38 is a piston-rod having mounted thereon heads 39 and 40, said heads 39 and 40 being adapted to operate in cylinders 35 and 36, respectively. At the outer end of piston 38 a sliding block 41 is provided, adapted to slide in guide-rods 42, said guide-rods being suitably mounted on base-plate 37.

43 is a connecting-link connecting sliding block 41 with crank-arm 44 on fly-wheel 45, mounted on shaft 46. Shaft 46 is actuated by any suitable means, as by a motor 47.

By reciprocating piston-heads 39 and 40 it will be seen that on the backward stroke of the piston air will be drawn into cylinders 35 and 36 through ports 48 and 49, respectively, while on the forward stroke of the piston air will be drawn into said cylinders 35 and 36 through ports 50 and 51, respectively. The air compressed on each side of the piston-head 40 in the cylinder 36 exhausts through spring-controlled valves 52 and 53, which in turn exhaust into passage 54, thence into pipe connection 18, which leads to the valve controlling the admission of sand to the mixing-chamber and to the mixing-chamber itself.

The air compressed on each side of piston-head 39 in cylinder 35 exhausts through ports 55 and 56 into suction-chamber 57. Suction-chamber 57 is provided with a sand-passage 58, receiving sand from pipe 59, discharging into funnel-shaped pipe 60 and delivering sand into pipe 61, said pipes and sand-passage being lined with any suitable material to resist the cutting action of the sand, such as paper fiber. The sand-passage 58 is so mounted in suction-chamber 57 that the suction in the suction-chamber creates a double vacuum therein, as at 62 and 63.

Mixing-chamber 14 tapers at its outer end to form a nipple adapted to receive the end of hose 64 for conveying air and sand to the object to be operated upon, such as the wall 65. 66 is a discharge-nozzle comprising a metal jacket 67 and a filling member 68, having a central bore 69 and extending a little beyond the casing 67, as at 70. The metal jacket 67 carries collector-ribs 71, preferably cast therewith and is provided with a nipple 72, adapted to receive the end of hose 64. The object of filling member 68 is to provide a means which will resist the action of sand and which when worn thereby may be replaced by a new one. The filling member may be made of any suitable material adapted to resist the

action of sand, preferably well-finished paper fiber. The nozzle 66 has mounted thereon suitable handles 73.

A sand-collector is formed on the discharge-nozzle 66 by riveting flexible canvas sheets 74 to ribs 71. The collector may be provided with a sight or window 75 in order to permit the operator to readily observe the object operated on. A bag 76, provided with a nipple 77 to receive the return-pipe connection 78, is provided to receive the sand from the collector.

79 is a pipe connection adapted to be fastened to the under portion of the wagon-platform and to receive the return connection 78 at one end, the other end thereof being connected with pipe 59 of the sand-suction means, as at 80.

81 is a pipe connecting pipe 61 and sand-reservoir 3, said pipe being controlled by a valve 82.

The operation of the device is as follows: The reservoir having been filled with sand and the cover 7 of the hopper 6 being closed, valve 20 is opened and the air under pressure from the compression-cylinder 36 is permitted to pass through the pipe 18 to the mixing-chamber 14. Valve 27 is now opened, permitting air to pass through pipe 25 and port 29 into chamber 26, forcing the plunger-head 22 downward, so that apertures 24 register with apertures 11 in valve-casing 10, at which point port 30 admits air from chamber 26 into discharge-jet 32, as described. The air admitted into the sand-passage through the discharge-jet 32 forces the sand flowing from the sand-reservoir downward into the mixing-chamber, where it is deflected by deflector-plate 17, then caught by the air passing through passage 16, carried through hose 64, and forcibly projected against the face of the wall 65. The sand after being forcibly projected against wall 65 falls back into bag 76 of the collector. This latter operation is generally assisted by gravity, as the nozzle 66 and the collector are frequently in use at a level higher than the reservoir. Valve 83 is then opened, the suction of the air from cylinder 35 causing the used sand to be returned to the sand-reservoir. The air accompanying the sand also enters the sand-reservoir and creates pressure therein, tending to force the sand contained therein downward, thus assisting the sand to flow out through apertures 11 in the valve 10. By the means described little sand is lost and the machine may be used a considerable length of time without replenishing, thus involving very suitable economies in operation as well as great convenience in manipulation.

It is obvious that the arrangement of apparatus described and the details thereof may

be considerably varied without departing from the spirit of my invention, and I do not restrict myself to any of the details shown.

What I claim, and desire to secure by Letters Patent, is—

1. An apparatus of the character described comprising a portable sand-reservoir, means for automatically controlling the discharge of sand from the sand-supply into a primary mixing-chamber, a secondary mixing-chamber, an air-passage adjacent thereto, means for automatically controlling said air-passage, and a sand-discharge pipe associated therewith having mounted on its extreme end a sand collecting and retaining means.

2. An apparatus of the character described comprising a portable sand-reservoir, means for automatically controlling the discharge of sand from the sand-supply into a primary mixing-chamber, a secondary mixing-chamber, an air-passage adjacent thereto, means for automatically controlling said air-passage, a sand-discharge pipe associated therewith having mounted on its extreme end a sand collecting and retaining means, and a sand-return pipe adapted to convey the used sand from said sand collector and retainer to the main sand-supply.

3. An apparatus of the character described comprising an air-tight portable sand-reservoir, an air-compression indicator in communication therewith, a sight mounted thereon, and an automatic controlling-valve adapted to control the passage of sand therefrom into primary and secondary mixing-chambers.

4. An apparatus of the character described including a sand-discharge nozzle detachably mounted on a sand-discharge pipe, a sand collecting and retaining hopper frame cast therewith, a covering for said hopper-frame having mounted therein a transparent observance member, and a collecting-receptacle formed on said frame adapted to have fastened thereto a sand-return pipe.

5. An apparatus of the character described comprising a sand-reservoir, a primary mixing-chamber, a secondary mixing-chamber, air-compression means in communication with said chambers, means for automatically controlling the discharge of sand from said reservoir into said secondary mixing-chamber, a sand-discharge pipe connected thereto, a discharge-nozzle on said sand-discharge pipe, means for collecting the sand discharged therefrom, and means for automatically exhausting said collector of the contents thereof.

6. An apparatus of the character described comprising a sand-reservoir, a mixing-chamber, air-compression means in communication therewith, means for automatic-

ally controlling the discharge of sand from said reservoir into said mixing-chamber, a sand-discharge pipe connected thereto, a discharge-nozzle in communication therewith, means for collecting the sand discharged therefrom, and means for automatically returning the sand collected by said sand-collector to the main sand-supply.

7. An apparatus of the character described comprising a sand-reservoir, a mixing-chamber, air-compressing means in communication therewith, means for automatically controlling the discharge of sand from said reservoir into said mixing-chamber, a discharge-nozzle in communication with said mixing-chamber, a collector means adjacent thereto, and means for returning the sand from said collector means to the sand-reservoir.

8. An apparatus of the character described including a sand-reservoir and air-compressing means comprising a plurality of cylinders, one of said cylinders being adapted to act as a sand-suction means.

9. An apparatus of the character described including a sand-reservoir, air-compressing means, a mixing-chamber, a valve connecting said reservoir and said chamber, and a connection from said air-compressing means to said valve, said valve comprising a casing, a plunger-head therein, and a spring, the valve parts being so arranged that the air forces the plunger-head down to open said valve and the spring closes said valve when the air-pressure is released.

10. An apparatus of the character described including a sand-reservoir, outlet and inlet connections to said reservoir and an air-compressing means comprising a plurality of cylinders, one of said cylinders being adapted to exhaust into the outlet-pipe and another to exhaust into the inlet-pipe.

11. An apparatus of the character described including a sand-reservoir, an outlet therefor, an inlet thereto, a suction-chamber in connection with said inlet and an air-compressing means comprising a plurality of cylinders, one of said cylinders being adapted to exhaust into said outlet and another to exhaust into said suction-chamber.

12. An apparatus of the character described including a sand-suction means comprising a plurality of cylinders, a piston-rod having mounted thereon piston-heads adapted to generate in each of the respective cylinders air suction and compression means.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

FRANKLYN M. WISE.

Witnesses:

HENRY M. WISE,
MAX S. HAMBURGER.