R. G. COBURN.

SAND BLAST MACHINE.

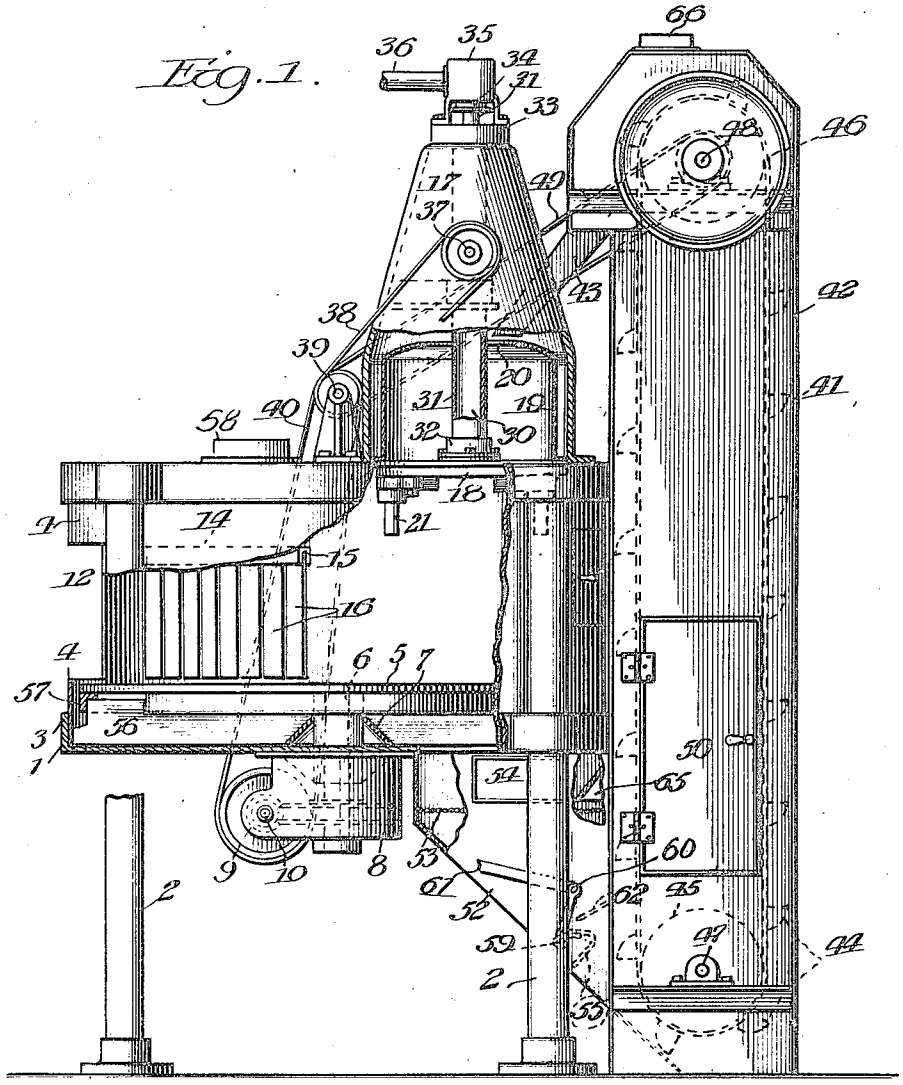
APPLICATION FILED JUNE 21, 1916.

1,424,713.

Patented Aug. 1, 1922.

2 SHEETS—SHEET 1.

Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 2.

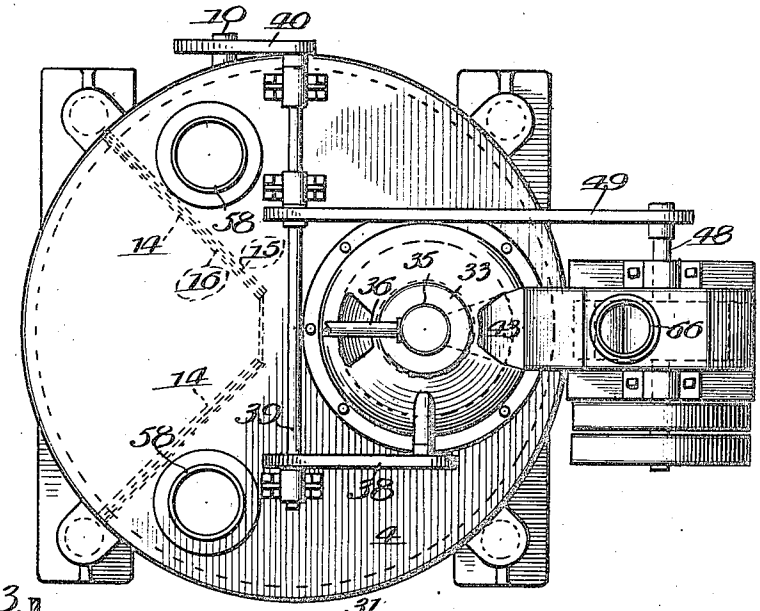


Fig. 3.

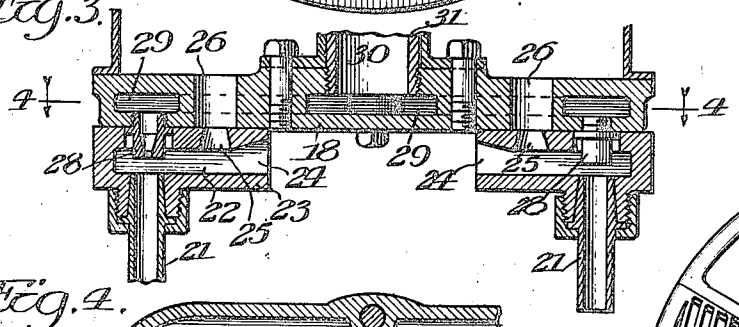


Fig. 4.

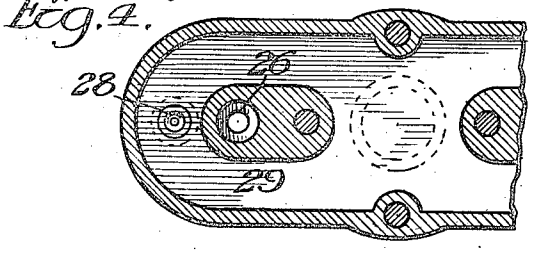
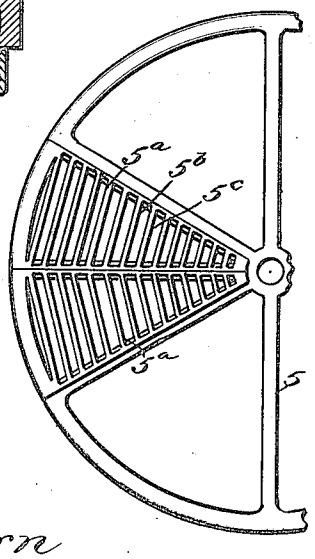


Fig. 5.



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UNITED STATES PATENT OFFICE.

RICHARD G. COBURN, OF CHICAGO, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO AMERICAN FOUNDRY EQUIPMENT COMPANY, OF NEW YORK, N. Y., A CORPORATION OF OHIO.

SAND-BLAST MACHINE.

1,424,713. Specification of Letters Patent. Patented Aug. 1, 1922.

Application filed June 21, 1916. Serial No. 105,007.

To all whom it may concern:

Be it known that I, RICHARD G. COBURN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Sand-Blast Machines, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to sand blast machines wherein a blast of sand is used for cleaning or otherwise treating castings or other articles.

Prominent objects of the invention are to provide a simple, practical and efficient type of sand blast machine; to arrange for the automatic feed of the sand when the machine is in operation and the automatic stoppage of the same when the machine stops operating; to provide for the continuous circulation of the sand and the effective control of the same; to provide for the ready introduction and removal of the castings or other objects to be treated by the sand blast; and to secure the foregoing and other desirable results in a simple and expeditious manner.

In the accompanying drawings Figure 1 is a view partly in elevation and partly in vertical section of a sand blast machine embodying my invention;

Fig. 2 is a plan view of the same;

Fig. 3 is a vertical section of a portion of the machine on an enlarged scale;

Figs. 4 and 5 are views of details of construction.

In the accompanying drawings I show a machine in which an upper framework 1 is supported by four legs 2—2. The frame 1 involves an annular member 3 supporting a hollow cylindric drum 4 whose lower end fits into the annular member 3. This drum 4 contains a rotary table 5 which is to receive and support the castings or other articles to be treated by the sand blast. The table 5 is mounted upon a central shaft or spindle 6 which is carried in a bearing 7 on the member 1. Said table 5 is rotated by means of a worm wheel 8 driven by a worm 9 on a driving shaft 10, the latter being the main driving shaft receiving power by means of a pulley 11. The drum 4 is provided with a cut-away portion 12 by which access can be had to its interior to place castings or other articles therein or remove the same therefrom. For the purpose of shielding this opening 12 from the sand blast, screens or shields 14 are provided, preferably at about 90 degrees apart, as shown in Figure 2, so that the space into which the opening 12 communicates is substantially shut off from the rest of the space in the drum. Each of these screens 14 is preferably made of a horizontally arranged arm 15 and a series of strips 16 depending therefrom, said strips 16 being made of rubber cloth or similar material. Thus while these shields form walls in effect cutting off a portion of the space of the drum from the rest of it, they are sufficiently flexible to permit the castings to pass underneath or through them, and so allow the proper rotation of the drum with the castings upon it to insure proper treatment of the latter.

Mounted upon the drum 4 is a housing 17 whose upper portion is conveniently made conical. Within this housing and at the bottom thereof is a rotary sand table 18 carrying a sand drum 19 having an opening 20 in its top. The rotary sand table 18 has depending from it one or more sand blast nozzles 21, two being shown arranged diametrically opposite one another. As shown in Figure 3 each of these nozzles 21 communicates with a passage 22 arranged horizontally in a block or member 23 secured to the lower side of the sand table 18. One end 24 of this passage 22 communicates with the outside air. A duct or passage 25 for the sand communicates with the passage 22 between its point of communication with the nozzle 21 and its end 24. This passage 25 communicates with a sand duct 26 in the table 18. An air nozzle 28 is secured to the lower side of the table 18 and is directed toward the nozzle 21, the lower end of the nozzle 28 however terminating in the duct 22. This nozzle 28 is preferably made as a separable or detachable element screw threaded into the bottom of the table 18. The nozzle 28 communicates with an air passage or chamber 29 which as shown in Figure 4 is of considerable width and substantially coextensive with the table 18, communicating at the center thereof with a central air duct or passage 30 formed by a tubular member 31. Thus it will be seen that air coming through the passage 30 is divided, part going each side of said pas-

sage to the oppositely arranged nozzles 28 and passing through the same into the sand blast nozzle 21. Sand passes into and down the duct 26 and thence into and down the duct 25 and into and through the duct 22 whence it is driven by the air current in the nozzle 28 into and through the sand blast nozzle 21. The open end 24 of the duct 22 permits outside air to be drawn or sucked in, thereby allowing for the proper movement of the sand into and through the duct 22 to the sand blast nozzle 21. The sand on the table 18 passes into the aperture 26 and duct 22 when the table is stationary; but when the table rotates, it passes outwardly through the duct 22 by centrifugal force, supplemented of course by the air blast when the same is turned on. When the table stops, and the air blast is shut off, the sand ceases flowing in the duct 22, thereby causing an automatic shut-off.

For rotating the table 18 I show the tubular member 31 is connected with said table by a flanged collar 32, and is extended up to a bearing 33 formed at the top of the housing 17. This member 31 extends above the bearing 33, and is connected by a suitable joint 34 with a housing or casing 35 into which an air supply pipe 36 is extended, whereby air under pressure may be continually supplied from the pipe 36 to the member 31 and thence to the nozzles 21 as described. The member 31 is driven by gear connections (not shown) with a rotary shaft 37 which latter is driven by a belt 38 from a driving shaft 39 which latter is connected by a belt 40 with the rotary shaft 10 which rotates the table 5.

For effecting a continuous circulation of the sand an endless conveyor 41 is provided and arranged within a vertically disposed housing 42. This housing has a spout 43 extending into the housing 17 and terminating above the opening 20 in the sand drum 19. The endless conveyor 41 is provided with buckets 44 and extends over pulleys 45 and 46, on rotary shafts 47 and 48, respectively. The upper shaft 48 is driven by a belt 49 extending to the driving shaft 39. A door 50 is provided in the housing 42 so as to permit access to the interior of said housing.

Sand from the rotary sand blast table 5 is conveyed by a chute 52 to the bottom of the conveyor housing 42 so that it may be taken by the buckets 44 and elevated by said conveyor and then dumped into the spout 43. The chute 52 is provided with a screen 53 for sifting the sand and catching any large articles. A door 54 is provided to permit access to the interior of the chute 52 to remove such large articles as may have been caught by the screen 53. A shutter 55 is pivoted at 59 in the chute 52 and so arranged as to control the flow of sand in said chute. The shutter 55 is controlled by a rod 61 pivoted to an arm 60 which latter is connected to the outer end of pivot 59, outside of the chute 52. Thus the pulling of the rod 61 will swing the shutter 55 upward and allow sand to slide down the floor of the chute, and this flow may be regulated as desired. The rod 61 may extend to any convenient place, preferably to the front of the machine. A plate 62 serves as a shield for the shutter below. These features of construction for controlling flow of sand or the like to an elevator are claimed in a separate application executed by me of even date herewith.

The table 5 is preferably made with bodily removable sectors 5^a, as shown in Fig. 5, whereby any part of said table may be removed without removing it all. These sectors are made like the grates of a stove or furnace with alternating cross pieces 5^b and slots or interstices 5^c, the sand of course passing through the latter. The top of the drum is provided with outlets 58 by which connection may be made with an exhaust apparatus so as to carry off the dust from the drum 4. The top of the elevator 41 is also provided with an outlet 66 by which connection may be made with an exhaust apparatus for withdrawing dust from said elevator. The elevator is also provided with an air opening 65 to carry dust out of chute 52.

The operation of the machine is that sand will be delivered by the elevator 41 through the chute 43 and upon the rotary sand table 18 near the center thereof. Sand will accummulate here and also in the opening 26 and duct 22, and as long as the machine is stationary the sand will remain in these places, and will not be fed through the nozzles. When the machine is operated, however, and the table 18 is rotated, the sand will be moved outwardly through ducts 22 to the nozzles 21, thereby causing continuous feed of sand to said nozzles. The air blast coming through the passage 30 in the tubular member 31 enters the passage 29 and travels along the same to the nozzles 28 through which it passes, discharging into the discharge sand blast nozzles 21. Thus the current of air under pressure draws and forces the sand through the passage 22 and into and through the nozzles 21, air being drawn in through the air apertures 24. As long as the table 18 keeps rotating enough sand is moved outwardly to form a continuous feed for the sand blast nozzles. The articles to be treated, such as castings or the like, are placed within the drum 4 and upon the rotary table 5. As this table rotates said articles are acted upon by the sand blast from the nozzles 21, the sand blasts from these nozzles being directed upon said articles and acting upon the different parts of the same by reason of the rotation of the sand table 18 and the article table 5. The

articles to be treated may be readily placed upon the table 5 and removed therefrom by reason of the cut-away portion 12 in the side of the drum 4, this cut-away portion exposing a part of the table 5 upon which articles may be placed by hand and from which they may be similarly removed. The screen formed by the flexible members 16 protects the hands of the operator from the sand blast in handling the articles. In this way articles placed upon the table 5 are treated by the sand blasts and this treatment continues as long as desired, the articles coming repeatedly into position between the screens 16 so as to permit of their being seen and removed, when sufficiently treated. The sand blasted upon the articles passes through the grates 5^a and thence down the chute 52 and into elevator 41, by which arrangement a continuous circulation of said is produced. The sand is scraped along the floor of the member 1 and into the opening of the chute 52 by the blades 56 which are secured to the under side of the grate 5. Dust and dirt are withdrawn from the elevator through the outlet 66 and from the drum 4 through the outlets 58, thus keeping the apparatus as free from dust and dirt as possible.

It will be understood that changes and modifications may be made without departing from the spirit of the invention.

What I claim is:

1. A sand blast machine having a rotary table which is provided with a sand passage leading downwardly and outwardly from the surface of said table, the outwardly extending portion of said passage being substantially horizontal so that the sand may be fed by centrifugal action, and a sand blast nozzle located near the outer end of said horizontal portion and receiving sand therefrom, said table also having an air jet nozzle opening into said sand passage and directing sand therefrom through said nozzle.

2. A sand blast machine having a rotary sand receiving and distributing member provided with a substantially horizontal sand passage in which the sand may be fed by centrifugal action, a sand blast nozzle carried by said rotary member near the outer end of said passage and arranged to receive sand therefrom, and an air jet nozzle opening into said sand passage and directing sand through said sand blast nozzle.

3. A sand blast machine having a rotary sand receiving and distributing member provided with a substantially horizontal sand passage in which the sand may be fed by centrifugal action, and a sand blast nozzle carried by said rotary member near the outer end of said passage and arranged to receive sand therefrom, said member comprising a table on which sand may be deposited and provided with a sand passage extending downwardly through said table, said substantially horizontal passage being below said table and communicating with the lower end of said downwardly extending passage, and an air jet nozzle opening into said sand passage and directing sand through said sand blast nozzle.

4. A sand blast machine having a rotary member provided with a substantially horizontal sand passage in which the sand may be fed by centrifugal action, and a sand blast nozzle near the outer end of said passage and opening into the same so as to receive sand therefrom, said substantially horizontal passage having its inner end open to the outside air to permit the free outward feed of the sand, and an air nozzle opening into said passage opposite said sand blast nozzle and directing sand from said passage through said last mentioned nozzle.

5. A sand blast machine having a rotary sand table provided with a passage leading from the sand surface of said table at a point remote from the center of rotation, and a sand blast nozzle carried by said table and communicating with said passage, said table also being provided with means for connecting with a source of air under pressure and also with passages for such air from said connecting means to said nozzle, said air connecting means being located centrally of said table, and said nozzle being located near the periphery of the same.

6. In a sand blast machine, the combination of a rotary table for the sand, a rotary tubular member supporting and serving as a means for rotating said table and connected to a source of air under pressure, one or more sand blast nozzles carried by said table, said table being provided with sand passages leading from the surface of said table to said nozzle or nozzles and being also provided with air passages leading from said central tubular member to said nozzle or nozzles.

7. The combination with the rotary sand table, of a detachable member 23 secured thereto, said member 23 having a duct or passage 24 communicating with the outside air and another duct or passage 25 communicating with the passage 24, a sand blast nozzle 21 detachably connected with the member 23 and an air nozzle 28 detachably connected to the sand table and opening into the duct 24, said member 23 having an aperture adapted to fit over the nozzle 28 so as to permit the removal of the member 23 without removing the nozzle 28, and the sand table having a sand passage extending to the passage 25.

8. A sand blast machine having a rotary member provided with a substantially horizontal sand passage for centrifugally feeding sand, a sand blast nozzle located near the outer end of said passage and projecting

downwardly from the under side of said member and an air nozzle located near the outer end of said passage and arranged on the upper side thereof and pointing downwardly so as to direct sand from said passage downwardly into said nozzle, the inner end of said substantially horizontal passage being open to the outside air.

9. A sand blast machine having a rotary member provided with a substantially horizontal sand passage for centrifugally feeding sand, a sand blast nozzle located near the outer end of said passage and projecting downwardly from the under side of said member and an air nozzle located near the outer end of said passage and arranged on the upper side thereof and pointing downwardly so as to direct sand from said passage downwardly through said nozzle, the inner end of said substantially horizontal passage being open to the outside air, and said passage being located in the under side of said member and said member having an upper sand receiving surface with a passage extending downwardly therefrom to and communicating with said substantially horizontal passage.

10. The combination of a rotary table provided with sand blast nozzles, a rotary tubular member supporting and rotating said table, and a connection for air under pressure connected with said tubular member and communicating with the interior thereof, a housing for said table, and a bearing for said rotary member supported by said housing.

11. The combination of a rotary sand table provided with nozzles, of a hood for said table, said hood having an opening in its top to permit the inflow of sand, a housing covering said table and hood, a tubular member supporting and rotating said table, said tubular member extending up through said hood and also to and through the top of said housing, a bearing at the top of said housing for said tubular member, a connection for compressed air connected with the upper end of said tubular member, and driving means for rotating said tubular member, said driving means being supported by said housing.

12. In a sand blast machine, the combination of a rotary member of circular form providing a surface for the deposit of sand, a tubular axially arranged member supporting said rotary member and serving as a means for rotating the same, said rotary member being provided with a diametrically arranged chamber with whose central portion the lower end of said tubular member communicates, air jet nozzles carried by said rotary member near its periphery and communicating with the outer end portions of said chamber, substantially horizontal sand passages also carried by said rotary member and arranged in radial manner to permit the centrifugal feed of sand therein, said air nozzles communicating with said sand passages near the outer ends thereof and arranged to direct sand from said passages, and sand blast nozzles also carried by said rotary member and communicating with said sand passages and having their receiving ends located opposite said air nozzles so that sand directed from said passages may enter and be discharged from said nozzles.

13. In a sand blast machine, the combination of a rotary member of circular form providing a surface for the deposit of sand, a tubular axially arranged member supporting said rotary member and serving as a means for rotating the same, said rotary member being provided with a diametrically arranged chamber with whose central portion the lower end of said tubular member communicates, air jet nozzles carried by said rotary member near its periphery and communicating with the outer end portions of said chamber, substantially horizontal sand passages also carried by said rotary member and arranged in radial manner to permit the centrifugal feed of sand therein, said air nozzles communicating with said sand passages near the outer ends thereof and arranged to direct sand from said passages, and said blast nozzles also carried by said rotary member and communicating with said sand passages and having their receiving ends located opposite said air nozzles so that sand directed from said passages may enter and be discharged from said nozzles, the inner ends of said substantially horizontal sand passages being open to the outside air.

14. In a sand blast machine, the combination of a rotary member of circular form providing a surface for the deposit of sand, a tubular axially arranged member supporting said rotary member and serving as a means for rotating the same, said rotary member being provided with a diametrically arranged chamber with whose central portion the lower end of said tubular member communicates, air jet nozzles carried by said rotary member near its periphery and communicating with the outer end portions of said chamber, substantially horizontal sand passages also carried by said rotary member and arranged in radial manner to permit the centrifugal feed of sand therein, said air nozzles communicating with said sand passages near the outer ends thereof and arranged to direct sand from said passages, and said blast nozzles also carried by said rotary member and communicating with said sand passages and having their receiving ends located opposite said air nozzles so that sand directed from said passages may enter and be discharged from said nozzles, the inner ends of said substantially horizontal sand passages being open to the outside air, and said rotary member being provided

with a sand receiving surface located above said substantially horizontal sand passages, and also provided with downwardly extending passages, extending from said surfaces to and communicating with said sand passages.

15. A sand blast machine having a rotary table provided with a substantially horizontal sand supporting and holding surface, a sand blast nozzle carried by said rotary table mounted eccentrically to said sand surface thereof, and means for delivering sand by centrifugal action from said surface to said nozzle.

16. A sand blast machine having a rotary table provided with a sand supporting surface, a sand blast nozzle carried by said table and mounted outwardly from said sand surface thereof, and a substantially horizontal passage extending between said sand surface and said nozzle for delivering sand by centrifugal action from the former to the latter.

17. A sand blast machine having a rotary table provided with a sand supporting surface, a sand blast nozzle carried by said table and mounted outside of said sand supporting surface, and a substantially horizontal passage extending between said sand surface and said nozzle for delivering sand by centrifugal action from the former to the latter, said rotary table being also provided with a compressed air passage having one end adapted for communication with a source of compressed air and the other end arranged to supply compressed air for forcing sand out through said nozzle.

18. A sand blast machine having a rotary member provided with a sand blast nozzle located near the periphery of said member, and also provided with a surface located radially inward from said nozzle on which sand may be deposited, said member also having a sand passage extending between said nozzle and said surface and opening into the latter at a point between said nozzle and the inner edge of said surface.

19. A sand blast machine having a rotary member provided with a sand blast nozzle located near the periphery of said member, and also provided with a surface located radially inward from said nozzle on which surface sand may be deposited, said member also having a sand passage extending between said nozzle and said surface and opening into the latter at a point between said nozzle and the inward edge of said surface, means for supplying compressed air to said nozzle and an air inlet for supplying outside air, said air inlet communicating with said sand passage between the nozzle and the opening of said passage into said surface.

In witness whereof, I hereunto subscribe my name this 2nd day of June, A. D. 1916.

RICHARD G. COBURN.

Witnesses:
A. L. JONES,
HAZEL A. JONES.