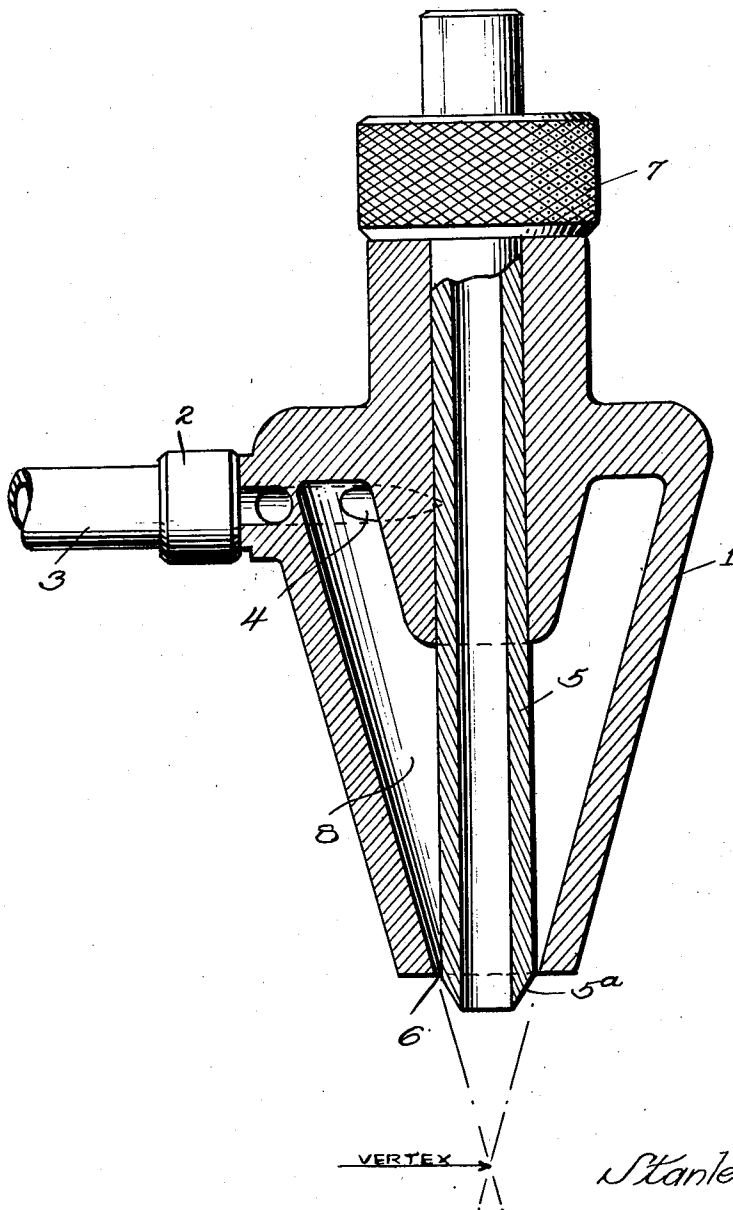


Dec. 5, 1950

S. BACKER
METHOD OF SANDBLASTING
Filed Sept. 27, 1949

2,532,655



INVENTOR

Stanley Backer

BY

Paul F. Ligon
ATTORNEY

UNITED STATES PATENT OFFICE

2,532,655

METHOD OF SANDBLASTING

Stanley Backer, Primos, Pa.

Application September 27, 1949, Serial No. 118,001

4 Claims. (Cl. 51—282)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

1

The invention described herein, if patented, may be manufactured and used by or for the Government for governmental purposes without the payment to me of any royalty thereon.

This invention relates to the art of sandblasting, that is, cleaning and/or roughening the surfaces of solid objects by blowing sand against such surfaces.

Among other objects, the invention aims to provide a new technique in sandblasting from a nozzle which will (1) permit the use of somewhat moist sand without clogging of the nozzle; and (2) will largely eliminate wear of the nozzle by abrasion from the sand, hence will permit the use of relatively inexpensive metals for manufacture of the nozzle, which nevertheless may have a long operating life. A third advantage of the method is an enhanced abrasive or scouring action of the sand arising from its whirling motion imparted by the nozzle as compared with the normal straight line motion of the sand in prior sandblasting.

In the accompanying drawing forming a part of this specification, the single figure is a sectional view through the nozzle employed in the method of the invention.

Referring particularly to the drawing, the nozzle has a body 1, preferably of metal, which is frusto-conical and has a coupling 2 for connection with a compressed air or steam pipe 3 which discharges into the nozzle through an inlet port 4, located at the larger end of the frusto-conical body. A sand-feeding tube 5 which is straight and of uniform diameter extends centrally or axially of said body and has one end beveled as at 5a and extending beyond the small end of the nozzle body, with a small clearance between the tube and the nozzle as indicated at 6 to provide a narrow annular discharge opening. The opposite end of tube 5 extends outside the nozzle body at the opposite end and has a threaded engagement (not shown) with a knurled nut 7 which makes possible limited longitudinal or axial adjustment of the tube, thus permitting an adjustment of the discharge opening 6. Compressed gas or steam discharged through inlet port 4 travels in a spiral path around the conical wall 8 on the interior of the nozzle and with increasing velocity as the discharge opening 6 is approached. It issues from the discharge opening as a whirling conical jet and flows with further increase in velocity until it reaches a point (marked "Vertex") which is the vertex of the cone coinciding with the conical wall 8. At this "Vertex" the velocity theoretically becomes

2

infinite, but actually, due to friction and other causes, is a finite figure which is supersonic, that is, the velocity is higher than that of sound waves in the atmosphere at sea level. Preferably air is used at a pressure of about 50 p. s. i., although of course other pressures may be used.

Sand may be fed by gravity, or mechanically, to the upper end of tube 5, and due to its freedom from bends, shoulders or constrictions, sand will flow through the tube even if somewhat moist. As is well known in sandblasting, moisture in the sand gives no end of trouble and frequently stops operations entirely. Discharge of the sand from the lower end of tube 5 takes place at a uniform rate and seemingly because of the suction from outside the nozzle of the whirling jet of air or steam. Beyond the vertex the sand flows as a whirling cone which is inverted relative to the first mentioned conical jet, or expressing the matter otherwise, the two cones are nappes of a complete geometrical cone. In prior art nozzles the sand is commonly subjected to high pressure in order to induce flow, but this high pressure inevitably causes severe abrasion of the surfaces which the sand contacts. To obviate rapid wear from this abrasion very hard and expensive metals have been employed in the nozzles, as experience has shown that in the absence of such metals, replacement of the nozzles may be necessary after a few hours of use. With the described nozzle, abrasion is very slow as the sand is not under pressure, and the nozzle may be used until the tube is worn very thin.

Having described my invention, what I claim is:

1. A method of creating a stream of sand suitable for sandblasting which consists in permitting sand to flow in a straight line to a point or vertex, the sand during such flow being under no pressure except that arising from its own weight, and causing a whirling conical jet of gas to travel at high velocity to said point or vertex where it picks up the sand and forms a conical whirling stream of sand, the two cones being nappes of a complete cone.

2. The invention as set forth in claim 1, wherein the gas is forced to flow at supersonic velocity at and near the vertex.

3. A method of creating a stream of sand suitable for sandblasting which consists in causing sand to flow through a straight conduit having a discharge end, and surrounding the discharge end with a whirling conical jet of gas traveling at high velocity, the axis of the conduit coinciding with the vertex of a cone coincident with the conical jet of gas, the jet of gas acting to induce

2,532,655

2,532,655

2,532,655

3

4

flow of sand out of the discharge end and picking up the sand beyond said discharge end and forming a cone which is inverted relative to the first mentioned cone.

4. The invention as set forth in claim 3, wherein the gas is forced to flow at supersonic velocity at and near the vertex.

STANLEY BACKER.

Number
409,751
2,440,643

Name
Mathewson
Pettinos

Date
Aug. 27, 1889
Apr. 27, 1943

FOREIGN PATENTS

Number
192,600

Country
Germany

Date
Nov. 29, 1907

REFERENCES CITED

10

The following references are of record in the file of this patent: