No. 839,483. PATENTED DEC. 25, 1906.

W. H. KELLY.

SAND BLAST NOZZLE.

APPLICATION FILED DEC. 26, 1905.

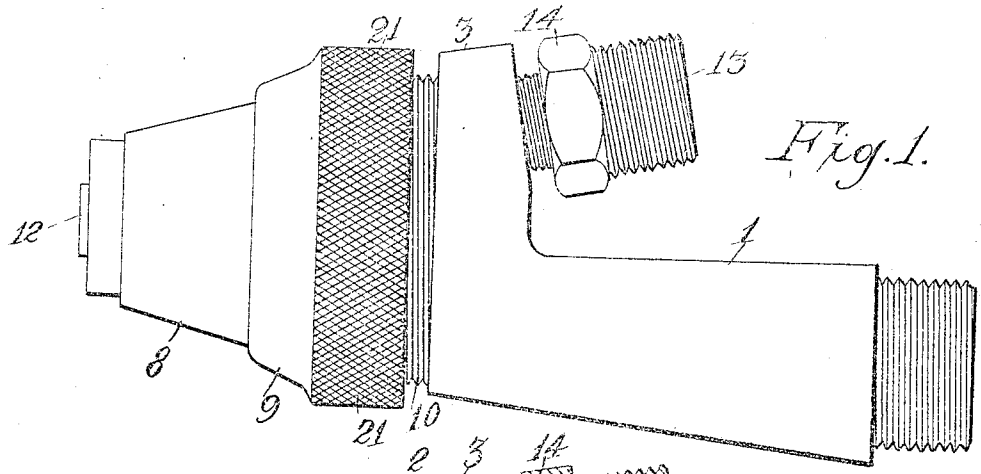


Fig. 1.

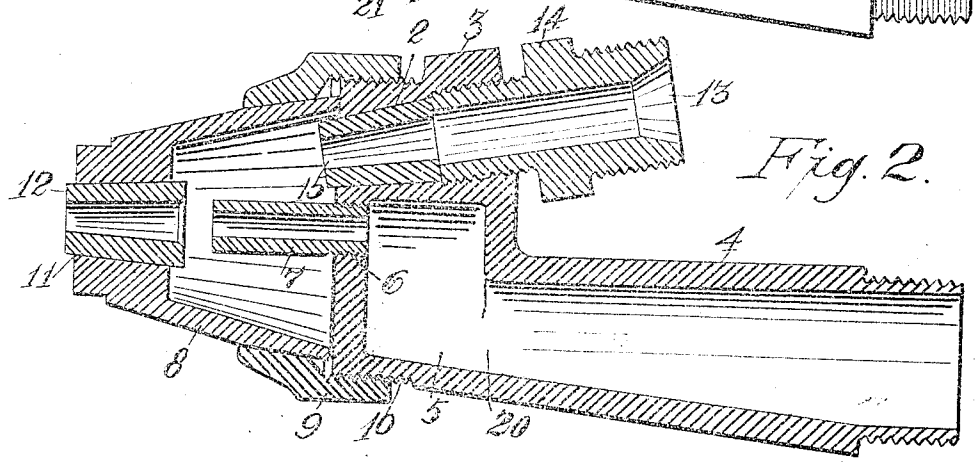


Fig. 2.

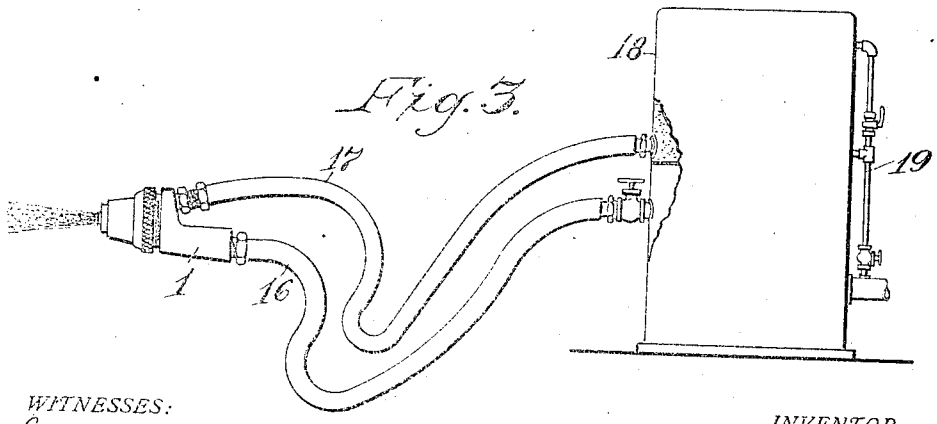


Fig. 3.

WITNESSES:

Bean & Thum-Larsen

W. R. Seely

INVENTOR.

William H. Kelly

BY Spear & Seely

ATTORNEYS.

UNITED STATES PATENT OFFICE.

WILLIAM H. KELLY, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR TO INTERNATIONAL SAND BLAST COMPANY, OF SAN FRANCISCO, CALIFORNIA, A CORPORATION OF CALIFORNIA.

SAND-BLAST NOZZLE.

No. 839,483. Specification of Letters Patent. Patented Dec. 25, 1906.

Application filed December 26, 1905. Serial No. 293,413.

To all whom it may concern:

Be it known that I, WILLIAM H. KELLY, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Sand-Blast Nozzles, of which the following is a specification.

My invention relates to sand-blast apparatus, and more particularly to the nozzle or portion through which the material is delivered for effecting the desired object.

In using a combined stream or current of an abrading material, as sand, and a propelling medium, as air under pressure, it is very important that the sand be delivered in as even and constant a stream as possible and under a uniform pressure, except when it is desired to vary them positively, which can be done in any desired manner. Where the sand is moist, it has been found very difficult, and in some instances impossible, to use it without drying before trying to pass it through the apparatus, owing to the liability of the delivery-orifice becoming partly or entirely clogged up.

One of the objects of my invention is to produce a nozzle which will be very compact but easily separated and which will have great efficiency with the least possible wear of the parts which are exposed to the abrading action of the sand.

Another object is to construct the tips or nozzles through which the sand is delivered to and from the body portion interchangable, thereby permitting of the use of the same-sized tip in either of two places, and thus avoiding the necessity of a multiplicity of different-sized parts for substantially the same purpose.

An embodiment of the invention is shown in the accompanying drawings, in which—

Figure 1 is a side elevation. Fig. 2 is a longitudinal sectional view. Fig. 3 is a broken elevation showing the device in use.

Referring more particularly to the drawings, 1 indicates the body or main portion of the nozzle, which is hollow and substantially boot-shaped, with the foot portion substantially cylindrical in cross-section and a passage or opening 2 through the toe portion 3. The hollow of the leg portion 4 terminates at its inner end in a cavity or chamber 5, which forms a reservoir for the compressed air, which can only escape through an opening or orifice 6 in the bottom, from which projects a hollow pintle or nipple 7.

A casing or shell 8, preferably tapering or conical upon its exterior and interior, is secured at the bottom of the boot, as by means of a clamp or band-like coupling or ferrule 9, which has one end tapering to engage with the larger end of the casing and the other end screw-threaded to engage with the screw-threads 10 on the body 1, and thereby draw the end of the casing closely against the bottom of the boot and assist in making an air-tight joint or connection.

The smaller end of the casing is closed except for an axial bore or opening 11, which is preferably slightly tapering and stands directly in alinement with the nipple 7 and in which a tip 12 is removably seated. The tip 12 is preferably slightly tapering, so as to fit the opening 11, with its smaller end preferably extending a short distance beyond the end of the casing and its larger end standing at a slight distance in front of the forward end of the nipple 7.

The opening 2 is preferably of two diameters and stands at an angle to the leg 4 and to the axis of the nipple 7. The inner end of the opening is tapering and of the same internal diameter as the opening 11, and the outer end is screw-threaded for the reception of a hollow connector 13, the intermediate portion of the connector being shouldered, as at 14, to form a means of screwing it into position. Removably seated in the inner or tapering portion of the opening 2 is a tip 15, which is the exact counterpart of the tip 12, so as to be interchangeable therewith, and like said tip its smaller end projects a slight distance beyond the end of the opening, so that it may be given a slight blow to unseat it in case it should have a tendency to stick in its opening. The larger end of the tip 15 is adapted to be engaged by the inner end of the pipe or connector 13 and be thereby firmly held in its seat when the parts are assembled.

When using my invention as above described, it is connected with the free ends of two hose or flexible tubes 16 and 17, which are connected with any suitable source of supply, as a double-compartment tank or re-

ceptacle 18, one of which compartments is provided with sand and the other with compressed air, the latter compartment being also preferably connected with the sand-chamber through a valved pipe 19.

The air enters the device through the leg 4 and is discharged from the tip 12 in a small stream or jet with considerable force, depending upon its flow through the pipe 16 and the pressure in the tank 18. The inner end of the bore through the tip 12 is larger than the bore through the nipple 7 and preferably slightly flaring, so that as the air passes across the short space from the end of the nipple into the bore of the tip it takes up the desired quantity of sand which has been discharged from the tank into the casing through the pipe 17 and connector 13 and drives it out of the tip 12 against the object being acted upon with sufficient force to effect the desired result. In this manner the nipple and tip virtually form a continuous passage for the air with an opening in its side or walls for the entrance of the sand or other abrading material similar to an injector. This avoids the excessive back pressure which occurs through the sand-supply pipe where the air is permitted to enter a chamber or cavity as it passes from its outlet to the bore of the discharge-tip, and it also renders it possible to use damp or moist sand without danger of its clogging or stopping up the nozzle and also reduces the wear or abrasion upon the nozzle to a minimum.

The formation of the cavity or reservoir at the rear of the discharge-outlet and at one side of the main passage, with its entrance or throat 20 contracted and its rear wall overhanging or directly to the rear of the orifice 6, also adds to the efficiency of the apparatus by providing a cushion of air, which acts as an automatic regulator, as it were, which will have a tendency to prevent backflow of the air in case the passage should temporarily become obstructed from any cause, as when using wet or moist sand.

By constructing the apparatus so that the same tip can be used interchangably for delivering the sand to or from the interior a very desirable structure is secured, and as those two pieces are substantially the only ones that are subject to wear and require to be replaced it renders it easier to repair, as there is no possibility of getting the wrong tip in the wrong place and there is not the requirement of carrying so many different-sized pieces in stock.

For taking the structure to pieces or putting the parts together the coupling 9 is roughened or knurled upon its exterior, as shown at 21, by which it can be firmly grasped, and the connector 13 can be readily removed by an ordinary wrench.

As the tips 12 and 15 can be manufactured at a very slight cost and can be replaced with but little trouble and delay, it will be seen that a maximum of efficiency can be secured by my invention with the minimum of deficiency or objection.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a sand-blast nozzle, a hollow body provided with a reservoir at one side of the main passage and having a contracted throat, a substantially continuous air-passage leading from the reservoir opposite the rear wall thereof and having an opening in its wall, and means for delivering an abrading material to said passage through said opening.

2. A sand-blast nozzle having a passage for the propelling fluid, with a removable tip, and a passage for the abrading material, said second passage being disposed at an angle to the axis of the first passage and communicating therewith intermediate its ends, the second passage having a removable tip, the tips of both passages being interchangeable.

3. In a sand-blast nozzle, a hollow, substantially boot-shaped body having an inclined opening through the toe, the inner end of the opening being tapered and the outer end screw-threaded, a casing removably secured to the bottom of the body, the forward end of which is provided with a tapering opening, interchangeable tapering tips in said openings, each provided with a tapering bore, a hollow, screw-threaded connector in the outer end of said inclined opening for securing said tip in the inner end and delivering sand thereto, and a nipple leading from the hollow of the body nearly to the rear end of the front tip and having a bore of a less diameter than the rear end of the bore in said tip.

4. In a sand-blast nozzle, a hollow, substantially boot-shaped body, the bottom of which is screw-threaded exteriorly and the toe is provided with an inclined opening, an interiorly and exteriorly inclined hollow casing at the bottom of the boot, the smaller end of which is provided with an axial opening, a tapering clamping-band engaging with the larger end of the casing and with the screw-threaded portion of the body, interchangeable tips in said openings, a nipple from the hollow of the body nearly to the rear end of the forward tip and a connector in the inclined opening to the rear of the tip therein.

In testimony whereof I affix my signature, in presence of two witnesses, this 15th day of December, 1905.

WILLIAM H. KELLY.

Witnesses:
F. M. Bartel,
M. R. Seely.