

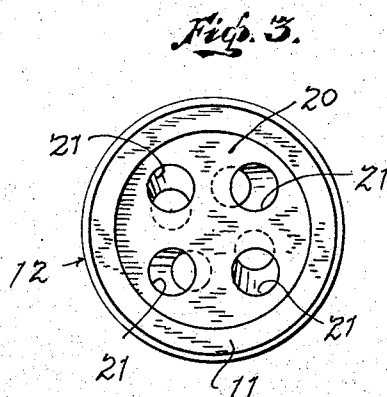
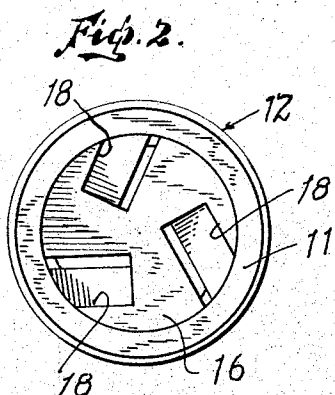
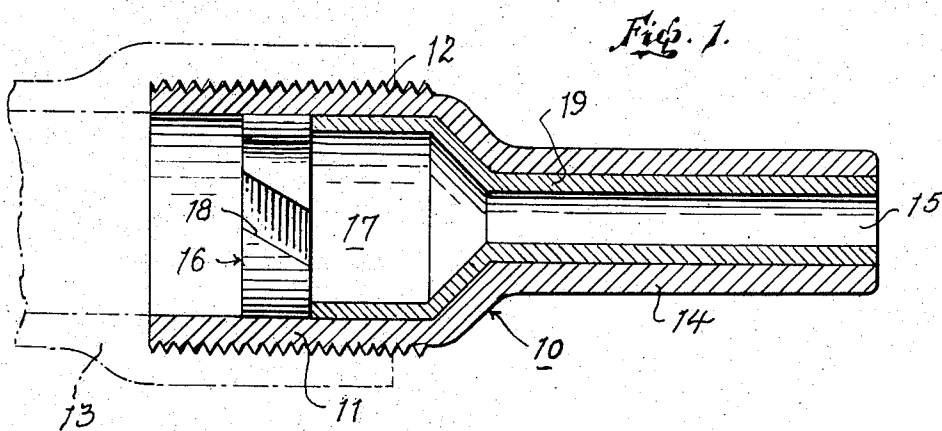
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SAND BLAST NOZZLE

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ABSTRACT OF THE DISCLOSURE

The purpose of this invention is to provide a nozzle for a sand blasting operation having a specially constructed chamber into which air and sand is introduced through tangentially and inwardly inclined nozzles that produce a swirling mixture of sand and air that is discharged through an axially extending restricted nozzle of sufficient length to direct the swirling mass of sand and air as an atomized jet of sand that will retain its swirling nature when directed upon a surface to be sand blasted. The arrangement is such that the enlarged cavity into which the sand is introduced provides for a pressure drop that will result in a more uniform distribution of the sand within the air stream.

My present invention relates to the art of sand blasting and more particularly to an improved nozzle by which large and substantially flat surfaces may be sand blasted in a uniform and effective manner.

The principal object of the invention is to provide a nozzle of novel construction for sand blasting equipment by which a blast of swirling sand may be applied to a surface to be cleaned in a uniform, effective and economical manner with a minimum of skill on the part of the operator.

Another object of the invention is to provide a sand blast nozzle which will provide a blast of sand with sweeping cyclonic effect as the blast of sand emanates from the end of the nozzle and strikes the surface being cleaned.

A further object of the invention is to provide a nozzle for sand blasting equipment which may be effectively employed for cleaning and sand blasting metallic surfaces and masonry of relatively large areas such as the exterior of buildings.

Other objects and advantages will be in part evident to those skilled in the art and in part pointed out hereinafter in the following description taken in connection with the accompanying drawing wherein there is shown by way of illustration and not of limitation preferred embodiments of the invention.

In the drawing:

FIGURE 1, sectional view taken centrally through a nozzle constructed in accordance with the invention,

FIGURE 2 is an end view of the nozzle at the intake end thereof, and

FIGURE 3 is a view similar to FIGURE 2 showing a modified inner detail.

In sand blasting various objects, such as metal sheets, castings, masonry and the like, it is the practice to project a blast of sand by air under pressure which impinges upon the work to be cleaned or treated. In this operation the blast of sand abrades and thus cleans the surface of the metal sheet, casting or masonry, as the case may be. It is now the general practice to use a nozzle from which a blast of air and sand is directed in a straight line toward the work and with such a nozzle it is necessary to keep the blast of sand and air in movement over the surface, otherwise a limited zone or area will be highly abraded and possibly pitted by the contacting sand. Therefore, in cleaning a surface with such a nozzle, the operator has to keep the nozzle in motion

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over the surface to be cleaned in order to accomplish a uniform effect upon the surface to be cleaned.

By my invention I have provided a nozzle in which the blast of sand and air is delivered with swirling cyclonic effect from a single source of air under pressure. This nozzle is considered an improvement over earlier sand blasting nozzles and while it is still necessary for the operator to exercise a considerable amount of skill in its use in order that the cleaning effect produced thereby will be substantially uniform over the surface being sand blasted, my nozzle does have the advantage that it is capable of covering a considerably larger surface in less time than is possible with a straight blast nozzle as practiced thereto.

It is, therefore, a further and primary object of my present invention to provide a nozzle of novel construction by which a blast of sand and air is directed therefrom with swirling and cyclonic force as it emanates for application to the surface under treatment. This will result in a more uniform distribution of the sand blast and thus avoid a pitting or overblasting such as might occur with a single nozzle when not skillfully operated.

For the purpose of illustrating my invention, I have in FIGURE 1 of the drawing, shown a nozzle 10 which, except for a definite modification, is somewhat similar to a conventional sand blast directing nozzle. As is here shown, the nozzle has a larger body forming portion 11 which is provided with an external screw thread 12 that is adapted to be threaded, as here indicated by dot and dash lines, into any conventional sand blast hose coupling 13. Extending centrally from the larger body portion 11 the nozzle has a cylindrical neck 14 with a central bore 15 through which the blast of sand is directed onto the surface to be cleaned. As here indicated, the body portion 11 of the nozzle has a substantially larger internal diameter and disposed within this portion 11, substantially as herein indicated, there is a swirl producing member 16 having a plurality of angularly disposed passageways 18 through which the blast of air and sand is directed from the supply hose coupling 13 in a tangential manner so that there is formed in a chamber 17, at the trailing side of the member 16, a swirling motion in the air and sand which will result in a spreading of the blast as it is discharged at the outer end of the bore 15. In this arrangement, the nozzle 10 may be constructed in its entirety of cast steel, but because of the abrasive action of the sand blast operating in the manner described I have shown my nozzle 10 as having a tungsten steel lining 19 that extends from the swirl producing member 16 through the chamber 17 to the outer end of the neck 14 of the nozzle. This tungsten steel lining 19 is of uniform thickness and at its inner end where it extends into the enlarged portion or chamber 17, it forms a funnel-like entrance to the bore 15. At this point, the air and sand will become a swirling mass that will be exhausted through the bore 15 of the nozzle. Because of this swirling motion, the jet of air and sand emanating at the end of the nozzle will flare outwardly and cover a substantially larger area of surface than is possible with a conventional sand blast nozzle. Therefore, when in use the operator will be able to obtain a substantially more uniform distribution of the blast of sand which will avoid any pitting or overblasting in limited areas as is often the case where the blast of sand is operating as a powerful straight line jet of sand.

Reference is now made to FIGURE 2 of the drawing wherein the swirl producing member 16 is shown as having three radially disposed kerfs in the form of angularly milled slots 20 that extend axially at an angle therethrough. At this point it is important to note that

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the width of these angularly disposed slots 20 are of a width that approximates the thickness of the disc 16 and with the inclination as shown in FIGURE 1, these slots 20 will project the air and sand at an angle substantially tangent to the axis of the chamber 17. Then as the air and sand are projected there through into the trailing end of the chamber 17, the air and sand will become loosely mixed and given a swirling motion which will continue out through the central bore 15 of the nozzle.

In FIGURE 3 there is shown a modification of the swirl producing member, here designated by the numeral 20, in which there is provided four equally spaced cylindrical openings 21 through which the air under pressure and sand is directed into the trailing end of the chamber 17. As here shown, the openings 21 of the swirl producing member 20 are inclined slightly inward with their axes substantially tangent to the axis of the nozzle. As in the case of the tungsten steel lining 19, these swirl producing members 16 and 20 are also preferably formed of tungsten steel.

While I have, for the sake of clearness and in order to disclose the invention so that the same can be readily understood, described and illustrated specific devices and an arrangement, I desire to have it understood that this invention is not limited to the specific means disclosed, but may be embodied in other ways that will suggest themselves to persons skilled in the art. It is believed that this invention is new and all such changes as come within the scope of the appended claims are to be considered as part of this invention.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. The combination with a compressed air and sand-blast conducting hose of, an elongated nozzle forming member having an enlarged cylindrical air and sand accommodating chamber open at one end for connection with said air and sand conducting hose and an axially extending nozzle forming portion of reduced diameter at the other end of said chamber, and a swirl producing member disposed within and intermediate the ends of said air and sand accommodating chamber having plurality of tangentially extending passageways through which the air and sand will be introduced into said chamber, whereby the sand delivered by said hose will be atomized and discharged through the axially extending nozzle

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portion of said member as a blast of sand with a swirling cyclonic motion.

2. The combination with a compressed air and sand blast conducting hose of, an elongated nozzle forming member having an enlarged cylindrical air and sand accommodating chamber open at one end for connection with said air and sand conducting hose and a nozzle forming portion having an opening of reduced diameter extending axially from the other end of said enlarged chamber, and a disc-like member disposed within and intermediate the ends of said air and sand accommodating chamber having plurality of tangentially extending bore openings through which the air and sand introduced into said chamber from said hose will pass to the axially extending nozzle portion of said member, whereby the air and sand delivered by said hose to the air and sand accommodating chamber will be discharged through the nozzle portion of said member as a blast of sand with a swirling cyclonic blasting action.

3. The invention as set forth in claim 2 characterized by the fact that said disc-like member has a thickness equal to approximately one-fourth the diameter of said air and sand accommodating chamber and has a plurality of radially spaced tangential passageways there-through that are inclined inwardly tangentially toward the axis of said cylindrical air and sand accommodating chamber.

4. The invention as set forth in claim 2, characterized by the fact that the nozzle forming member has a funnel-like lining of tungsten steel which encompasses the large cylindrical air and sand accommodating chamber beyond the disc-like member and to the blast discharge end of the nozzle.

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