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[54] **PARTICLE BLASTING NOZZLE**

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[58] **Field of Search** 451/87, 88, 90, 451/99

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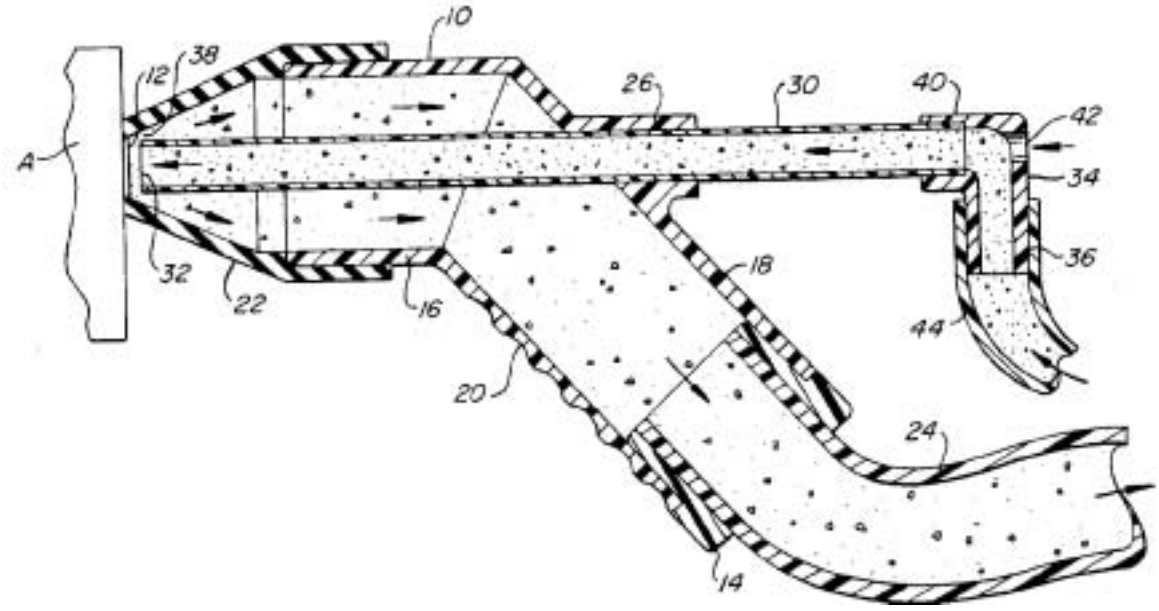
[57] **ABSTRACT**

A particle blasting nozzle has a nozzle body having an outlet opening and a suction connection with an acceleration tube extending at least partly within the nozzle body. The front end of the acceleration tube is arranged in the region of the outlet opening and its rear end has a further suction connection.

10 Claims, 1 Drawing Sheet



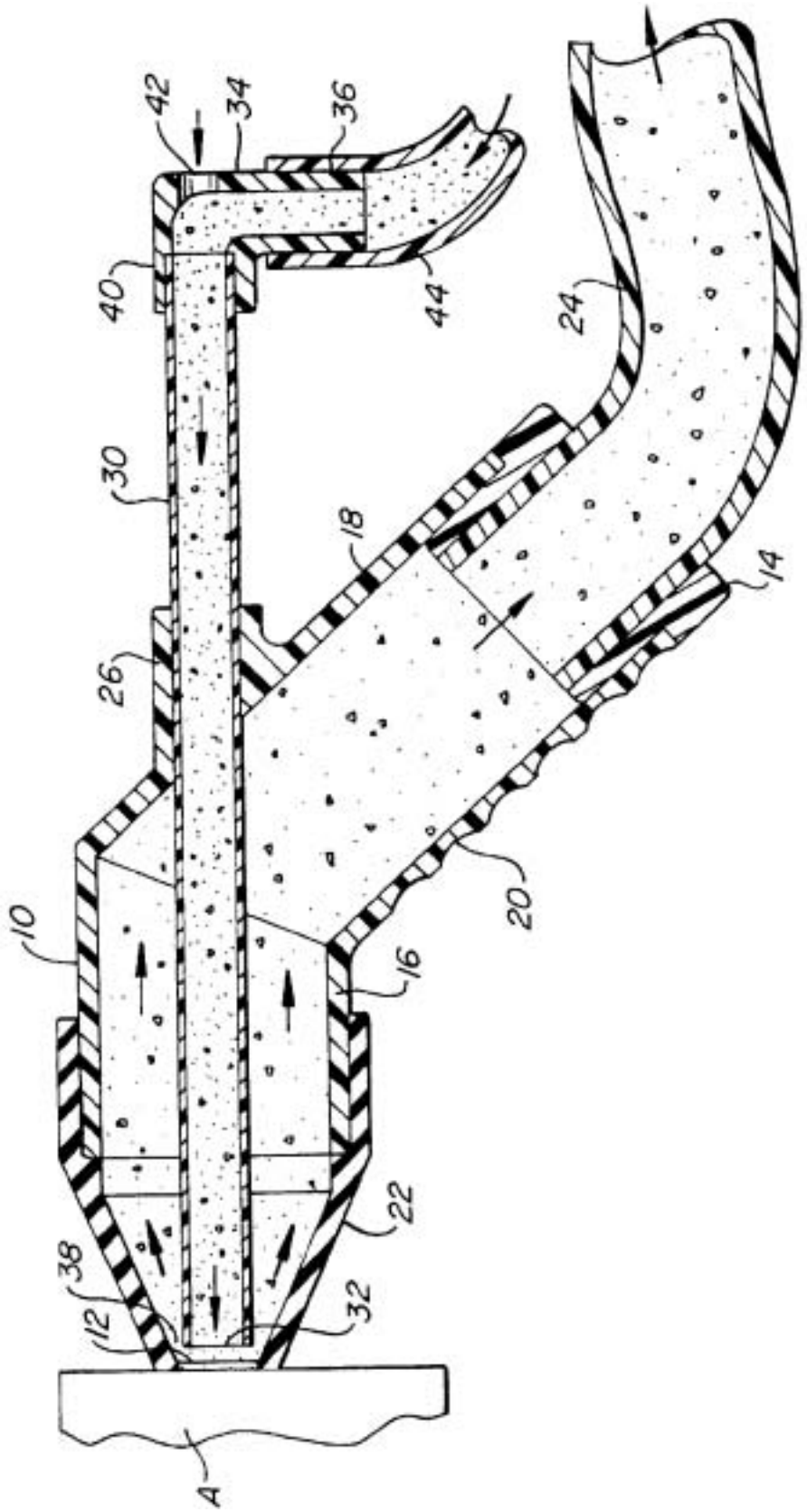


FIG. 1.

PARTICLE BLASTING NOZZLE

FIELD OF THE INVENTION

The present invention relates to a blasting nozzle and in particular to a particle blasting nozzle for producing a jet of sand, which can, for example, he used to remove rusty areas on metal parts.

DESCRIPTION OF PRIOR ART

In customary blasting methods, small particles or metal, plastic or stone are accelerated onto a workpiece surface with the aid of compressed air, liquid or steam, in order to achieve cleaning, roughening smoothing, compression and consolidation of the surface and the like. Since corresponding pressure fluids are normally not available in private households, customary blasting methods have hitherto been exclusively the preserve of industrial users.

OBJECT OF TILE INVENTION

It is the problem underlying the present invention (object) to provide a particle blasting, nozzle which is of simple design and which can he operated without a pressure fluid source.

BRIEF DESCRIPTION OF THE INVENTION

This object is satisfied in that the particle blasting nozzle comprises a nozzle body having an outlet opening and a suction connection, and an acceleration tube extending at least partly within the nozzle body, with the front end of the acceleration tube being arranged in the region of the outlet opening and its rear end having. a further suction connection.

Thus, in accordance with the invention, the particle blasting nozzle has a nozzle body having an outlet opening and a suction connection. Furthermore, an acceleration tube is provided, which extends at least partly within the nozzle body, with the front end of the acceleration tube being arranged in the region at the outlet opening and with the rear end of the acceleration tube having a further suction connection. In order to operate the particle blasting nozzle of the invention, it is only necessary to connect the suction connection of the nozzle body to a source of partial vacuum, for example a customary vat type vacuum cleaner. The further suction connection of the acceleration tube is connected to a particle reservoir in order to stick in the blasting particles and accelerate them. Through the acceleration tube provided in accordance with the invention, the sucked in blasting particles are accelerated so strongly that they emerge at the front end of the acceleration tube and impinge at high speed onto a surface to be treated. Thereafter, the particles leave the nozzle body through the suction connection and are collected in the container of the vacuum cleaner.

The particle blasting nozzle of the invention is very simply constructed and has the great advantage that it can he operated with commercially available suction apparatus, such as wet vacuum cleaners, industrial vacuum cleaners or vat type vacuum cleaners. Rusty areas can be removed without trace by means of the particle blasting nozzle of the invention, with the suction apparatus that is required as a vacuum source being available in almost every household. Thus, rusty areas on vehicle bodywork or the like can he removed effectively and without residue, without having to go to a workshop.

Advantageous embodiments of the invention are described in the specification, the figure and the subordinate claims.

In accordance with a first advantageous embodiment of the invention, the acceleration tube is led out of the nozzle body and has an air suction opening outside of the nozzle body. By providing an air suction opening of this hand, the particulate material is, on the one hand, sucked in through the acceleration tube when a source of vacuum is connected to the first suction connection, and, on the other hand, the air which is sucked in through the air suction opening produces an additional acceleration of the particular material within the acceleration tube. In this way an excellent blasting action can be produced, even with a low suction power or with a longer path between the further suction connection and the particle reservoir.

It is particularly advantageous when the air suction opening and the front end of the acceleration tube lie substantially on a straight line. In this way a linear acceleration path is achieved which accelerates the blasting particles to the highest possible speed.

In accordance with a further embodiment of the invention, the acceleration tube is of angled shape outside of the nozzle body, with the air suction opening being arranged in the vicinity of the angle portion. In this embodiment, the sucked in air and also the sucked in stream of particles are led together in a favorable manner. In this respect, it can he advantageous to make the acceleration tube straight within the nozzle body in order to avoid frictional losses and or momentum losses.

The nozzle body of the particle blasting nozzle can be of angled shape and can be provided with grip recesses at its outer side. In this way, the handling of the particle blasting nozzle is made easier.

In accordance with a further embodiment of the invention, the further suction connection can be led into a supply container, which is connected to the nozzle body. An embodiment of this kind is very compact, because no separate particle reservoir need be provided.

The front end of the acceleration tube preferably lies within the nozzle body and is spaced a little from the outlet opening. In this way, an additional acceleration action is achieved, because a narrow region arises between the end of the acceleration tube and the nozzle body.

In accordance with a further advantageous embodiment of the invention, the length of the acceleration tube call he varied. For this purpose the acceleration tube can he formed in a plurality of parts, with one part of the acceleration tube being displaceable relative to the other part. By changing the length of the acceleration tube, the impact action of the particular material can he changed, so that the particle blasting nozzle can he adjusted for different materials or different impact objects, i.e. articles to he blasted.

It is particularly advantageous when the nozzle body has a rubber-like material in tile region of the outlet opening, because in this way the particle blasting nozzle can he sealingly placed against the object to he blasted and possible damage on placement of the particle blasting nozzle can be precluded.

Finally, it is advantageous when the first suction connection is formed as a plug connection for a customary vacuum cleaner. In this way, the particle blasting nozzle of the invention can he used as an accessory or addition to a conventional vacuum cleaner, the suction hose of which simply has to he plugged into the connection socket.

BRILL DESCRIPTION OF TILE DRAWINGS

The FIGURE shows a cross-sectional view through a preferred particle blasting nozzle in accordance with the invention, which is directed towards an object to be blasted.

DESCRIPTION OF THE EXEMPLANRY EMBODIMENT

The particle blasting nozzle shown in FIG. 1 comprises a nozzle body **l0** which has an outlet opening **12** and a suction connection **l4**. The nozzle body **10** comprises a plastic tube **16**, which is angled through an angle of ca.. 135° and has a handle part **18** at its angled portion, with gripping recesses **20** being provided at the outer side of the handle part.

The front region of the nozzle body is formed by a rubber cap **22**, which is mounted onto the tribe **16** and which tapers conically in the direction of the outlet opening **l2**. The suction connection **14** of the nozzle body **10** is arranged at the end or the handle part **18** of the nozzle holy and is formed as a plug connection--more particularly as a socket--for receiving the suction hose **24** of a customary vat type vacuum cleaner.

A stub **26** is formed in one piece on the grip part **18** of the nozzle body **10** and has a bore in which an acceleration tube **30** is received, with the front end **32** of the acceleration tube being arranged in the area of the outlet opening **12** and with its rear end 34 having a further suction connection **36**. The front end of the acceleration tube **30** is arranged within the nozzle body **10** and only slightly spaced from the outlet opening **12**, so that a ring space **38** results between the front cap **32** of the acceleration tube **30** and the inner jacket wall of the rubber cap **22**. A plastic hose **44** is pushed onto the suction connection **36** of the acceleration tube **30** and is led into a non-illustrated particle reservoir, for example a sand container.

The rear end **34** of the acceleration tube **30** is formed in the illustrated embodiment by an L-piece **40**, which has an air suction opening in the form of a bore **42**. The air suction opening **42** is formed concentric to the front outlet opening **32** of the acceleration tube **30**, i.e. the front end **32** and the bore **42** lie on a straight line. As can he seen, the bore **42** is arranged in the region of the angled portion of the L-piece of the acceleration tube **30**. The acceleration tube **30** extends, following the bore **42**, in a straight line up to its front end **32**.

In the following the manner of operation of the particle blasting nozzle of the invention will lie described.

In order to prepare the particle blasting nozzle for operation, a hose **24** of a customary vat type vacuum cleaner is first pushed into the socket connector **14** of the nozzle body **10**. Furthermore, the hose **44** is dipped into the particle reservoir, for example a plastic container filled with quartz sand. After the nozzle body **l0** has been placed onto an object A to he blasted and after the vacuum device has been set into operation. a depression first arises within the nozzle body **10**, which sucks in the blasting particles via the hose **44** and the acceleration tube **30**.

Through the particle stream which arises within the acceleration tube **30**, air is additionally sucked in through the bore **42**, which additionally accelerates the particles within the acceleration tube **30**, so that these impact at high speed onto the object A to he blasted. Alter the impact, individual particles are led back into the vacuum device via the suction hose **24**, which is indicated by black arrows.

Since the nozzle body **10** is formed of a rubber-elastic material in the region of its contact surface against the object A to lie blasted, it lies sealingly against the object and does not damage the latter. In order to lie able to treat specific regions of a specific size of the object to be blasted, a (non-illustrated) template can lie laid onto the blasting object A, which is, for example, formed or rubber, and which has differently sized openings. In this way the blasting area can he specified and can be larger or even smaller than the outlet opening **12**. At the same time good seating is always ensured, because both the template and also the blasting consist of a rubber-like material.

The present invention has admittedly been described in connection with sand as the blasting material. It is. however, clear to the person skilled in the art that other blasting material in addition to sand can also lie used.

I claim:

1. A particle blasting nozzle comprising:

a nozzle body including an outlet opening and a suction connection; and

an acceleration tube extending at least partly within the nozzle body, a front end of the acceleration tube being arranged in a region of the outlet opening and a rear end or the acceleration tube including a second suction connection, the acceleration tube extending out of the nozzle body and including an air suction opening outside the nozzle body;

wherein the second suction connection extends to a supply container that is connected to the nozzle body.

2. A particle blasting nozzle in accordance with claim **1**, wherein the air suction opening and the front end of the acceleration tube lie substantially on a straight line.

3. A particle blasting nozzle in accordance with claim **1,** wherein the acceleration tube is of angled design outside of the nozzle body and the air suction opening is arranged in a region of an angled portion.

4. A particle blasting nozzle in accordance with claim **1**, wherein the acceleration tube extends in a straight line within the nozzle body.

5. A particle blasting nozzle in accordance with claim **1**, wherein the nozzle body is of angled design and preferably has gripping recesses at an outer side.

6. A particle blasting nozzle in accordance with claim **1**, wherein the front end of the acceleration tube lies within the nozzle body and is slightly spaced from the outlet opening.

7. A particle blasting nozzle in accordance with claim **1**, wherein the diameter of the acceleration tube amounts to 20% to 35% of the diameter of the nozzle body.

8. A particle blasting nozzle in accordance with claim **1**, wherein the length of the acceleration tube is variable.

9. A particle blasting nozzle in accordance with claim **1**, wherein the nozzle body has a rubber-like material in the region of the outlet opening.

10. A particle blasting nozzle in accordance with claim **1**. wherein the first suction connection is formed as a plug and socket connector for a customary vacuum cleaner.

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