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J. M. GERLACH

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SAND BLASTING NOZZLE

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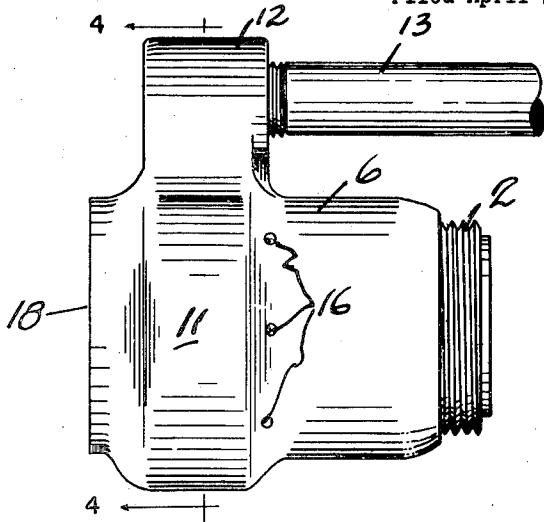


FIG. 1

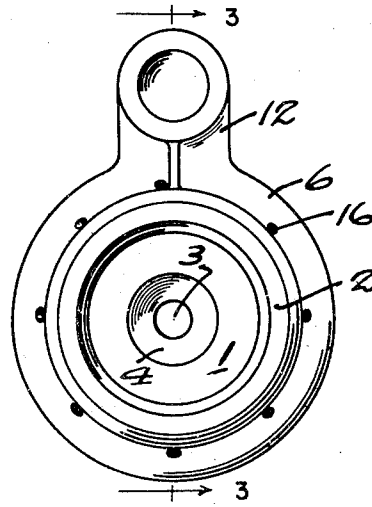


FIG. 2

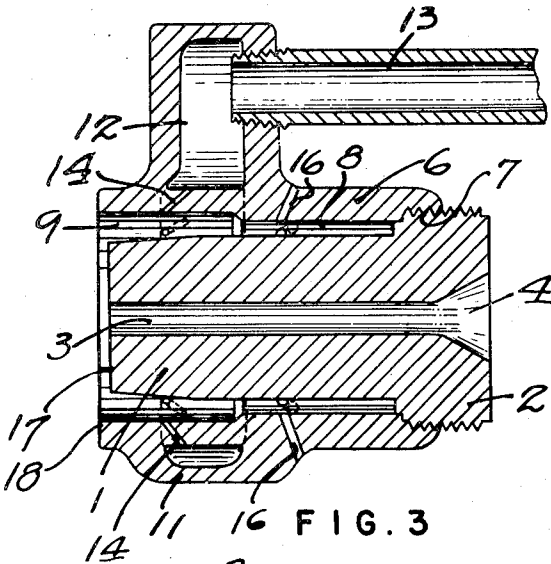


FIG. 3

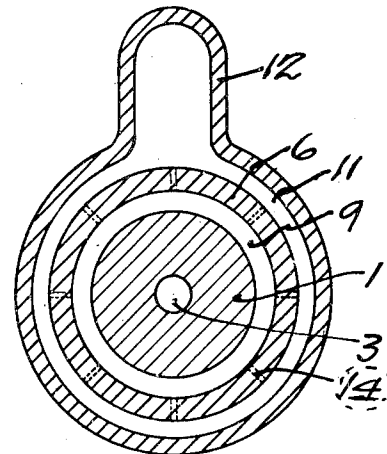


FIG. 4

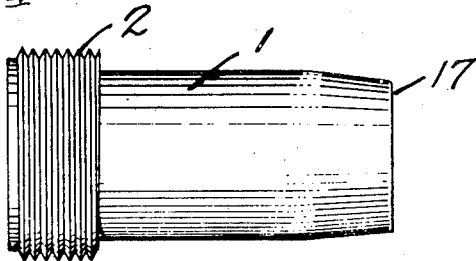


FIG. 5

INVENTOR

JOSEPH M. GERLACH

BY: *George B. White*
ATTORNEY

UNITED STATES PATENT OFFICE

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SANDBLASTING NOZZLE

Joseph M. Gerlach, Albany, Calif.

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14 Claims. (Cl. 51-11)

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This invention relates to sand blasting nozzles. In connection with sand blasting in the past, difficulty was encountered by the formation of dust which reaches such a degree that sand blasting with dry sand is practically prohibited. When attempts were made to obviate this dust by using moist or wet sand and the sand was wetted before its entry into the nozzle, it clogged the nozzle as well as the line leading to the blasting nozzle. This resulted in inefficient and costly sand blasting operations.

One of the features of my invention is that it prevents the formation of dust in sand blasting, at the same time it obviates any danger of clogging of the line or the nozzle.

A feature of my invention is to conduct dry sand through the line and through the nozzle under pressure and to draw the moisture into the sand at about the area where the sand leaves the nozzle, in such a way as to prevent the formation of dust without affecting the flow of the sand through the nozzle.

Another object of this invention is to provide a sand blasting nozzle which is highly useful and simple in construction. Convenience of arrangement, lightness and comparative inexpense of manufacture are further objects which have been borne in mind in the production and development of the invention.

I am aware that some changes may be made in the general arrangements and combinations of the several devices and parts, as well as in the details of the construction thereof without departing from the scope of the present invention as set forth in the following specification, and as defined in the following claims; hence I do not limit my invention to the exact arrangements and combinations of the said device and parts as described in the said specification, nor do I confine myself to the exact details of the construction of the said parts as illustrated in the accompanying drawings.

With the foregoing and other objects in view, which will be made manifest in the following detailed description, reference is had to the accompanying drawings for the illustrative embodiment of the invention, wherein:

Fig. 1 is a side view of a sand blasting nozzle constructed in accordance with my invention;

Fig. 2 is an end view of said nozzle viewing from the end where the hose is usually coupled to the nozzle;

Fig. 3 is a sectional view of said blasting nozzle, the section being taken at lines 3-3 of Fig. 2;

Fig. 4 is a cross-sectional view of the nozzle, 55

the section being taken on line 4-4 of Fig. 1, and

Fig. 5 is a detail view of the inside member of the nozzle.

In carrying out my invention, I make use of a tubular nozzle 1, an end of which is formed into a coupling head 2 and is threaded exteriorly for engagement by the usual coupling of a hose which conducts the sand under pressure to the nozzle. The nozzle 1 has a passage 3 therethrough which terminates in the head in an enlarged and tapering counter-sunk chamber 4 wherein the sand from the hose is received and directed into and through the passage 3.

A nozzle housing 6 is hollow interiorly and is threaded in one end 7 thereof for engagement with the threaded head 2 of said nozzle 1 and opposite to the usual coupling on said head 2, not shown.

The inner cavity of said housing 6 is substantially cylindrical and it is spaced from the outer periphery of the nozzle 1. The portion of the cavity of the housing 6 adjacent the outlet end of the nozzle is spaced farther from the outer periphery of the nozzle than the remaining or back portion of said cavity. Thus the space between the nozzle 1 and the inner periphery of the housing 6 is divided in an inside narrower chamber 8 and a broader chamber 9 adjacent the outlet.

Around the outer periphery of the housing 6 around the larger chamber 9 and on the outside of said housing 6 is provided a jacket 11 which surrounds the housing 6 so as to form a water conducting chamber. A portion of this jacket 11 is enlarged into an intake head 12 into which is threadedly secured at one side a water conduit 13, which latter is connected in any suitable manner to a source of water or moisture supply.

Through the inner wall of said jacket 11 are provided a plurality of holes 14 which are generally radial with respect to the structure of the nozzle, and are inclined inwardly and toward the tip of the nozzle as particularly shown in Fig. 3. These holes are substantially even spaced around the entire periphery of the larger chamber 9 and are spaced inwardly from the tip of the inner nozzle 1.

Behind the water jacket 11 and around the narrower chamber 8 are provided a plurality of circumferentially spaced air intake vents 16, which are inclined inwardly and toward the outlet of the nozzle, each at about a 45° angle to the axis of the nozzle. Each of these air vents 16

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extends from the outside of the housing 6 to the narrower inner chamber 8.

It is to be noted that the tip 17 of the nozzle 1 is spaced from the tip 18 of the housing 6 inwardly of the cavity of the housing.

In operation as the sand under pressure is discharged through the passage 3 at the nozzle tip 17 it creates a suction. This suction operates to draw air through the air vents 18 into the smaller chamber 8 at a high velocity. As the air rushes past the ends of the water intake holes 14 in the larger chamber 9 it draws water through said holes 14 from the water jacket 11. Thus the water is fully atomized and intermixed with air and it rapidly mixes with the sand issuing from the nozzle tip 17. It was found that the atomized moisture or vapor issuing from the larger chamber 9 immediately intermixes with the sand particles blown from the nozzle tip 17 and moistens the sand sufficiently to prevent the creation of injurious dust, at the same time it does not interfere with the free flow of the dry sand through the nozzle and through the hose. The condition of the sand particles reaching the surface blasted is sufficiently abrasive to efficiently perform the work as required by sand blasting, yet it does not produce dust.

I claim:

1. In a sand blasting nozzle of the character described, a nozzle tip, a chamber formed around said tip, a plurality of air vents leading into said chamber so as to draw air into the chamber by the suction created by the sand discharged from the tip of said nozzle, and a moisture issuing device leading into said chamber in the path of said air flow to introduce moisture into said air-flow and into said sand particles issuing from said nozzle.

2. In a sand blasting nozzle of the character described, a nozzle tip, a chamber formed around said tip, a plurality of air vents leading into said chamber so as to draw air into the chamber by the suction created by the sand discharged from the tip of said nozzle, and a moisture issuing device leading into said chamber in the path of said air flow to introduce moisture into said air-flow and into said sand particles issuing from said nozzle, said moisture issuing device discharging moisture between said air vents and the tip of said nozzle.

3. In a sand blasting nozzle of the character described, a nozzle tip, a chamber formed around said tip, a plurality of air vents leading into said chamber so as to draw air into the chamber by the suction created by the sand discharged from the tip of said nozzle, and a moisture issuing device leading into said chamber in the path of said air flow to introduce moisture into said air-flow and into said sand particles issuing from said nozzle, said moisture issuing device discharging moisture between said air vents and the tip of said nozzle, the chamber at said moisture issuing device being larger around said nozzle tip than the chamber at said air vents.

4. In a sand blasting nozzle of the character described, a nozzle tip, a chamber formed around said tip, a plurality of air vents leading into said chamber so as to draw air into the chamber by the suction created by the sand discharged from the tip of said nozzle, and a moisture issuing device leading into said chamber in the path of said air flow to introduce moisture into said air flow and into said sand particles issuing from said nozzle, said chamber extending beyond the tip of said nozzle.

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5. In a sand blasting nozzle of the character described, a nozzle tip, a housing around said nozzle tip forming a chamber around said nozzle tip, a moisture supplying device on said housing including holes communicating from said water supplying device into the chamber of said housing and around the outer periphery of said nozzle tip, and air vents around said housing spaced inwardly of said chamber with respect to said holes.

6. In a sand blasting nozzle of the character described, a nozzle tip, a housing around said nozzle tip forming a chamber around said nozzle tip, a moisture supplying device on said housing including holes communicating from said water supplying device into the chamber of said housing and around the outer periphery of said nozzle tip, and air vents around said housing spaced inwardly of said chamber with respect to said holes, the tip of said housing extending beyond the tip of said nozzle.

7. In a sand blasting nozzle of the character described, a nozzle tip, a housing around said nozzle tip forming a chamber around said nozzle tip, a moisture supplying device on said housing including holes communicating from said water supplying device into the chamber of said housing and around the outer periphery of said nozzle tip, and air vents around said housing spaced inwardly of said chamber with respect to said holes, the tip of said housing extending beyond the tip of said nozzle, the said chamber around said nozzle being larger at said moisture supplying holes than at said air vents.

8. In a sand blasting nozzle of the character described, a nozzle tip, a housing on said nozzle tip surrounding said nozzle tip and being spaced from the outer periphery thereof to form a chamber therearound, a plurality of air vents around the housing leading into said chamber, a moisture supplying device on said housing between said air vents and the tip of said housing including holes communicating the moisture supply from said device into said chamber as the suction of the sand blown from said nozzle draws air from said air vents through said chamber and past said holes.

9. In a sand blasting nozzle of the character described, a nozzle tip, a housing on said nozzle tip surrounding said nozzle tip and being spaced from the outer periphery thereof to form a chamber therearound, a plurality of air vents around the housing leading into said chamber, a moisture supplying device on said housing between said air vents and the tip of said housing including holes communicating the moisture supply from said device into said chamber as the suction of the sand blown from said nozzle draws air from said air vents through said chamber and past said holes, said air vents being substantially inclined toward the tip of the nozzle and inwardly of said housing at about 45° with respect to the axis of said nozzle.

10. In a sand blasting nozzle of the character described, a nozzle tip, a housing on said nozzle tip surrounding said nozzle tip and being spaced from the outer periphery thereof to form a chamber therearound, a plurality of air vents around the housing leading into said chamber, a moisture supplying device on said housing between said air vents and the tip of said housing including holes communicating the moisture supply from said device into said chamber as the suction of the sand blown from said nozzle draws air from said air vents through said chamber

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and past said holes, the chamber periphery in said housing at said moisture intake holes being spaced farther from the periphery of the nozzle tip than the inner periphery of the housing at said air vents.

11. In a sand blasting nozzle of the character described, a nozzle tip, a housing on said nozzle tip surrounding said nozzle tip and being spaced from the outer periphery thereof to form a chamber therearound, a plurality of air vents around the housing leading into said chamber, a moisture supplying device on said housing between said air vents and the tip of said housing including holes communicating the moisture supply from said device into said chamber as the suction of the sand blown from said nozzle draws air from said air vents through said chamber and past said holes, the chamber periphery in said housing at said moisture intake holes being spaced farther from the periphery of the nozzle tip than the inner periphery of the housing at said air vents, the tip of said housing being open and extending beyond the tip of the nozzle.

12. In a sand blast nozzle, an outer tubular member having a discharge opening at its forward end, a sand discharge nozzle fitted into the tubular member and having a restricted bore terminating rearwardly of the discharge end of the tubular member, the said nozzle being coaxially arranged with respect to the tubular member and also arranged with its forward end portion spaced circumferentially from the tubular member, the said nozzle being arranged to project a jet of sand through the discharge opening of the tubular member, an annular water jacket formed on the tubular member having water inlet means and a plurality of circularly positioned water outlet openings arranged to supply water to the interior of the tubular member for mixing with the sand discharged from the nozzle, and a series of air inlet openings in the walls of the tubular member and arranged where air may be drawn into the tubular member by the suction created around the forward end portion of the nozzle, the said air inlet openings being positioned to direct air into engagement with the water entering the tubular member through the water outlet openings, whereby the water may be broken up into fine particles for mixing with the discharged sand, and a conduit connected to the nozzle for supplying dry sand thereto under pressure.

13. In a sand blast nozzle, an outer tubular member having a discharge opening at its forward end, a sand discharge nozzle fitted into the

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tubular member having a restricted bore terminating rearwardly of the discharge end of the tubular member, the said nozzle having its forward end portion arranged in spaced relation to the walls of the tubular member and being also arranged to project a high velocity stream of sand outwardly through the discharge end of the tubular member, the space around the forward end of said nozzle forming a suction chamber rearwardly from the discharge end of said tubular member and from the point of the sand discharge from said nozzle, a water jacket around said suction chamber having circularly arranged outlet openings, all of which are spaced rearwardly from the point of discharge of said nozzle and discharging water into said suction chamber, and means for supplying sand under pressure to said nozzle.

14. In a sand blast nozzle, an outer tubular member having a discharge opening at its forward end, a sand discharge nozzle fitted into the tubular member having a restricted bore terminating rearwardly of the discharge end of the tubular member, the said nozzle having its forward end portion arranged in spaced relation to the walls of the tubular member and being also arranged to project a high velocity stream of sand outwardly through the discharge end of the tubular member, the space in the tubular member around the forward end of the nozzle being enlarged into a suction chamber, a water jacket on said tubular member spaced rearwardly from the discharge end of the nozzle, and a plurality of outlet openings discharging water from said jacket into said suction member at an area spaced rearwardly from the discharge end of said nozzle, and means for supplying sand under pressure to said nozzle.

JOSEPH M. GERLACH.

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