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W. M. MYERS

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WET JET NOZZLE UNIT FOR SANDBLASTING

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Fig. 1

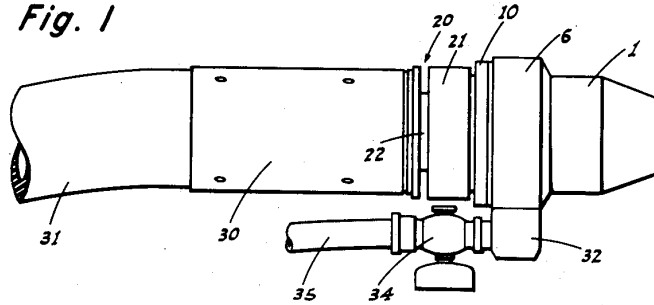


Fig. 2

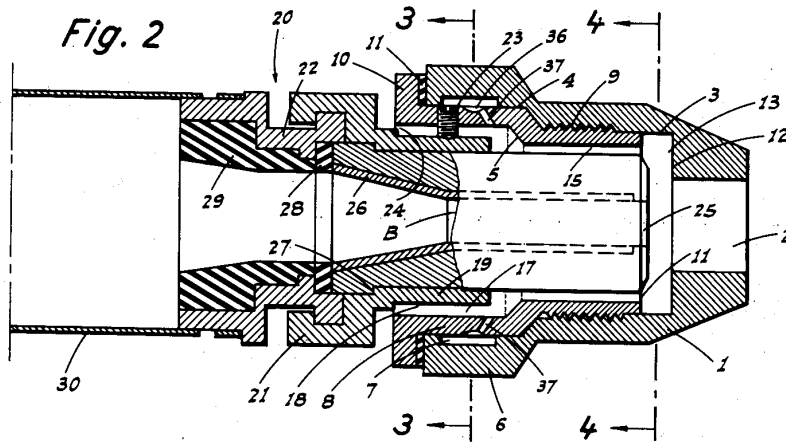


Fig. 3

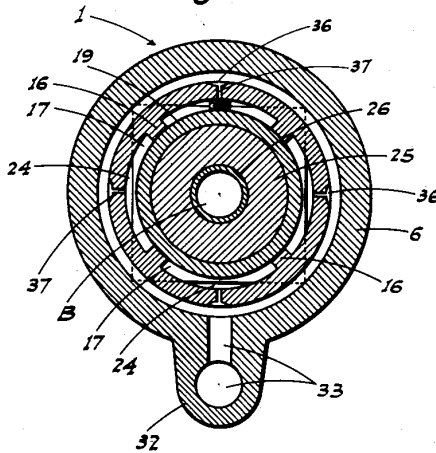
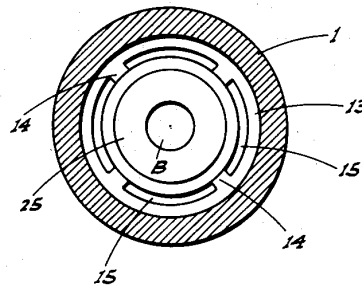


Fig. 4



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WET JET NOZZLE UNIT FOR SANDBLASTING

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5 Claims. (Cl. 51—11)

This invention relates generally to improvements in the nozzle unit of a sandblasting machine.

In particular the invention is directed to, and it is a major object to provide, a novel nozzle unit adapted for wet-jet sandblasting; i. e. sandblasting wherein the air-sand stream has water introduced therein, to the end that a wet, dustless blast is accomplished.

Another important object of the invention is to provide a nozzle unit having an arrangement of parts whereby water is effectively introduced into the air-sand stream subsequent to its discharge from a sandblast nozzle, but before its passage through an aperture in a head which surrounds said nozzle; the air-sand stream, as it flows from the nozzle through the head aperture, creating a suction, which aids in the mixture of water in said stream.

An additional object of the invention is to provide a wet jet nozzle unit which comprises a novel assembly of engaged parts, and which assembly is formed with a water passage system arranged to assure of an adequate, properly proportioned, and effectively distributed supply of water being introduced into the air-sand stream.

A further object of the invention is to provide a wet-jet nozzle unit which does not require a high pressure exterior water supply; the nozzle unit functioning effectively under ordinary faucet or city water pressure.

A still further object of the invention is to provide a wet-jet nozzle unit which is efficient and economical in operation.

It is also an object of the invention to provide a wet-jet nozzle unit which is designed for ease and economy of manufacture, together with long life; the unit having no moving parts and no wearing parts, with the exception of the nozzle, which is readily replaceable.

Still another object of the invention is to provide a practical, reliable, and durable wet-jet nozzle unit for sandblasting, and one which will be exceedingly effective for the purpose for which it is designed.

These objects are accomplished by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings:

Fig. 1 is a side elevation of the wet-jet nozzle unit.

Fig. 2 is an enlarged sectional plan view of the same.

Fig. 3 is a transverse vertical section on line 3—3 of Fig. 2.

Fig. 4 is a transverse vertical section on line 4—4 of Fig. 2.

Referring now more particularly to the drawings, and to the characters of reference marked thereon, the nozzle unit comprises a cylindrical nozzle head 1 which is hollow, open at its rear end, and formed at the forward end with a reduced-diameter, central discharge aperture 2.

The forward portion of the bore of the nozzle head 1 is indicated at 3, while the rearward portion of said bore is of increased diameter, being indicated at 4; said portions 3 and 4 being connected, at adjacent ends, by a tapered annular shoulder 5.

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The nozzle head 1, at the rear portion thereof, includes an integral, enlarged collar 6, and the rearward portion 4 of the bore is formed, in said collar 6, with an annular, inwardly opening channel 7.

An insert barrel 8 is engaged in the nozzle head 1 from the rear, and such insert barrel matchingly engages the internal configuration of the nozzle head 1, including the forward bore portion 3; the rearward bore portion 4; and the shoulder 5. The insert barrel 8 is removably secured in the nozzle head 1 by threading into the latter, as at 9. When the insert barrel is so threaded into the nozzle head 1, an annular flange 10 on the rear end of said barrel forcefully clamps a gasket 11 between said flange and the adjacent end of said head 1. Also, where the insert barrel 8 is in position, as above, its forward end 11 terminates adjacent but short of the corresponding end wall 12 of the nozzle head 1, whereby to define—in said head—a chamber 13.

The insert barrel 8 is formed, in the forward half thereof, with a plurality of internal, circumferentially spaced, longitudinal ribs 14 which define longitudinal passages 15 therebetween, and which passages 15 open at their forward ends into the chamber 13.

The rearward half of the insert barrel 8 is formed, as extensions of the ribs 14, with a plurality of internal, like circumferentially spaced, longitudinal ribs 16 which define longitudinal passages 17 therebetween. The longitudinal passages 17 communicate, at their forward ends, with corresponding passages 15, while at their rear ends said passages 17 open to the rear end of said insert barrel 8.

The internal, circumferentially spaced, longitudinal ribs 16 are notched for substantially their full length, as at 18, for the reception—in matching engagement—of a cylindrical neck 19 which projects forwardly from a quick-coupling, indicated generally at 20, and which quick-coupling is of opposed bayonet-slot type, including a female element 21 and a cooperating male element 22.

When the cylindrical neck 19 is engaged in the notched ribs 16, such neck defines the inner side of the longitudinal passages 17; said cylindrical neck 19 being secured in the insert barrel 8 by means of a set screw 23. When the cylindrical neck 19 is so secured in the insert barrel 8, said neck—though enlarged at its rear portion—nevertheless does not fully close the rear ends of the longitudinal passages 17, whereby to permit of air entry, as at 24, into the rear end of said passages 17.

The cylindrical neck 19 surrounds the rearward portion of, and provides a support for, a tubular sandblast nozzle 25, whose bore B is surfaced with a wear-resistant lining 26.

At the rear end thereof the sandblast nozzle 25 is enlarged somewhat in diameter, forming an outwardly projecting, forwardly facing shoulder 27 which matchingly seats in the cylindrical neck 19.

When the quick-coupling 20 is engaged, an annular gasket 28 is positively clamped between the rear end of the sandblast nozzle 25 and a corresponding abutment part of the male element 22. Additionally, said male element 22 carries an anti-abrasion internal grommet 29. A metallic connector sleeve 30 is secured at one end to the male element 22 of the quick-coupling 20, and at the other end is adapted for connection with the flexible hose 31 which carries the forceful air-sand stream from the sandblasting machine (not shown).

The forward end portion of the sandblast nozzle 25 matchingly seats in engagement with, and is supported by, the ribs 14; the front end of said nozzle projecting only slightly into the chamber 13, with the nozzle bore in axial alinement with the central discharge aperture 2 of the nozzle head 1.

Water is supplied to the annular channel 7 through a



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passed boss 32 on the under side of the nozzle head 1, the passageway being indicated at 33.

A manually regulated valve 34 is connected to the boss 32 in communication with the passageway 33, and at the end opposite said boss the valve is coupled to a hose 35 which leads from a source of water under relatively low pressure, which may be an ordinary faucet from which city water pressure is derived.

From the channel 7, which is enclosed, the water is received in shallow basins 36 formed in the insert barrel 8 within said channel; such basins communicating, by bores 37 in the barrel 8, with the longitudinal passages 17. From the longitudinal passages 17 the water flows forwardly into the connected and corresponding longitudinal passages 15, thence discharging into the chamber 13 at circumferentially spaced points about the discharge end of the bore B of the sandblast nozzle 25.

The forceful air-sand stream, as delivered through the hose 31 from the sandblast machine, discharges at high velocity through and from the sandblast nozzle 25, passing centrally through the chamber 13, and out of the aperture 2. This creates a substantial suction in the chamber 13, to the end that the water which delivers into such chamber from the passages 15 is effectively sucked into and mixed with the air-sand stream after it leaves the nozzle 25 but before such stream discharges from the nozzle head 1.

The air-sand stream, with the water content carried therein, impinges against the work beyond nozzle head 1; the water assuring of a wet and dustless sandblasting operation; the sand, after impinging against the work, together with the then wetted dust, merely falling to the ground.

In addition to the novel water passage system embodied in the nozzle unit, the latter is especially advantageous and effective in use, in that the water is introduced into the air-sand stream within the confines of the nozzle unit, rather than beyond or forwardly of the nozzle unit, as has been the practice, but which latter has not been wholly satisfactory.

From the foregoing description it will be readily seen that there has been produced such a device as substantially fulfills the objects of the invention, as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described the invention, the following is claimed as new and useful, and upon which Letters Patent are desired:

1. In a wet-jet sandblast nozzle unit, a nozzle, means to deliver an air-sand stream through the outlet end of the nozzle, a nozzle enclosing unit mounted on the nozzle and including a nozzle head terminating in an outlet having a smaller diameter than the exterior diameter of the nozzle alined with and rearwardly of the nozzle and pro-

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viding an axially short relatively large diameter chamber in the head between the nozzle and outlet, means forming a longitudinal circumferential and radially narrow passage between the nozzle and head open to the chamber, and means to feed water into the passage back of the forward end thereof.

2. A unit, as in claim 1, in which the water feed means includes circumferentially spaced radial bores leading radially into the passage intermediate its ends at a slope toward the forward end of said passage; the latter being open at its rear end to atmosphere.

3. In a wet-jet sandblast nozzle unit, a nozzle, means to deliver an air-sand stream through the outlet end of the nozzle, a nozzle enclosing unit mounted on the nozzle and including a nozzle head terminating in an outlet having a smaller diameter than the exterior diameter of the nozzle alined with and rearwardly of the nozzle and providing an axially short relatively large-diameter chamber in the head between the nozzle and outlet, and means to feed water into and about the axially extending wall of the chamber from rearwardly of said chamber.

4. In a wet-jet sandblast nozzle unit, a nozzle, means including a hose to deliver an air-sand stream to the rear end of the nozzle for discharge from the forward-end outlet thereof, a neck engaging the rear portion of the nozzle and providing means to detachably couple the unit to the hose, a barrel removably attached to and projecting over the neck and extending rearwardly thereof to the rear end of the nozzle in spaced relation to said neck and nozzle to form an annular passage thereabout, said passage being open at its rear end to atmosphere, a head on the barrel and projecting rearwardly from the nozzle to provide an outlet alined with that of the nozzle, means between the barrel and head removably securing the latter intermediate its ends on the barrel, the head rearwardly of said securing means being formed with an internal annular groove forming an enclosed chamber with the adjacent face of the barrel, and said barrel having bores therethrough providing communication between said chamber and the passage ahead of the forward end of the nozzle and sloping in the direction of the latter, and means attached to the head to feed water to the chamber.

5. A unit, as in claim 4, in which said head-securing means is a threaded connection forming a water-tight seal between the head and barrel, and means providing a water-tight seal between the head and barrel at the rear end thereof.

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