July 7, 1953 J. HOGUET 2,644,275

WATER CURTAIN PROJECTING DEVICE FOR USE WITH SAND BLASTING APPARATUS

Filed April 7, 1950 2 Sheets-Sheet 1

Fig.1

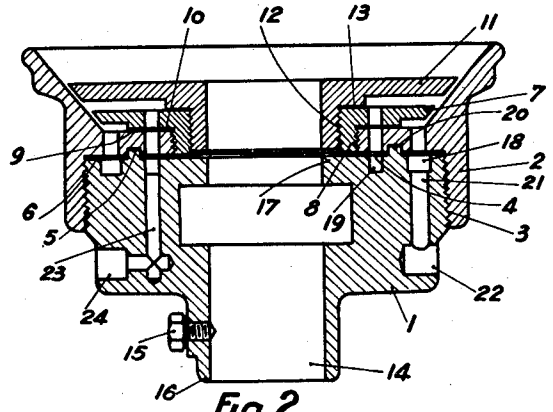

Fig.2

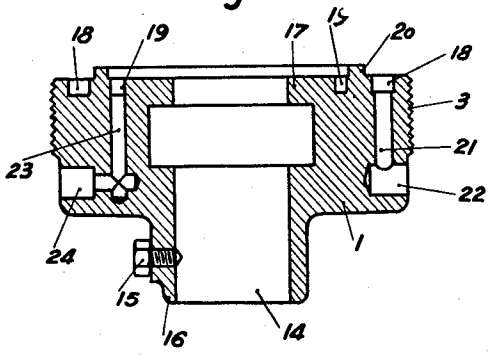

Fig.3

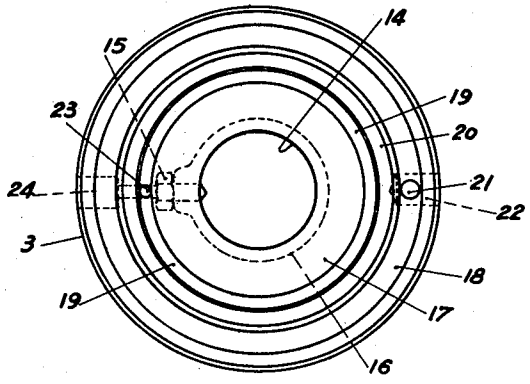

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Fig.4

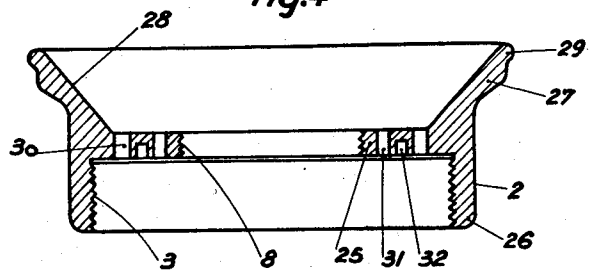


Fig.5

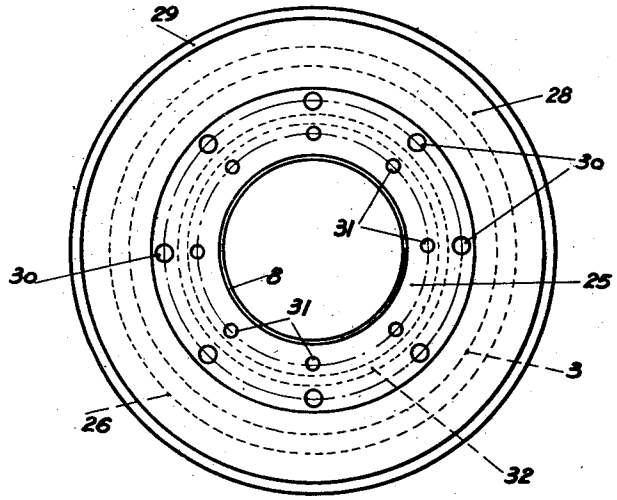


Fig.6

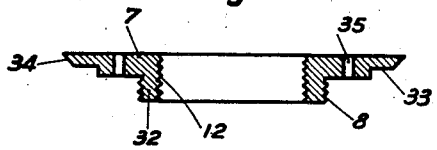
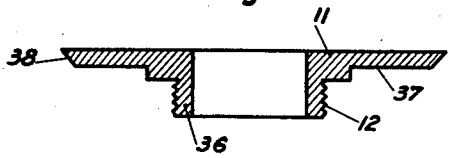


Fig.7



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WATER CURTAIN PROJECTING DEVICE FOR USE WITH SAND BLASTING APPARATUS

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7 Claims. (Cl. 51—8)

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It is well known that sand blasting apparatus has the serious inconvenience of causing the dispersion, in the surrounding atmosphere, of siliceous particles detrimental to the operator's health.

According to the present invention, this inconvenience is avoided by arranging, round the end of the sand blasting tool, a device suitable for projecting, round the jet of sand, a thin conical screen or curtain of water under pressure, surrounding the jet of sand and forming, with the surface upon which this jet is projected, an enclosure which the sand particles cannot traverse without being wetted. This wetting augments their density and consequently causes them to fall down, so that they cannot pass into the ambient air.

Particularly effectual results will be obtained by sending air under pressure into the water screen, whereby the jet of sand will be surrounded with a thin conical curtain constituted by a mixture of water and air.

The implementation of said water screen is subject to various difficulties. In particular, the amount of water to wet the sand particles must be sufficiently small to avoid thickening. On the other hand, means for carrying out this screen must be simple but solid in construction and light in weight, and permit easy but accurate regulation of the water screen or of the water-and-air-mixture screen, and further must be easily separable from the sand blasting tool in order to be, on one hand, readily replaceable, in the case of an accident in the course of operation, and on the other hand, re-employable on the apparatus successive nozzles, on account of the latter being subject to rapid wear and tear.

In order that the invention may be more clearly understood, a form of water-and-air screen projecting device embodying the same will now be described with reference to the accompanying drawings in which—

Fig. 1 is an axial section of the entire device;

Fig. 2 is an axial section of the base component thereof;

Fig. 3 is a plan view corresponding to Fig. 2,

Fig. 4 is an axial section of the conic frustum-shaped concave part of the end component of the device shown in Fig. 1,

Fig. 5 is a plan view corresponding to Fig. 4;

Fig. 6 is an axial section of the first annular disk of the end component of the device; and

Fig. 7 is an axial section of the second annular disk of the end component of the device.

Similar numerals refer to similar parts throughout the several views.

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The device comprises a base component 1, an end component 2 formed with a conic frustum-shaped concave surface and secured to the base component 1 by means of a threaded connection 3, with interposition of gaskets 4, 5 and 6, a first annular disk 7 secured to the end component 2 by means of a threaded connection 8, with interposition of spacing gaskets 9 and 10, and a second annular disk 11 secured to the disk 7 by means of a threaded connection 12, with interposition of a spacing gasket 13.

The base component 1 (Figs. 2 and 3) is constituted by a body generated by revolution and provided with an axial bore 14 to make passage for the sand blasting tool. This component 1 is secured to the tool by means of a screw 15 screwed into the neck 16 of the component 1 and having its point protruding into the bore 14. The upper face 17 of the component 1 has two concentric annular grooves 18 and 19 separated from each other by an annular protrusion 20. The outer groove 18 is connected, through the passage 21, with a fitting 22 adapted to receive a convenient conduit (not shown) for supplying the device with air under pressure. The inner groove 19 is similarly connected, through a passage 23, with a fitting 24 adapted to receive a convenient conduit for supplying the device with water under pressure. The component 1 further has a threaded portion denoted by numeral 3.

The end component 2 (Figs. 4 and 5) comprises an annulus-like member 25 formed, on one hand, with an inwardly extended sleeve 26 internally threaded as at 3 and, on the other hand, with an outwardly extended top member 27 internally hollowed out to a conic frustum-shaped surface 28 whose angle at the apex is substantially equal to 80°, that is, to the opening of the conical water screen intended to be obtained. The outermost edge of the top member 27 is prevented by reinforcement 29 from getting too thin.

The annulus-like member 25 is provided, on one hand, with a number of holes 30, eight for example, disposed at a distance from its center corresponding to the radial distance of the groove 18, and, on the other hand, with holes 31, for example eight in number, disposed at a distance from said center corresponding to the radial distance of the groove 19. Moreover, the inward side of the member 25, overlying the sleeve 26, is provided with an annular groove 32 into which is fitted the annular protrusion 20 of the base component 1.

The component 2, thus constituted, is secured to the component 1 by screwing the sleeve 26 onto

the corresponding threaded portion of the component 1. A gasket 5, placed into the groove 32, is jammed in by the annular protrusion 20 and forms tight seal between the grooves 18 and 19. Gaskets 4 and 6, placed respectively between the annulus 25 and the upper face of component 1, between the groove 19 and the bore 14, and between the groove 18 and the threads 3, render tight the passages formed by these two grooves after the component 2 has been screwed onto the base component 1.

The first annular disk 7 (Fig. 6) has a coaxial collar 32 threaded internally to form the threaded connection 12 and externally to form the threaded connection 8, and further has its edge portion thinned as shown at 33. The radial distance of this thinned portion is substantially equal to that of the groove 16, and the disk edge is constituted by a conic frustum-shaped surface 34 whose angle at the apex is substantially equal to 80°, the radii of the surface 34 being such that this edge may be brought in contact with the surface 28 when the disk 7 is screwed down into the component 2 without interposition of gaskets. Moreover, the non-thinned portion of the disk 7 is provided with holes 35, for example eight in number, disposed at a distance from the disk center equal to that separating the holes 31 from the center of annulus 25 coaxial with the disk 7. The latter is made rigid with the component 2 by means of the threaded connection 8. Two gaskets 9 and 10, placed sidewise of the hole 35, assure the tightness between the said holes and the chamber formed by the thinned portion 33, annulus 25 and wall 28, and permit of adjusting by positioning the disk 7, the thickness of the thin conical passageway existing between the surfaces 28 and 34.

The second annular disk 11 (Fig. 7) likewise has a coaxial collar 36 externally threaded to form the threaded connection 12. The inner radius of this disk as well as that of the collar 36, are equal to the radius of the bore 14 made through the base component 1. The disk 11 has a thinned edge portion 37 and the inner radial distance of this thinned portion is substantially equal to that of the groove 19 of base component 1. The outer edge of this disk is constituted by a conic frustum-shaped surface 38 whose angle at the apex is substantially equal to 80°, the radii of said surface being substantially such that this edge may be brought in contact with the surface 28 when the disk 11 is screwed down, without interposition of gaskets, into the disk 7 placed in the device. The disk 11 is made rigid with the disk 7 by means of the threaded connection 12. A gasket 13 placed between the disks 7 and 11, against the non-thinned portions thereof, permits of adjusting, by positioning the disk 11, the thickness of the thin conical passageway existing between the surfaces 28 and 38.

The device, thus constituted, is mounted on the nozzle of a sand blast apparatus and connected with the conduits admitting water and air under pressure. The air under pressure admitted through the fitting 22, flows through the passage 21 into the annular groove 18 from which it passes through the holes 30 into the annular chamber, formed by the thinned portion 33 of disk 7, from which it escapes through the thin conical passage existing between the surface 28, on one hand, and the surfaces 34—38, on the other hand, thereby taking the form of a thin conical envelope. The water admitted through the fitting 24, flows through the passage 23 into the annular groove 19, from which it flows through the passageways 31—35 into the annular chamber formed by the thinned portion 37 of disk 11, and is finally drawn from this chamber by the thin layer of air escaping between the walls 28 and 38, and being mixed therewith.

In this way there is obtained a thin conical screen or curtain produced by a mixture of water and air, positively stopping sand dusts. The thickness of this curtain, as well as the relative proportions of water and air, are adjusted by varying, on one hand, the thickness of the gaskets 9, 10 and, on the other hand, the thickness of the gasket 13.

The device, thus designed and constructed, may be rapidly and easily separated from the sand blasting tool, when it is necessary either to change the tool nozzle, or to change the device itself on account of its failure, which latter, however, is practically excluded.

Obviously, modifications of detail may be effected in the particular constructions, described and shown, without substantially departing from the invention itself which is intended to be defined in the appended claims.

What is claimed is:

1. A device for preventing the dispersion, in the atmosphere, of siliceous particles arising from sand blast apparatus, which includes, an annular base component provided with an axial bore for the purpose of removably securing this component onto the sand blasting tool passing through this bore, a coaxial annular end component securable onto said base component and provided with an internal conic frustum-shaped surface having its large base opened outwardly, toward the periphery of the spot to be sand-blasted by the said tool, and its small base formed to an annulus coaxial with said components and bore, a first annular core member coaxial with and adjustably securable, within said conic frustum-shaped surface, to said annulus and adapted to form with this surface a first thin annular passage directed toward the periphery of the said spot, a second annular core member coaxially disposed over and adjustably securable, within said surface, to said first core member and adapted to form with this surface a second thin annular passage disposed over said first thin passage and also directed toward the periphery of the spot, air canalizing passages managed in said base component and said annulus for feeding air under pressure into and through said thin annular passages, and water canalizing passages managed in said base component, as well as in said annulus and first annular core member, for feeding water under pressure into a chamber between said annular core members and through the said second thin annular passage to be mixed therein with said air, so as to thereby permit of projecting a thin conical water-and-air screen or curtain under pressure encompassing the jet of sand produced by the said tool, all substantially as set forth.

2. Device as defined in claim 1 wherein said first annular core member is an annular disk peripherally thinned to form a variable chamber communicating, through holes provided in the said annulus, with the air canalizing passages, while second annular core member is an annular disk peripherally thinned to form a variable chamber communicating, through holes provided in the first named annular disk and in the said annulus, with the water canalizing passages, the

two chambers, and hence the corresponding thin annular passages, being regulated by varying the thickness of the gaskets interposed, on one hand, between the said annulus and the first named annular disk and, on the other hand, between the two annular disks, all substantially as described.

3. Device as defined in claim 1 wherein the air and water canalizing passages comprise two respective concentric annular grooves managed in the face of junction of the base component with the end component and facing the respective air and water holes provided in the said annulus, said two grooves being insulated from each other by means of an intermediate annular gasket concentric with these grooves, and further comprise two conduits, managed in the body of the base component, one being adapted to feed compressed air into the air distributing groove and the other to feed water under pressure into the water distributing groove, all substantially as described.

4. Device as defined in claim 1 wherein the said components, as well as the said annulus and annular disks, are secured to one another by means of threaded connections and tightly insulated from one another by means of suitably interposed annular gaskets substantially as described.

5. A device for preventing the dispersion of fine dry particles away from the working end of a tool, which comprises a spray unit securable to the end of the tool providing a relatively thin, annular frusto-conical passage diverging outwardly in the direction of the discharge end of said tool, means defining a thin, annular passage communicating with said frusto-conical passage inwardly of the discharge end of said tool, means for supplying water to said second-named passage to provide a thin layer of water lying in a plane substantially at right angles to the axis of said tool and means for supplying air under positive pressure to said first-named passage, whereby to provide a thin, annular curtain of air moving past said second passage to project a thin, annular curtain of air containing particles of water suspended therein diverging outwardly from the discharge end of said tool.

6. A device for preventing the dispersion of fine dry particles away from the working end of a tool duct adapted to project a jet of said fine particles suspended in air under pressure, which comprises a spray unit securable to the end of the tool duct providing a relatively thin, annular frusto-conical passage diverging outwardly in the direction of the discharge end of said tool duct, means defining a thin, annular passage communicating with said frusto-conical passage inwardly of the discharge end of said tool duct, means for supplying water to said second-named passage to provide a thin layer of water lying in a plane substantially at right angles to the axis of said tool and means for supplying air under positive pressure to said first-named passage, whereby to provide a thin, annular curtain of air moving past said second passage to project a thin, annular curtain of air containing particles of water suspended therein diverging outwardly from the discharge end of said tool duct and surrounding the jet of fine dry particles issuing therefrom without intermixing therewith.

7. A device for preventing the dispersion of fine dry particles away from the working end of a tool duct adapted to project a jet of said fine particles suspended in air under pressure, which comprises a spray unit securable to the end of the tool, said unit having an internal frusto-conical surface diverging outwardly in the direction of the discharge end of said tool duct, core means adjustably securable in said unit to define with said surface a frusto-conical annular passage of variable thickness, a relatively thin annular frusto-conical passage diverging outwardly in the direction of the discharge end of said tool duct, means defining a thin, annular passage communicating with said frusto-conical passage inwardly of the discharge end of said tool duct, means for supplying water to said second-named passage to provide a thin layer of water lying in a plane substantially at right angles to the axis of said tool and means for supplying air under positive pressure to said first-named passage, whereby to provide a thin, annular curtain of air moving past said second passage to project a thin, annular curtain of air containing particles of water suspended therein diverging outwardly from the discharge end of said tool duct and surrounding the jet of fine dry particles issuing therefrom without intermixing therewith.

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