Dec. 20, 1932. F. J. HULL 1,891,625

SAND BLAST AIR WASHING

Filed July 25, 1929 2 Sheets-Sheet 1

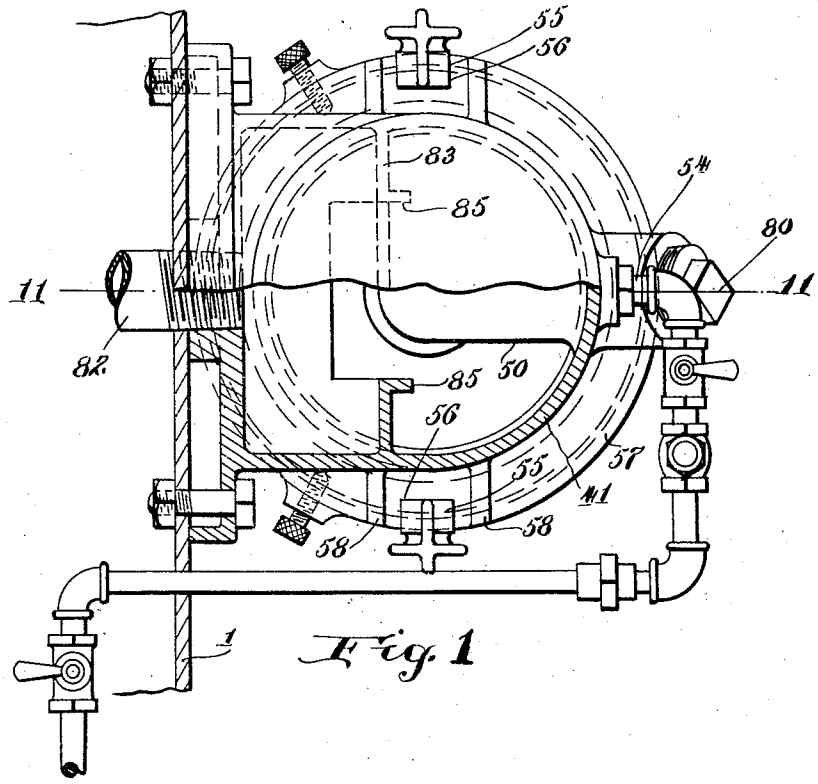


Fig. 1

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SAND BLAST AIR WASHING

Filed July 25, 1929 2 Sheets-Sheet 2

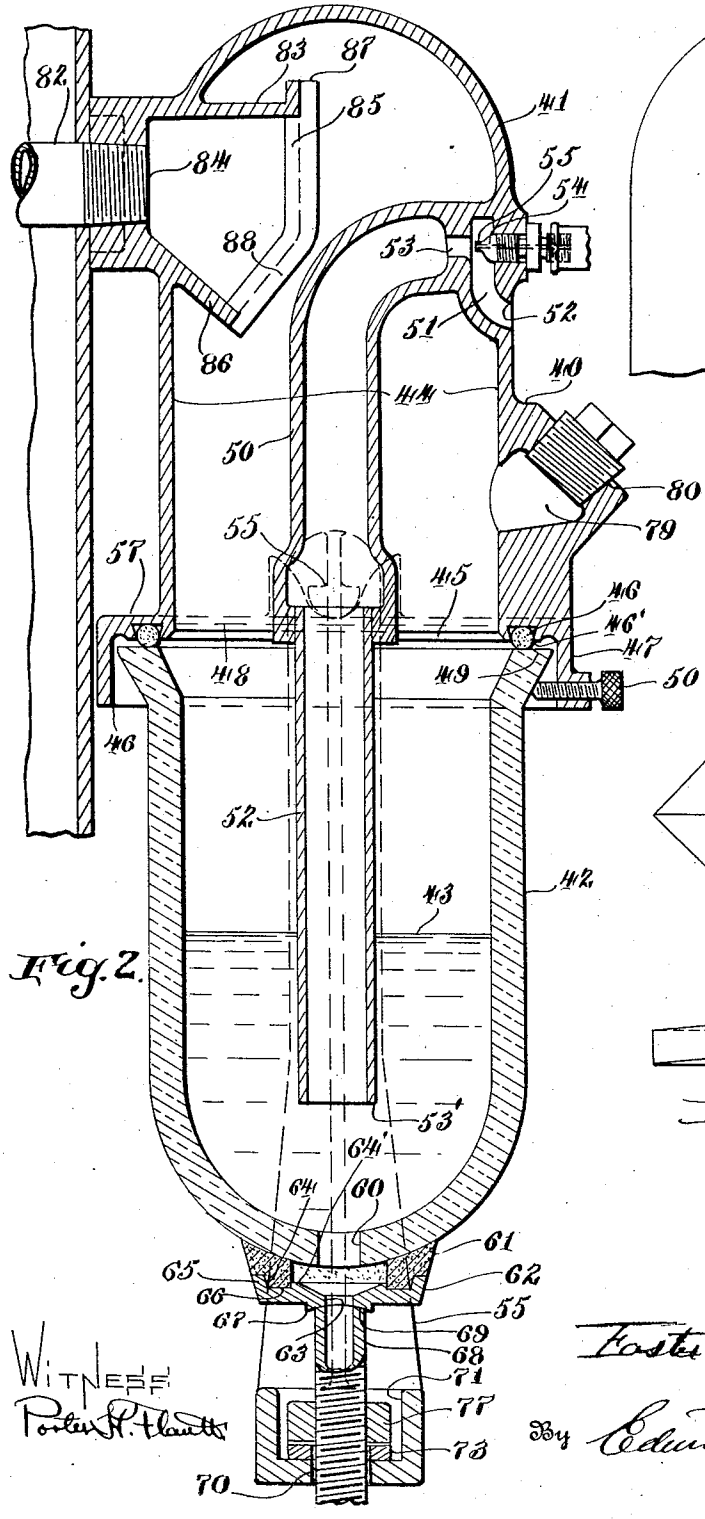


Fig. 2.

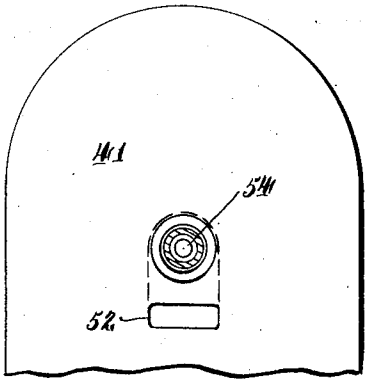


Fig. 3.

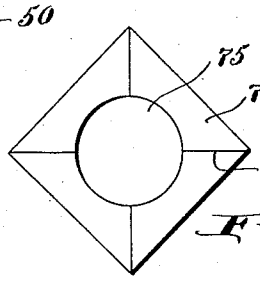


Fig. 5.



Fig. 4.

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Patented Dec. 20, 1932 1,891,625

UNITED STATES PATENT OFFICE

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SAND BLAST AIR WASHING

Application filed July 25, 1929. Serial No. 380,785.

The invention relates to that branch of the sand blasting art in which the operator, directing a stream of abrasive by means of a nozzle fed by a hose, works in a chamber or other suitable enclosure which confines the abrasive particles and the dust resulting from the operation thereby preventing injury to surrounding objects and discomfort and injury to individuals which might result from the escape of the flying abrasive.

While the enclosure or chamber is a usual incident, it is not essential to the operative relation of the elements, features and combinations of elements and features constituting the invention.

In the sand blasting operation thus identified the operator is protected from the flying abrasive and dust by a helmet which encloses the entire head and neck, making a contact with the operator's shoulders sufficiently close to prevent the entrance of outside air, together with the dust and abrasive. In accordance with the practice to which the invention relates, a considerable volume of air is supplied to the helmet through an air hose at a pressure considerably in excess of atmosphere. The bulk of this air is taken from the atmosphere outside the chamber.

The present invention relates to a washing apparatus whereby the air supplied to the chamber from both sources is relieved of all dust, grit and other solid particles suspended therein, the removal of the particles of solid matter being accomplished by passing the air through a body of water.

In the accompanying drawings I have illustrated the features of the invention in the preferred form.

In the drawings:

Figure 1 is a top plan view partially in section.

Figure 2 is a vertical central section on the line 11—11 of Figure 1.

Figure 3 is a fragmentary elevation looking from the right at the top portion of the air washer, Figure 2.

Figure 4 is an elevation of an equalizing washer used in connection with the air washer yoke.

Figure 5 is a top plan of the same.

Referring to the illustration of the air washer, Figures 1 and 2, the air washer 40 consists of a body member or main casting 41, which may be of any suitable material and produced in any convenient manner, and a cup 42. The cup is preferably of glass so that its contents can be conveniently observed. This cup contains the wash water 43. The cup may also be referred to as a sediment bulb or basin. The body casting 41 includes a dome or air chamber 44, which overlies the cup 42, being open downwardly into the mouth of the cup at 48. The cup may be secured to the body casting in any suitable manner. As shown, there is a soft packing ring 46 seated in a groove 46′, surrounding the opening 45, and a further depending skirt 47 surrounding the ring. The top edge of the cup 42 is shown as flared upwardly and outwardly at 48.

The flared portion fits inside of the skirt, the top edge or rim of the cup at 49 coming in contact with the packing. The cup is held in position in any convenient manner, the preferred arrangement being hereinafter described, and it is further secured and its position is adjusted laterally by means of set screws 50 passed through the skirt into contact with the flared rim 47.

The cup 42 in the form of the invention shown is supported and clamped in watertight relation to and with the main casting 41 by means of a yoke 55 shown in section and in dotted lines in Figure 2. This yoke is a U shaped depending member, having inwardly disposed hooks 56, one at the upper end of each leg of the U, which hooks engage a shoulder 57 on the main casting at the top of the skirt 47 and in the form shown each hook is located in engaged position between two vertical webs 58 on the main casting 41.

In the form shown the cup 42 is provided with a draining aperture 60 at the bottom, which aperture is, in the assembled form of the apparatus surrounded by a rubber gasket 61 which rests on the glass, pressed upwardly into watertight relation therewith by means of a plate 62, which is centrally apertured at 63 preferably in line with the aper-

ture 60. In the form shown the gasket 61 and the plate 62 are formed with interengaging shoulders and ribs 64, 65, 64′ and 66, respectively. The plate 62 as shown is also formed with a ground or equivalent seat 67 surrounding the opening 63 and there is a depending drain tube 68 cooperating with the opening 63 and having an end surface 69 ground or otherwise formed to engage the seat 67 which may be ground or prepared in any suitable manner. The tubular member 68 is held with its end surface 69 in liquid tight contact with the seat 67 by means of the yoke 55, which extends under the center of the cup. For this purpose the tube 68, which acts as a drain cock tube, is threaded externally and passed through a suitable aperture 70 in the yoke, which aperture may be formed at the bottom of a socket 71 which in the form of the invention shown is formed in the yoke in line with the center of the cup. This socket, in turn, contains a rocker washer 73 surrounding the drain tube 68 and resting on the bottom of the socket 71. This rocker washer is shown in detail in Figures 4 and 5. As shown, it is square in plan and formed with a central aperture 75 to pass the drain tube 68, and it is further formed with upwardly disposed ribs 76, radiating from the central aperture 75 to each corner of the rocker washer. These ribs are also inclined downwardly from the center toward the corners and the bottom of the washer is shown as concave, the corners being lowest. The washer preferably fits loosely about the tube, providing for motion of the tube relatively to the washer and the hole 70 in the yoke fits loosely about the tube. The thread on the tube is engaged by a nut 77, which fits down in the socket and bears on the ribs 76 of the rocker washer. In this way the drain tube 68 is given a certain freedom of motion relatively to the yoke and permitted to align itself so as to bring its end surface 69 into liquid tight contact with the seat 67 as already pointed out. Tightening of the nut forces the end of the tube 68 against the seat 67 and also forces the cup upwardly against the packing 46, the pressure being distributed by plate 62 and gasket 61.

A drain tube 68 may be provided at its lower end below the yoke with a drip cock. This drip cock provides for drawing the wash water 43 from the cup 42 whenever it becomes dirty or otherwise at the will of the operator, the new wash water being introduced through a clean water opening 79 in the wall of the chamber or dome 44, the same being closed by a screw plug 80.

Another important feature of the apparatus resides in the arrangement of the body casting 41 in the vicinity of the sand blast chamber air pipe 82. Said pipe in the form of the invention shown is threaded into the casting 41 at the top and is protected from the spray which may be thrown up from the wash water by the action of the air by means of a hood 83 surrounding the intake end 84 of said pipe. This hood is flared outwardly from the vicinity of said pipe and has an opening 85, preferably of a transverse area equal to the entire end of the hood at its enlarged or flared end which is disposed toward the center of the chamber or dome 44. This hood, as to its bottom surface 86, is inclined downwardly and outwardly toward the center of the chamber and the opening is preferably flanged at 87, both of which formations serve to deflect the spray from the opening. To facilitate the separation of spray from the out going air passage, the outer rim is inclined inwardly as to the lower portion thereof below the pipe 84 and toward the bottom of surface 86, said inclined portion being indicated by reference character 88. This hood is formed to act most efficiently in deflecting the spray from the air which is supplied through the sand blast chamber. The chamber or dome 44 in the form of the invention shown contains an intake air pipe 50, and an intake opening 51 at the side and a depending discharge pipe 52 which is secured to the lower end of the air intake pipe 50 and extends downwardly into the cup in the line of the central axis of the same but the exact location and arrangement is not of primary importance. The lower end of the discharge pipe at 53′ is shown downwardly disposed and central of the cup beneath the surface of the wash water 43.

The intake 51 is of peculiar and unusual construction, being formed with a mouth or inlet 52 in the form of a horizontal slot in the outer wall of the dome or chamber 41, the intake 51 being continued in an upright direction from said slot, being preferably of a cross section substantially the same as the area of the slot though the detail is not of controlling importance. The intake 51 is connected by a small opening 53 with the inlet pipe 50 and there is an air pressure nozzle 54 seated in the wall of the chamber having its discharge openings in said intake 51, the same being immediately adjacent to and directed through the small opening 53 into the inlet 50, being, however, spaced away from the walls of the intake and positioned so as to permit the free flow of air into the opening 53 from all directions in response to the injector action of the nozzle 54.

The arrangement of the nozzle 54 and the opening 53 opposite the nozzle, both being disposed at right angles to the greatest transverse dimension of the passage 51, and the inlet 52 directly through the face of the casting and the arrangement of the main air passage 50 and deflector 83 are details of importance in connection with the air washer element of the invention and to the construction of a cheap, efficient and simple air washing

device for the purposes in hand. It is further of interest that the body casting, 41, containing the dome or chamber 44, can be cast in a single piece including the injector portions 51, 52 and 53, and the air passage 50, the mere screwing of the nozzle into a tapped hole in the casting serving to complete the injector.

In the sand blast operation in which this apparatus is used the workman directs the abrasive stream against the work by means of a nozzle, supplied with a mixture of abrasive and air under pressure by way of a hose. The operator, wearing a helmet, by which he is protected from abrasive and dust, is supplied with outside air by way of an air hose.

The supply of air to the hose is taken directly from outside, being propelled by air under pressure supplied to the nozzle 54, which is disposed directly at right angles to the greatest transverse dimension of the air inlet passage 51. The outside air is carried by the jet from the nozzle from passage 51 through opening 53 into and through the pipe 50 by which it is delivered beneath the surface of the wash water 43 and passed upward to the hose pipe 82, which latter is protected from spray by the hood 83.

The sediment cup 42 being transparent, the presence of an excess of sediment therein is easily observed. This sediment can ordinarily be discharged with the water by opening the drip 68 or the cup can, if necessary, be removed by loosening the nut 77 and swinging the yoke 55 to one side. The sediment having been thus removed and the receptacle replaced and/or closed, wash water may be introduced by way of opening 79.

The function of the rocker washer 73 which permits the drip tube 68 to align itself with the round or otherwise preferred cooperating surfaces 67 and 68 in close contact has been fully explained.

I have thus described specifically and in detail an apparatus embodying my invention in the preferred form in order that the construction and manner of operation of the same may be clearly understood. However, the specific terms herein are used descriptively rather than in a limiting sense, the scope of the invention being defined in the claims.

What I claim as new and desire to secure by Letters Patent is:

1. In a sand blast air washer having an air chamber with an opening at the bottom, a sediment cup removably secured thereto covering said opening, the air chamber having a downwardly disposed air pipe near the center, an air passage leading from the outside to the vicinity of the upper end of said air pipe, said air passage being of extended lateral dimension, a reduced air opening connecting the top of said air pipe and said air passage and a pressure air nozzle directed across said air passage and into said reduced opening toward said air pipe, which extends down into its sediment cup, the air chamber having an outlet for washed air.

2. In a sand blast air washer having an air chamber with an opening at the bottom, a sediment cup removably secured thereto covering said opening, the air chamber having a downwardly disposed air pipe near the center, an air passage leading from the outside to the vicinity of the upper end of said air pipe, said air passage being of extended lateral dimension, a reduced air opening connecting the top of said air pipe and said air passage and a pressure air nozzle directed across said air passage and into said reduced opening toward said air pipe which extends down into said cup, a sand blast chamber air pipe leading from the upper portion of said air chamber and a hood surrounding the same to exclude spray from said pipe, the walls of said hood being flared outwardly from said chamber.

3. In a sand blast air washer having an air chamber with an opening at the bottom, a sediment cup removably secured thereto covering said opening, the air chamber having a downwardly disposed air pipe near the center extending down into said cup, an air passage leading from the outside to the vicinity of the upper end of said air pipe, said air passage being of extended lateral dimension, a reduced air opening connecting the top of said air pipe and said air passage and a pressure air nozzle directed across said air passage and into said reduced opening toward said air pipe, a sand blast chamber air pipe leading from the upper portion of said air chamber and a hood surrounding the same to exclude spray from said pipe, the walls of said hood being flared outwardly from said chamber, and inclined downwardly and inwardly toward the adjacent wall of the chamber.

4. In a sand blast air washer, an air chamber having a downwardly disposed opening and a depending air pipe with means to supply the air thereto, a sediment cup secured to the chamber covering said opening, a yoke supporting the cup, the cup having a discharge opening at the bottom, a washer surrounding said opening and having a downwardly disposed seat, a drip pipe having its end formed to cooperate with said seat, and the yoke being apertured to pass the pipe, a rocker member seated on the yoke and a nut engaging said drip pipe which is threaded to cooperate with the nut, the nut being adapted to be screwed down against the rocker washer to thrust the pipe upwardly against the seat providing for free alignment of the pipe with the seat.

5. A sand blast air washer comprising an air chamber and a sediment cup, the air chamber having a central downwardly disposed

air pipe, an air inlet passage of flat extended cross section, a reduced opening connecting said inlet passage to said pipe, a threaded opening for an air nozzle in alignment with said reduced opening, a water supply opening, a threaded opening for a sand blast air pipe and a hood protecting said opening, said chamber having said features cast in a single piece.

6. The combination in a sand blast air washer of an air chamber having an injector and a downwardly disposed air pipe into which the injector discharges, the chamber being open at the bottom and having a sediment cup registering with said opening, a support extending beneath the cup, a drip pipe threaded externally and having a ground end, the cup being apertured at the bottom in alignment with said pipe, a plate having a ground seat with an opening to cooperate with the end of the pipe, a gasket between said cup and said plate, the support being apertured to pass the pipe and carrying a rocker member and a nut seated thereon engaging said pipe whereby the pipe is forced upwardly against the seat and the cup is forced upwardly into airtight contact with the chamber which is provided with soft packing to engage the cup.

Signed by me at Hagerstown, Maryland, this 22nd day of July, 1929.

FOSTER J. HULL.