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BLAST GUN

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1 Claim. (Cl. 51—11)

This invention relates to improvements in sand blasting guns of the type using a high pressure of water for scouring or cleaning work or surfaces, the water being mixed with air or sand and detergents and particularly relates to improvements over my prior Patent No. 2,107,084.

In such patent, a blasting gun of the type above mentioned is disclosed, wherein a jet nozzle is interposed in a passage between the valve chamber and the mixing chamber and the nozzle has a diagonal port, which communicates with the bore of the nozzle and the mixing chamber so that certain of the water passing in a stream through the bore is lead through the port and into the mixing chamber in a manner to set up a turbulence in the chamber.

It has been found that the diagonal port in the jet considerably reduces the velocity of the stream of air, water and sand because it interferes with the main stream or jet passing through the port of the nozzle and issuing therefrom. Also, it has been found that the nozzle and mixing chamber had to be replaced after a short period of use, because the nozzle makes a turbulence with the sand and water which wears on the nozzle and the mixing chamber, resulting in a necessary replacement of such parts.

The blasting gun of my prior patent is also disadvantageous in use because of the means for operating the valve, the spring action of the gun being reduced in force and causing faulty opening of the valve. In this respect, my prior patent discloses a valve seat which is interposed between the valve chamber and the mixing chamber and a valve which is adapted to seat in such seat to control the flow of the stream of water into the mixing chamber. The valve is automatically closed by the use of a spring and the force of the spring is overcome to open the valve by means of a pivoted handle which acts directly on the stem of the valve and opposes the spring force.

The primary object of the instant invention is to provide an improved blasting gun, which takes in more air and sand and cleans in a better and more efficient manner and which avoids the aforementioned defects of my prior patent.

Another object of the present invention is to provide a nozzle, which is interposed between the valve chamber and the mixing chamber and which is so formed and related to such chambers as to create a more efficient jet of water issuing into the mixing chamber, whereby the intake of air and sand is appreciably increased.

Another object of the instant invention is to provide an improved valve means and valve actuating means for controlling the flow of water from the valve chamber to the nozzle, the valve means being so formed that it will more efficiently close off the nozzle to the water stream. In this respect, the valve and valve seat of the valve means are formed so that they will be tightly engaged, irrespective of slight wear thereon and will constantly interfit to prevent any possible seepage of the water, which is under high pressure, into the mixing chamber.

Also, the valve is moved axially relative to the valve seat by a manually rotatable rod, which has a threaded connection with a portion of an axial passage in which the rod moves, such passage being aligned with the nozzle and with the bore in the partition between the valve chamber and the mixing chamber. The threads are so pitched that a slight rotational movement of the rod will effect a considerable axial movement of the rod and a consequent seating and unseating of the valve in the valve seat. The rod is provided at its outer end with an enlarged knob having a peripheral surface formed to obtain a more efficient grip and more effective leverage.

A further object of this invention is to provide a compact and more efficient blasting gun, which can be inexpensively constructed and will be extremely efficient in use, the gun being so formed that the parts will be resistant to wear and consequently the gun will not have to be replaced or cleaned until after long periods of use.

These and ancillary objects are attained by this invention the preferred embodiment of which is set forth in the following description and illustrated in the accompanying drawing, wherein;

Fig. 1 is a longitudinal sectional view taken through a blasting gun constructed in accordance with this invention and showing some of the parts in side elevation;

Fig. 2 is a vertical sectional view taken on line 2—2 of Fig. 1;

Fig. 3 is a vertical sectional view taken on line 3—3 of Fig. 1; and,

Fig. 4 is a view in perspective of the valve.

Referring now more particularly to the drawing, the numeral 10 generally designates the blasting gun, which comprises a body portion 12 that is attached to a mixing chamber 14, which carries a discharge nozzle 16.

The body portion is formed with an axial passage 18 that terminates at its inner end in an enlarged valve chamber 20. The passage 18 is provided with an internally threaded portion 22, which is axially positioned between the valve chamber 20 and a radial enlargement 24 of the passage 18.

An elongated rod 26 is axially disposed within the passage 18 and is provided with external threads 28 adjacent its inner end. The threads 28 are engaged with the threads on the threaded portion 22 of the passage 18 and it is to be noted that the threads are so pitched that a slight rotational movement of the rod 26 will effect a considerable axial displacement thereof in the passage 18 for a purpose to be described in the consideration of the valve means.

The passage 18 terminates at its outer end in an enlarged packing chamber 30 within which a packing assembly 32 is held in place by a bored gland nut 34. The rod 26 extends axially through the packing, which surrounds the rod.

A passage 36 is formed in the lower portion of the body portion and extends tangentially in communication with the passage 18 and the valve chamber 20. The passage 36 terminates at its outer end in a threaded connection 38, which is provided for coupling one end of a hose to the passage, the hose leading from a suitable source of water under pressure.

The rod 26 projects outwardly from the gland nut 34 and an enlarged knob 40 is fixedly circumposed on the extending end thereof, the knob having an undulated peripheral surface for achieving a more efficient grip and more effective leverage. The periphery of the knob, due to its undulation, can be more effectively grasped to rotate the rod. The mixing chamber 14 is formed by a barrel 42, which has an externally threaded nipple 44 projecting rearwardly therefrom and threaded in the open internally threaded end 46 of the body portion. The nipple 44 is formed with an axial passage 48, that is aligned with the

passage 18 and the passage 48 terminates in a valve seat 50 which is adapted to seat the valve 52 formed on the end of the rod 26. The valve 52, as shown in Figs. 1 and 4, is cylindrical and has a frusto-conical shaped seat portion 54, which complements the flared curvature of the valve seat 50 to effect a positive and tight seat. The cylindrical body of the valve is formed with a diametrical opening 56 to receive a pin 58 that passes through a radial opening in the end of the rod 26 and secures the valve body on the rod, the valve body having an axial bore 60 for receiving the end of the rod.

The barrel 42 is formed with a partition 62, which is interposed between and separates the valve chamber 20 and the mixing chamber 14. The partition 62 has a threaded bore 64, which receives an externally threaded jet nozzle 66, the outer end of the nozzle extending into the mixing chamber 14. The nozzle is provided with an axial bore 68, which is aligned with the center of the passage 48.

A nipple 70 is provided and is adapted to have sleeved thereon one end of a hose or flexible conduit leading from a source of sand supply which is fed by vacuum to the chamber 14. The nipple has a threaded end 72 which is threaded into a threaded opening 74 formed in the top of the barrel 42 above the mixing chamber 14. The nipple 70 is also provided with a stop shoulder 76 to limit the threading of the end 72, the shoulder seating on the enlargement formed on the top of the barrel around the opening 74.

The barrel 42 is formed with an axial passage 78 that is threaded and receives the discharge nozzle assembly 16. The discharge nozzle comprises a pair of complemental sections 80 and 82 which are threaded together, the inner section 80 being threaded into the threaded passage 78. The sections 80 and 82 have overlapping and threaded adjoining ends, forming an annular groove 84 for tightly receiving the annular shoulder 86 of an insert 88. The insert 88 is axially disposed within the tubular sections 80 and 82 and is provided at its outer end with an axial bore 90 that is of constant cross-sectional area. The bore 90 is connected at its inner end with an outwardly flared bore 92 formed in the inner end of the insert and communicating at its mouth with the mixing chamber 14.

In use, the valve body 52 will be unseated from its seat 50 by a slight rotation of the rod 26 through a manual movement thereof. Such movement is easily accomplished by a single hand which can easily and efficiently grip the knob 40. As aforementioned, a slight rotational movement of the rod 26 will be sufficient to unseat the valve body, because of the extreme pitch of the threads on the rod and on the passage.

When the valve is unseated, the water from the passage 36, which is under pressure, will pass through the valve seat and the passage 48 and be increased in velocity by the restricted passage 18 in the jet nozzle, such passage being extremely smaller in diameter than the passage 48. The water will, therefore, issue from the nozzle 66 in the form of a fine jet and under considerable pressure and a venturi action will be produced in the mixing chamber 14 to draw in the air from the nipple 70. When the gun is used for cleaning with only water and air, the cleaning is accomplished by means of breaking up the solid stream of water, which varies in pressure from 100 to 10,000 pounds. For every cubic inch of water that passes through the mixing chamber, a large number of cubic inches of free air are taken in by the venturi action. The incoming air breaks the stream into millions of tiny air-filled bubbles which, when they come in contact with the surface to be cleaned, will explode and remove the dirt and all foreign material which is washed away by the water.

When the gun is used with water and sand, the sand is taken in through the nipple 70 by the venturi action. The

sand or other detergents are taken in with the air and mixed with the water, such operation being used for removing rust, grease or paint or whenever a scouring action is required.

The admixed stream of water and air or water and air and sand is again increased in velocity because of the tapered bore 92 in relation to the diametrically smaller and constant area of the bore 90 in the discharge nozzle insert 88. The stream will issue from the bore 90 in a steady and constant stream, under considerable pressure.

While the best-known form of this invention has been illustrated in the drawing and described herein, such is merely by way of example and other forms may be realized as come within the purview of the appended claim.

I claim:

A sand blast gun comprising a body member having an axial passage, a portion of said passage being internally threaded, said passage having an inner end terminating in a coaxially enlarged valve chamber, a rod axially disposed in the passage and having a portion of its surface externally threaded and enmeshed with the threaded portion of the passage, the threads on both parts being acutely pitched so that a slight rotational movement of the rod will effect a considerable axial movement thereof in the passage, said rod extending outwardly of the passage and having an enlargement, provided with an undulated peripheral surface, on its extending end for manually rotating the rod to move it axially of the passage, an enlarged cylindrical valve body detachably socketed on the inner end of the rod and disposed in the valve chamber, said valve body having an inwardly tapering end and being of less diameter than the valve chamber, a mixing chamber attached to the body member and aligned with the valve chamber and disposed forwardly thereof, a partition disposed transversely between the valve chamber and the mixing chamber, said partition having a bore aligned with the valve chamber and communicating the valve chamber and the mixing chamber, said partition having a wall facing the valve chamber and a valve seat formed in such wall and being outwardly flared to receive the end of the valve body, said body member having an inlet bore of constant cross-section for water under pressure formed below the passage; said inlet bore being curved forwardly and tangentially opening into the bottom of the valve chamber and extending over the entire bottom of the valve chamber, a jet nozzle removably fixed in the partition bore and extending forwardly into the mixing chamber, said nozzle having an axial bore of considerably less diameter than the bore in the partition and of constant cross-sectional area and communicating centrally with the valve chamber and the mixing chamber, an inlet nozzle for air and sand communicated with the mixing chamber, said mixing chamber having a threaded opening in its top wall and the inlet nozzle having a lower end threaded in such opening so that the inlet nozzle is disposed perpendicular to the mixing chamber and at right angles to the jet nozzle, said jet nozzle terminating in alignment with the inner wall of the inlet nozzle and a discharge nozzle carried by the mixing chamber and extending forwardly thereof, said discharge nozzle having an axial bore aligned with and axially spaced from the jet nozzle and said bore of the discharge nozzle tapering forwardly from the mixing chamber and terminating outwardly in an outlet section of constant cross-sectional area.

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BLAST GUN

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Fig. 1

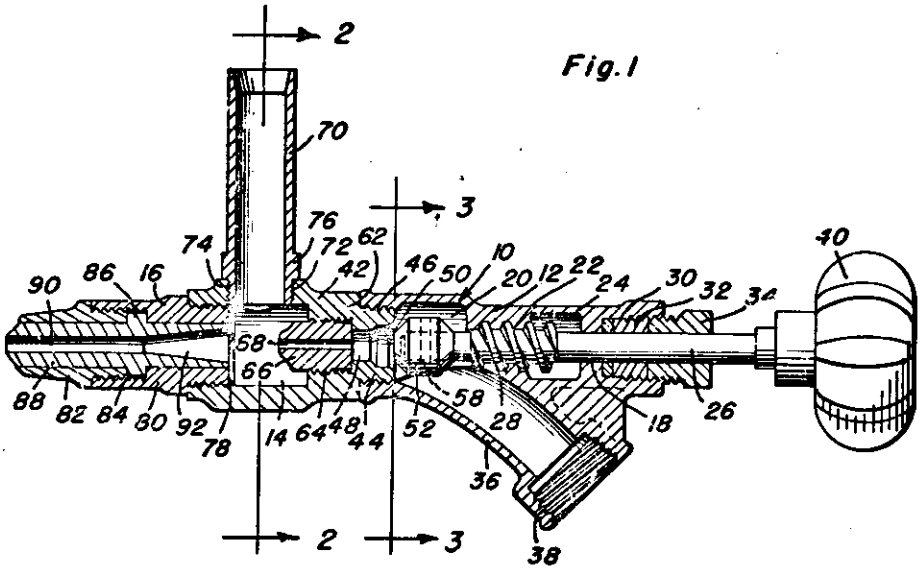


Fig. 2

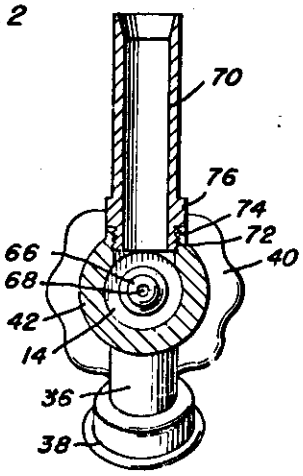


Fig. 3

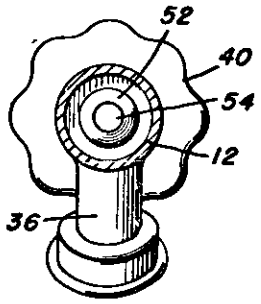
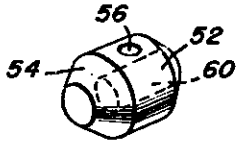


Fig. 4.



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