Feb. 1, 1938. C. B. PLETCHER 2,107,084

BLAST GUN

Filed April 17, 1937 2 Sheets-Sheet 1

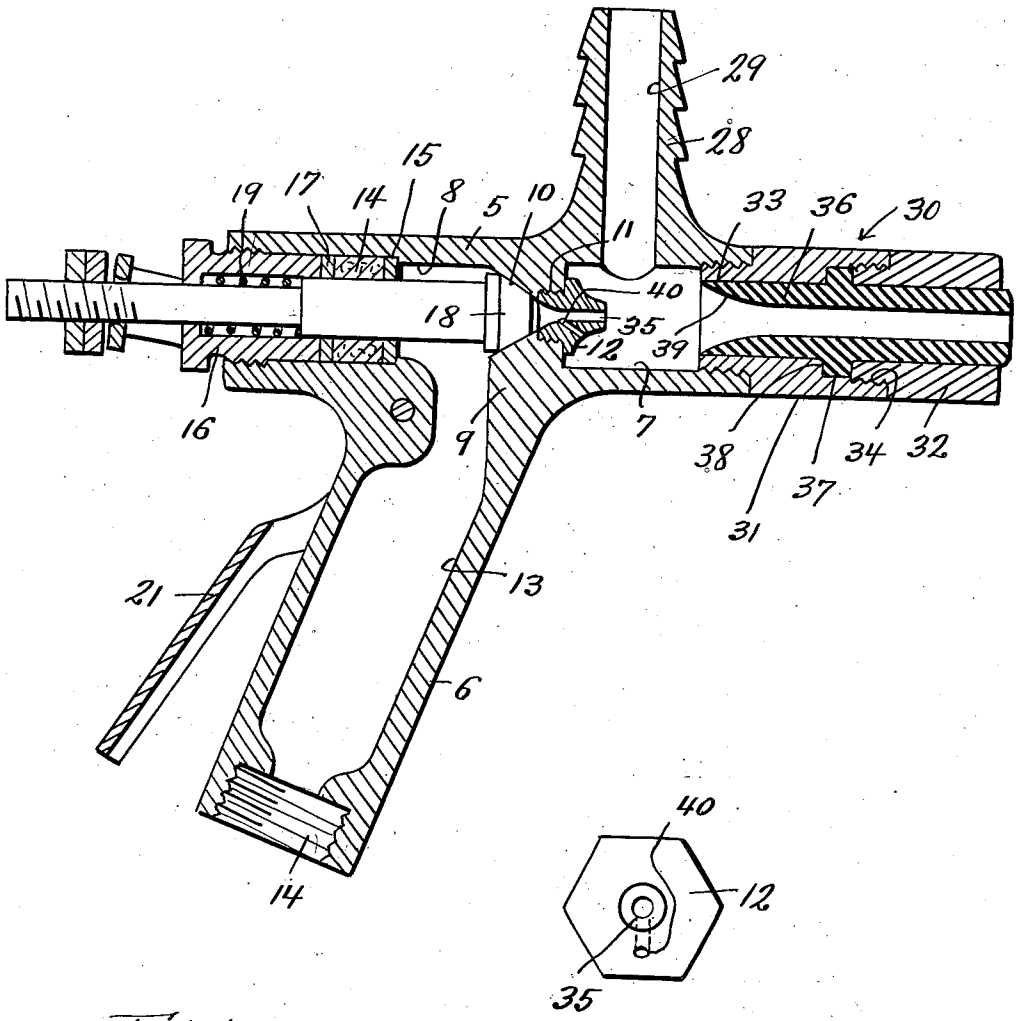


Fig. 1.

Fig. 2.

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BLAST GUN

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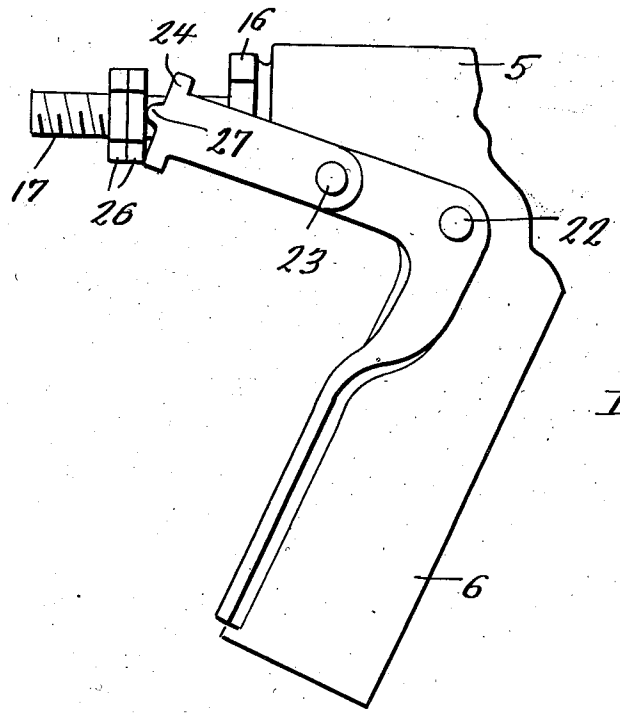


Fig. 3.

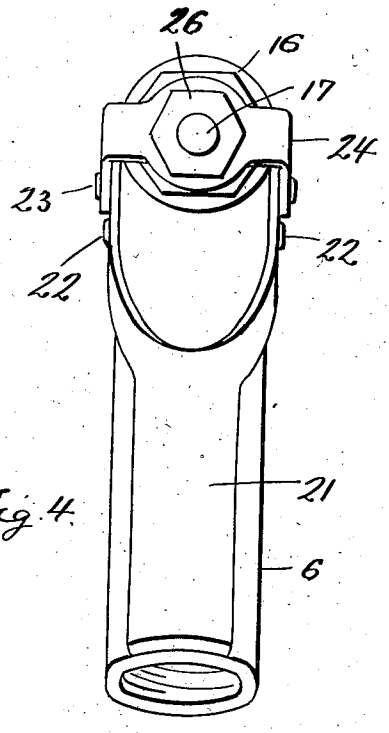


Fig. 4.

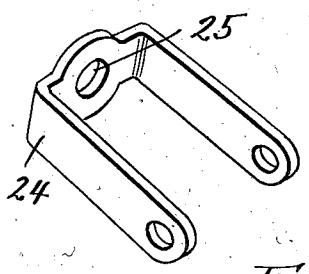


Fig. 5

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UNITED STATES PATENT OFFICE

2,107,084

BLAST GUN

Clarence B. Fletcher, St. Joseph, Mich.

Application April 17, 1937, Serial No. 137,576

5 Claims. (Cl. 51—11)

REISSUED

This invention relates to sand blasting guns of the type using a high pressure of water for forcing a mixture of the water, sand and air from the nozzle of the gun on to the work or surface to be cleaned or sand blasted.

An object of the present invention is to provide a blasting gun of the character above mentioned characterized by improved means for insuring a thorough mixing of the water, sand and air.

To this end the gun is provided with a chamber into which sand and air is drawn by suction and into which water under pressure is introduced in a manner to set up a turbulence within the chamber conductive to a thorough mixing of the water with the sand and air to the end that there will be no choking of the orifices and as would otherwise occur due to a lack of a proper mixing of the water and sand.

A further object of the invention is to provide for such a mixing of the water and sand that cleaning of the gun will be necessary occasionally and only after long periods of use.

The invention together with its objects and advantages will be best understood from a study of the following description taken in connection with the accompanying drawings wherein:—

Figure 1 is a sectional view through a blast gun involving the features of the present invention.

Figure 2 is an elevational view of a jet nozzle.

Figure 3 is an enlarged fragmentary side elevational view of the gun at the handle end thereof.

Figure 4 is an end elevational view of the gun viewing the same from the handle end thereof and

Figure 5 is a perspective view of a yoke member.

Referring to the drawings by reference numerals it will be seen that in the preferred embodiment thereof the gun comprises a barrel 5 having integral therewith a handle 6.

Barrel 5 is bored to provide a suction and mixing chamber 7 and a valve chamber 8. Chambers 7 and 8 are provided with a common or partition wall 9 that has a bore therethrough which bore has a conical end 10 forming a valve seat and a threaded end 11 into which latter end is threaded a jet nozzle 12.

The handle 6 is provided with a bore 13 that opens into the valve chamber 8 and at the free end thereof the handle 6 is provided with internal threads as at 14 for the coupling thereto of one end of a hose leading from a source of water pressure.

Fitted within the end of the barrel 5 equipped with the chamber 8 is a packing assembly 14 held in place between an internal shoulder 15 and a hollow gland nut 16.

Having a working fit through the packing assembly 14 is a valve member 17 provided at one end with a frusto-conical head 18 normally engaging the seat 10. Housed within the hollow of the gland nut 16 is a coil spring 19 which at one end bears against a shoulder 20 on the valve member 17 in a manner to yieldably retain the valve head 18 engaged with its seat 10.

For retracting or unseating the valve 17 there is provided a handle 21 which is forked at one end and at said end straddles the gun handle 6 and is pivoted to the handle 6 at opposite sides of the latter as at 22.

The legs of the handle 4 are substantially L-shaped as shown in Figure 3 and at their free ends are pivoted as at 23 to the legs of a yoke 24 that at its closed end is provided with an opening 25 which loosely accommodates the stem of the valve 17.

On the outer end thereof the stem of valve 17 is threaded to receive a pair of stop nuts 26 with which the closed end of the yoke 24 cooperates for retracting or unseating the valve. In this connection it will be noted that at the closed end thereof yoke 24 is provided with lugs or projections 27 that have bearing engagement with the nuts 26 in a manner shown in Figure 3 when the valve operating handle 21 is swung from the position shown in Figure 1 to the position shown in Figure 3 for unseating the valve 17. Obviously upon release of pressure on handle 21 spring 19 will operate to seat the valve 17. Thus it will be seen that the valve 17 may be controlled by the same hand holding the gun so that the other hand of the operator is left free.

The barrel 5 has formed integrally therewith and in the region of the chamber 7, a nipple 28 that is suitably corrugated 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 air pressure to the chamber 7 of the gun through said hose and the bore 29 of the nipple 28.

For the gun there is also provided a nozzle indicated generally by the reference numeral 30. Discharge nozzle 30 comprises a pair of complemental sections 31, 32. Section 31 is provided at one end with a threaded pin 33 that threads into the chamber equipped end 7 of the gun barrel. At its other end nozzle section 31 is provided with internal threads to receive a threaded

pin 34 formed integral with one end of the complemental nozzle section 32.

The bore of the nozzle 30 is materially larger than the bore 35 of jet nozzle 12 herein before referred to, and the bore of the nozzle 30 is lined by a tubing 36 of rubber or other suitable material formed intermediate its end with an integral shoulder 37 that is clamped between an internal shoulder 38 provided integral with the nozzle section 31 and the pin 34 of the nozzle section 32. At the intake end thereof the bore of the lining tube 36 is flared as at 39.

Nozzle 12 is relatively small and is provided at one end with a threaded portion that threads into the end 11 of the bore in the partition wall 9. The body of the nozzle 12 is provided with the aforementioned axial bore 35 which at the end thereof opening into chamber 8 is flared as shown.

Intermediate its ends the body of the nozzle 12 is provided with a diagonal port 40. Thus it will be seen that when valve 18 is unseated water from the source of supply passes through the passage 13 in handle 6 into the chamber 8 and from chamber 8 through the bore 35 of nozzle 12 into the chamber 7, certain of the water discharging in a stream into the chamber 7 through the port 40 in nozzle 12 in a manner to set up a turbulence and thoroughly agitate the mixture of the sand and air entering the chamber 7 to the end that the water entering the chamber 7 will be thoroughly mixed with said sand and air, the mixture of sand and water discharging under pressure through the nozzle 30 of the gun on to the surface to be cleaned.

This setting up of a turbulence within the chamber 7 will as above mentioned, not only insure a thorough mixing of the sand and water but will also preclude accumulations of wet sand about the nozzle 12, within the chamber 7, and within the bore of the nozzle 30 and as would tend to obstruct and free flow of water and sand from the gun.

It is thought that a clear understanding of the construction, utility and advantages of an invention of this character will be had without a more detailed description.

Having thus described the invention, what is claimed as new is:—

1. In a sand blast gun, a barrel provided with a partition, a valve chamber on one side of the partition and a vacuum and mixing chamber at a relatively opposite side of the partition, an integral handle for said barrel having a water passage therethrough for supplying water to said valve chamber, a spring biased reciprocating valve mounted in said barrel, and said partition having a bore therethrough and provided at one end of said bore with a seat against which said valve normally engages, a jet nozzle threaded into said bore of the partition and extending from said partition into said vacuum and mixing chamber, said jet nozzle being provided with an axial bore through which water under pressure passes into said mixing and vacuum chamber, and also being provided with a diagonal passage through which a jet of water passes into the last mentioned chamber to set up a turbulence therein for insuring a mixing of water and sand fed to the last mentioned chamber, said barrel being provided in the region of said last mentioned chamber with a nipple for the attachment of a hose thereto for supplying sand under air pressure to the last mentioned chamber, and a nozzle mounted on the mixing and vacuum chamber equipped end of said barrel.

2. In a sand blast gun, a barrel provided with a partition, a valve chamber on one side of the partition and a vacuum and mixing chamber at a relatively opposite side of the partition, an integral handle for said barrel having a water passage therethrough for supplying water to said valve chamber, a spring biased reciprocating valve mounted in said barrel, and said partition having a bore therethrough and provided at one end of said bore with a seat against which said valve normally engages, a jet nozzle threaded into said bore of the partition and extending from said partition into said vacuum and mixing chamber, said jet nozzle being provided with an axial bore through which water under pressure passes into said mixing and vacuum chamber, and also being provided with a diagonal passage through which a jet of water passes into the last mentioned chamber to set up a turbulence therein for insuring a mixing of water and sand fed to the last mentioned chamber, said barrel being provided in the region of said last mentioned chamber with a nipple for the attachment of a hose thereto for supplying sand under air pressure to the last mentioned chamber, a nozzle mounted on the mixing and vacuum chamber equipped end of said barrel, said nozzle having a bore therethrough and a tubular member of rubber lining the bore of said nozzle.

3. In a sand blast device, a barrel having aligned valve and mixing chambers, respectively, and also having a lateral water inlet for said valve chamber and a lateral sand inlet for said mixing chamber, together with a partition wall common to said chambers and having a passage therethrough and a valve seat at the end of the passage opening into the valve chamber, a valve in the valve chamber normally engaging said seat, means supporting the valve in said chamber for axial shifting movement including a spring yieldably urging said valve into engagement with said seat, said valve also having a stem projecting beyond one end of said barrel, a handle member pivotally mounted on said water inlet, a yoke having legs pivoted to said handle, said yoke at the closed end thereof being provided with an opening loosely accommodating said valve stem, and stop means on said valve stem with which the closed end of the yoke engages for unseating said valve incidental to a pivotal movement of said handle.

4. In a sand blast device, a barrel having aligned valve and mixing chambers, respectively, and also having a lateral water inlet for said valve chamber and a lateral sand inlet for said mixing chamber, together with a partition wall common to said chambers and having a passage therethrough and a valve seat at the end of the passage opening into the valve chamber, a valve in the valve chamber normally engaging said seat, means supporting the valve in said chamber for axial shifting movement including a spring yieldably urging said valve into engagement with said seat, said valve also having a stem projecting beyond one end of said barrel, a handle member pivotally mounted on said water inlet, a yoke having legs pivoted to said handle, said yoke at the closed end thereof being provided with an opening loosely accommodating said valve stem, stop means on said valve stem with which the closed end of the yoke engages for unseating said valve incidental to a pivotal movement of said

handle, and a jet nozzle threaded into said partition at the side thereof facing the mixing chamber, said jet nozzle having an axial bore aligning with the bore in said partition, and also having a diagonal bore for directing a stream of water into the mixing chamber in a manner to set up a turbulence therein tending to secure a thorough mixing of the water and sand within said chamber.

5. In a sand blast device, a barrel having aligned valve and mixing chambers, respectively, and also having a lateral water inlet for said valve chamber and a lateral sand inlet for said mixing chamber, together with a partition wall common to said chambers and having a passage therethrough and a valve seat at the end of the passage opening into the valve chamber, a valve in the valve chamber normally engaging said seat, means supporting the valve in said chamber for axial shifting movement including a spring yieldably urging said valve into engagement with said seat, said valve also having a stem projecting beyond one end of said barrel, a handle member pivotally mounted on said water inlet, a yoke having legs pivoted to said handle, said yoke at the closed end thereof being provided with an opening loosely accommodating said valve stem, stop means on said valve stem with which the closed end of the yoke engages for unseating said valve incidental to a pivotal movement of said handle, a jet nozzle threaded into said partition at the side thereof facing the mixing chamber, said jet nozzle having an axial bore aligning with the bore in said partition, and also having a diagonal bore for directing a stream of water into the mixing chamber in a manner to set up a turbulence therein tending to secure a thorough mixing of the water and sand within said chamber, and a nozzle threaded on said barrel and having a bore communicating with said mixing chamber, the bore of said nozzle being of materially greater diameter than the axial bore of the jet nozzle.

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