April 11, 1950 W. L. KEEFER 2,503,743

NOZZLE SKIRT FOR BLAST GUNS

Filed Jan. 12, 1948

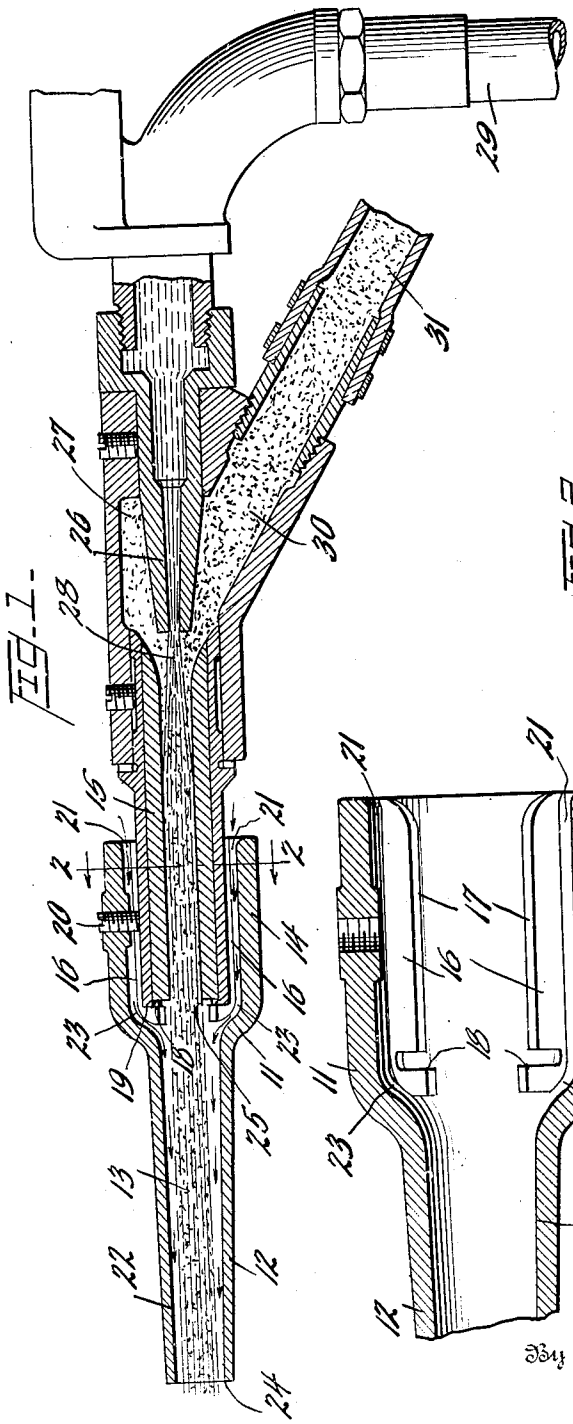


FIG. 1.

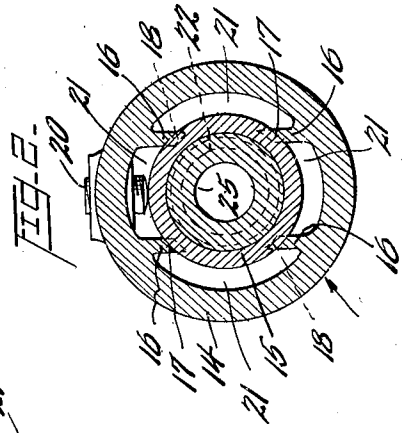


FIG. 2.



FIG. 3.

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Patented Apr. 11, 1950 2,503,743

# UNITED STATES PATENT OFFICE

2,503,743

## NOZZLE SKIRT FOR BLAST GUNS

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Application January 12, 1948, Serial No. 1,886

7 Claims. (Cl. 51—11)

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This invention relates to abrading equipment, and is more particularly concerned with guns used to project at high velocity a stream of liquid and abrasive material, such as water and sand.

Guns of this type usually comprise a jet disposed in a chamber for delivering a stream of liquid at high velocity into a nozzle, and means for communicating the chamber with a source of abrasive material whereby both the liquid and the abrasive material are mixed together in the chamber and forced out through the nozzle. One of the difficulties heretofore encountered is the fact that the mixture streaming from the nozzle outlet at high velocity has a tendency to expand and lose density thereby decreasing the efficiency of the gun and the accuracy with which the projecting stream may be utilized in various types of abrading work.

It is an object of the present invention to reverse this undesirable tendency and thereby to maintain the streaming mixture in a concentrated form.

Other objects and advantages of this invention will be apparent from the following description considered together with the accompanying drawing, in which drawing:

Fig. 1 is a section through the longitudinal axis of a blast gun of the type mentioned showing an embodiment of my invention disposed thereon.

Fig. 2 is a section along the line 2—2 of Fig. 1.

Fig. 3 is an enlarged longitudinal section of a portion of the embodiment of my invention shown in Fig. 1.

Referring with more particularity to the drawing in which like numerals designate like parts, the embodiment illustrated comprises an elongated tubular member or skirt 11, the front or discharge end 12 being an elongated conduit through which a stream 13 of liquid and abrasive material is projected. The rear or nozzle end 14 is larger than the outlet end of the nozzle 15 of the gun. The inner wall of the nozzle end 14 is provided with a group of inwardly projecting fins or ribs 16. These fins are secured to or integral with the nozzle end 14, and their inner edges 17 comprise radially facing shoulders to fit snugly about the outlet end of the nozzle 15. Shoulders 18 are also provided within nozzle end 14 to engage the nozzle tip 19 when the latter is properly inserted in the nozzle end 14, thereby making it easy to dispose the skirt on the nozzle in the proper relative position. The nozzle and skirt are held together in this relationship by means of a set screw 20 disposed through the wall of the skirt to releasably engage the nozzle 15,

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substantially as shown. However, other means may be employed for securing these two members in position. The spaces between the fins 16 are open to the surrounding atmosphere through openings 21 and they also communicate with the bore 22 of the discharge end 12 through openings 23.

The bore 22 has a gradual taper from its rear to its forward tip 24 where the diameter is greater than that of the nozzle outlet 25. This is a very important feature of the invention, as will be explained hereinafter.

In operation, a jet 26 disposed in a chamber 27 projects at high velocity a stream of liquid under pressure, such as water 28, from a source (not shown) through the pipe 29 into the nozzle 15. An abrasive, such as wet sand 30, is led into the chamber 27 through a pipe 31. The effect of the projection of the liquid from the jet 26 at high velocity is to create a partial vacuum in the chamber 27, which, in turn, draws the abrasive material into the chamber where it is mixed with the liquid and projected through the nozzle 15. Ordinarily, the stream 13 of mixed liquid and abrasive projecting from the nozzle expands and rapidly loses density. The invention reverses this tendency. As the stream 13 passes through the bore 22, it induces a flow of air from the atmosphere through the channels between the fins 16. The indrawn air passes through the bore 22 and is trapped between its wall and the stream 13 passing therethrough. Since the cross-sectional area of the bore decreases toward its tip but is always greater than the nozzle outlet, the trapped air becomes more and more compressed. The pressure created by this compression tends to maintain the liquid and abrasive stream in a concentrated state.

I claim:

1. A skirt for the nozzle of a high velocity blast gun comprising a tubular member having one end adapted to be disposed over the outlet end of the nozzle in radially spaced relation, means for securing the skirt on the nozzle, the other end of the skirt being elongated and having a bore tapering gradually away from the nozzle end to a diameter greater than that of the nozzle outlet.

2. A skirt for the nozzle of a high velocity blast gun, said skirt having a nozzle end and a discharge end, said nozzle end being adapted to be disposed over the outlet end of the nozzle in radially spaced relation, means for securing the skirt and nozzle in said relation, the discharge end of the skirt being elongated and having a

bore gradually tapering to the outlet thereof to a diameter greater than that of the nozzle outlet.

3. A skirt for a high velocity blast gun nozzle, said skirt having a nozzle end and a discharge end, said nozzle end being adapted to be disposed over the outlet end of the gun nozzle, means for holding said nozzle end aligned with and in spaced relation to the gun nozzle, said discharge end being elongated and having a bore gradually tapering to the outlet thereof to a diameter greater than that of the gun nozzle outlet.

4. A skirt for the nozzle of a high velocity blast gun, said skirt having a nozzle end and a discharge end, said nozzle end being adapted to be disposed over the nozzle, longitudinal fins within the nozzle end, the inner edges thereof being adapted to engage the nozzle, means for securing the skirt on the nozzle against relative movement, the discharge end of the skirt being elongated and having a bore gradually tapering to the outlet thereof to a diameter greater than that of the nozzle outlet.

5. A skirt as defined by claim 4 having shoulders within the nozzle end to abut the nozzle of the gun when the nozzle and skirt are in a predetermined relative position.

6. A high velocity blast gun nozzle in combination with a skirt having a nozzle end and a discharge end, said nozzle end being secured on the nozzle of the gun in radially spaced relation, the discharge end of the skirt being elongated and having a bore gradually tapering to the outlet



thereof to a diameter greater than that of the nozzle outlet.

7. The combination of a blast gun nozzle for projecting at high velocity a stream of liquid and abrasive material and a skirt therefor, said skirt having its inlet end disposed on the nozzle, the outlet end of the skirt having a bore gradually tapering to the outlet thereof to a diameter greater than that of the nozzle outlet, said inlet end having air admission passages therethrough communicating said bore freely with the ambient atmosphere, and providing for induction therethrough, by passage of the liquid stream through said bore, of atmospheric air to sheath the stream within the bore, the walls of said tapering bore being positioned throughout their extent to be in spaced relation to the liquid stream as confined by the sheath of induced air squeezed down between said stream and bore.

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