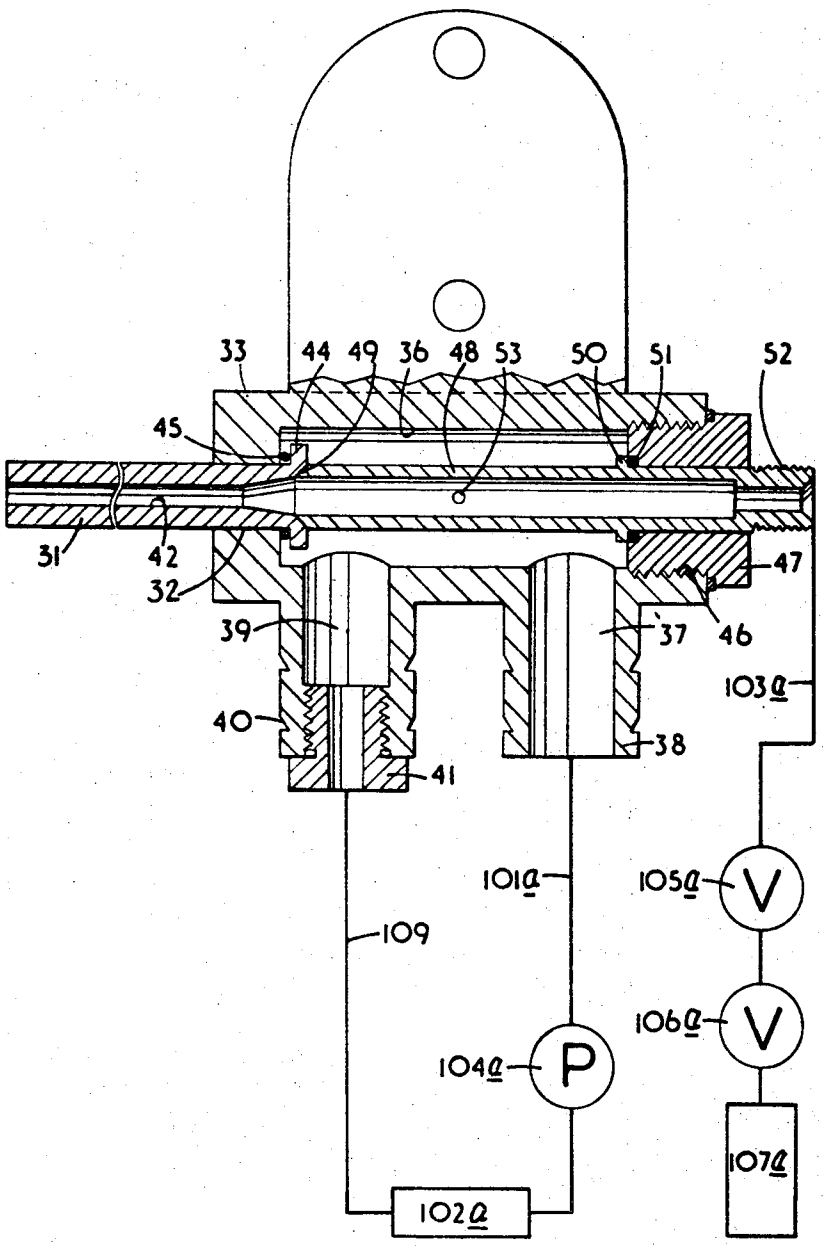
Oct. 29, 1968 S. I. ASHWORTH 3,407,539

ABRADING DEVICES

Filed March 16, 1966



INVENTOR:

STEWART IVES ASHWORTH

BY Kurt Kelman

AGENT

United States Patent Office

3,407,539

Patented Oct. 29, 1968

3,407,539

ABRADING DEVICES

Stewart I. Ashworth, Crimond, Outhill, near Studley, England, assignor to Abrasive Developments Limited, Solihull, England, a British company

Continuation-in-part of application Ser. No. 340,984, Jan. 29, 1964. This application Mar. 16, 1966, Ser. No. 534,809

Claims priority, application Great Britain, Feb. 24, 1966, 8,084/66

3 Claims. (Cl. 51—11)

ABSTRACT OF THE DISCLOSURE

An abrading gun for delivering a blast of a mixture of abrasive, liquid and gas, which includes a feed chamber, a tube extending therethrough and defining a mixing chamber, at least one aperture in the tube opening into the feed chamber, a first conduit delivering a slurry of abrasive and liquid from a supply to the feed chamber, a second conduit returning the slurry from the feed chamber to the supply, a pump circulating the slurry through the conduits, and a further conduit delivering gas from a supply under pressure to one end of the tube.

This application is a continuation-in-part of my application Ser. No. 340,984 filed Jan. 29, 1964, now Patent No. 3,276,168.

This invention relates to abrading devices comprising guns for producing blasting jets of abrasive grains in a mixture of liquid and gas usually, but not necessarily, water and air. The invention is particularly concerned with such a device including a gun comprising a mixing chamber with means for separately feeding thereto the gas and a slurry of the abrasive grains in the liquid and having an outlet comprising, or adapted to be connected to, a nozzle for directing the resulting mixture at a workpiece.

According to the invention, I improve the abrading device disclosed and claimed in the above-named patent by providing for the continuous circulation of the abrasive slurry and liquid through the feed chamber of the gun.

The invention will now be described by way of example with reference to the accompanying single figure.

The drawing is a schematic diagram of an abrading device embodying the invention, with the gun being shown in longitudinal section.

The gun comprises a body component **33** in which is formed a cylindrical feed chamber **36** having an entry **37** formed in a spigot **38** and an exit **39** formed in a spigot **40**. A restrictor sleeve **41** is threadably engaged in the end of the spigot **40**.

A nozzle **31** having a bore **42** is received in an aperture **32** in one end wall of the feed chamber **36**. The nozzle has a flange **44** which is within the feed chamber and a sealing ring **45** is inserted between the flange and the internal surface of the end wall of the chamber.

The opposite end wall of the chamber is formed with a threaded bore **46** in which is mounted an apertured plug **47**. A tube **48** is mounted within the feed chamber and has one end **49** which is tapered and fits into a corresponding formation in the flange **44** of the nozzle.

The tube has a further flange **50** which seals against the inner end of the plug **47** by means of a seal **51**. The tube continues through the plug and at a position outside the feed chamber is provided with the threaded connection **52**.

The connection **52** is connected to an air supply **107***a* receiving air supplied through a line **103***a* and valves **105***a* and **106***a*.

There is also provided a supply **102***a* of slurry which is pumped by means of a pump **104***a* through a line **101***a* to the inlet **37**. Some of the slurry entering the feed chamber passes through two diametrically opposed metering holes, one of which is indicated at **53** in the tube **48**, and is mixed with the air passing through the tube and forms, with the air, a blast which passes out through the nozzle. The remaining slurry, passes through the outlet **39** and passes through the restrictor **41** back to the supply **102***a* to the line **109**.

The operation of the gun is in all respects similar to that described in relation to my patent No. 3,276,168. However, the pump is enabled to run at maximum efficiency and, moreover, since there is a constant passage of slurry through the feed chamber, there is no danger of the feed chamber silting up.

What I claim is:

1. An abrading device comprising a gun for delivering a blast of a mixture of abrasive, liquid and gas, the gun including a feed chamber having an entry and an exit, a tube extending through the feed chamber, the interior of the tube constituting a mixing chamber, an inlet connection at one end of the tube outside the feed chamber and an outlet at the other end of the tube, an outlet nozzle communicating with the outlet and at least one aperture in the tube opening into the feed chamber; a supply of a slurry of abrasive and liquid; first conduit means for delivering the slurry from the supply to the entry of the feed chamber; second conduit means for returning the slurry from the feed chamber to the supply; means for causing circulation of the slurry from the supply through said conduit means and the chamber back to the supply; a supply of gas under pressure; and further conduit means connected to the inlet connection for delivering the gas from the latter supply to one end of the tube.

2. A device according to claim **1** including a flow restrictor in the second conduit means.

3. An abrading device according to claim **1** wherein the feed chamber has opposite end walls and wherein the outlet nozzle passes through an aperture in one of said end walls and has a flange within the chamber in sealing engagement with the inner surface of said one wall, wherein the outlet of the tube is in sealing engagement with the flange of the nozzle and wherein the inlet connection passes through a bore in a removal plug received in the other of said end walls, the plug engaging a flange on the tube to seal therewith and to urge the tube into sealing engagement with the nozzle.

References Cited

UNITED STATES PATENTS

3,276,168 10/1966 Ashworth ---------- 51—11

LESTER M. SWINGLE, *Primary Examiner.*