

UNITED STATES PATENT OFFICE

2,439,032

SHOT BLASTING NOZZLE

John O. Almen, Royal Oak, Mich., assignor to
General Motors Corporation, Detroit, Mich., a
corporation of Delaware

Application November 1, 1945, Serial No. 626,065

5 Claims. (Cl. 51-11)

1

This invention relates to the art of shot peening. Cold working of metal articles to compact the surface layer by shot peening is easily accomplished if the surface can be exposed to the shot blast. Existing equipment is unsuited to the peening of interior surfaces of openings and cylinders and other out of the way places.

An object of the present invention is to provide an improved tool for shot blasting interior surfaces including those of narrow deep holes into which the tool can be inserted axially and which tool includes as an important feature a rotatable deflector adjacent the nozzle to direct the blast substantially normal to the surface and by continuous deflector rotation relative to the nozzle will sweep the entire circumference once or repeatedly as may be desired. Continuous rotation of the deflection in the same direction may be done concurrently with axial travel of the tool within the opening to perform a peening operation over the entire interior surface in one stroke. A deflector plate and detachable mounting has been designed for easy and quick replacement at low cost since the deflector surface is rapidly worn by the blasting material and must be frequently replaced.

A preferred embodiment of the invention is shown in the accompanying drawing illustrating in Figure 1 a nozzle partly in section, for attachment to the ordinary air type shot or sand blasting machine and in Figure 2 a detail elevation of the deflector and associated parts.

In the drawing the inner tube 1 is connected, as by means of a pipe or a flexible hose, to a source of high pressure fluid, such as air or a liquid solution and the fluid flows into a Venturi shaped nozzle tip 2. The tip 2 is secured in the end of a hollow body 3 having at its rear end a duct 4 joined by a suitable pipe or flexible hose to a receptacle containing shot, sand or other solid particles of appropriate material and size for the particular operation to be performed. Fluid flowing into the Venturi shaped nozzle 2 creates a partial vacuum within the chambered body 3 and draws the shot through the duct 4 for entrainment in the high pressure fluid stream discharged from the nozzle tip 2. A set screw 5 retains the pressure delivery tube 1 in selected settings with respect to the Venturi shaped nozzle 2 and enables varying degrees of vacuum to be produced as required.

Directly in the path of discharge from the nozzle 2 is a deflector, preferably in the nature of a hardened steel plate 6, supported by an adjustably mounted sleeve 7 rotatably and slidably tele-

2

scoping the body 3. Such mounting enables the deflector to be shifted both axially and rotatably in relation to the main body 3 and to be turned continuously or to any desired angle about the axis of the tool. To facilitate replacement after wear the hardened deflector plate 6 is detachably mounted on the supporting sleeve 7 as by means of a pair of oppositely facing side ears 8 affording slide grooves to receive the plate on top of a locating block 9 having an inclined mounting face for the wear plate 6. A set screw 10 is threaded in the block 9 and bears on the back of the plate to detachably lock it within its locating grooves.

High velocity particles striking the deflector 6 will carom at an angle approximately equal to the approach. With the plane of the deflecting surface at 45° to the angle of the nozzle tip the shot blast projected from the tool will be in a plane substantially perpendicular to the nozzle axis and upon rotation of the sleeve the blast can be directed at any angle of rotation as desired or caused to sweep around throughout an entire 360° turn and on indefinitely. The nozzle may be traversed in the direction of its axis whereby all portions of deep holes or other inside surfaces may be subjected to the peening or shot blasting action. Thus this device makes it possible to shot blast or sand blast the inside of holes that are inaccessible to the ordinary shot blast or sand blast devices.

I claim:

1. A blasting tool of the character described, comprising a tool body shaped for introduction into a hole whose internal surface is to be blasted, means to supply surface working material to the body for ejection under pressure and a deflector positioned to direct the surface working material angularly of the body and mounted on the body for rotatable adjustment relative thereto.

2. The tool of claim 1 and a replaceable wear plate constituting the deflector surface and means for detachably mounting the same.

3. A blasting tool for introduction into an opening whose internal surface is to be blasted including a tubular body having an ejector chamber therein, means to lead fluid under pressure through said chamber, means to connect said chamber with a source of solid particles, an ejector nozzle on the end of the tubular body, a sleeve fitted to the body for rotational adjustment and projected beyond said nozzle and a deflector carried by said sleeve in alignment with said nozzle

3

to direct the blast therefrom angularly to said internal surface.

4. A tool for axial insertion within a hole to treat the internal surface of the hole, comprising a tubular body containing means for flow of surface treating material and terminating in a delivery ejector, a member telescopically fitted to said tube for axial and rotary adjustment relative thereto and deflector means carried by said member for cooperation with said delivery ejector in directing the treating material in selected lateral direction as determined by member adjustment position.

5. Shot blast means for compressively stressing the interior surface of an opening, comprising a conductor member for flow therethrough of shot blasting material, said member terminating in a discharge end insertable within the opening whose internal surface is to be compressively stressed, a deflector cooperating with said discharge end

4

to direct the discharge of said shot blasting material laterally from said discharge end for impingement on said internal surface and means mounting the deflector for relative rotation circularly of the member.

JOHN O. ALMEN.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
108,408	Tilghman	Oct. 18, 1870
1,073,149	Lawrence	Sept. 16, 1913
2,392,897	Archer	Jan. 15, 1946

FOREIGN PATENTS

Number	Country	Date
370,068	France	Jan. 28, 1907

April 6, 1948.

J. O. ALMEN

2,439,032

SHOT BLASTING NOZZLE

Filed Nov. 1, 1945

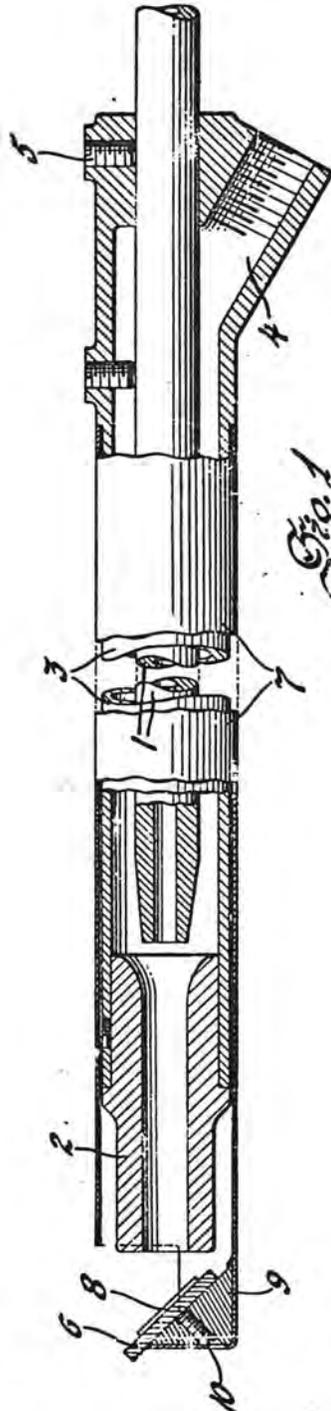


Fig. 1

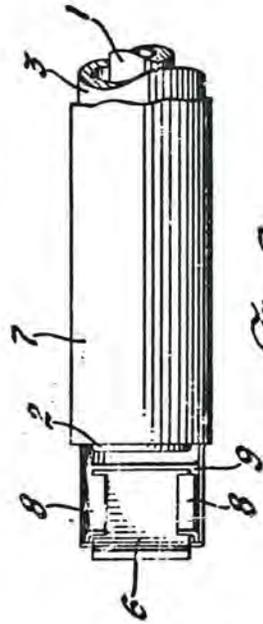


Fig. 2

Inventor
John O. Almen
By
D. Hubert Spencer & Co.
Attorneys