Dec. 24, 1946. J. R. BUGLEY 2,413,167

SANDBLAST NOZZLE

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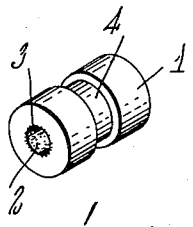


Fig. 1.

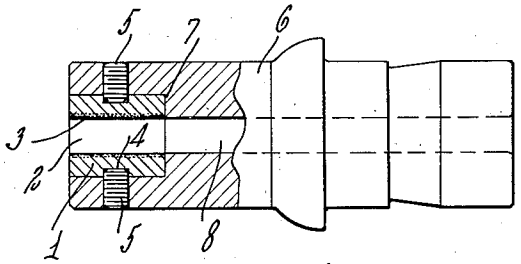


Fig. 2.

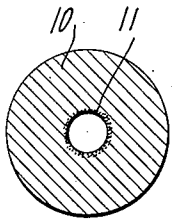


Fig. 3.

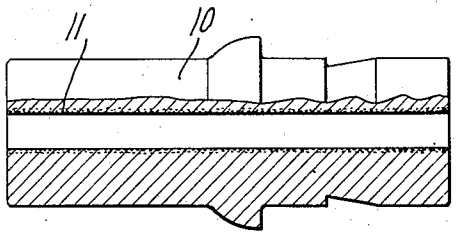


Fig. 4.

Inventor
James R. Bugley
By Wright Brown Quinby & Woy
Attys

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SANDBLAST NOZZLE

James R. Bugley, Boston, Mass., assignor of one-half to Raymond Hunter, Boston, Mass.

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3 Claims. (Cl. 51—11)

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This invention has for an object to produce a nozzle for sand blasting wherein the wear, due to erosion of the sand on the nozzle, will be less rapid than heretofore.

This is accomplished, in accordance with this invention, by treating with or applying to the bore of the nozzle, a coating of hard material highly resistant to the abrasive action of the sand, such as commercial diamond dust. Such dust may be charged into a relatively soft metal retaining medium and then the medium may be hardened. A material particularly suitable for this purpose is known to the trade as beryllium copper. A representative formula for such material comprises 2% beryllium, 0.25% cobalt, and the remainder copper. When such material is quenched, say, from 800° C. it is in its annealed soft state. The bore of such material which either forms a coating on the inner face of the nozzle, or is formed as a tubular insert which may be placed in position within the nozzle, is charged on its inner surface with the diamond dust by methods well known in the art, and the material so charged is then subjected to heat at from 250° C. to 350° C. for a sufficient length of time, commonly about seven or eight hours, to reach its maximum hardness.

For a complete understanding of this invention, reference may be had to the accompanying drawing in which

Figure 1 is an isometric view of a beryllium copper sleeve insert charged on its inner face with the diamond dust.

Figure 2 is a view partly in side elevation and partly broken away and in section of a sand blast nozzle to which the insert of Figure 1 has been applied.

Figure 3 is a cross sectional view of a nozzle having a diamond dust charge in a coating of beryllium copper in its inner face.

Figure 4 is a view partly in side elevation and partly in section of the nozzle of Figure 3.

Referring to the drawing, at 1 in Figure 1 is shown a sleeve of material adapted to have the commercial diamond dust which comprises fine particles of the hard commercial diamond material charged into its inner face. This sleeve may well be of beryllium copper which can be annealed in soft condition in which it may be readily worked, and in which condition its central bore 2 may have charged into the surface thereof the commercial diamond dust as at 3 forming an exceedingly hard inner surface coating. The sleeve may then be hardened, the beryllium copper hardening when its temperature is raised from 250° C. to 350° C. and there held for some hours, say seven or eight, at which time the beryllium copper attains its maximum hardness. If the heating be continued beyond the maximum point, the hardness tends to decrease to some extent.

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As shown, the sleeve 1 is provided with a peripheral groove 4 to receive the inner end of one or more set screws 5 threaded through the outer wall of the nozzle 6, which is provided with a recess 7 adjacent to its outer end shaped to receive the insert sleeve 1 and with its central bore 8 forming a continuation of the bore of the sleeve. Since the size of the nozzle at the exit end determines the pressure of the jet of the sand blast for any given pressure and volume of air, the maintenance of this exit opening at the proper size is of great importance, while the matter of increase of size of the jet opening back of the exit opening is of little consequence in determining the pressure of the blast as it issues from the nozzle. Hence in order to economize, the more expensive beryllium copper and the commercial diamond dust may be localized, as shown in Figure 2, adjacent to the exit end of the nozzle. However, if desired, the entire length of the bore of the nozzle may have its inner face impregnated with the diamond dust and when this is desired, it is preferable to coat the inner wall of the nozzle with beryllium copper since this furnishes a medium which can be made sufficiently soft to be thoroughly impregnated with the diamond dust after which it may be made hard to hold the diamond dust in position and to aid in resisting erosion of the nozzle by the sand. For example, the nozzle itself may comprise a tube 10 of material such as cast iron suitably shaped to connect it to the source of supply of sand and compressed air, and provided with a central bore 11, the surface of which is charged with the commercial diamond dust, preferably in a layer of beryllium copper applied to the inner face of the cast iron tube by any suitable means such as electrodeposition, brazing of a liner tube, or otherwise, such means being well known in the art.

From the foregoing description of certain embodiments of this invention it should be evident to those skilled in the art that various other changes and modifications might be made without departing from the spirit or scope of this invention.

I claim:

1. A nozzle element comprising a metal tube having its inner face impregnated with commercial diamond dust particles.

2. A nozzle element comprising a tube of hardened beryllium copper having its inner face impregnated with commercial diamond dust particles.

3. A nozzle having an inner bore provided with an enlarged diameter recess in its outer end, a sleeve of beryllium copper seated in said recess, said sleeve having its inner face impregnated with commercial diamond dust particles, and means for securing said sleeve in said recess.

JAMES R. BUGLEY.