May 24, 1966 J. F. QUAAS 3,252,828

CARBIDE WELDING ROD

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Fig. 2.

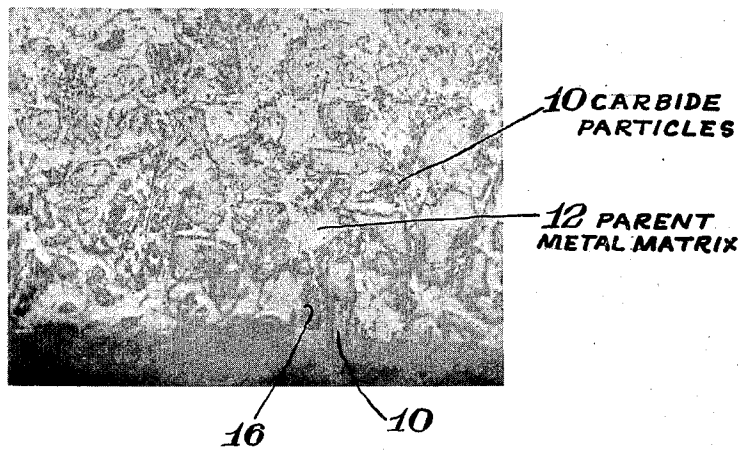
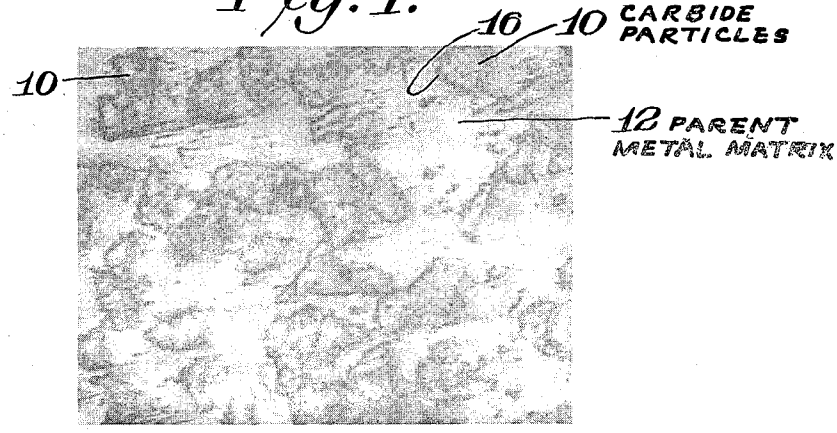


Fig. 1.



INVENTOR
Joseph F. Quaas
BY Connolly and Hutz
ATTORNEYS

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Fig. 3.

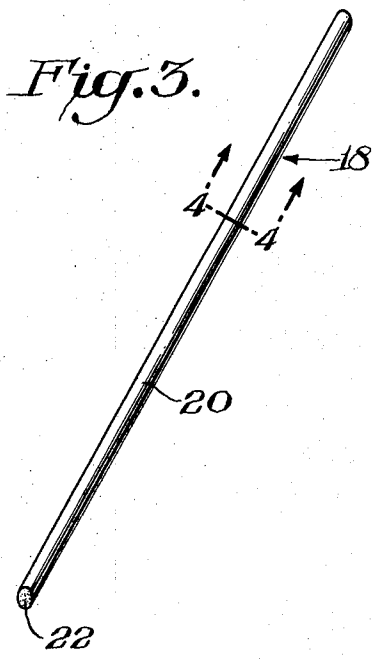
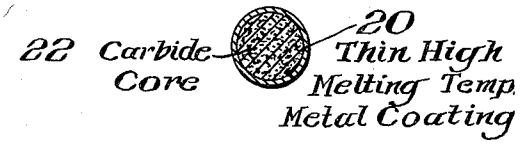


Fig. 4.



INVENTOR

Joseph F. Quaas

BY Connolly and Hutz

ATTORNEYS

United States Patent Office

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CARBIDE WELDING ROD

Joseph F. Quaas, Island Park, N.Y., assignor to Eutectic Welding Alloys Corporation, a corporation of New York

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9 Claims. (Cl. 117—207)

This application in a continuation-in-part of copending application Serial No. 183,637, filed March 29, 1962. That application describes a rod incorporating sintered carbides in conjuction with amount of matrix metal that is relatively low in comparison with that formerly utilized with carbides. However, that amount of matrix usually in the form of a tube is still appreciable, and a rod incorporating it applies a relatively homogeneous carbide surface layer which is advantageous for various hard surfacing but functions only fairly well as a cutting surface. The less matrix metal in a given rod, the more undiluted carbides can it deposit. However, heretofore a substantial amount of matrix metal was believed necessary for use as a molten fluid vehicle to facilitate the continuous and even deposit of sintered carbides.

This invention relates to a rod for depositing a carbide-laden surface layer upon a parent metal, and it more particularly relates to such a rod which deposits heterogeneously dispersed carbides.

An object of this invention is to provide a hard surfacing rod for depositing sintered carbide in conjunction with a minimum amount of additional metal.

Another object is to provide such a rod which deposits a hard surface that is particularly effective for cutting service.

In accordance with this invention a thin metal coating ranging from 2 to 10% by weight of the ultimate rod and preferably from 4 to 7% by weight thereof is applied to a carbide core of the cast or preferably the sintered type. A coating of 6% by weight of the ultimate rod is particularly effective.

A sintered carbide core is a mass of fine refractory carbide particles compressed and sintered in the presence of small amounts of a metallic binder such as cobalt, nickel, or molybdenum to fuse it together. The applied coating metal is of a type which melts approximately from 1800–2870° C. A sintered tungsten carbide core approximately ⅛ inch and specifically 0.140 inch in diameter is accordingly chromium plated to a thickness ranging from 0.002 to 0.015 inch, most effectively from 0.005 to 0.010 inch and specifically to 0.008 inch, to provide a protective coating that burns off evenly with the carbide during deposition, even by the atomic hydrogen process with its extreme concentration of high temperature heat. In the deposited surface the carbide particles are heterogeneously dispersed with minimum dilution in the parent metal to expose their edges and enhance their cutting action. The coating also protects the sintered carbides from atmospheric corrosion during storage.

The protective coating of this invention may also be formed of high melting temperature refractory metals such as colombium, vanadium, molybdenum and other metals or alloys thereof with melting points ranging approximately from 1800–2870° C. The expression high melting temperature refractory metal accordingly refers to each of said metals and also to combinations or alloys thereof. Some of these metals and combinations thereof cannot be effectively plated, and they are accordingly sprayed upon the carbide rods.

Novel features and advantages of the present invention will become apparent to one skilled in the art from a reading of the following description in conjunction with the accompanying drawings wherein similar reference characters refer to similar parts and in which:

FIGS. 1 and 2 are respectively 150× and 100× photomicrographs of carbide surfaces deposited by an embodiment of this invention.

FIG. 3 is a perspective view of a rod which is one embodiment of this invention, and

FIG. 4 is an enlarged cross-sectional view taken through FIG. 3 along the line **4—4**.

The previously described chrome plated sintered tungsten carbide electrode of this invention is deposited upon a parent material such as mild steel by the inert arc or atomic hydrogen process. As shown in FIG. 1, a relatively heterogeneously dispersed array of carbide particles **10** are suspended in a matrix consisting of parent metal **12**.

As shown in FIG. 2, the edges **16** of carbide particles **10** are exposed to facilitate their efficient cutting action, and the chromium carbides and other alloys in the deposit help improve the wear resistance of the overlay.

The rod **18** of this invention therefore provides a very dense carbide surface upon a parent material that may be used for various metal cutting operations despite its remarkably slight coating **20** of high melting temperature metal upon carbide core **22**. A machine shop may accordingly make its own tools by depositing carbide surfaces upon parent metals, such as steel, with this electrode. Such a surface is extremely hard and wear-resistant and particularly possesses a relatively great red hardness, which is a significant property for cutting tools.

What is claimed is:

1. A carbide surfacing rod comprising a refractory carbide core having a coating ranging approximately from 2–10% by weight of said rod of a refractory metal compatible with deposition of said carbide upon a parent metal surface and melting at a temperature ranging approximately from 1800–2870° C.

2. A rod as set forth in claim **1** wherein said carbide core comprises a sintered carbide.

3. A rod as set forth in claim **2** wherein said sintered carbide core comprises sintered tungsten carbide.

4. A rod as set forth in claim **1** wherein said coating comprises chromium.

5. A rod as set forth in claim **4** wherein said chromium coating ranges in thickness from 0.002 to 0.015 inch.

6. A rod as set forth in claim **4** wherein said coating ranges in thickness from 0.005 to 0.010 inch.

7. A rod as set forth in claim **1** wherein said coating ranges in thickness from 0.002 to 0.015 inch.

8. A rod as set forth in claim **7** wherein said coating ranges in thickness from 0.005 to 0.010 inch.

9. A rod as set forth in claim **1** wherein said coating ranges approximately from 4 to 7% by weight of said rod.

References Cited by the Examiner

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RICHARD D. NEVIUS, *Primary Examiner*