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Wick et al.

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[54] PENETRATING ARRANGEMENT

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[52] **U.S. Cl.** ..... **86/1 A**, 89/1 B, 102/52, 102/92.2

[51] **Int. Cl.** **F42b 33/00**

[58] **Field of Search** ..... 89/1; 102/52, 92.2; 86/1 A

[56] **References Cited**

UNITED STATES PATENTS

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[57] **ABSTRACT**

A metal penetrating arrangement in which a steel projectile containing a sample contents is penetrated by a propellant actuated steel needle provided with an electro-deposited indium plating or coating. The coating has a 0.0001 to 0.0002 inch thickness that surrounds the entire needle for penetration of the projectile wall without fusion therebetween.

2 Claims, 2 Drawing Figures

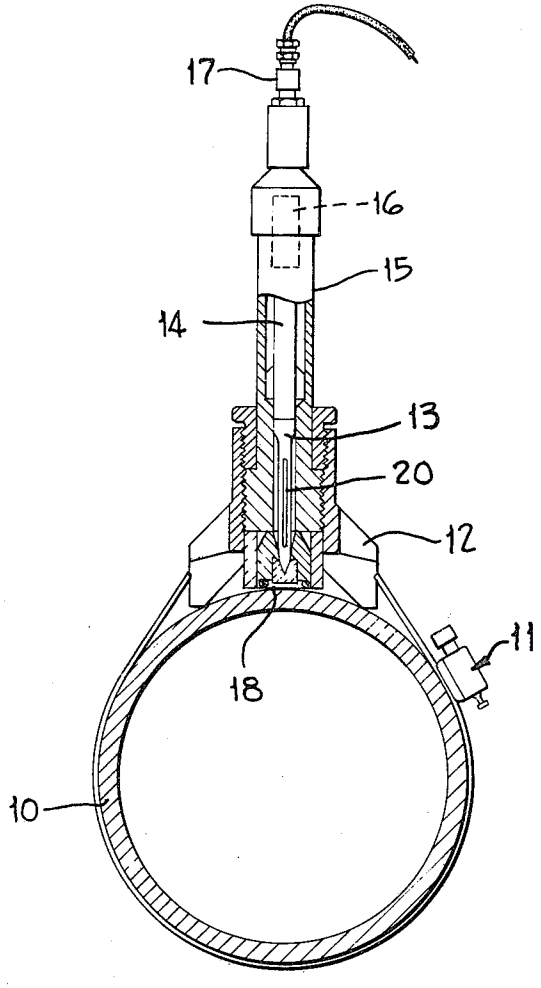


Fig. 1

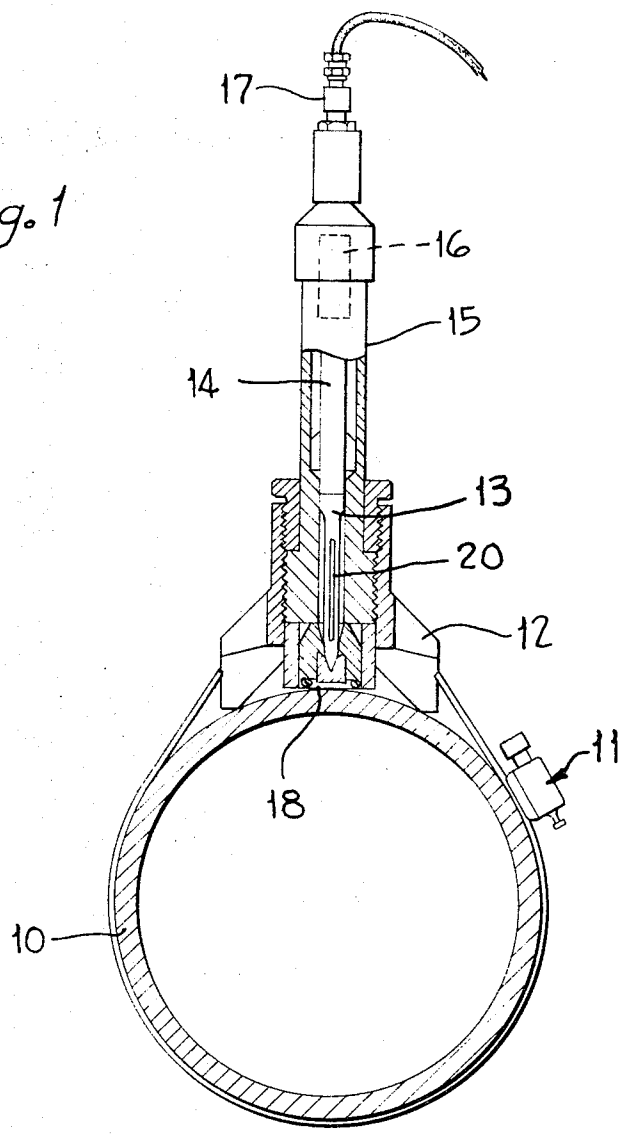
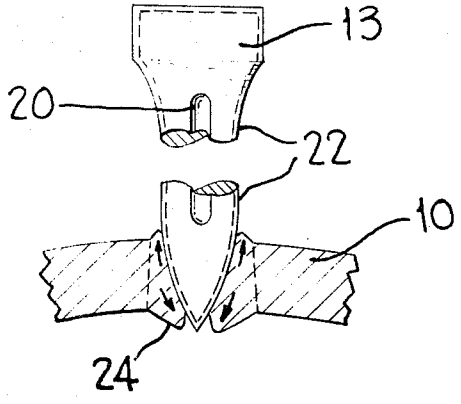


Fig. 2



PENETRATING ARRANGEMENT

The invention described herein may be manufactured, used, and licensed by or for the Government for governmental purposes without the payment to us of any royalty thereon.

This invention relates to penetrating apparatus, and more particularly to a propellant actuated metal penetrating arrangement.

A need has existed for means of improving the metal penetration ability of steel needles used in a propellant actuated device.

It is an object of the invention to provide a metal penetrating arrangement in which the needles have a substantially improved penetration ability.

Another object of the invention is to provide such an arrangement in which fusion is eliminated between a steel penetrator and a steel body being penetrated.

These and other objects, features and advantages will become more apparent from the following description and accompanying drawing in which:

FIG. 1 is an elevational view, partly broken away, of a preferred metal penetrating arrangement embodying the principles of the invention.

FIG. 2 is an enlarged view of the needle operatively penetrating the container of FIG. 1.

The projectile 10 (FIG. 1) or other steel vessel containing a sampling fluid has an appropriate adjustable clamp and steel band support structure, shown generally at 11, for mounting the retainer or base 12 of a propellant actuated unit in which a propellant actuated force drives at least the pointed tip of penetrating needle 13 into the container wall at high pressure and low velocity conditions. The piston 14 within the substantially cylindrical body 15 that drives needle 13 is actuated by an impulse cartridge 16 that is ignited by an electrically fired ignition element 17. A suitable sealing adapter 18 precludes loss of sampling contents upon operative penetration of the container.

Heretofore, difficulties have developed due to fusion occurring between the steel needle 13 and steel container 10.

The steel needle 13 has a plurality of elongated slots 20 (FIGS. 1, 2) provided in the lateral surface thereof

to facilitate deployment of appropriate syringe equipment (not shown) in order to remove samples from within the container. As shown in FIG. 2 the steel needle 13 has an electro-deposited indium plating or coating 22 covering its entire surface. When the needle tip is operatively driven to penetrate the steel container 10, the 0.0001 to 0.0002 inch coating or plating of indium prevents fusion of the steel members and the penetration of the needle tip caused a plastic flow or deformation of the apertured container material in opposed directions along the needle surface. This deformation includes a petalling of the container inner surface at 24.

We wish it to be understood that we do not desire to be limited to the exact details of construction shown and described, for obvious modifications will occur to a person skilled in the art.

We claim:

1. In a propellant actuated penetrating arrangement having a steel surfaced fluid sample container, a base member, means for securing said base member against a peripheral surface of said container, a pointed tip steel needle slidably mounted in said base member, and propellant means for driving said needle a predetermined distance into said container, said needle having a plurality of longitudinally extending elongated slots in its peripheral surface, said slots being substantially parallel to the longitudinal axis of said needle, said slots extending over a substantial portion of the exterior surface of said needle thereby defining an operative passageway from the interior of the sample container to the exterior thereof.

said needle having means for eliminating fusion between said needle and container during penetration of the container by said needle, said fusion eliminating means including a thin plating of electrodeposited indium covering the entire surface of said needle.

2. The structure in accordance with claim 1 wherein said container is a projectile, a sample contents is located in the projectile at a predetermined location, and said indium plating has a thickness in the range of 0.0001 to 0.0002 inches.

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