

## UNITED STATES PATENT OFFICE

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## COMPOUND BODY FOR THE PRODUCTION OF HOLLOW DRILL STEEL

No Drawing. Application filed August 8, 1928, Serial No. 298,391, and in Great Britain April 5, 1928.

This invention relates to the manufacture of a compound body for the production of hollow drill steel therefrom.

According to this invention a compound body comprises an outer tubular mass of drill steel cast around a pre-formed solid cylindrical core of metal of the austenitic steel class, a pre-formed intermediate tubular mass of metal united to the outer tubular mass during the casting of the latter and enveloping the core but disunited therefrom, whereby said core is free to be subsequently removed and said core having properties such that its tensile strength increases as its cross section is reduced, thereby enabling it to be removed indestructibly from the compound body by stretching it under tension.

For producing the compound body into hollow drill steel said body is subjected to forging, rolling or other reducing operation so as to elongate it, the core being afterwards withdrawn or removed by stretching it in any suitable manner.

In some cases the compound body, for example when in the form of an ingot, is cogged or otherwise suitably reduced by a preliminary operation into a billet or smaller compound body prior to a subsequent reducing operation. The intermediate tubular mass may be composed of corrosive or non-corrosive metal or alloy, ferrous or non-ferrous metal or alloy rustless iron or steel or a steel containing a high percentage of nickel, as for example, 25%, 33% or 40% of nickel.

The cross sectional area of the blank may be predetermined so that the quantity of molten metal will not be sufficient to heat the core up to welding temperature.

It is found in practice that a very convenient core to use is one of manganese or austenitic steel, as such a core has the added advantage that, after the reducing operation and the core is being withdrawn in any convenient manner, as for example by pulling or stretching, such core will elongate or stretch more or less uniformly with a consequential reduction in diameter, thus facilitating its withdrawal from the resultant product. A suitable example of austenitic steel core is one low in carbon, say about 0.1% and con-

taining about 16% of chromium and about 12% nickel.

Another example of core may be one of steel having a high percentage of nickel or a suitable manganese steel.

One form of carrying this invention into effect consists in casting molten metal upwards into a mould around the core hereinbefore described and a very convenient means for thus producing a compound body may comprise the means which is described and claimed in my prior Patent No. 1,517,781 and which means may comprise a unit consisting of a molten-metal receiving open-ended tubular brick having a spigot and a socket at the opposite ends, openings and a central recess in the upper side of said brick, a two-part mould surmounting said brick and in open connection therewith, a removable cover to said mould, a central opening in said cover, the core being positioned in said mould with its opposite ends seated in said cover-opening and brick-recess.

What I claim and desire to secure by Letters Patent is:—

1. The method of making hollow drill steel, comprising covering a core of metal of the austenitic steel class with a layer of metal capable of separation from the core, pouring a mass of molten drill steel about the core in a mold, whereby the drill steel is united to the metallic layer, and subsequently removing the core from the casting by pulling the core from the composite casting whereby the core becomes elongated, stretched and reduced in cross section.

2. The method of making hollow drill steel comprising covering a core of metal of the austenitic steel class with a layer of steel capable of separation from the core, pouring a mass of molten drill steel about the core in a mold whereby the drill steel is united to the steel layer and subsequently removing the core from the casting by pulling the core from the composite casting whereby the core becomes elongated, stretched and reduced in cross section.

3. The method of making hollow drill steel comprising covering a core of metal of the austenitic steel class with a layer of steel al-

loy having 25 to 40 percent of nickel capable of separation from the core, pouring a mass of molten drill steel about the core in a mold whereby the drill steel is united to the layer 5 of steel alloy and subsequently removing the core from the casting by pulling the core from the composite casting whereby the core becomes elongated, stretched and reduced in cross section.

**10** In testimony whereof, I affix my signature.  
**FREDERICK FELIX GORDON.**

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