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1,963,320

PIERCING POINT

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Fig. 1.

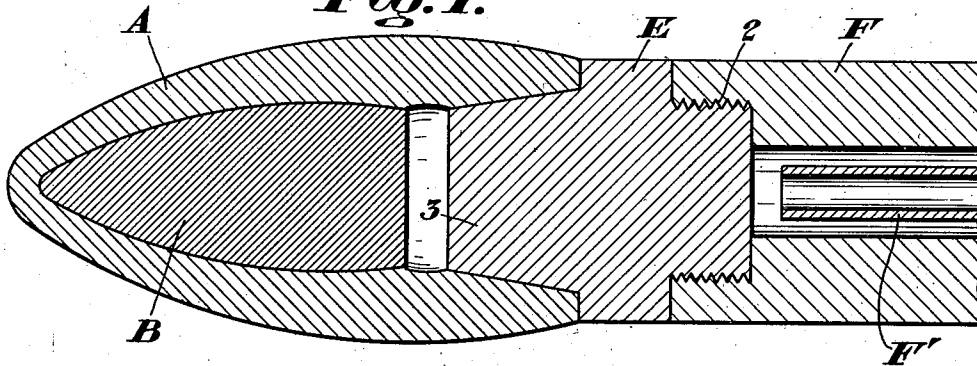


Fig. 2.

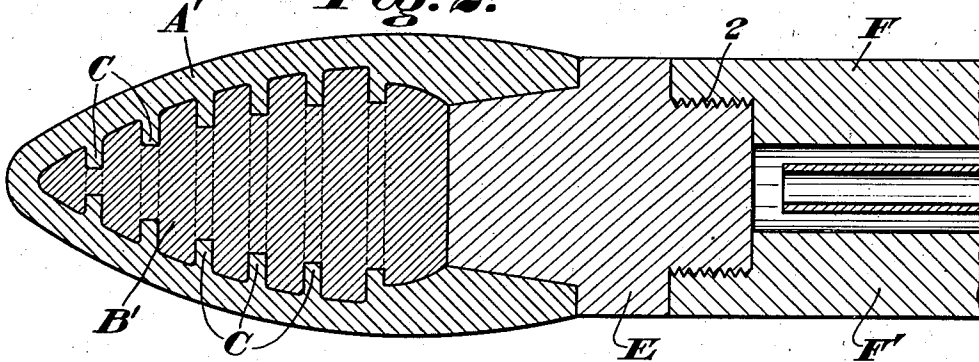
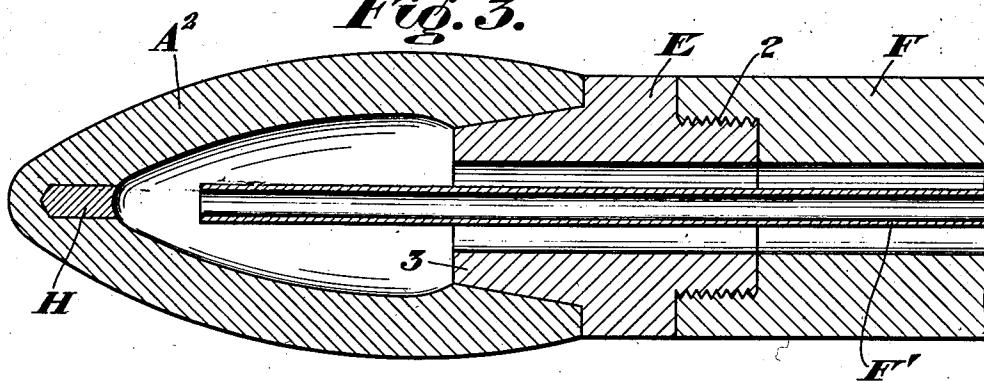


Fig. 3.



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PIERCING POINT

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3 Claims. (Cl. 78—103)

This invention relates to tube working points and plugs used for piercing, expanding and reeling seamless tubes, and has for its object the provision of a novel form of point or plug which will remain cooler during the working of tubes than will the solid, ferrous metal points or plugs of the prior art.

It is substantially the universal practice in the United States to use chrome nickel steel castings for piercing points; a steel containing from .25 to .50 per cent. carbon, 1 to 3 per cent. nickel and .50 to 2 per cent. chromium. These steel castings are generally annealed at a high temperature to refine the casting structure and to coat the surface of the point with an oxid which is believed to act as a lubricant in the tube working operation.

Many attempts have been made to use special alloy castings for piercing points or plugs. However, it is generally found that these special alloy points were unsatisfactory, due to the fact that they would weld to the metal being worked.

The usual steel casting which is almost universally used in the United States for piercing points is unsatisfactory for the purpose in many respects. The number of billets pierced per point varies from one to two pieces to over one hundred pieces, depending on the grade of steel pierced and on other mill operating conditions.

In observing the action of the solid steel castings used as piercing points it has been noted that the nose of the point, for a distance of about three inches from its end, invariably reaches a higher temperature in the piercing operation than the remainder of the point. It has also been noted that in many instances the nose portion of the castings or points got so hot that a button of scale was built up. Since the melting temperature of the scale is approximately 1250° centigrade, the casting or point itself must approach the same temperature in forming the button of scale.

The piercing points or plugs of this invention are constructed in such a manner that the heat will be readily dissipated or conducted from the point or nose end so as to increase the life of the point and materially improve the tube working operations.

In the drawing:

Figure 1 is a sectional plan through a piercing point or plug constructed in accordance with my invention.

Figures 2 and 3 are similar views through modified forms of points or plugs.

Referring more particularly to the drawing,

the letter F designates a tubular mandrel bar adapted to have cooling water circulate through from a pipe F'. The point end of the bar is internally threaded, as at 2, to receive a bar cap E having a tapered end portion 3 on which is mounted and frictionally held a piercing point or plug A.

The piercing plug A of Figure 1 is preferably formed as a steel casting which is cored out from a shell, and the interior of the plug is filled for the major portion of its length with a cast plug B of copper or other high heat conducting metal.

The point or plug A¹ of Figure 2 is formed as a steel casting which is cored out and provided with a filling or plug B¹ of copper or other high conducting material which extends from the point end of the point or plug rearwardly to a point where it will contact or lie closely adjacent the terminal end of the tapered portion 3 of the bar cap E. The interior surface of the cored out point or plug shell A¹ is provided with a plurality of internal ribs C which serve to increase the tensile or crushing strength of the point or plug. With the use of the ribs C the ferrous metal shell or casting of the point may be made materially thinner than is the case when the ribs are omitted, as is shown by comparison with Figure 1.

In Figure 3 a modified form of point or plug A² is shown which consists of a steel casting in the form of a shell with a relatively heavy wall and point end. The interior of the point or plug at its nose end is cored out to provide a recess in which a plug of copper or other high heat conducting metal H is inserted. The interior of the main body portion of the plug A² of Figure 3 is hollow and receives the discharge end of the water circulating pipe F', which is extended from the bar F through the bar plug E, which is cored out for this purpose. In operation, the cooling water is discharged from the pipe F' into the interior of the plug A² of Figure 3, and absorbs the heat from the copper insert H so as to maintain the nose of the point or plug A² cool during the tube working operation.

Experience has shown that piercing points constructed in accordance with this invention are very superior to the solid piercing points of ferrous metal heretofore commonly used. It has been clearly demonstrated that the conducting core of copper or other high heat conducting metal materially aids in drawing the heat away from the nose of the point or plug, and such points have been used continuously for considerable lengths of time without at any time causing the point to attain a temperature above a

dull red. As a result of the low temperature maintained in the points of this invention the nose of the piercing points has remained stronger and harder during the piercing operation, so that
5 the shape of the point is not distorted by the upsetting action which has heretofore always taken place.

While I have shown and described one specific embodiment of my invention, it will be understood that I do not wish to be limited thereto, since various modifications may be made without departing from the scope of my invention, as defined in the appended claims.

I claim:

15 1. The combination with a hollow water-cooled mandrel bar, of a cap secured to the forward end of said bar and a mandrel point secured to said cap and comprising a cast ferrous metal shell and an insert of metal of materially greater

heat conductivity than said shell extending rearwardly from the nose end of said shell for an appreciable distance to conduct the heat away from the nose end of said point.

2. The combination with a hollow water-cooled
80 mandrel bar, of a cap secured to and closing the forward end of said bar and a mandrel point secured to said cap and comprising a cast ferrous metal shell having a filling of a metal of materially higher heat conductivity than said shell.
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3. The combination with a hollow water-cooled mandrel bar, of a cap secured to and closing the forward end of said bar and a mandrel point secured to said cap and comprising a cast ferrous metal shell having a filling of metal of
90 materially higher heat conductivity extending rearwardly from the nose end of said shell to a point adjacent said cap.

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