

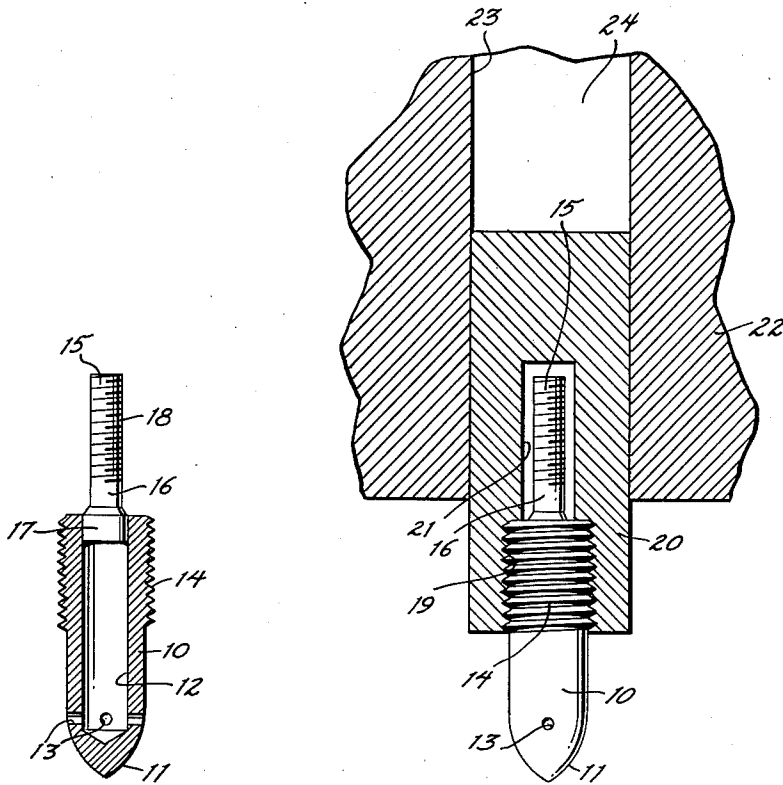
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EXPLOSIVE-ACTUATED SERVICE T

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*Fig. 1.*

*Fig. 2.*

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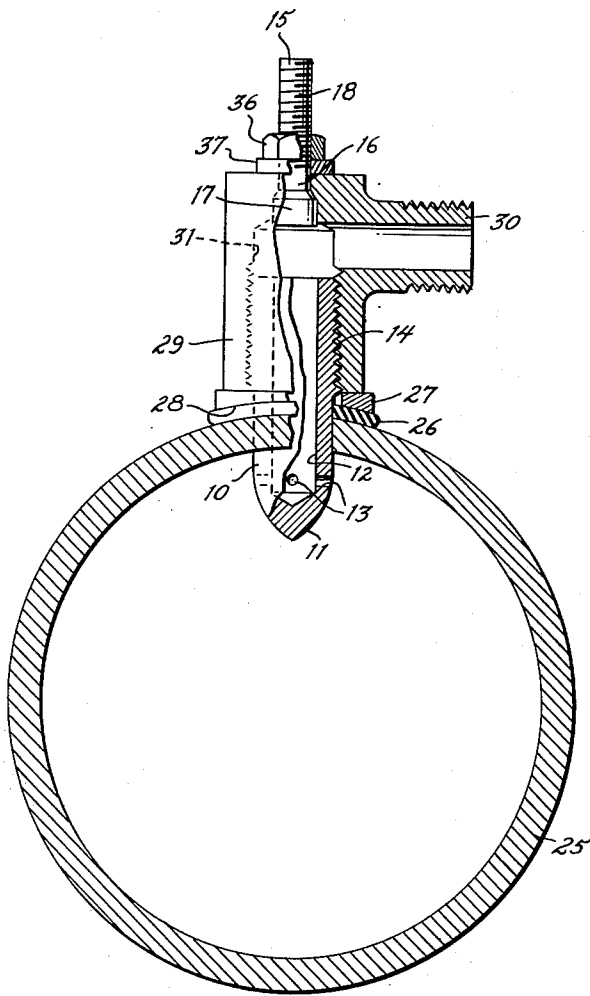


Fig. 3.

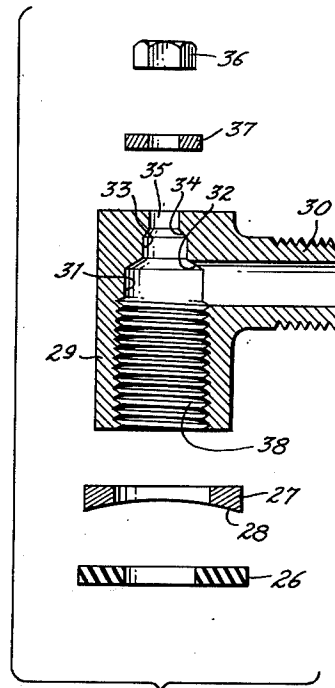


Fig. 4.

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**EXPLOSIVE-ACTUATED SERVICE T**

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6 Claims. (Cl. 137-318)

The present invention relates to service T's and is concerned primarily with such a T that is secured in effective position in a main under the influence of an explosive charge.

At the present time, it is common practice to tap a gas main so as to position a service T therein to provide communication with a branch line. Moreover, practical conditions require that the main be continued in use as the connection is established and service is not interrupted. Heretofore, the establishment of the connection between the service T and the gas main has required the use of large and expensive equipment which requires skilled operators. Of late, this art has been receiving the attention of various inventors and research workers in attempt to provide a more simple way of achieving this connection. The present invention is founded on the fact that an effective connection may be achieved by driving a penetrating barrel into the main under the influence of an explosive charge.

An important, if not absolute, requirement of a service-T connection of this character is that there be a sure and effective bond between the T and the main. It has been found that, if the penetrating barrel which is driven under the influence of the explosive charge is properly shaped, the metal of the main is caused to flow as penetration takes place, with the result that after it is achieved a connection with the main is established which is in the nature of a "cold weld" or excessively tight pressed fit.

Thus an important object of the invention is to provide, in a service T of the character aforesaid, a penetrating barrel which is so shaped that penetration of the main by the barrel will establish the "cold weld" or pressed fit aforesaid. This end is achieved by utilizing a cylindrical tubular barrel having a rounded pointed nose.

It is necessary that the barrel be susceptible of operation by a gun which houses the explosive charge, and provision must be made for utilizing the full effect of the explosive charge, which is accurately predetermined. Thus, another object in view is to provide, in a service T of the type noted, a penetrating barrel together with a driver which is removably carried thereby and which driver is adapted to be received in an actuating gun. The connection between the driver and the barrel is established by screw threads.

After the barrel has penetrated the main, the driver is removed and the main body of the T is secured to the barrel. The threads which previously established the connections to the driver particularly lend themselves to this purpose.

Another object in view is to provide, in a service T of the type noted, a T body having a main bore which is threaded to receive the threads of the penetrating barrel, and a branch which is exteriorly threaded to establish communication to a house branch.

In accordance with the present invention, the penetrating barrel has a cylindrical bore which terminates just above the pointed nose. The walls of the barrel are formed with cross passages which communicate with the bore, and these passages are positioned within the bore of the main after penetration. It is important that this bore of the barrel be closed to prevent gas escaping after penetration and before communication with the

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house branch is established. Thus, another object in view is to provide, in a service T of the character aforesaid, a penetrating barrel having a cylindrical bore the upper end of which slidably receives, but with a pressed fit, a plug carrying an upwardly extending threaded stem. This plug normally closes the bore of the barrel but may be removed after the T body is positioned to open communication between the bore and the house branch.

Another highly important object is to provide a T body which will accommodate the removal of the plug from the bore.

Various other more detailed objects and advantages of the invention, such as arise in connection with carrying out the above-noted ideas in a practical embodiment, will in part become apparent and in part be hereinafter stated as the description of the invention proceeds.

The invention therefore comprises a service T which is adapted to be connected to and in a gas main by an explosive charge and which consists essentially of a penetrating barrel having a pointed nose and a bore, a removable plug closing said bore, a driver removably carried by said barrel and which is adapted to be replaced by a T body including means for accommodating said removable plug.

For a full and more complete understanding of the invention, reference may be had to the following description and accompanying drawings, wherein:

FIGURE 1 is a longitudinal vertical section through the penetrating barrel of the service T of this invention, with the plug shown in elevation;

FIGURE 2 is a side view depicting the penetrating barrel in elevation and showing the driver as connected thereto and positioned in the explosive chamber of a gun;

FIGURE 3 is a vertical section through a gas main, with the service T of this invention connected thereto, the latter being shown partially in section and partially in elevation; and

FIGURE 4 is a view developing the T body and associated elements in exploded relation.

Referring now to the drawings, wherein like reference characters denote corresponding parts, and first more particularly to FIGURE 1, a penetrating barrel is therein illustrated and identified by the reference character 10. The barrel 10 has a pointed nose at 11 and a bore 12. This bore terminates at the pointed nose, and just above the latter the barrel 10 is formed with four transverse passages 13 which establish communication between the exterior of the barrel and the bore 12. The upper portion of the barrel 10 is exteriorly threaded as indicated at 14. A plug stem is designated 15. The stem 15 has a smooth cylindrical portion 16 which functions as a valve or closure, as will be later described, and a plug portion 17 which is received in the upper end of the bore 12 with a pressed fit, thus effectively closing the bore 12. The stem 15 is exteriorly threaded as indicated at 18.

Referring now more particularly to FIGURE 2, a driver 20 of appropriate cross-sectional shape, preferably cylindrical, has a threaded socket 19 which receives the threads 14 of the barrel 10. Moreover, the driver 20 is formed with a counterbore at 21 which accommodates the stem 15 when the driver is assembled on the barrel.

The details of the gun which actuate the driver and penetrating barrel under the influence of the explosive charge are not a particular part of this invention. It suffices to point out that a gun body is represented at 22 and has a bore 23 which receives the driver 20. The bore 23 provides a firing chamber 24 for the explosive charge. The size of these explosive charges will be accurately predetermined to afford the desired penetrating effect on the barrel 10.

Referring now more particularly to FIGURE 3, a gas main is shown at 25. After the barrel 10 has penetrated the wall of the gas main under the influence of the explosive charge, the metal of the main will have been so influenced by the penetrating action as to have been caused to flow, and the natural tendency of the metal to return to its original condition will achieve what is in effect a "cold weld" or very tight pressed fit between the barrel 10 and the wall of the main 25.

The driver 20 will have of course cleared the gun 22 and is now unscrewed from the barrel 10. A gasket 26 of rubber or other desirable gasket composition is now placed over the barrel 10 in engagement with the outer surface of the main 25. A metallic washer 27 is then placed over the gasket 26. The underside of the washer 27 will be curved as indicated at 28 to generally conform to the curvature of the main so that the gasket will be forced into intimate contact therewith.

A T body 29 has a threaded bore 38 and a branch 30. The threaded bore 38 is screwed onto the threads 14 of the barrel and the screwing action continued until the gasket 26 is forced into sealing engagement with the main 25 by the washer 27. As this action takes place, the bore 12 will have remained closed by the presence of the plug 17.

Referring now more particularly to FIGURE 4, it will be noted that the T body 29 has a smooth bore 31 above the threaded socket 33. Adjacent to this smooth bore 31 there is a conical shoulder 32 which terminates at its inner edge at a reduced bore 33. There is another conical shoulder 34 between this reduced bore 33 and a counter-bore 35 having a diameter substantially the same as that of the stem 15.

After the T body 29 has been secured in position, the stem 15 is pulled upwardly to remove the plug 17 from the bore 12, and the upward movement is continued until the plug 17 is received in the reduced bore 33 with the upper end face of the plug, which takes the form of a conical shoulder complementary to the conical shoulder 34, being received in the latter. A nut 36 is screwed onto the threads 18 and the stem 15 with the washer 37 being interposed between the nut 36 and the outer end of the T body. As the nut 36 is tightened, the opening in the top of the T body is effectively closed and sealed against the escape of gas. Communication is now established from the interior of the main 25 through passages 13 to the bore 12, and from the upper end of the latter to the branch 30.

It is evident that the foregoing service T adequately provides for penetration of the gas main by the barrel 10 under the influence of an explosive charge and at the same time properly positions the T body on the barrel.

While a preferred specific embodiment of the invention is hereinbefore set forth, it is to be clearly understood that the invention is not to be limited to the exact constructions, mechanisms, and devices illustrated and described, because various modifications of these details may be provided in putting the invention into practice within the purview of the appended claims.

What is claimed is:

1. In combination, a penetrating barrel having a pointed nose adapted to penetrate a gas main under the influence of an explosive charge, a bore, a cross passage establishing communication between the exterior of said barrel and said bore, external threads on the upper end of said barrel, a stem carrying a plug closing the upper end of said bore, and a driver having a threaded socket receiving the threads on said barrel, and a counterbore accommodating said stem.

2. In combination, a tubular penetrating barrel of cylindrical formation having a bore and terminating in a rounded pointed nose, the walls of said barrel being formed with a plurality of cross passages establishing communication between the exterior of said barrel and said bore, external threads on the upper end of said barrel, a threaded stem having a plug received in the upper end of said bore with a pressed fit, and a driver having a threaded socket receiving the threads of said barrel, and a counterbore accommodating said threaded stem.

3. In a service T, a penetrating barrel having a pointed nose, a bore, and a cross passage communicating with said bore, a plug removably positioned in the upper end of said bore and carrying a stem, a T body carried by said barrel and having an opening adapted to receive said stem, a service branch extending from said T body, and means for securing said plug in position closing said opening in said T body, said means being operable to move said plug out of said bore to leave said bore unrestricted and thereby establish fluid communication between said bore and said service branch.

4. In a service T, a penetrating barrel having a bore, a plug removably positioned in and closing said bore and having a threaded stem extending upwardly therefrom, cross passages communicating with said bore, a T body having a threaded bore receiving threads on said barrel, and an opening in alignment with the bore of said barrel and adapted to receive said stem, a service branch extending outwardly from said body, a nut on said threaded stem for moving said plug out of said bore and into sealing engagement with said body to close said opening in said body thereby establishing fluid communication between said bore and said branch.

5. In a service T, a penetrating barrel having a bore, a plug removably positioned in and closing said bore and having a threaded stem extending upwardly therefrom, a cross passage communicating with said bore, external threads on said barrel, a T body having a threaded bore receiving the threads in said barrel, and an opening in alignment with the bore of said barrel and adapted to receive said stem, a service branch extending outwardly from said body, a nut on said threaded stem for moving said plug out of said bore and into sealing engagement with said body to close said opening in said T body thereby establishing fluid communication between said bore and said branch, and a gasket-and-washer assembly disposed about said barrel at the end of said body remote from said nut and adapted to sealingly engage a gas main.

6. In combination, a gas main defined by a metallic wall, a penetrating barrel held in said wall by a cold weld and having a bore and cross passages communicating between the interior of said main and said bore, a gasket about said barrel engaging the outer surface of said main, a washer about said barrel engaging said gasket, external threads on that portion of said barrel exterior of said main, a threaded stem having a plug removably positioned in and closing the upper end of said bore, a T body having a threaded bore screwed onto the threads of said barrel and clampingly engaging said washer-and-gasket assembly, said T body having an opening in alignment with the bore of said barrel and receiving said threaded stem, a service branch, and a nut-and-washer assembly on said threaded stem for holding said plug in position closing the opening in said T body thereby establishing fluid communication between said bore and said branch.

References Cited in the file of this patent

UNITED STATES PATENTS

2,414,911	Temple	Jan. 28, 1947
2,839,075	Mueller	June 17, 1958