

May 5, 1964

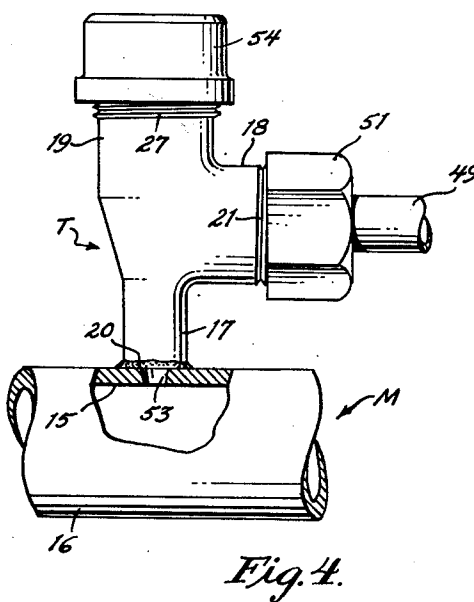
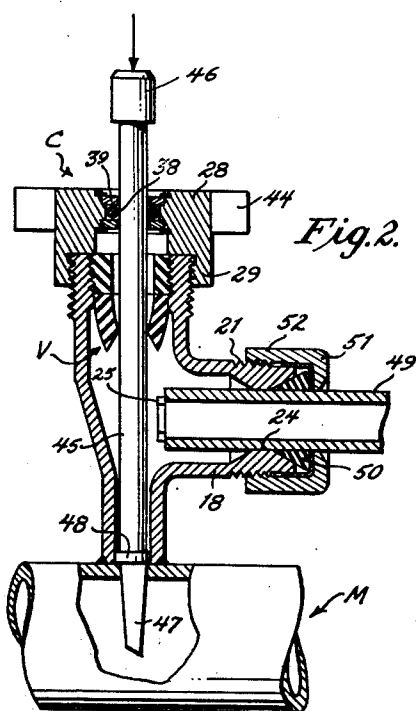
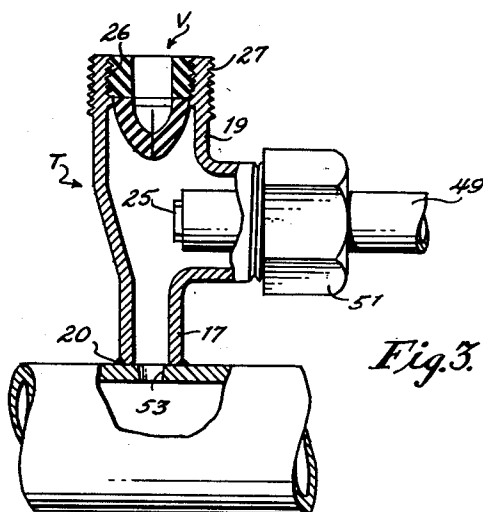
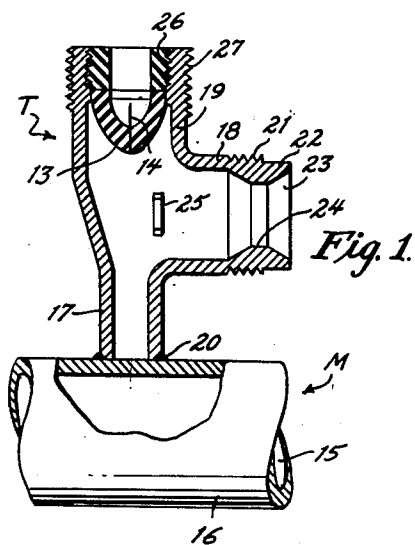
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3,131,712

PUNCHING TEE

Filed May 12, 1960

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

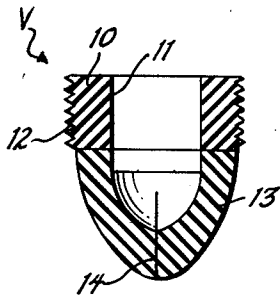


Fig. 6.

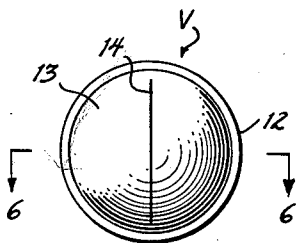


Fig. 5.



Fig. 9.

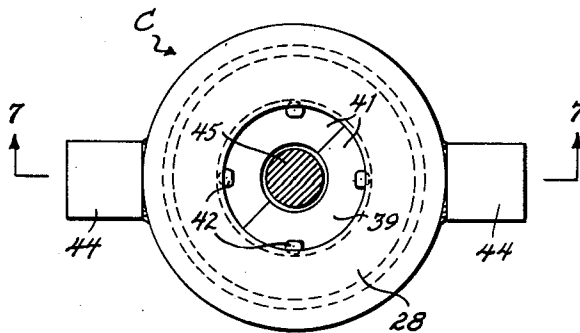


Fig. 8.

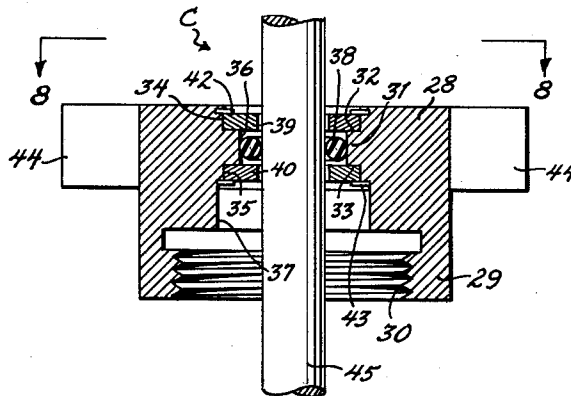


Fig. 7.

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3,131,712

PUNCHING TEE

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3 Claims. (Cl. 137—318)

The present invention deals with a so called punching tee and is concerned primarily with a service tee that is designed to accommodate a punch for piercing a main.

At the present time the use of service tees is widespread. Such tees are employed to effect a connection with a gas main without interrupting use. In order to achieve this end it is, of course, necessary to penetrate the main and at the same time control the flow of gas which might come through the hole formed by the penetration. At the present time there is equipment available to the public which will accommodate these conditions. However, the known equipment is expensive, massive, complicated and somewhat difficult to operate requiring the need of skilled operators.

With the foregoing conditions in mind the present invention has in view as its foremost objective the provision of a new and improved service tee which is susceptible of easy attachment to a main, will accommodate a main penetrating tool in the form of a punch, and at the same time adequately control the flow of gas through the hole formed by the punch.

More in detail, the invention has as an object the provision of a service tee having a lower neck that is adapted to be secured to a service main, a lateral or side nipple for effecting a house connection and an upper body portion in alignment with the neck and which is interiorly and exteriorly threaded so that it functions as a valve holder and a base for securing a cap in position.

An important object of this invention is to provide, in a punching tee of the character indicated, an acorn shaped valve which is mounted on the internal threads of said body portion and which is designed to accommodate a punch in that a conventional punch may be driven there-through and upon retraction the valve will close and seal itself. Other somewhat more detailed features of the invention are intimately associated with this valve.

Still another object in view is to provide, in a combination with a service tee of the character aforesaid, a punching cap which is removably mounted on the external threads of said body portion and which operatively carries a punch that may be driven past the acorn valve and through the neck to penetrate the main on which the tee is mounted. Particular objects and advantages of the invention are intimately tied up with this punching cap and will be hereinafter developed in detail.

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 tee consisting of a lower neck adapted to be attached to a main, a lateral extension for effecting a house connection and an upper body in alignment with said neck and exteriorly and interiorly threaded with an acorn valve mounted in the

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internal threads and the external threads accommodating either a punching cap or a permanent cap.

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 side view largely in section and partially in elevation showing a service tee that is designed in accordance with the precepts of this invention as mounted on a main.

FIGURE 2 is a side view similar to FIGURE 1 depicting the punching cap in position and the punch after it has penetrated the main. In this view the lateral extension for effecting the house connection is also shown in section.

FIGURE 3 is another side view partly in section and partly in elevation showing the tee with the house branch connected thereto after the punch has been removed subsequent to punching the hole in the main.

FIGURE 4 is still another side view largely in elevation showing the tee after the permanent cap has been positioned.

FIGURE 5 is a bottom view of the acorn valve per se.

FIGURE 6 is a vertical section through the acorn valve being taken about on the plane being represented by the line 6—6 of FIGURE 5.

FIGURE 7 is a vertical diametric section through the punching cap being taken about on the plane represented by the line 7—7 of FIGURE 8.

FIGURE 8 is a top plan view of the punching cap with the punch being shown in section. This view is taken about on the plane representing the line 8—8 of FIGURE 7; and

FIGURE 9 is a detail of one of the washer parts that is employed in the punching cap.

Referring now to the drawings wherein like reference characters denote corresponding parts and first more particularly to FIGURES 5 and 6 the acorn valve which is an important part of the present invention will be described. This valve is referred to in its entirety by the reference character V. It includes an upper cylindrical portion 10 of hard rubber and having an inner bore 11 and an outer threaded surface 12. Integrally joined to the hard rubber part 10 is a soft rubber nose 13 which is formed with a longitudinal slit 14. It will be understood that while the portions 10 and 13 of the valve V are of hard and soft rubber respectively they will be vulcanized as an integral one piece unit. The nose 13 is of soft rubber because the slit 14 is intended to accommodate a punch as will be later described and during such action the nose is appreciably distended. At the same time it must be capable of returning to its original or sealing position after the punch is removed. The part 10 is of hard rubber because of the necessity of forming the threads 21 therein and these threads constitute the means for securing the valve in position.

Referring now more particularly to FIGURES 1 through 4 inclusive, a gas main is designated M and is shown as being a fairly thick walled conduit having a bore 15 and an outer cylindrical surface 16. The main M ordinarily is of metal, such as steel or cast iron.

The service tee of this invention is referred to in its entirety by the reference character T. It consists essentially of a one piece integral unit including a lower neck

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17, a lateral extension 13, and a main body portion 19 which is in alignment with the neck 17 but of somewhat larger diameter than the neck 17.

The neck 17 may be attached to the main M in any preferred manner. As illustrated in the drawing welding is shown at 20 for this purpose when the main is of steel. It will be understood, however, by those versed in this art that a saddle might be substituted for the weld at 20 when the main is cast iron.

The lateral extension 13 is exteriorly threaded as indicated at 21 and extending therebeyond is a nipple 22 having an inner conical surface 23 terminating in a bore 24. An abutment is provided at 25 in alignment with the bore 24.

The main body portion 19 is interiorly threaded as indicated at 26 and exteriorly threaded at 27. The valve V is mounted in the body portion 19 by screwing the threads 12 thereon into the threads 26.

Referring now more particularly to FIGURES 7 and 8, a punching cap is therein illustrated and referred to in its entirety by the reference character C. The cap C comprises a thick wall structure 28 from which depends a skirt 29 which is interiorly threaded at 30 and which threads 30 are adapted to be screwed onto the threads 27 of the tee body 19. The thick wall structure 28 includes an intermediate inwardly extending annular rib 31 presenting an upper shoulder 32 and a lower shoulder 33. Extending upwardly from the shoulder 32 is a bore 34 and extending downwardly from the shoulder 33 is a bore 35. The bores 34 and 35 are of substantially the same diameter and somewhat greater than the bore 36 of the rib 31. Between the skirt 29 and the bore 35 there is a counterbore at 37.

Positioned within the bore 36 of the rib 31 is an O ring 38 and on the opposite side of this O ring 38 are washers 39 and 40. Each of the washers 39 and 40 is a two part affair being made up of two complementary semi-circular ring like parts such as shown at 41 in FIGURE 9. The washer 39 bears against the shoulder 32 and after being so positioned tangs or protuberances 42 are struck from the wall structure 28 so as to hold the washer parts in position. The washer 40 is assembled against the shoulder 33 in the same manner and tangs or protuberances 43 are struck from the wall structure 28 to hold the parts making up this washer in position.

Wings 44 extend from opposite sides of the wall structure 28 and constitute an operating means for facilitating screwing the cap C onto the tee body 19.

The cap C carries a penetrating tool such as a punch 45 or a drill which passes through the O ring 38 in sealing relation thereto. This punch 45 has a head 46 that is adapted to be engaged by a hammer or similar impact tool and a penetrating end at 47 which is adapted to penetrate the main M. Just above this penetrating portion 47 is an annular shoulder 48 which limits movement of the punch in both directions.

Referring now more particularly to FIGURE 2 a house branch is shown in the form of a conduit 49 which passes through the bore of a gasket 50 and the bore 24 of the lateral extension 13. Inward movement of the branch conduit 49 is limited by the abutment 25. After the conduit 49 has been positioned in the manner illustrated a follower 51 having an interiorly threaded skirt 52 is tightened on the threads 21 to compress the gasket 50 and achieve a fluid tight seal.

Operation

It is evident that with the punching cap C mounted on the main body portion 19 of the service tee T by engagement of the threads 30 and 27 the punch 45 may be moved downwardly to first spread the nose portion 13 of the valve V in the manner depicted in FIGURE 2. This downward movement is continued until the pointed end of the punch bears against the outer surface 16 of the main M. The head 46 is now subjected to impact as by a hammer which drives the penetrating portion 47 of the

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punch through the main and forms a hole in the latter such as represented at 53 in FIGURES 3 and 4. The punch is now retracted and the cap C is unscrewed from the service tee. As the punch is withdrawn from the acorn valve V the nose 13 of the latter closes and pressure from the line content of the main M will enter the interior of the service tee through the opening 53 and the pressure of this line content will aid in maintaining the slit 14 closed. Thus, no gas is permitted to escape from the tee. A permanent cap 54 of conventional construction is now screwed into the threads 27 of the body portion 19 and will ordinarily remain in position during service use.

From the foregoing it is apparent that the punching tee of this invention provides a highly simplified arrangement for fixing the service tee in position on the main, penetrating the latter, and at the same time preventing the escape of gas as the tee is conditioned for permanent usage.

While a preferred specific embodiment of the invention is hereinbefore set forth it is clearly to be understood that the invention is not to be limited to the particular constructions, designs, and materials 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 a service tee including a neck attachable to a gas main and a body portion in alignment with said neck, the upper end of said body portion having internal and external threads, a punching cap screwed onto said external threads and having a central passage in alignment with said neck, a punch operable with a straight rectilinear movement and passing through said passage, body portion, and neck, said punch comprising an impact head disposed outwardly of said punching cap, a shank integral with said head, and a penetrating end portion, there being an annular shoulder between said end portion and said shank; and an acorn valve in said body portion through which said punch passes, said acorn valve comprising a comparatively hard rubber cylindrical body having external threads screwed into the internal threads of said body portion and a soft rubber body formed with a slit which accommodates said punch and closes when said punch is removed therefrom.

2. In a service tee including a neck attachable to a gas main and a body portion in alignment with said neck, the upper end of said body portion having internal and external threads, a punching cap screwed onto said external threads and having a central passage in alignment with said neck, an O-ring mounted between a pair of spaced washers lining said passage, a punch operable with a straight rectilinear movement and passing through said O-ring, body portion and neck, said punch comprising an impact head disposed outwardly of said punching cap, a shank integral with said head, and a penetrating end portion there being an annular shoulder between said end portion and said shank limiting penetrating movement of said punch; and an acorn valve comprising a comparatively hard rubber cylindrical body having external threads screwed into the internal threads of said body portion and a soft rubber body formed with a slit which accommodates said punch and closes when said punch is removed therefrom.

3. In a service tee including a neck attachable to a gas main and a body portion in alignment with said neck, the upper end of said body portion having internal threads, a punch operable with a straight rectilinear movement and passing through said body portion and neck, said punch comprising an impact head disposed outwardly of said body portion, a shank integral with said head and a penetrating end portion, there being an annular shoulder between said end portion and shank limiting penetrating movement of said punch, and an acorn valve in said body portion through which said punch passes, said acorn valve

comprising a comparatively hard rubber cylindrical body having external threads screwed into the internal threads of said body portion and a soft rubber body formed with a slit which accommodates said punch and closes when said punch is removed therefrom.

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