

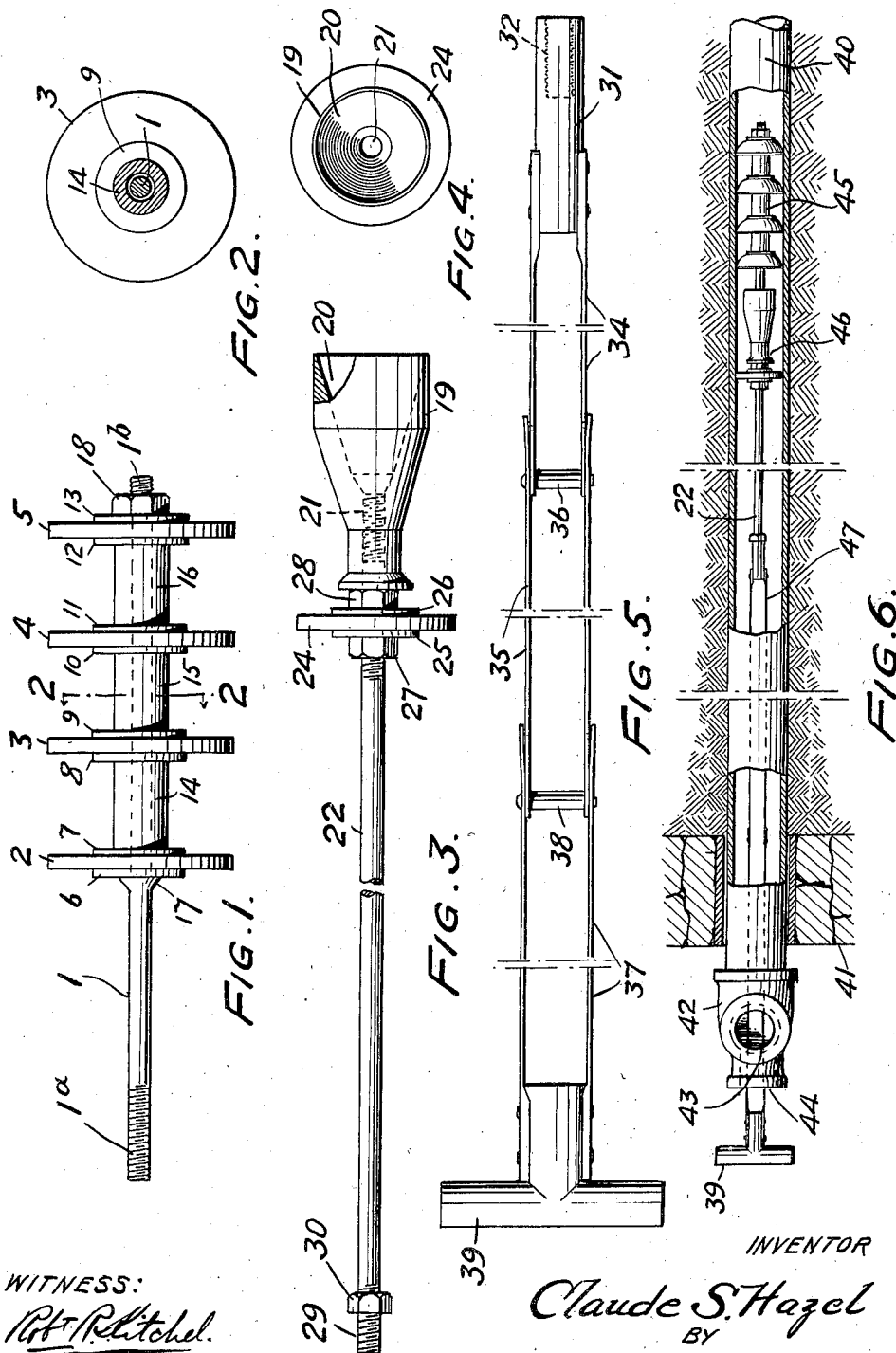
Feb. 1, 1938.

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2,107,259

MEANS FOR STOPPING SERVICE AND OTHER GAS PIPES

Filed May 2, 1934



WITNESS:
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UNITED STATES PATENT OFFICE

2,107,259

MEANS FOR STOPPING SERVICE AND
OTHER GAS PIPES

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Application May 2, 1934, Serial No. 723,464

3 Claims. (Cl. 138—89)

The present invention relates to stoppers for gas service and other pipes.

Such stoppers are used, among other purposes, for preventing the theft of gas from service pipes which are presumably inactive and shut off. For this purpose, it is very desirable to position the stopper in the service pipe at a considerable distance from the head of the service pipe, so that, if a would-be illicit consumer removes the plug at the head of the service pipe, the stopper is not visible and is difficult to reach and remove without special tools.

In order to provide economical insurance against theft, the stoppers must be relatively inexpensive, and the cost of installing them, as well as that of removing them on resumption of normal supply to consumers, must be low.

The principal object of the present invention is to provide new and improved apparatus for effectively stopping gas service in a manner difficult to circumvent, and in which the stoppers and tools for installation and removal are relatively inexpensive, and in the use of which economical installations and removals of the stoppers may be made.

Other objects of the invention will appear from the following description, at the end of which the invention will be claimed.

Generally stated, the invention consists in a sectional tool projectable and retractable through an opening in a gas service pipe located on the inlet side of a gas meter and of which one part is a stopper element and is provided with flexible projections exceeding in diameter the bore of the pipe and reversely cupable in the pipe, and of which the other part is a handle element connectible and disconnectible with and from the stopper element, and it serves to push the stopper element into the pipe and to leave it there at a point remote from the opening and to capture and fish the stopper element out of the pipe.

The invention also consists in the improvements to be presently described and finally claimed.

The invention may be best described and its advantages pointed out in connection with the accompanying drawing which forms a part of this specification and which shows a form of the invention chosen for illustration, and in which:

Figure 1 is a side elevation of a stopper;

Figure 2 is a cross-section along the line X—X in Figure 1;

Figure 3 is a side elevation of a portion of the tool for inserting and removing the stopper;

Figure 4 is an end elevation of the tool of Figure 3;

Figure 5 is a side elevation of an extension handle for the tool of Figure 3; and

Figure 6 is a view, partly in cross-section and partly in side elevation, of portions of a service installation together with the apparatus of the previous figures, showing the insertion or removal of a stopper.

Referring to Figures 1 and 2, 1 indicates a bolt provided with a thread 1a which, for purposes of deception, may be left-handed; 2, 3, 4 and 5 are spaced disks of resilient material such as rubber, provided with centered holes through which the bolt 1 passes. Pairs of stiff washers, such as metal washers 6 and 7, 8 and 9, 10 and 11, 12 and 13, are arranged on each side of disks 2, 3, 4 and 5, respectively. Spacing tubes, such as metal tubes 14, 15 and 16, serve to space the disks. The washer 6 abuts against a shoulder 17 formed on the bolt and the nut 18 serves to tighten the assembly of disks, washers and spacers which are held firmly between the shoulder 17 and the nut 18 which engages the thread 1b. The disks provided are of larger diameter than the inside diameter or bore of the service pipe into which the stopper is to be inserted.

Referring to Figures 3 and 4, 19 generally indicates the head of the tool which is provided with an internal cavity 20 (shown dotted in Figure 3) which tapers inwardly to the threaded bore 21 (shown dotted in Figure 3) adapted to receive and engage the threaded end 1a of the bolt 1 of the stopper of Figure 1. The thread on the bore 21 is of course left-handed, if left-handed threads are provided on the stopper bolts. The tool head 19 is attached to the rod 22, for instance, as by the means shown in Figure 3, in which the end of the rod is threaded into the bore 21. The rod may be provided with the aligning or centering disk 24, which may be of rubber and slightly smaller in diameter than the interior diameter of the service pipe. The disk 24 is provided with a central hole, through which the rod passes and is held by the washers 25 and 26 and the nuts 27 and 28. In Figure 3 the rod is shown as provided with a thread 29 and stop-nut 30 for attaching the rod to an extension illustrated in Figure 5.

Referring to Figure 5, this figure shows a discontinuous side elevation of a folding extension of the rod 22 of Figure 3. 31 indicates a ferrule provided with a central bore 32 (shown dotted) threaded to receive and engage the threaded end 29 of the rod of Figure 3. 34 and 35 indicate

sections of the extension joined by the pivot 36. 37 is a third section joined to section 35 by the pivot 38. The extension may be provided with the handle 39.

Referring to Figure 6, 40 generally indicates a service pipe leading through the building basement wall 41 to the T 42 at the head of the service pipe. 43 is the pipe leading to the meter. The T opening 44 is normally closed by a plug (not shown). 45 generally indicates the stopper. 46 generally indicates the tool, and 47 the extension of the tool rod.

In operation, referring to all the figures, when the stopper 45 is to be inserted in the service pipe, the bolt 1 is screwed into the bore 21 of the tool head, and the thread 29 is threaded into the bore 32 in the tool extension. The plug normally in the T opening 44 is removed and the stopper forced into the opening, the rubber disks successively flexing back into a cup-shape to permit their entrance into the opening 44. If, as is frequently the case, the opening 44 is smaller in diameter than the internal diameter of the service pipe, the alignment disk 24 on the tool rod 22 is also flexed back in passing through the opening 44, resuming its unflexed position after passing into the enlargement leading to the service pipe. The disks of the stopper, having greater diameters than the internal diameter of the service pipe, remain in a cupped deformation within the service pipe, their resiliency pressing the rubber at or near the disk peripheries tightly against the interior of the pipe and stopping off the gas. With the extension 47, the stopper may be conveniently pushed five or six feet into the service pipe from the service pipe head.

When so positioned, the tool may be disengaged from the stopper by turning the handle 39 and unscrewing the head of the tool from the bolt of the stopper. The tool is then withdrawn, leaving the stopper tightly engaged and well within the service pipe. The opening 44 is then closed by a plug.

The stopper is very difficult to remove without the described special tool. It is far within the service pipe, and if disks of the proper diameter with respect to the internal diameter of the service pipe are used, their outer edges are pressed so firmly against the interior of the pipe that it is necessary to reverse the cupped deformation of the disks in withdrawing the stopper. The washers limit the deformation to the outer portions of the disks, and a strong force is required to reverse the deformation and withdraw the stoppers, requiring some means of positively engaging the end of the stopper bolt. Provision of a left-hand thread on the bolt-screw makes unauthorized removal still more unlikely.

In removing the stopper with the tool, the tool 46 and the extension 47 are connected and inserted through the opening 44 and into the service pipe, the aligning disk 24 roughly centering the tool head 19 with respect to the bolt 1 of the stopper. As the tool head encounters the end of the bolt 1, the tapered wall of the cavity 20 in the tool head guides the end of the bolt into engagement with the threaded bore 21, and turning the handle 39 screws the bolt into the bore 21, firmly connecting the tool and stopper. A strong pull on the handle 39 then reverses the deformation of the disks, and the stopper is withdrawn from the service pipe and out through the opening 44, which opening is then plugged.

In many gas situations, the T at the service pipe head is constructed as shown in Figure 5,

with the opening 44 of smaller diameter than the internal diameter of the service pipe; for instance, the opening 44 may be $\frac{3}{4}$ " diameter and the internal diameter of the service pipe $1\frac{1}{4}$ ". Expandable plugs at present employed for the same purpose as the apparatus of the invention, when small enough to pass through the $\frac{3}{4}$ " T opening, cannot be properly expanded to block the $1\frac{1}{4}$ " service pipe, necessitating a replacement of the T with one having a larger opening at 44, thus permitting the entrance of a larger expandable plug.

With the present stopper a diameter of the disks may be chosen which will permit passage through the restricted T opening and still effectively block the larger service pipe. For instance, and purely for illustration, rubber disks $1\frac{1}{2}$ " in diameter and $\frac{1}{8}$ " thick may be readily forced through the $\frac{3}{4}$ " T opening and are large enough to block effectively the $1\frac{1}{4}$ " service pipe, even though the internal diameter of the service pipe is slightly over size as it frequently is. The washers on the stopper are provided with a smaller diameter than the T opening.

If the T openings 44 in the distribution system are as large as the internal diameter of the service pipe, the alignment disk on the tool need not be of resilient material.

The stopper of the present invention is inexpensive, its parts being economical to make, requiring no expensive machine work. In assembly, all that is required is to slip the parts successively on the bolt and tighten the nut 18.

In the figures, a stopper with four disks is illustrated, as it has been found inexpensive and suitable for low pressure service pipes. More or fewer disks may be provided, depending upon requirements.

The stopper of the present invention permits the use of an inexpensive tool for its insertion and removal, as compared with the wrenches employed in connection with expandable plugs, and permits the insertion or removal of the stopper to be done by one man.

The spacing of the disks on the stopper may be arranged so that the gas is blocked off from the T opening 44 as soon as the first disk is pressed against the T opening. With the expandable plug stopper, the gas is not shut off until the plug is expanded after insertion.

The provision of a tool extension, which may be folded or otherwise collapsed into a small length, permits the gas company employee to enter a premise with the stopper and tool concealed, and to install the stopper without the knowledge of the occupants as to the means employed for preventing unauthorized consumption.

The stopper also may be employed with or without the tool for blocking gas pipes for other purposes than the prevention of theft.

It will be obvious to those skilled in the art to which the invention relates that modifications may be made in details of construction and arrangement and in matters of mere form without departing from the spirit of the invention which is not limited to such matters or otherwise than as the prior art and the appended claims may require.

I claim:

1. Means for stopping service and other gas pipes, said means being adapted for insertion through an orifice smaller than the internal diameter of the pipe to be stopped and equipped with flexible discs cupable to enter and stop and

reversely cupable to leave the pipe, said multiple disk member including means adapted to be engaged by an inserting tool.

2. Means for stopping gas service and other gas pipes, said means being adapted for insertion through an orifice smaller than the internal diameter of the pipe to be stopped and comprising a stopper rod having a shoulder and a clamping nut, a series of flexible discs mounted on the rod, washers strung on the rod and applied to the faces of the discs and tubes strung on the rod and interposed between the washers, said parts assembled into a stopper structure, said multiple disk member including means adapted to be engaged by an inserting tool.

3. Means for stopping service and other gas pipes, said means comprising a plurality of spaced parallelly arranged flexible rubber discs, a supporting member for said discs arranged axially thereof, said discs being of a diameter sufficiently larger than the pipe to be stopped and of adequate resilience at their peripheral edges to be cupable upon entering said pipe and to form a gas tight fit with said pipe, said discs also being reversibly cupable to facilitate removal from said pipe, and means on said supporting member adapted to be engaged by an inserting and removing tool.

CLAUDE S. HAZEL. 15