J. S. FORBES.

RETAINING DEVICE.

APPLICATION FILED JULY 9, 1915.

**1,199,684.**

Patented Sept. 26, 1916.

2 SHEETS—SHEET 1.

Fig. 1.

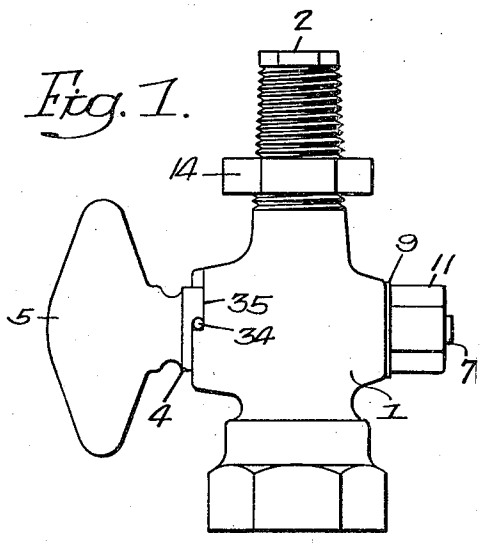



Fig. 2.

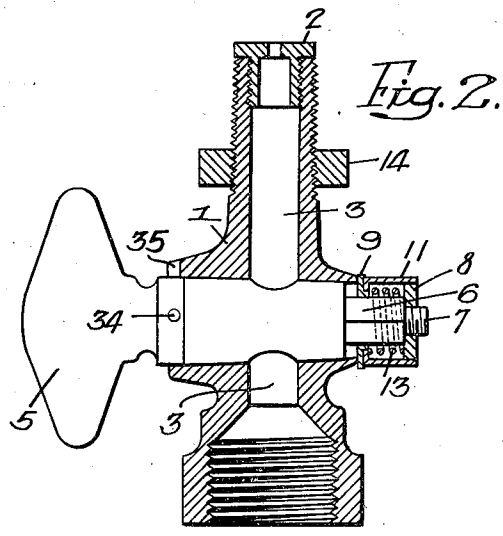



Fig. 3

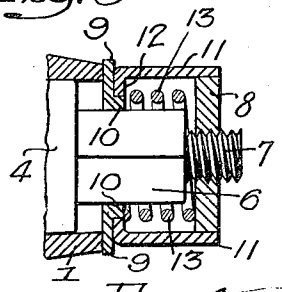



Fig. 4.

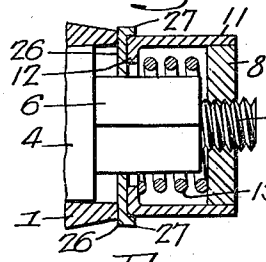



Fig. 5.

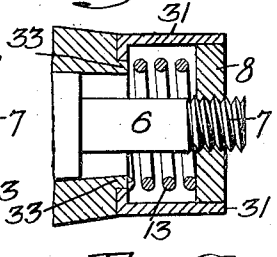



Fig. 6.

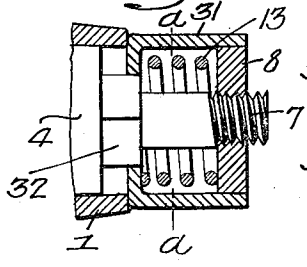



Fig. 7.

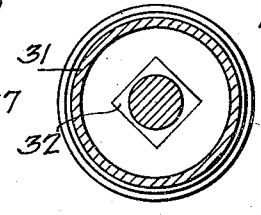
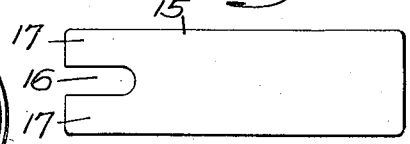



Fig. 8.




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2 SHEETS—SHEET 2.

Fig. 9.

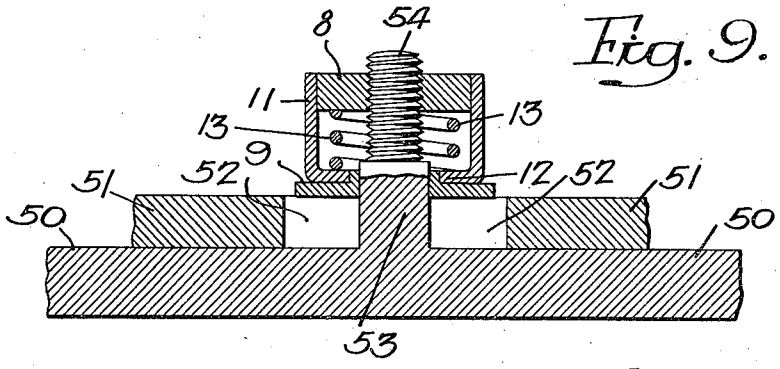



Fig. 10

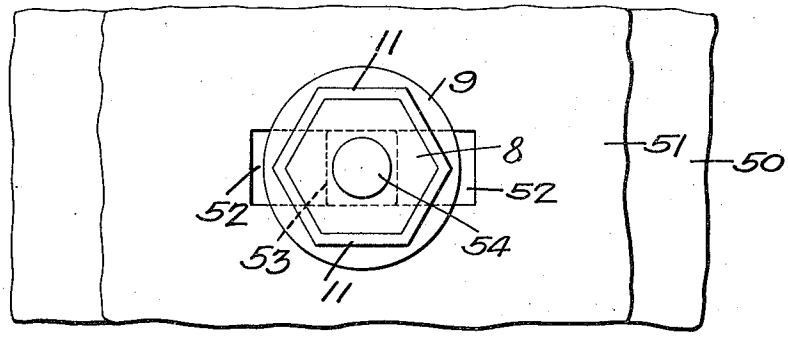
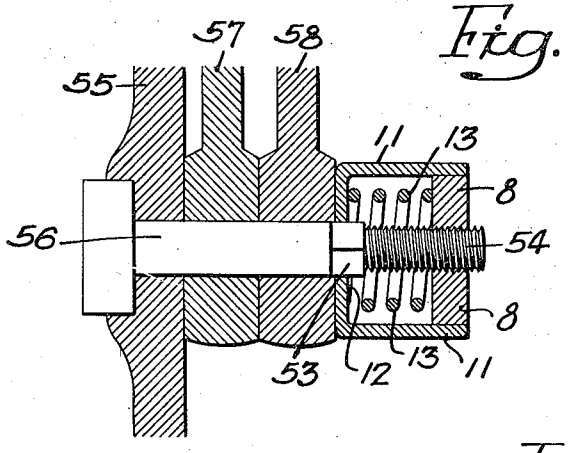



Fig. 11




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# UNITED STATES PATENT OFFICE.

JOHN S. FORBES, OF PHILADELPHIA, PENNSYLVANIA.

## RETAINING DEVICE.

1,199,684. Specification of Letters Patent. Patented Sept. 26, 1916.

Application filed July 9, 1915. Serial No. 38,942.

*To all whom it may concern:*

Be it known that I, JOHN S. FORBES, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Retaining Devices, of which the following is a specification.

One object of my invention is to provide a relatively simple form of valve having its movable and fixed elements so connected that while limited longitudinal and rotary movement of the movable member shall be possible, it shall be held from removal from the valve body by a novel form of locking means effectually preventing it from otherwise becoming loosened or tightened.

Another object of the invention is to provide the movable element of a valve with a locking or retaining device including two members which while normally locked or clutched so as to be compelled to move together when said valve element is turned, may be temporarily disconnected to permit of the adjustment or separation of said parts.

I further desire to provide a valve of the plug type having means whereby its movable element is yieldingly held to its seat, with a locking or retaining device whereby its parts are held in place without possibility of their becoming loosened or accidentally separated under operating conditions, the invention in certain of its forms including means whereby the movable valve member is prevented from remaining in a loose condition in its casing.

These objects and other advantageous ends I secure as hereinafter set forth, reference being had to the accompanying drawings, in which,

Figures 1 and 2 are respectively a side elevation and a vertical section illustrating my invention as applied to a well known form of gas cock; Fig. 3 is a fragmentary section illustrating on an enlarged scale, certain features of the construction shown in Fig. 2; Figs. 4 and 5 are fragmentary sections of other modifications of the invention; Figs. 6 and 7 are respectively a vertical section and a transverse section on the line *a*—*a*, Fig. 6, illustrating still another modification of the invention; Fig. 8 is a plan of a wrench used with my invention; Figs. 9 and 10 are respectively a vertical section and a plan showing my invention as applied to hold together two movably engaged members; and Fig. 11 is a vertical section illustrating another modification of the invention.

In the above drawings 1 represents the casing or body of a well known form of gas cock having in the present instance a vapor jet nozzle 2 mounted in one end, which is externally threaded and provided with a loose nut 14. In addition to the passage 3 for the gas or fluid to be controlled, this body is provided with a conical or tapered chamber extending at right angles with and intersecting said passage, for the reception of the valve proper or movable element 4 which is tapered to fit said chamber and has an operating handle 5. This movable element is necessarily at all times drawn into the chamber or cavity in the casing in order that it may closely engage the walls thereof so as to prevent leakage, and for this purpose I provide it with an extension or stem 6 terminating in a threaded portion 7 on which is mounted a square or hexagonal nut 8.

The main portion of the square stem 6 has fitted to it a washer 9 whose square opening has a flange 10 externally square, and a hexagonal sleeve 11 which slidably engages the nut 8 is inwardly flanged at 12 to fit against the flat face of said washer, the opening through said flange being square so as to closely fit the flange 10. Within the casing formed by the nut 8, the sleeve 11 and the stem 6, I mount a coiled spring 13 acting between said nut and the flanges 10 and 12, so that the latter and their attached parts are at all times forced toward the adjacent portion of the casing 1. Obviously therefore the valve element 4 is drawn into its chamber so as to make good contact with the walls thereof, although it is free to be moved longitudinally out of the chamber for a limited distance when sufficient force is exerted on its handle 5, in which case the spring 13 is compressed and the nut 8 is caused to slide within the sleeve 11.

When the valve element 4 is turned, the square portion 6 causes turning of the washer 9 with its flange 10, the sleeve 11 and the nut 8, so that there is no possibility of the latter becoming loosened or accidentally unscrewed from the threaded part 7 of the valve spindle. If it be desired to remove the nut 8, a holding device such as that shown in Fig. 8, at 15 is employed. This consists of a relatively thin elongated body of sheet material having a parallel

sided recess 16 in one end forming a fork whose extremities 17 are beveled or sharpened to allow of their easy insertion between the outer face of the washer 9 and the adjacent face of the flange 12. The recess 16 is of such width that its sides engage two opposite sides of the flange 10 and serves as a wrench to hold it with the stem 6 from turning. At the same time the wedging action of the sharpened extremities 17 forces the sleeve 11 outwardly against the action of the spring 13, until its flange 12 is clear of the flange 10, whereupon the sleeve 11 with the nut 8 may be completely unscrewed from the stem 7.

When the nut 8 is being placed in position, the stem 6 and valve member 4 may be held from turning by the key as shown, or after the washer 9, sleeve 11, and spring 13 have been put in place, the nut 8 may be screwed by hand on the part 7 until it is stopped by engagement with the edge of said sleeve. This latter may then be drawn outwardly by hand or forced outwardly by the device 15 over the nut, until its flange 12 is disengaged from the flange 10 and while so held, it with said nut may be turned until the latter is screwed home into the position shown in Fig. 3.

In the case shown in Fig. 4, I provide a washer 26 having an external flange 27 designed to fit the exterior of an inwardly flanged sleeve 11 of the same construction as that shown in Figs. 1 to 3 inclusive. As in these figures, the coiled spring 13 is mounted concentrically with the spindle extension 6 and acts between a hexagonal or other nut 8 and the flange 12 of said sleeve. As before the outward movement of the sleeve 11 longitudinally on the extension 6 will permit the flange 27 to clear the sleeve 11 so that said sleeve and the nut which fits it may be turned until said nut is screwed completely off of the threaded extremity 7 on the valve stem.

That form of the invention shown in Fig. 5 differs from the others so far described in that the casing 31 is provided with an inwardly extending flange having a square or hexagonal opening designed to fit a similarly outlined extension 33 of the valve body 1. As before the movable member 4 of the valve has an extension 6 terminating in a threaded portion 7 on which is mounted a hexagonal or square nut 8 fitting into the open outer end of the hexagonal casing 31, and the spring 13 acts between the flange of said casing 31 and the nut. When the valve member 4 is turned, its threaded extremity necessarily turns in the nut 8 because this latter is held stationary by the casing 31 which likewise is held by the square or hexagonal extension 33 of the valve body. Obviously however this movement of the valve stem relatively to the nut 8 cannot result in the separation of these parts, since as in valves of this type, the member 4 is provided with a pin 34 fitting into a notch 35 in the adjacent portion of the valve body so as to limit the movement of said member 4 to an angle of 90°. Accidental removal or working off of the nut 8 from the threaded part of the stem 6 is thus effectively prevented, although it is possible to longitudinally move the valve element 4 against the action of the spring 13 which however normally maintains said member seated in engagement with the walls of its chamber. Separation in this case is effected by moving the casing 31 outward from the valve body sufficiently to disengage the squared portion 33 and then turning the casing 31 with the nut 8 until the latter is free of the threaded portion 7.

Figs. 6 and 7 show a further modification of the invention in which an inwardly flanged hexagonal casing 31 so engages the movable valve member 4 as to necessarily turn therewith, for which purpose the squared or hexagonal extension 32 of said valve fits into the similarly shaped opening in the flange of said casing. In this case the nut 8 is threaded onto the extremity of the extension 32 and being square or hexagonal, fits into the similarly shaped opening of the casing 31. As before the spring 13 operates between the nut and the flange of said casing and when the valve member 4 is turned, the casing 31 together with the nut 8 is likewise rotated. At the same time said valve member is free to be moved longitudinally against the action of the spring which at all times tends to hold it seated. When it is desired to remove the nut 8 the casing 31 may be drawn or forced away from the valve casing so as to free its flanges from the extension 32, whereupon it may be turned and with it the nut.

While in some instances I interpose the washer 9 between the spring inclosing casing and the valve body 1 and although in most cases the spring 13 acts between the nut 8 and the inwardly projecting flange of said casing, it is obvious that said washer or flange forms one of the abutments against which said spring acts while the nut 8 or the washer 25 constitutes the second abutment.

Obviously the above described arrangement of parts is by no means limited to preventing the accidental working off of the nut or other retaining member of a valve since, without departing from my invention, it may be advantageously employed in any device for the purpose of preventing the unintentional or accidental backing off of a nut, pin or other retaining member. For example, as shown in Figs. 9 and 10, it may be desired to connect two members 50 and 51 having the forms of plates or bars, etc.,

and of which the latter is shown as having a slot 52. In this case the member 50 has an integral projecting portion 53, although obviously this portion may be structurally independent as in Fig. 11, and said portion projects through the slot 52, terminating in a threaded extremity 54 on which is mounted a nut 8. While I have shown an internally flanged washer 9 as mounted on the portion 53 so as to be held from rotation thereby and in turn having non-rotatably but separably mounted upon it the flanged casing 11, obviously said washer may be omitted and said casing be non-rotatably but slidably engaged with the polygonal or other shaped part of said portion 53. This casing 11 slidably engages the nut 8, and as before, a spring 14 is mounted between it and the internal flange 12. Although in this case the member 51 is free to move relatively to the member 50, it is held to the same by the nut 8 and spring 13, and said nut is effectually prevented from accidental rotation relatively to the portion 54 such as would be caused by excessive vibration, by the casing 11, either with or without the washer 9.

Another application of the invention is illustrated in Fig. 11 where a supporting structure 55 is provided with an opening for the passage of a bolt 56 having a threaded extremity 54 and a part 56 of polygonal or other geometrical outline. On the bolt are mounted two members 57 and 58 which may be movable relatively to each other or to the structure 55 and in order to hold them together without possibility of their accidental dislodgment I provide a nut 8 movably held from rotation by the casing 11 whose flange 12 engages the part 53 of the bolt which as before incloses the spring 13.

I claim:—

1. The combination of a supporting structure; a member therein having rotary and longitudinal movement and provided with an extension; a nut threaded on said extension; a washer engaging said extension so as to be rotated thereby; a casing surrounding the extension and slidably engaging said nut; and a spring operative between the nut and said washer.

2. The combination of a supporting structure; a member operative therein and having an extension of geometrical section; a retaining element on said extension; a casing slidably engaging said element and fitting the same so as to be forced to rotate therewith; and a spring in the casing acting against the element to retain the member in place.

3. The combination of a supporting structure; a rotatable member therein having an extension of geometrical section; a washer having a flange fitting said extension so as to be held from independent turning thereon while being separable therefrom; a retaining element on the extension; with a spring acting between the washer and said element.

4. The combination of a supporting structure; a member rotatable therein; a retaining element for said member; a spring acting on said element to hold the member in place; with a casing inclosing the spring and slidable relatively to the retaining element while being rotatable therebv for normally preventing its removal.

5. The combination of a support; a member rotatable therein; a retaining element for the member; a spring acting on said element to hold the member in place; with a structure rotatable with the member and normally locking the retaining element from movement independent of said member.

6. The combination of a support; a member therein having an extension of geometrical section; a retaining element for the member; a spring acting on said element to hold the member in place; with a structure slidably holding the retaining element and normally prevented by said extension from rotation independently of the member.

7. The combination of a valve body having a valve passage and a tapering chamber; a tapering valve fitting said chamber, and having a portion of geometrical section threaded at its extremity; a nut threaded on said extremity; a washer having a flanged opening formed to fit said extension; with a casing formed to slidably fit over the nut and provided with a flange non-rotatably engaging the flange on the washer.

8. The combination of two members; means for connecting said members including a structure of geometrical section; a retaining element on said structure; a spring acting on said element to press said members together; with a device slidably engaging the retaining element and normally prevented from rotation by said structure of geometrical section.

9. The combination of two members; means for connecting the same including a structure of geometrical section; a retaining element on said structure; a spring acting on said element to press said members together; a piece mounted on and held from rotation by said structure of geometrical section; with a device slidably engaging the retaining element and said piece and normally prevented from rotation by the piece.

JOHN S. FORBES.