W. A. KITTS, JR.

GAGE COCK.

APPLICATION FILED APR. 8, 1913.

1,081,968. Patented Dec. 23, 1913.

Fig. 1.

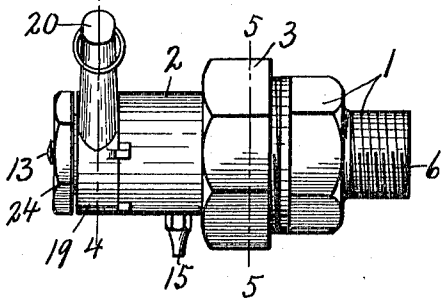


Fig. 2.

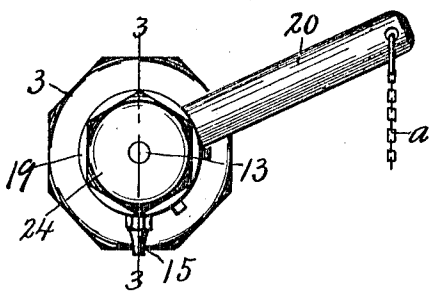


Fig. 3.

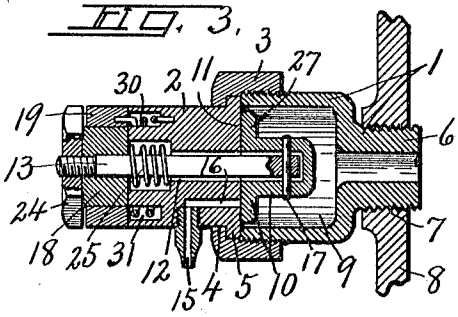


Fig. 4.

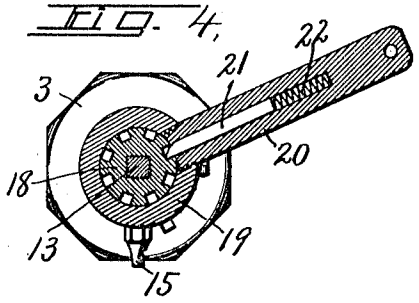


Fig. 5.

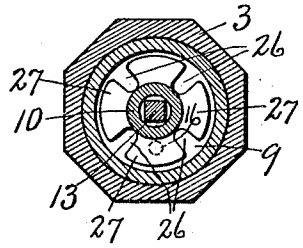


Fig. 6.

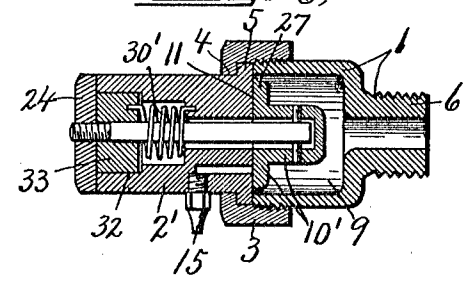


Fig. 7.

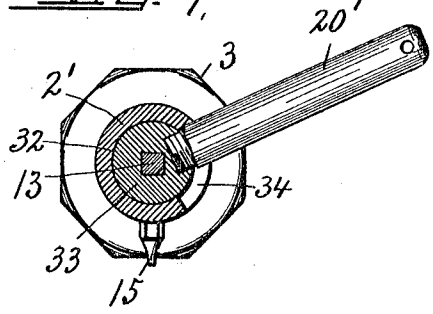
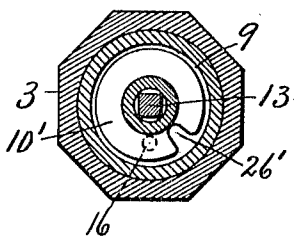


Fig. 8.



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WILLARD A. KITTS, JR., OF NEW YORK, N. Y.

GAGE-COCK.

1,081,968. Specification of Letters Patent. Patented Dec. 23, 1913.

Application filed April 8, 1913. Serial No. 759,682.

To all whom it may concern:

Be it known that I, WILLARD A. KITTS, Jr., of New York city, in the county of Kings, in the State of New York, have invented new and useful Improvements in Gage-Cocks, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to certain improvements in gage cocks, commonly known as tri-cocks as applied more particularly to the water columns or other parts of steam boilers for testing the water level or presence of steam, but is equally useful in other relations where it is desired to determine varying levels of liquids in liquid containing receptacles. In this class of apparatus, it is necessary to direct the escaping jet or stream of water downwardly and at the same time to establish a sufficiently tight joint or connection with the water column or boiler to prevent any possibility of leakage. These connections are usually made by providing the tri-cock with a threaded tubular nipple, screwing into a corresponding threaded opening in the water column or shell of the boiler and it frequently happens that when the tri-cock is tightened to its maximum degree, to prevent leakage, the discharge nozzle will be directed upwardly or radially to an objectionable angle, particularly when such nozzle is integral with or in fixed relation to the part having the threaded nipple.

The main object, therefore, of my present invention is to enable the nozzle-carrying part of the device to be adjusted rotarily to the desired angle (preferably at the bottom) relatively to that part which is screwed into the water column or boiler, so that the threaded nipple may be tightened to any degree to prevent leakage without displacing the discharge nozzle from its adjusted position, or if displaced, may be re-adjusted as desired.

Another object is to provide the tri-cock with a rotary disk valve, adjustable rotarily to and from a position across an eccentrically disposed outlet leading to the discharge nozzle and acting with the pressure of the steam or water to positively close said outlet when the valve is adjusted to its closed position.

Another object is to provide means for holding the valve to its seat under an adjustable yielding pressure.

A still further object is to provide means for automatically returning the operating member to its starting position after each voluntary operation thereof in shifting the valve.

Other objects and uses will be brought out in the following description.

In the drawings—Figures 1 and 2 are, respectively, a side elevation and an end view of a gage cock embodying the various features of my invention. Figs. 3, 4 and 5 are, respectively, a longitudinal vertical sectional view taken on line 3—3, Fig. 2, and transverse vertical sectional views taken on lines 4—4 and 5—5, Fig. 1. Fig. 6 is a longitudinal vertical sectional view, similar to Fig. 3, showing a slightly modified form of valve operating means. Fig. 7 is a transverse vertical sectional view of the device shown in Fig. 6, in the plane of the valve operating handle. Fig. 8 is a transverse sectional view of the device shown in Fig. 6, taken in the plane of the valve.

The tri-cock shown in Figs. 1 to 5, inclusive, comprises a nipple section —1— and a nozzle section —2— co-axial with and coupled to the nipple section by means of a union or internally threaded sleeve —3— which is screwed upon the adjacent externally threaded end of the nipple section —1— and is provided with an in-turned flange —4— in rotary interlocking engagement with a corresponding out-turned annular flange —5— on the adjacent end of the nozzle section —2—, so as to permit relative rotary adjustment of the union and nozzle section one upon the other. The nipple section —1— is provided with a reduced externally threaded nipple —6—, adapted to be tightly screwed into a threaded aperture —7— of a water column —8— or other part of a steam boiler or container for liquids, gas or vapor. This nipple section —1— is preferably hollow or provided with an opening therethrough from end to end for communication with the interior of the water column, the main body or larger end of said section, except its threaded portion, being angular, as hexagonal, while its interior opening is also enlarged to form a valve chamber —9— for the reception of a disk valve —10—, the angular portion constituting a nut for the reception of a suitable wrench by which the nipple section may be tightly screwed into the water column or other portion of the boiler.

The nozzle section —2— is preferably cy-

lindrical and arranged with its flanged end —5— abutting against and of substantially the same diameter as the adjacent end of the nipple section —1—, in which position it is held by the union or coupling nut —3—, which is also angular in cross section for the reception of a suitable tool by which it may be screwed upon the threaded end of the nipple section —1—, for firmly clamping the nozzle section —2— in its adjusted position. The inner face of the nozzle section —2— is substantially flat and disposed at right angles to its axis to form a suitable valve seat —11— for the valve —10—, which is also provided with a substantially flat face coacting with its seat, said flat faces of the valve and its seat being ground to form a tight joint. This nozzle section —2— is provided with a central lengthwise opening —12— for receiving a valve stem —13— and is also provided with a radially projecting discharge nozzle —15— communicating with a lengthwise passage —16— leading from the inner end of the nozzle to the valve seat, parallel with and at one side of the lengthwise opening —12— to establish communication between the valve chamber —9— and nozzle when the valve —10— is open, in a manner hereinafter described.

The central lengthwise opening —12— in the nozzle section —2— is preferably cylindrical to allow turning of the stem —13—, which is shown as angular or square in cross section, the inner end of said stem being arranged in a central lengthwise socket in the valve —10— and is secured to said valve against relative rotation by a pin or key —17—. A ratchet wheel —18— is slidably fitted upon the angular portion of the valve stem at the outer end of the nozzle section —2— and is surrounded by a cylindrical collar —19— having a radially projecting handle —20—, by which the collar may be rotated, said handle and collar being provided with a radial opening for the reception of a sliding pawl —21—, which is forced into engagement with the teeth of the ratchet wheel by means of a spring —22—, as shown more clearly in Fig. 4, said pawl and socket in which it is slidable being of angular cross section to prevent turning of the pawl.

The inner end of the pawl is beveled to permit it to ride over the face of the ratchet teeth when the handle is rocked upwardly, but is adapted to engage said teeth for rotating the ratchet wheel and valve through the medium of the valve stem when the handle is rocked downwardly.

The extreme outer end of the valve stem is threaded externally for receiving a nut —24— which engages the adjacent outer face of the ratchet wheel to hold the latter against the outer end of the nozzle section —2— and thereby hold the valve —10— to its seat, said nut also serving to retain the collar —19— in operative relation to the ratchet wheel against endwise displacement and in close proximity to the outer end of the nozzle section, leaving just sufficient clearance to permit the collar to be rotated freely without excessive friction between the nut and the adjacent end of the nozzle section.

The outer end of the central opening —12— in the nozzle section —2— is enlarged to form an annular shoulder and to receive a coil spring —25— which is compressed between said annular shoulder and inner face of the ratchet wheel to yieldingly press the valve to its seat, through the medium of the valve stem around which the spring coil is placed.

The object of the ratchet —18— and pawl —21— is to cause the valve to be rotated progressively in one and the same direction by each downward movement of the operating lever —20— for alternately opening and closing the valve. This valve is provided with a series of, in this instance four, openings or radial slots —26— and a corresponding number of radial wings —27— arranged equidistant from center to center about the axis of the valve, for alternate registration with the inner end of the outlet passage —16— for opening and closing the same, it being understood that the radial distance from the axis of the valve to the center of the opening —26— is substantially equal to the radial distance from the same axis to the center of the outlet passage —16—.

The number of teeth in the ratchet wheel —19— is preferably equal to the combined number of openings —26— and wings —27— and is, therefore, provided, in this instance, with eight teeth, spaced uniform distances apart and adapted to be operated one tooth space at a time by the handle —20— through the medium of the pawl —21—.

A retracting spring —30— for the collar —19— and its operating handle —20—, is arranged in a socket —31— in the outer end of the nozzle section —2—, as shown more clearly in Fig. 3, and has one end attached to the base of said socket and its other end attached to the collar —19—, said spring being arranged to return the collar and handle to their starting positions after each voluntary operation downward and is also adapted to limit the movement of the collar and its operating handle through an arc of approximately an eighth turn or 45°, although it is evident that other means may be employed for limiting the arc of movement of said collar and its operating handle.

It is evident, from the foregoing description, that by employing the ratchet and pawl in the manner described, the valve

disk —10— may be operated progressively to successively register the openings —26— and wings —27— with the outlet passage —16—, and that after each operation the collar —19— and its operating lever —20—, together with the pawl —21—, are returned to their normal positions by the spring —30—, leaving the valve in its last adjusted position. For example, assuming that the valve is closed by shifting one of its wings —27— across the adjacent end of the outlet passage —16— and that it is desired to open said valve to test the level of the water or presence of steam in the boiler, then by drawing the handle —20— downwardly by means of a pull cord or cable —*a*—, through an arc of approximately 45° or one tooth space of the ratchet wheel, the valve will then be shifted to register the next succeeding opening —26— with the outlet passage —16— to allow the escape of water or steam through the discharge nozzle —15—, thus indicating the presence or absence of water at the level of the tri-cook, whereupon by relieving the pull upon the cord —*a*—, the collar —19— and its operating lever —20—, together with pawl —21—, will be returned to their normal positions by the spring —30— and by repeating the operation of the handle it is evident that the valve will be again rotated an eighth turn or one tooth space of the ratchet wheel to bring the next succeeding wing to its closed position across the inner end of the outlet passage —16—, thereby cutting off the escape of steam or water. It is possible, however, to accomplish a similar adjustment of the valve without the use of the ratchet wheel and pawl, by allowing the valve to return to its normal position after each operation and in Fig. 6, I have shown such a device as provided with a slightly modified form of nozzle section —2′— having an enlarged socket —32— in its outer end for receiving a collar —33— adapted to take the place of the ratchet wheel —18— in that it is splined on the angular portion of the valve stem for slight axial adjustment and is provided with a handle —20′— projecting radially through a circumferentially elongated slot —34— in one side of the adjacent portion of the nozzle section, as shown more clearly in Fig. 7, thus permitting the valve to be rotated across its seat by rocking the handle downwardly against the action of a retracting spring —30′—. In this construction of tri-cock I have also shown a slightly modified form of valve —10′— as provided with a single opening or radial passage —26′—, normally held out of registration with the inner end of the outlet passage —16— by the action of the retracting spring —30′— which, therefore, normally holds the valve in its closed position with a portion of the disk across the inner end of the outlet opening. In both cases, however, the nipple section —1— may be tightly screwed into the water column or other portion of the boiler without rotating the nozzle section, or if this nozzle section should be rotated to shift the nozzle to an undesirable angle, its section may be re-adjusted by simply loosening the union or coupling nut —3— and then turning the nozzle section by hand until its nozzle points downwardly, or to any other desired angle.

What I claim is:

1. A gage cock comprising a threaded nipple section and a nozzle section co-axial with and adjustable rotarily relatively to the nipple section, a union connecting said sections and a valve for opening and closing communication between the nipple section and nozzle section.

2. A gage cock comprising a threaded nipple section and a co-axial nozzle section having a radially projecting nozzle communicating with the interior of the nipple section, a union screwing upon one of said sections and engaging with the other section to permit relative rotary adjustment of said nozzle section, and a valve controlling communication between the nipple section and nozzle.

3. A gage cock comprising a nipple section having a reduced threaded nipple and its larger portion threaded externally, a nozzle section having a flanged end co-axial with the nipple section, an internally flanged nut screwing upon the threaded larger end of the nipple section and engaging with the flanged end of the nozzle section for rotary adjustment relatively thereto, said nozzle section having a nozzle communicating with the interior of the nipple section and a valve controlling such communication.

4. A gage cock comprising a valve case having an inlet and an outlet, a valve disk rotatable to and from a position across the outlet, an operating member for the valve, means for returning the operating member to starting position after each operation.

5. A gage cock comprising a threaded nipple section, a co-axial nozzle section, a union connecting said sections, said nozzle section being adjustable rotarily relatively to the union and nipple section, and provided with a valve seat and an outlet leading therefrom through the periphery of the nozzle section, a valve rotatable on said seat to and from a position across the adjacent end of the outlet, a spring for holding the valve to its seat, an operating member for said valve, and means for returning the operating member to its starting position after each operation of the valve.

6. A gage cock comprising a valve connection having an inlet and an outlet, a valve rotatable to and from a position across the outlet, a valve stem, a ratchet mounted on

and movable with the valve stem, and a pawl co-acting with said ratchet to rotate the valve stem and thereby the valve.

7. A gage cock comprising a valve connection having an inlet and an outlet, a valve rotatable to and from a position across the outlet, a valve stem, a ratchet mounted on and movable with the valve stem, and a spring-pressed pawl co-acting with said ratchet to rotate the valve stem and thereby the valve.

8. A gage cock comprising a valve connection having an inlet and an outlet, a valve rotatable to and from a position across the outlet, a valve stem, a ratchet mounted on and movable with the valve stem, a collar surrounding and rotatable on said ratchet, a lever operably connected to and rotatable with said collar, and a pawl carried by the lever and engaging the ratchet teeth for rotating the same.

9. A gage cock comprising a valve connection having an inlet and an outlet, a valve rotatable to and from a position across the outlet, a valve stem, a ratchet mounted on and movable with the valve stem, a pawl co-acting with said ratchet to rotate the valve stem and thereby the valve, and means for returning said pawl to its starting position after each operation.

10. A gage cock comprising a valve connection having an inlet and an outlet, a valve rotatable to and from a position across the outlet, a valve stem, a ratchet mounted on and movable with the valve stem, a collar surrounding and rotatable on said ratchet, a lever operably connected to and rotatable with said collar, a pawl carried by the lever and engaging the ratchet teeth for rotating the same, and means for returning said collar to starting position after each operation.

11. A gage cock comprising a valve case having an inlet and an outlet, a valve rotatable to and from a position across the outlet, a valve stem, a ratchet mounted on and movable with the valve stem, a collar surrounding said ratchet, means for rotating said ratchet with said collar and means for returning said collar to normal position, independently of the ratchet, after each operation.

12. A gage cock comprising a valve case having an inlet and an outlet, a valve rotatable to and from a position across the outlet, a valve stem, a ratchet mounted on and movable with the valve stem, a collar surrounding said ratchet, means for rotating said ratchet with said collar and allowing free return movement of the collar to starting position.

In witness whereof I have hereunto set my hand this 29th day of March 1913.

WILLARD A. KITTS, JR.

Witnesses:
WILLIAM S. PITTS,
M. V. C. JORDAN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."