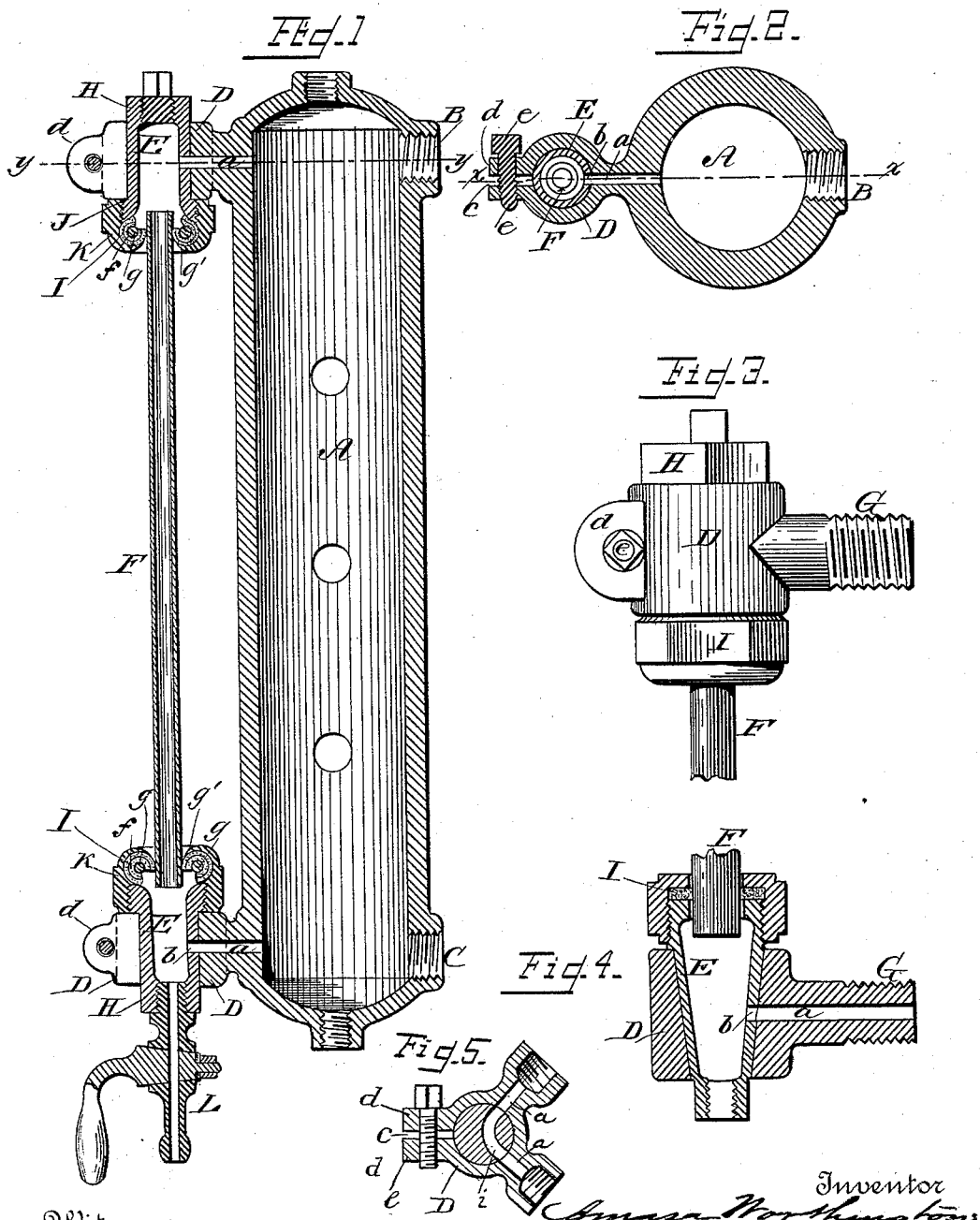


(No Model.)

A. WORTHINGTON.  
WATER GAGE.

No. 419,743.

Patented Jan. 21, 1890.



Witnesses  
Jas R. Steward,  
Henry B. Parker.

Inventor  
Amasa Worthington  
By his Attorney  
Chas M. Forbes

# UNITED STATES PATENT OFFICE.

AMASA WORTHINGTON, OF BROOKLYN, NEW YORK.

## WATER-GAGE.

SPECIFICATION forming part of Letters Patent No. 419,743, dated January 21, 1890.

Application filed October 4, 1888. Serial No. 287,226. (No model.)

### *To all whom it may concern:*

Be it known that I, AMASA WORTHINGTON, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Plug-Cocks, of which the following is a specification.

My invention relates to plug-cocks having a plug either of uniform diameter or tapered, adapted to control ports extending laterally to the plug through a seat in which it is rotative, or to control communication between a passage-way that is permanently connected through the axis of the plug to its interior, and such port or ports as may extend laterally.

My invention is especially applicable to glass-tube gages for steam-boilers or other vessels containing liquid under pressure or free from pressure; and it consists of certain novel features of construction whereby the fitting of a tubular gage is simplified by the direct connection of the extremities of the tube through the axes of the cock-plugs, which latter are terminal to the said tube.

Reference being had to the accompanying drawings, in which like letters indicate like parts, Figure 1 is a vertical section of a stand-pipe adapted to a steam-boiler, a water-gage connected thereto, and gage-cocks of the herein-described novel construction, the plane of said section being indicated by the line *x x*, Fig. 2; Fig. 2, a horizontal section of Fig. 1 on the line *y y*; Fig. 3, an enlarged side view of one of the cocks similar to those in Fig. 1, but constructed independently of the stand-pipe; Fig. 4, a sectional view of a tapered plug-cock having certain characteristics in common with those of Fig. 1; and Fig. 5, a sectional view of a modification of the invention, the plane of section being a direction similar to that of Fig. 2.

A is a vertical stand-pipe connected at B and C by means of pipes with the steam and water spaces, say, of a steam-boiler, and located horizontally opposite, and including the range of variation of the water-level in the usual manner.

D D are the casings of the cocks E, that are preferably cast integral with the stand-pipe A and project therefrom rigidly, so that

the seating-surfaces of the cocks may be bored accurately in a common axis, and such relation be made permanent against displacement, and obviate the difficulty of adjustment which occurs in cases where the cocks are made separate in the more usual manner. Such coincidence of axial position of the tube-fittings is of necessity to effect perfect joints at the ends of the glass tube F, and in the present case to maintain the tightness of such joints when the cocks are rotatively operated about the tube, as further explained. I may, however, employ separate cock-fittings, as illustrated by Fig. 3, having ordinary screw-threaded shanks G, that are screwed into the openings of the stand-pipe, boiler, or other vessel.

The plugs E of the cocks perform the double function of affording settings for the gage-tube F, being terminal to the same, and of controlling the communication of said tube F with the passages *a a* from the vessel A. To this purpose the plugs E are rotative in the seats D and accurately fitted therein, and are provided with squared portions H, Fig. 3, or otherwise shaped portions by which purchase can be obtained by a suitable wrench, key, or lever applied to turn them. The plugs E are also provided with packed glands I, of any suitable construction, as in Fig. 1 or 4, which are adapted to maintain a tight joint irrespective of the positions of rotation. The plugs E, whether of uniform diameter, as in Fig. 1, or tapered, as in Fig. 4, are retained in their seats by the pressure within them as opposed to one another through the tube F, or as against the confinement of pressure in said tube where a cock is used singly in other applications than that illustrated. To provide for the endwise seating in the instance of the straight plug, Fig. 1, I employ a shoulder, as J, that receives the longitudinal strain just described. Thus maintained in position and rotatively operated, the plugs E cover or uncover the passages *a* by the coincidence of their openings *b* with said passages, as will be understood by Fig. 2, a quarter-turn being sufficient to operate them.

The adaptation of the seats D to the plugs of uniform diameter, whereby the seats are rendered capable of tightening to take up

the wear or to properly adjust the tightness of the fitting, is illustrated in Figs. 1, 2, 3, and 5. The seats D are split on the outer side at *c* in a direction lying in a plane parallel to and intersecting the axis of the seat and at a portion of the seat opposite or substantially opposite the port or ports *a*. The split portion *c* affords a gap in the seat, which, as due to whatever degree of flexibility the metal may have, will permit the compression of the gap to effect the slight increase of the tightness that may be necessary from time to time in the course of usage. The split portion of the seat D is provided with lugs *d*, projecting outwardly, which are engaged with by a suitable screw, as *e*, turning loosely through the one lug and screw-threaded into the other, so as to bind them to the degree required.

The construction which I adopt for the gland-packings is shown in Fig. 1. The packings are composed of flat flexible washers, preferably of rubber, that are folded, as seen in cross-section at *f*, about a ring *g*, which forms a core, so that the exterior and interior margins of the washers are overturned upon the ring and partly envelop the same. Either one or a plurality of washers may be so employed. The nut K, which binds the packing, is made with an annular concavity of a shape to correspond with the packing, and said concavity is left open toward the nipple of the plug E, and is terminated externally by an inwardly-turned flange *g'*, that tends to confine the portions of the packing adjacent to the tube F and direct its inner margins so as to constitute a form analogous to "cup" packing about the tube. The pressure itself within the gland thereby tends to tighten the inner portion of the annulus, while the nut K retains the outer portion thereof.

In its application to a water-gage, as shown, the lower cock is provided with the blow-out cock L, usual to gage-tubes, secured to and permitted to turn bodily with the plug E, and located in a vertical line with the tube F, to induce a steam-current through the latter when its cleansing is required.

In Fig. 5 I have illustrated the application of the contractible seat to a plug which controls lateral ports through its seat exclusively in the absence of an axial connection of a tube or other passage to a chambered interior of the plug. In this illustration the plug is adapted to connect or disconnect the ports *a* by the coincidence or non-coincidence thereof of its curved port *i*, effected by partial rotation.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

In a tube-gage, the combination of projections extending from the side of a vessel in a fixed position, intersected by cylindric plug-seats in a common axis, from one side of which ports extend to said vessel, and from the opposite side of which the projections are split in a direction lying in a plane parallel with the axis of the seats to render the latter contractible, and of plugs of uniform diameter adapted to support the extremities of the gage-tube and rotative thereon and within the said seats to control the communication between said gage-tube and the said ports, in the manner specified.

AMASA WORTHINGTON.

Witnesses:

C. W. FORBES,  
HENRY F. PARKER.