(No Model.)

J. DEWRANCE & G. H. WALL.

COCK.

No. 567,584. Patented Sept. 15, 1896.

Fig. 1.

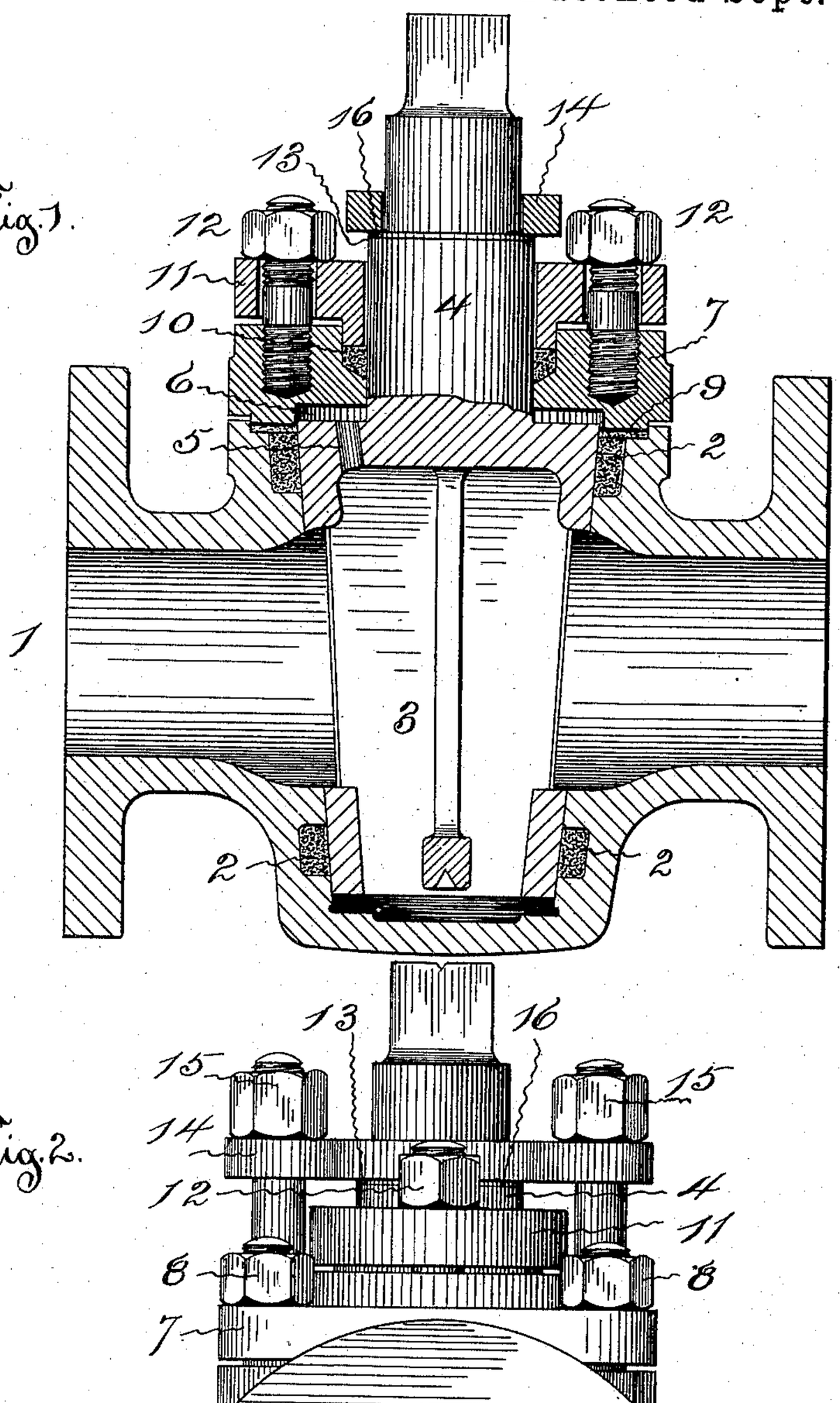
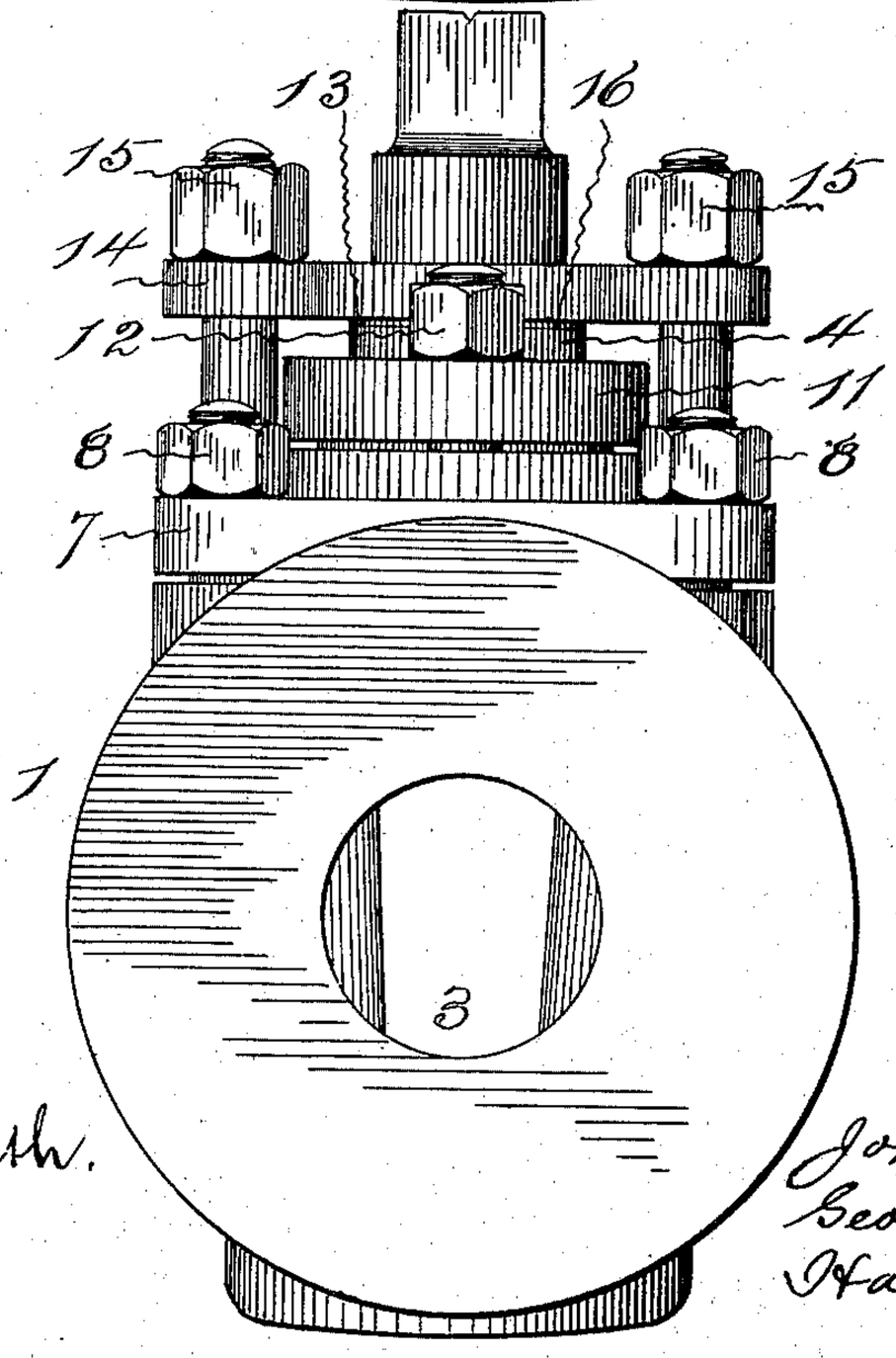


Fig. 2.



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UNITED STATES PATENT OFFICE.

JOHN DEWRANCE AND GEORGE HENRY WALL, OF LONDON, ENGLAND.

COCK.

SPECIFICATION forming part of Letters Patent No. 567,584, dated September 15, 1896.

Application filed October 12, 1895. Serial No. 565,487. (No model.) Patented in England May 8, 1894, No. 9,110.

To all whom it may concern:

Be it known that we, JOHN DEWRANCE and GEORGE HENRY WALL, subjects of the Queen of Great Britain, residing at London, England, have invented certain new and useful Improvements in Cocks, (for which I have obtained a patent in Great Britain, No. 9,110, dated May 8, 1894,) of which the following is a specification.

The invention relates more particularly to the construction, arrangement, and location of the packing and plug holding and adjusting parts of rotary plug-cocks that are more especially designed and intended for use in connection with systems in which fluid under high pressure is employed; but it is equally applicable, of course, to the construction of large or small rotary plug-cocks which are to be used under ordinary pressures.

The object of the invention is to construct a cock of this class with simple, apparent, and ready means, which are independently and permanently adjustable in such manner that the different joints can be separately tightened and made to remain tight at all times without unnecessary strains and compressions resulting to the packings, thus insuring a tight cock with durable packings and a plug that will rotate for opening and closing the fluid-way with about equal ease when hot or cold under high or ordinary pressure.

To this end the invention resides in a cock having a suitably-packed body, a properly-packed rotary plug fitting the packing in the body, and an independently-adjustable plate which engages and alone holds the plug against the packing in body, so as to insure a permanently tight fluid-way, which plate is not required to aid in packing or making tight any other part or joint, so that unnecessary compression of any packing does not result from any adjustment of the plate or change of condition of the plug, as more particularly hereinafter described, and pointed out in the claim.

Referring to the accompanying drawings, Figure 1 is a central longitudinal section of a cock embodying the invention, and Fig. 2 is an end elevation of the same.

In the views, 1 indicates the body of the cock, which may be formed of any desirable metal with screw-threaded or flanged ends, as convenient, for attachment to the pipes of the system in which it is to be utilized. Placed in grooves formed in the common manner in the walls of the plug-chamber around the fluidway is any suitable packing 2, preferably indurated asbestos, and resting on this packing is the tapering plug 3. This plug is provided with a stem or spindle 4, that is preferably made as small as possible compatible with the requisite strength in order to provide a balancing-surface at the upper end of the plug. Usually the plug is open at the bottom, and a perforation 5 is put through the upper end to admit fluid-pressure to the chamber 6, left between the upper end of the plug 3 and the bottom of the cover 7, in order that the fluid-pressure will be balanced as near as possible on the plug.

The cover 7 is of usual shape and is held down to the body by studs and nuts 8 with force sufficient to cause the packing-ring 9 to make a tight joint between the body and the cover. This cover is provided with a suitable recess around the stem of the plug, in which is placed any durable packing 10, as asbestos fiber or asbestos string, and on this is fitted a gland 11.

The gland is formed to any common shape and is held down to the cover by studs and nuts 12 with sufficient force to cause the packing 10 to bind laterally against the walls of the stem of the plug and make a tight joint.

The stem of the plug is formed with a shoulder 13, and bearing on this shoulder is a plate 14. This plate, which may be more or less yielding or springy, is drawn down, so as to bear with the requisite pressure on the shoulder and properly force the plug into the body against the packing by means of bolts or studs and nuts 15, which studs extend from the holding-plate 14 to the cover 7. Usually the gland-plate is made longer than it is wide and located with its length extending with the length of the body of the cock, while the holding-plate is located so that its length extends across the length of the cock. A thin washer 16, of non-metallic material, may be inserted between the holding-down plate and the shoulder on the stem of the

plug, if desired, to prevent abrasion, but this washer if used should be practically incompressible.

In cocks constructed according to the present invention the holding-down plate is by means of its nuts so adjusted as to bring just the correct pressure on the shoulder of the stem of the plug to properly force the plug sufficiently close against the packing-surfaces in the interior of the cock-body to keep the cock tight and prevent steam under high pressure from leaking through in the direction of the fluid-way without crowding the plug down so it will turn too hard, and this adjustment when once made is permanent. It is preferred that the holding-down plate should have a limited amount of spring to allow the tapering plug to rise slightly in the tapering-plug chamber when hot, for otherwise expansion under the heat would cause it to bind and work hard and also to crush the packings in the body. The holding-down plate performs but the single function of keeping the plug down against the packing-surfaces in the body, so that the fluid-way can be made tight by this simple and apparent means, and when the nuts that adjust the holding-plate are once set the adjustment of the plug will, of course, remain unaltered, for this holding-down plate is not required to assist in packing the cover or gland joint, so that its adjustment can be fixed with relation to the one feature of holding the plug down in the body without regard to the elasticity of the cover or gland packings. The gland that packs the stem of the plug so that the fluid will not escape around it is independently adjustable, and this insures that its packing makes a tight lateral joint, for the gland does not perform any other function and the packing can be compressed without regard to pressing the plug into the body. The cover is adjustable only with relation to the body, and not being required to aid in pressing the plug down into the chamber or to aid in packing a gland-joint it can be held down to its packing, making sure of a tight permanent joint between the cover and the body, so that steam cannot escape around the top of the plug or from the balancing-chamber 9 without regard to the question of rotation of the plug and without compressing the packing in the grooves around the ports. The parts that aid in packing the joints are all adjustable independently of each other and each can be so set that the packings will be properly compressed to make the joints tight without in any way interfering with the rotation of the plug or exerting any compression on any packing except the one that each part holds. The holding-down plate can be adjusted so that the plug will rotate comparatively easy, for it does not have to aid in packing any joint except that between the plug and packing-surfaces in the body around the fluid-way.

In the old forms of cocks the part that held down the plug also aided in packing a joint. This required the gland-packing to be compressed by a rigid gland sufficiently to insure a tight joint around the plug and also to hold the plug down tight against the packing in the interior of the body around the fluid-way. This adjustment required great skill, and oftentimes it was not properly accomplished, even when thought to be. To insure the tight packing in the interior necessitated a pressure on the gland-packing, which caused such friction that the plug rotated very hard in opening and closing and which caused undue compression on the gland-packing. This particularly resulted when the parts were adjusted to make tight joints and the plugs of such cocks became heated and expanded, for the gland upon the plug and the cover being rigid to secure tight joints would not permit the plug to rise and free itself when the plug thus rigidly held as of necessity was expanded by the heat, and this consequently unduly compressed the packings in the grooves and also in the gland so that a readjustment was necessary when the temperature changed, which necessity was not always apparent and was difficult to properly accomplish. With high-pressure cocks of this class the steam-pressure of course tends more or less, according as the plug is balanced, to force the plug up away from the packing in the interior of the body, and this put great strain upon the packings of the prior rigid gland or cover that were required to hold the plug down, which, besides unduly compressing such packing, made the plug turn very hard, and of course if the gland was left loose to accommodate this it would be too loose to properly pack the joint when the pressure was reduced or the plug cooled.

With the present invention the plug will rotate evenly at all times, for the pressure of the holding-down plate can be adjusted to hold the plug to its bearings without reference to any other packing, and the holding-down plate may be made with a little spring in order that the plug may rise up when it is expanded under changes of temperature and free itself in the chamber and not unduly compress and shrink the groove-packings, the gland-packing, or the cover-packing, while the gland and cover packings may be kept very tight, for not being required to aid in holding the plug down the cover and gland can be tightly and permanently held to place and the packings compressed as much as desired without affecting the rotation of the plug. The gland and cover packings are not compressed by high pressures under the plug tending to raise it, so are not affected by the varying conditions of the plug and can be tightened without allowing for the same. The adjustment of the plug by means of the holding-down plate is simple in accomplishment. It is readily apparent and convenient, and when the plug is once adjusted by means of this holding-down plate it is permanent,

for the expansion or contraction of any of the parts of the other packings in no way affects it. This construction and arrangement insures a cock with very durable packings and a cock in which the plug will rotate evenly under all pressures.

We claim as our invention—

A rotary plug-cock consisting of a body with a suitably-packed fluid-way, a rotary plug fitting the packing-surfaces in the body, a packed cover secured to the body over the plug-chamber, a packed gland secured to the cover, and a spring holding-down plate which will yield slightly against outward pressure so as to allow the plug to move outwardly and not bind in the body under expansion, said plate being connected with the cover independently of the gland by adjustable means which hold it against a shoulder on the plug, substantially as specified.

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