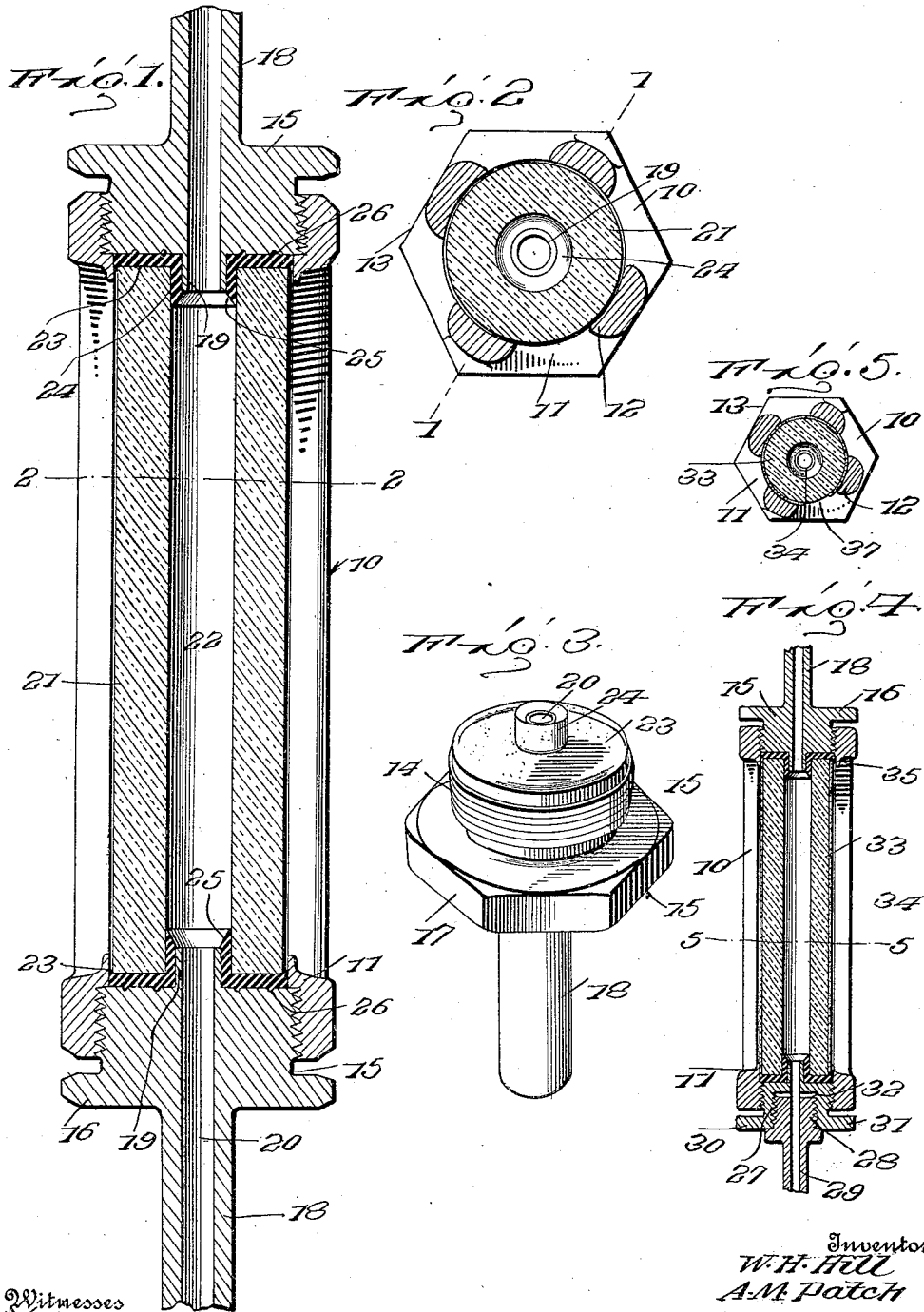


W. H. HILL & A. M. PATCH.
 WATER GAGE.
 APPLICATION FILED APR. 30, 1912.

1,057,834.

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WATER-GAGE.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, WILLIAM H. HILL and ALEXANDER M. PATCH, citizens of the United States, residing at Lebanon, in the county of Lebanon and State of Pennsylvania, have invented certain new and useful Improvements in Water-Gages, of which the following is a specification.

Our invention relates to new and useful improvements in water gages, and the object of our invention is to provide a novel means of clamping the sight glass or water tube of the gage in its cage to permit the expansion of the parts and at the same time to provide a water tight joint between the ends of the tube and the heads of the cage.

A further object of our invention is to provide a novel form of clamping head having an inwardly directed nipple which projects into the end of the tube to center the same with respect to the cage.

A further object of our invention is to provide a novel form of compressible washer for use between the end of the tube and the head and provided with a sleeve surrounding the nipple and extending beyond the same to protect the end of the tube from direct contact with the steam and water.

A further object of our invention is to so form the extended portion of this sleeve that the pressure of the water and steam in the tube will force the sleeve into direct contact with the inner face of the tube to assist in maintaining a leak proof joint. And a still further object of our invention is to provide a novel form of sight glass or water tube for the water gage.

With these and other objects in view, our invention will be more fully described, illustrated in the accompanying drawing, and then specifically pointed out in the claims which are attached to and form a part of this application.

In the drawing: Figure 1 is a central longitudinal section of our water gage, taken on the line 1—1 of Fig. 2; Fig. 2 is a transverse section on the line 2—2 of Fig. 1; Fig. 3 is a detail perspective of one of the clamping heads of the cage; Fig. 4 is a longitudinal section similar to the section in Fig. 1, but of a somewhat different form of construction; Fig. 5 is a section on the line 5—5 of Fig. 4.

Corresponding and like parts are referred to in the following description and indi-

cated in all the views of the drawing by the same reference characters.

The embodiment of our invention includes a cylindrical cage 10 provided with diametrically formed sight slots 11, the outer edges of which are beveled as at 12 to permit the more ready passage of light to the water tube and consequently to facilitate the reading of the water level therein. The non-slotted ends of the cage are provided exteriorly with angular faces 13 for the reception of a wrench and are screw threaded interiorly to engage with the externally formed threads 14 of the heads 15. Each of these heads includes a cylindrical, externally threaded portion adapted for engagement in one end of the cage, and an annular shoulder 16 provided with angularly formed faces 17 for the reception of a wrench. Each head is provided with an outwardly directed nipple 18 and an inwardly directed nipple 19, and a bore 20 is formed centrally through the head and nipples.

A sight glass or water tube 21 is positioned within the cage and clamped between the heads 15, this tube being formed of glass with the relatively heavy walls forming a central bore 22 which, when the tube is in position, forms a communication between the bores of the heads. As a means for preventing all leaking between the ends of the tube and the heads of the cage, we have provided relatively thick packing washers 23 which surround the nipples formed upon the inner ends of the heads and which have inwardly directed extensions or sleeves 24 bearing about the nipples 19 and extending beyond the same, these extensions or sleeves being so proportioned as to fit snugly within the ends of the tube 21 when the latter is in place. The end portions of these sleeves, which project beyond the nipples 19, are skived or beveled as shown at 25 to form inclined faces and as will be readily seen the pressure of the water and steam in the tube will act against these faces to expand the sleeves against the inner face of the tube and so prevent any water or steam escaping to the ends of the tube. In order to further insure a close connection, the inner faces of the heads of the cage are preferably provided with a plurality of concentrically formed grooves 26 in which the packing washers 23 seat when com-

pressed. As will be seen, the nipples and sleeves 24 of the packing washers, extending into the ends of the tube as they do, also serve to center the tube within the cage and to hold the same against lateral movement. These sleeves, as before stated, fit closely within the ends of the tube and therefore, when the washers are compressed by the clamping of the tube between the heads 15, the sleeves 24 are expanded somewhat, rendering their engagement between the nipples and tube still closer. Upon the passage of the hot water and steam into the tube, it will of course be understood that the tube not only expands longitudinally, but also diametrically, that is, that its bore becomes somewhat greater. The nipple however, being of metal expands fully twice as much as the tube and the sleeve 24 is therefore still further expanded and not only takes up all span caused by the expansion of the tube, but is tightly compressed between the nipple and tube to form an absolutely tight joint. Moreover, the pressure of the water and steam against the inclined faces 25 of the sleeves serves to force the free ends of the sleeves against the inner face of the tube and absolutely prevent all leakage between the sleeves and tube.

In Figs. 4 and 5, we have illustrated a somewhat modified form of construction in which one of the clamping heads of the cage is formed with an internally threaded socket 27 in its outer face, adapted to receive the exteriorly threaded end 28 of a detachable nipple 29. This head is provided with an annular shoulder 30 having angularly formed faces 31 for the application of a wrench. The tube itself is provided upon its outer face with an opaque coating of paint or other suitable compound to prevent the access of light to the tube, this coating entirely covering the outer surface of the tube with the exception of a longitudinally extending strip 37 which is positioned at one of the sight slots of the cage and through which the reading may be taken. In this form of tube, the steam in the tube, because of the black background, appears as a white cloud, while the column of water appears black, this giving a very clear reading of the level.

It will of course be understood that the tubes are interchangeable, that is, that the coated tube may be used with the cage construction shown in Fig. 1 and the clear tube used with that shown in Figs. 4 and 5, if desired.

Our water gage construction is of great value, due to the fact that the ends of the tube are, at all times, protected from direct contact with the water and steam and also to the fact that the pressure of water and steam in the tube is utilized to assist in the

expansion of the packing sleeve to render a tight connection between the clamping heads of the cage and the ends of the tube.

Having thus described the invention, what is claimed as new is:

1. A water gage including a longitudinally slotted cage, heads threaded into the ends of the cage, inwardly directed nipples formed centrally of said heads, packing rings bearing against the inner faces of the heads and around said nipples, sleeves formed integrally with said packing rings and bearing about the nipples, the inner ends of the sleeves extending beyond the ends of the nipples, and a tube positioned in the cage and clamped between the heads, the nipples extending into the ends of the tube and the sleeves of the packing rings bearing against the inner face thereof, the extended ends of the sleeves being beveled to form inclined faces.

2. A water gage including a longitudinally slotted cage, heads threaded into the ends of the cage, inwardly directed nipples formed centrally of said heads, packing rings bearing against the inner faces of the heads and around said nipples, sleeves formed integrally with said packing rings and bearing about the nipples, the inner ends of the sleeves extending beyond the ends of the nipples, and a tube positioned in the cage and clamped between the heads, the nipples extending into the ends of the tube and the sleeves of the packing rings bearing against the inner face thereof, the extended portions of the sleeves being beveled interiorly.

3. A water gage including a longitudinally slotted cage, heads threaded into the ends of the cage, inwardly directed nipples formed centrally of said heads, packing rings bearing against the inner faces of the heads and around said nipples, sleeves formed integrally with said packing rings and bearing about the nipples and extending by their inner ends beyond the inner ends of the nipples, and a tube positioned in the cage and clamped between the heads.

4. A water gage including heads movable toward and away from each other, a tube clamped between said heads, nipples formed upon the heads and extending within the ends of the tubes, yieldable elements interposed between the heads and the ends of the tubes and having extended portions bearing within the tube and adapted to be forced into engagement with the inner wall thereof and to extend beyond the ends of the nipples.

5. A water gage including a cage, heads forming ends to the cage and having inwardly directed nipples, yieldable packing rings carried by the heads and having sleeves surrounding the nipples and extending beyond the same, and a tube clamped between the heads and receiving the ex-

tended sleeves of the packing rings which are adapted and arranged for forceful engagement against the inner face of the tube.

5 6. A water gage including a cage, heads forming ends to the cage, a tube clamped between said heads, yieldable packing rings interposed between the heads and the ends of the tube and extended portions formed upon the packing rings and projecting into
10 the ends of the tube, said portions being adapted and arranged to be forced into en-

gagement against the inner wall of the tube and having their inner ends beyond the nipples beveled interiorly.

In testimony whereof we affix our signatures in presence of two witnesses.

WILLIAM H. HILL. [L. S.]
ALEXANDER M. PATCH. [L. S.]

Witnesses:

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