No. 809,471. PATENTED JAN. 9, 1906.

G. T. SEABURY.

WATER OR FLUID GAGING TUBE.

APPLICATION FILED FEB. 7, 1905.

2 SHEETS—SHEET 1.

Fig. 1.

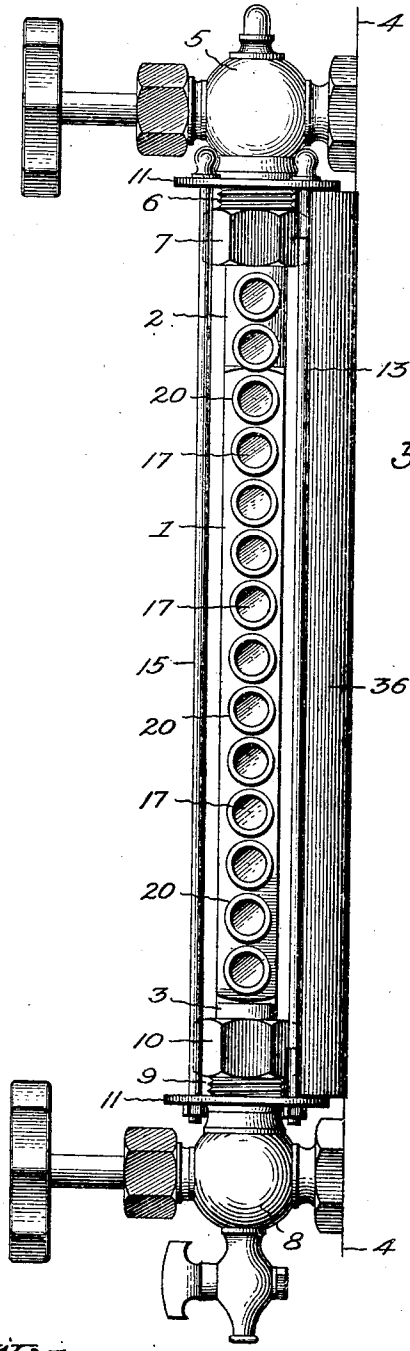
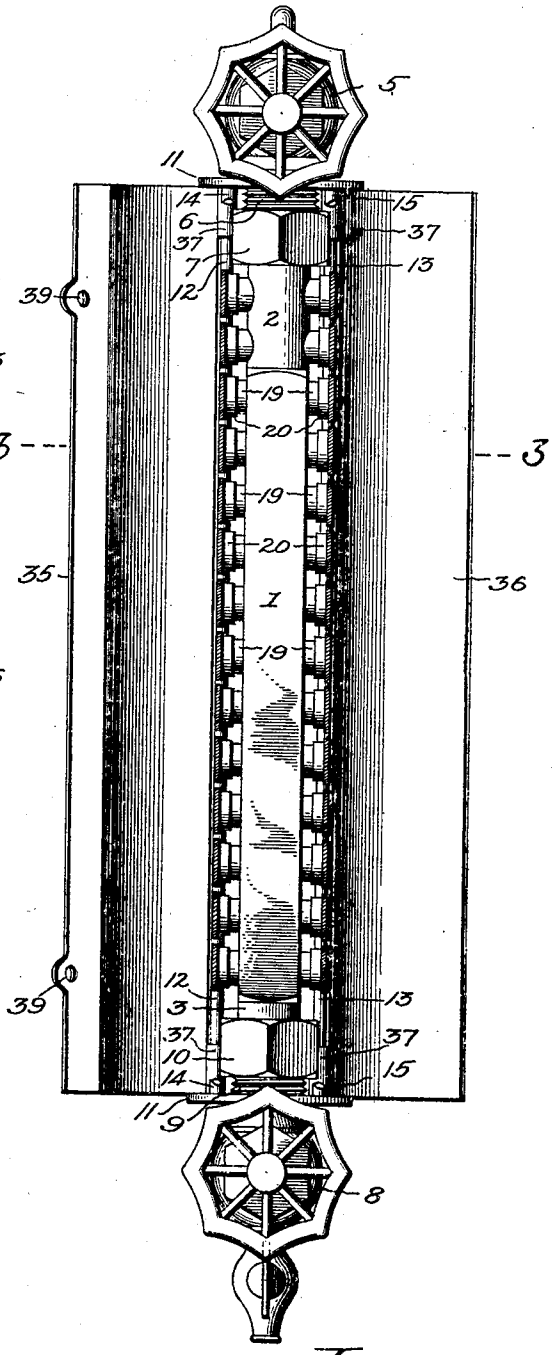


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

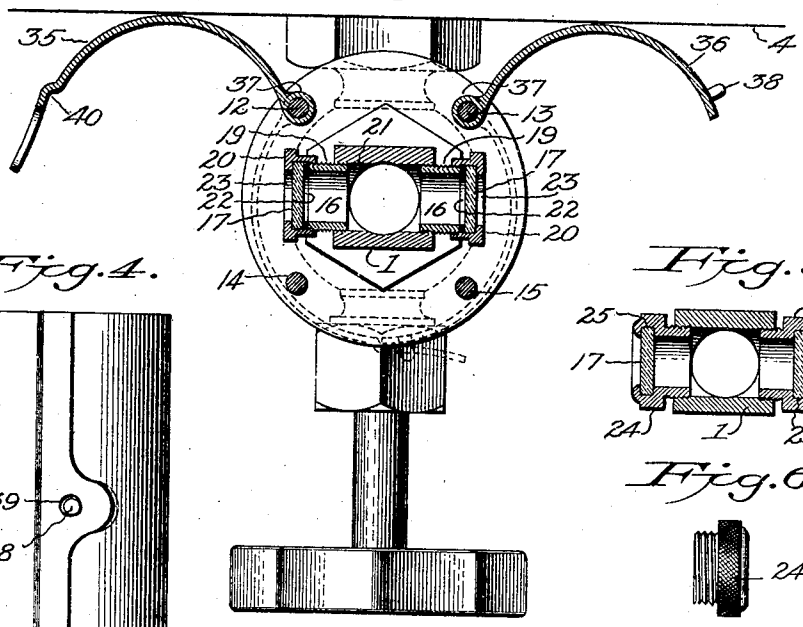


Fig. 4.

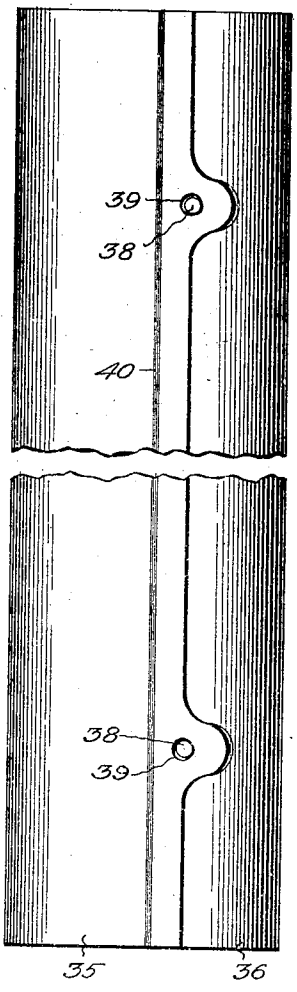


Fig. 5.

Fig. 6.

Fig. 7.

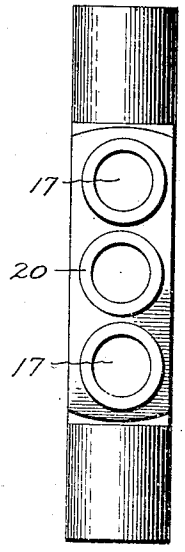


Fig. 8.

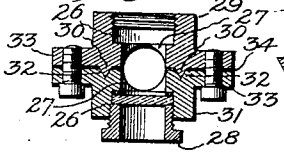


Fig. 10.

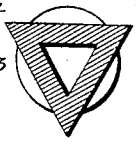
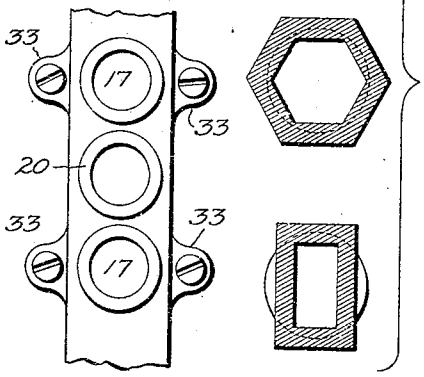


Fig. 9.



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H. S. Bailey. Attorney

UNITED STATES PATENT OFFICE.

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WATER OR FLUID GAGING TUBE.

No. 809,471. Specification of Letters Patent. Patented Jan. 9, 1906.

Application filed February 7, 1905. Serial No. 244,632.

To all whom it may concern:

Be it known that I, GORHAM T. SEABURY, a citizen of the United States of America, residing at Cheyenne, in the county of Laramie and State of Wyoming, have invented certain new and useful Improvements in Water or Fluid Gaging Tubes; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in water-gages for steam and hot-water boilers, liquid-receivers, oil-cups, lubricators, and for all kinds of fluid-holding receptacles that it is desired to attach a depth-indicating gage to; and the objects of my invention are, first, to provide a practically indestructible and perfectly safe water-gage that is non-crackable and non-breakable from the heat or expansive tension of steam or fluids; second, to provide a water-tube gage that is provided with a plurality of independent transparent light and sight inlet and eyelet-windows that are adapted to indicate the height of the fluid within the tube; third, to provide a water-tube gage that is provided with a plurality of independent renewable light and sight inlets and eyelets that are of such form and size that they are practically unbreakable by internal heat and the commonly-used expansive pressure of steam-boilers and that are arranged in such a manner that in case one or two or more of the sight-inlets are broken the escape of steam or liquid is confined to a small aperture; fourth, to provide a water-tube gage having a hood arranged to stand normally open, but arranged to be closed around the tube when a crack or break occurs in an eyelet that prevents steam or hot water from escaping from it; fifth, to provide a water-tube gage that is made in two parts or halves that are detachably secured together; sixth, to provide a water-tube gage that is made of two half-tubes that are arranged to be clamped together and in which either one or both halves are provided with a plurality of independent sight-inlet eyelets arranged in any predetermined order, and, seventh, to provide a perfectly safe, durable, and economical water-tube gage the sight-indicating eyelets of which can be quickly and easily repaired without removing the tubes from the boiler.

I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of my improved water-tube gage operatively attached to a fragment of a boiler. Fig. 2 is a front elevation thereof. Fig. 3 is a sectional view on the line 3 3 of Fig. 2. Fig. 4 is a front view of the two halves of the hood folded and buttoned together. Fig. 5 is a cross-section of the water-tube and shows a sight-inlet eyelet of slightly-different arrangement from that shown in Fig. 3. Fig. 6 is a side elevation of the cap used on the sight-inlet shown in Fig. 8. Fig. 7 illustrates my tube arranged and adapted for use as an oil or lubricator cup. Fig. 8 is a cross-section of a modified form of tube. Fig. 9 is a side view of a fragment of the tube shown in Fig. 8, and Fig. 10 is a cross-section of several forms of tubes I could use for gage-tubes.

Similar figures of reference refer to similar parts throughout the several views.

Referring to the drawings, the numeral 1 designates a tube of metal or any other suitable non-transparent material. I preferably make my improved tube out of brass or aluminium, although copper or alloyed metals may be used, if desired.

My improved water or other fluid indicating tubes may be made of any form of cross-section, either round, triangular, hexagonal, or of any polygonal form; but I preferably use a square tube having short round portions 2 and 3 at each end, which are made of the same diameter as the glass water-tube gages in common use. I also make the tubes of any length and also of the same length as the commonly-used water-tubes in order that they can be placed in the water-tube gage-fixtures of locomotives, stationary marine boilers, and other fluid-receptacles in use.

In the drawings, the numeral 4 designates a fragment of the end of a boiler. A water-gage valve 5 is connected to the boiler in a well-known manner. This valve is provided with a depending water-tube-receiving stuffing-box, which comprises the nipple member 6 and the gland-nut 7, the construction of which is well known. Below the valve 5 a similar water-gage valve 8 is secured to the boiler, which is also provided with an upward-projecting stuffing-box, nipple member 9, and with a gland-nut 10, which is threaded to the nipple. The gland-nuts and nipples of both of these valves are arranged to receive the

opposite round terminal end portions of my improved tube and are arranged on all boilers to receive the common size and lengths of glass water-tubes. A rubber packing-ring is placed on the ends of the tube and in the gland-nut and is secured by the nut against the end of the nipple of the valves and packs the connection between the tube and the valves against leakage. The rubber packing-ring and the interior of the gland-nut and valves are not shown, as their construction is well known and they do not form any part of my invention. Both of the valves are provided with disk plates 11, to which the opposite ends of four guard-rods 12, 13, 14, and 15 are secured. These guard-rods extend from one plate to the other. They are positioned at a short distance from the tube and at substantially equal distances apart, and where a square tube is used, as illustrated, they are preferably placed opposite its four corners. I preferably use four of these guide-rods; but, if desired, the two front rods may be dispensed with. The tube is provided with one or two or three or four rows of light and sight inlet eyelets or windows 16, which are preferably arranged in vertical rows on either one or two or three or four sides of the tubes. For locomotive use I preferably place a row on each of the sides of the tube, as shown in Fig. 2, this arrangement permitting the engineer of the cab to see one row of eyelets and the fireman to see the opposite row of eyelets. These light and sight eyelet-windows may be made of any suitable transparent material, such as mica or glass, and they each consist of small independent pieces of glass or mica 17 or other suitable transparent material, that are positioned and removably connected to the tube at predetermined distances apart and in any desired order and by any suitable means. I preferably make these sight-inlet windows of small round disks of glass of sufficient thickness to withstand the highest heat and pressure they are likely to ever be subjected to. My invention contemplates any means for removably securing these glass disks in and to the tube; but I preferably use a thimble comprising a nipple 19, having a removable cap 20, or one or two modifications of this arrangement. These thimbles are removably attached to the tube in preferably the following manner: I form a row of threaded holes 21 in one or more sides of the tube, at equal distances apart, and preferably space them just far enough apart to permit the caps and the nipples of the thimbles to stand close together without touching one another, although, if desired, they may be spaced any desired distance apart. Where but two rows of eyelets are used, I preferably place them directly opposite each other, as shown in Fig. 3. In each of the threaded holes 21 I screw one end of a threaded nipple 19. (See Fig. 3.) The opposite end of this nipple is also threaded, and a cap 20 is interiorly threaded to screw onto it. A rubber washer 22 rests against the outer end of the nipple, and the glass disk 17 rests on the washer, and the glass and washer are clamped to the end of the nipple by screwing the cap against them. An aperture 23 is made through the top of the cap, which is large enough to expose all but a narrow edge portion of the glass to view. This arrangement permits the glass disk to be easily and quickly removed should one crack or break, and a new one can be replaced in a minute or two without removing the nipple from the tube.

In Fig. 5 I illustrate a slight modification of the cap-and-nipple thimble shown in Fig. 3. In this modification the cap and nipple are made in one integral thimble member, and the nipple portion of the thimble is threaded and screws into the threaded holes of the tube. The cap end of the thimble comprises an enlarged annulet member 24, in the top of which a recess 25 is formed, in which the glass is placed. The top edge of the cap is then spun over the glass, thus securing the glass permanently to the thimble. In this arrangement if a glass cracks or breaks it is necessary to remove the nipple and replace it by one having a perfect glass in it.

In Fig. 8 I illustrate another modification of the means for securing the glass disks to the tube. In this view a row of holes 26, each of which is large enough to receive loosely a glass disk, is first drilled into the shell of the tube for a short distance, and a smaller hole 27 is then drilled from the bottom of the holes 26 through the shell of the tube. The interiors of the larger holes are then threaded and the shoulders between the two holes are counterbored to form a flat shoulder. Rubber washers are then placed in the large holes against the shoulders, and the glass disks are then placed in the holes against the washer. A cylindrical thimble 28, which is provided with an enlarged annulet or bead in its outer end, is then threaded into the hole and is screwed against the glass disk, thus removably securing it to the tube. The annulets or bead portion of the cap or outer ends of all of these thimbles are knurled or serrated to provide a frictional surface for the fingers, or, if desired, this enlarged annulet or band may be made of a polygonal or any other form adapted to receive a wrench.

In Fig. 8 I illustrate a tube constructed in two halves or parts which are arranged and adapted to be secured together. My invention contemplates water or fluid gage tubes made up of separate parts and secured together by any suitable means. I preferably make this divided tube in two equal half-tubes and provided in their meeting edges with tongues and grooves which fit one within the other. Thus the edges of the half 29 are provided with tongues 30 and the half 31 is provided with grooves 32, and the tongue

fits within the groove and keys the two halves in alinement, as well as increasing the stability and unity of the joint. The side edges of the two halves are provided with lugs 33, which are positioned to register opposite each other. These lugs are provided with suitable apertures in which bolts or screws are inserted to clamp the two halves together. A suitable packing 34 is preferably placed between the meeting edges of the two halves to insure a perfectly tight joint; but two rows of sight-inlet eyelets are placed on this form of tube, one row on each half opposite each other, and I preferably use the form of eyelet described in this modification for this built tube, as the form of this tube necessitates a thicker shell in order to secure the desired stiffness in the complete tube.

In Fig. 7 I illustrate a short length of my improved fluid-gaging tube which is adapted for use as an oil-cup, any suitable cap and base being used therewith. The construction of these tubes for use as oil-cups or lubricators is the same as when used for water or other fluids; but when they are to be used for oil-cups they are made shorter and are made larger in diameter.

One of the new and novel features of my invention is to prevent scalding of the engineer or fireman in case one or more of the eyelets should blow or break out. I preferably use for this purpose a hood, which I hinge in any suitable manner, adjacent to the tube in such a manner that it will swing and fold around the tube, and thus inclose the escaping steam and hot water within the hood until the engineer can close the tube's valves. My invention contemplates any means for operatively attaching and operating the hood; but I preferably carry out this feature of my invention in the following manner: To each of the two rear guard-rods I hinge one side edge of two segmentally-curved sheets of metal or other suitable material 35 and 36, the guard-rods passing loosely through hinge-eyes 37, formed on the side edge of each hood-plate. These hood-segments are made to meet in front of the gage and slightly overlap each other, and lugs 38 are formed on one side plate and apertures 39 are formed on the opposite hood-plate that receives loosely the lugs of the opposite plate and locks the two together. A step 40 is also formed in one side plate, against which the edge of the other side plate strikes when the two half-hoods are closed together. The two hood-plates are thus closed around the sides and front of the gage, thus effectually inclosing the escaping steam. This hood is adapted to be closed by hand, which can be safely done without danger of the attendants being burned by escaping steam or hot water, which escapes in case an eyelet breaks at right angles to the axis of the tube instead of up and down, as when a glass tube breaks. Consequently it is an easy matter for the engineer or fireman to close the hood by catching hold of its plates above the broken eyelet. These hood-plates, however, can be very easily arranged to be closed by a cord mounted on grooved pulleys that are positioned to lead the cord to some convenient point away from the boiler. Thus both the engineer and fireman of a locomotive could have a cord attached to the plates in an operative manner and could arrange this cord to extend along the top of the cab and down within easy reach of their sitting positions and in case of the breakage of an eyelet could instantly close the hood and then afterward close the valves without danger of being burned. Normally these half-hoods stand swung back, as shown in Fig. 3, and if but one row of eyelets is placed in a tube only one hood-plate need be used.

The operation of my improved fluid-tube gage is as follows: The water, oil, or other fluid of the boiler, tank, receiver, or receptacle, to which the tube is operatively attached, rises in the tube the same as in an ordinary glass water-gaging tube and its height in the tube is plainly seen in the sight or light inlet eyelets. Especially is the water or other fluid very plainly seen when a row of eyelets is placed on either two, three, or four sides of a tube, as light is then admitted to the interior of the tube.

My invention is simple, practically indestructible, and perfectly safe and the eyelets are very easily and quickly repaired at trifling expense and without removing the tube.

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

1. In a water or fluid gaging tube, a tube of any suitable non-transparent material, provided with a plurality of apertures arranged in any predetermined order along the length of said tube; a nipple threaded to each aperture; a transparent disk seated in said nipple; and a ring-shaped cap arranged to removably secure said transparent disk to said nipple.

2. In a water or fluid gaging tube, the combination of a metal tube adapted to water-gage-valve fittings, and provided with a plurality of threaded apertures arranged in vertical rows along its length, with a plurality of nipples removably threaded to said apertures; a cap-ring threaded to the outer end of said nipple; and a glass disk arranged to be clamped between said cap-ring and said nipple.

3. In a water or fluid gaging tube, the combination of a tube, through its operative gaging body portion, having round end portions, adapted to be operatively mounted in water-gage valves, and provided with a plurality of independent and renewable light and sight inlet eyelet-windows arranged to admit light to the interior of said tube, and arranged along the length of said tube, said windows comprising nipples threaded to said tube, a cap-

ring threaded to each of said nipples, a pliable washer in said cap-ring, and a glass disk secured between said nipple and washer and said cap-ring.

4. In a water or fluid gaging tube, a tube adapted to be connected to water-gage-valve fittings provided with guard-rods; a pair of curved plates loosely hinged to said guard-rods, and arranged to fold over said tube.

5. In a water or fluid gaging tube, the combination of the tube operatively connected to water-gage fittings, provided with guard-rods, and provided with a plurality of light and sight inlet eyelet-windows, with a hood comprising two curved plates each of which is hinged to one of said guard-rods and arranged to swing and overlappingly fold over said tube; means including lugs for locking said hood-plates in a folded position.

6. In a water or fluid gage, the combination with the gaging-tube, the valve-fittings, the guard-rod plates, and the guard-rods, with a hood arranged to fold over said tube and comprising a pair of curved plates, one of each of which is pivotally hinged to a guard-rod, to swing and fold together around said tube; an outward-curved lip on the free edge of one of said plates, provided with a stepped shoulder; apertures in said lip, and lugs on the edge of the opposite plate, adapted to enter said apertures, when said plates are folded over said tube, and lock said plates together.

7. In a water or fluid gaging tube, an operative gaging-tube, provided with guard-rods and one or more curved plates pivotally connected to said guard-rods and arranged to be folded around said tube.

In testimony whereof I affix my signature in presence of two witnesses.

GORHAM T. SEABURY.

Witnesses:
G. SARGENT ELLIOTT,
BESSIE THOMPSON.