

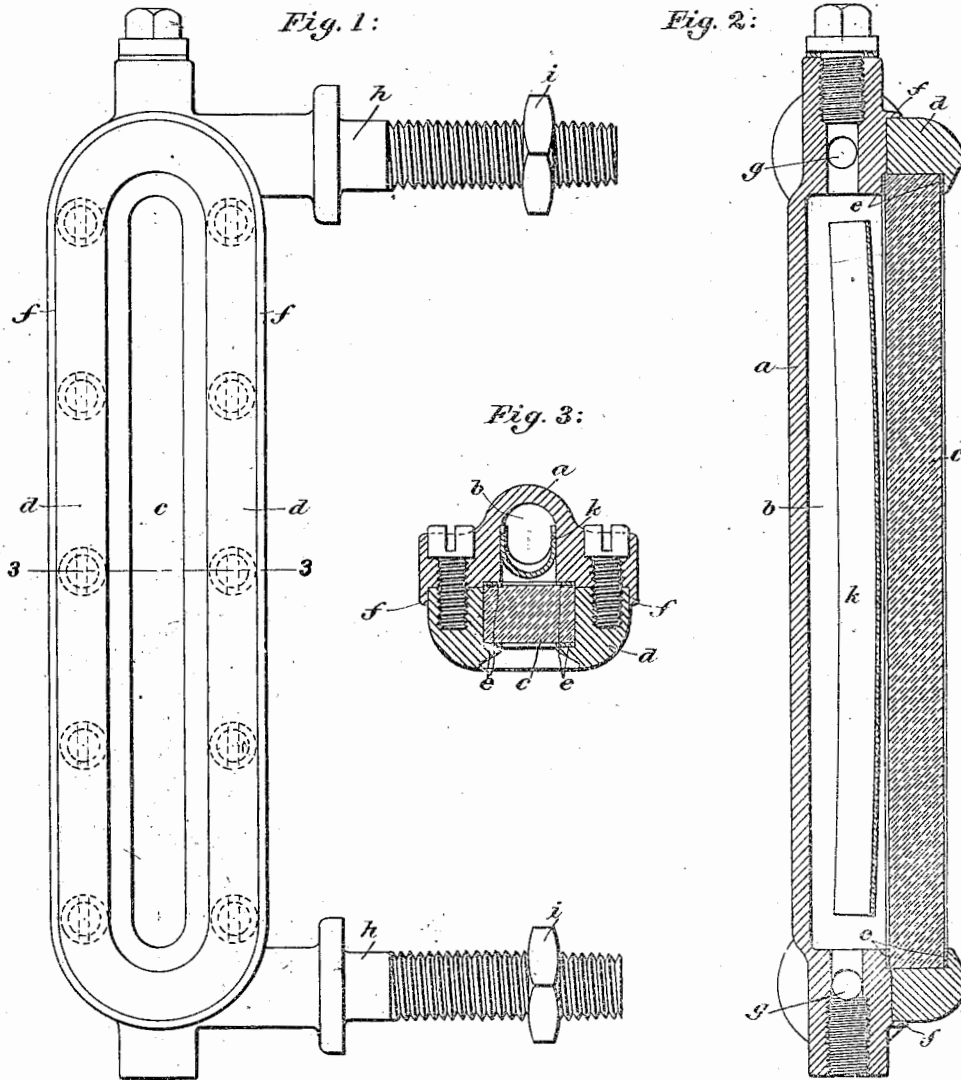
No. 890,742.

PATENTED JUNE 16, 1908.

G. E. WHITNEY.

LIQUID GAGE.

APPLICATION FILED JULY 26, 1902.



Witnesses,
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UNITED STATES PATENT OFFICE.

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LIQUID-GAGE

No. 890,742.

Specification of Letters Patent.

Patented June 16, 1908.

Application filed July 26, 1902. Serial No. 117,107.

To all whom it may concern:

Be it known that I, GEORGE E. WHITNEY, a citizen of the United States, residing at East Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Liquid-Gages, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My invention comprises a new form of liquid gage suitable for attachment to steam boilers and other like liquid containing receptacles, whereby the height or level of the liquid therein may be observed through a transparent wall in said gage. Its object is to provide a liquid gage of simple construction, the appearance of which above the liquid level is so contrasted with its appearance below the same that the precise location of the liquid line in the gage will be plainly discernible and unmistakable even at a distance or in a dim light.

The character of my invention will more fully appear and be better understood by reference to the accompanying description and illustration of one specific embodiment thereof.

In the drawings,—Figure 1 is a front elevation of one form of my improved gage; Fig. 2 is a central longitudinal section of the same; and, Fig. 3 is a cross sectional plan view taken on the line 3—3 in Fig. 1.

The main body or casing *a* is provided as shown with a recessed portion *b* forming a chamber for the water or other liquid. The front of this chamber is closed by a transparent wall *c* consisting of a plate of annealed glass or other suitable material of sufficient thickness to withstand the necessary pressure. This wall is held in place by a retaining shoulder on a cap *d*, suitable packing *e e* being interposed between the wall and the adjacent surfaces of the retaining shoulder and casing. The casing *a* has a projecting lip *f* which embraces the edges of the cap, the latter being held in position by screws entering the casing from the rear, and forcing the wall against its packing *e*. Suitable passages *g* at either end of the casing extend through the laterally projecting connecting portions *h* the ends of which are threaded and provided with union nuts *i* whereby the gage may be connected in any desired manner through suitable piping with the boiler

or other liquid containing receptacle to which it is to be applied.

It is to be understood that the size, shape and details of construction of the gage in the particulars referred to are immaterial and may be varied within wide limits to suit the character and requirements of the service to which it is to be applied.

Within the liquid chamber *b* is a reflector *k* so placed as to oppose a reflecting surface to the light transmitted through the transparent wall *c*. This reflector I preferably form of an aluminum strip and polish the reflecting surface thereof to produce a reflecting mirror, but my invention is not in any way limited in this respect, and any means providing a suitable reflecting surface may be employed. By bending the edges of this strip as shown sectionally in Fig. 3 it may be placed in the chamber and frictionally held therein, as shown in Fig. 2, thereby presenting to the light entering the chamber an opposing convex reflecting surface. I have also shown the reflector as slightly curved in the direction of its length so that it has longitudinally, as well as laterally, a non parallel relation with the transparent wall. This non-parallel relation between the reflector and the transparent wall renders the line of liquid level very distinct by causing the liquid in the glass to appear dark and the space above the liquid to appear white, affording a marked contrast at the liquid line. The cause for this latter effect I have assumed to lie in the difference between the index of refraction of liquids, such as water, and of vapors, such as air or steam, and to the fact that the critical angle or the angle at which light is no longer refracted but reflected on passing from one of these mediums into another, such as glass, is less in the case of one than in the case of the other. I have therefore assumed that the light reflected from the vertically curved reflector meets the inner surface of the transparent wall at such an angle as to cause its transmission through the wall or its reflection back again into the chamber according as the interposed medium may be vapor or liquid.

It is to be understood that the specific construction described is submitted for illustrative purposes only and that my invention is not in any way limited thereto.

Claims.

1. In a liquid gage, a liquid chamber, a

transparent wall therefor and a reflecting surface within said chamber presenting a portion inclined at an angle with said wall in a vertical direction.

5 2. In a liquid gage, a liquid chamber, a transparent wall therefor and a laterally convex reflecting mirror within said chamber having a surface opposed to said wall and in predetermined relation thereto.

10 3. In a liquid gage, a liquid chamber, a transparent wall therefor and a reflecting surface within said chamber and opposed to said wall, said reflecting surface being curved in a vertical direction.

15 4. In a liquid gage, a liquid chamber, a transparent wall therefor and a reflector within said chamber having a laterally and vertically curved reflecting surface opposed to said wall.

20 5. In a liquid gage, a liquid chamber, a transparent wall therefor and a reflecting surface within said chamber, said reflecting surface and a surface of said wall having a non-parallel relation in a vertical direction.

25 6. In a liquid gage, a liquid chamber, a transparent wall therefor, and a vertically curved reflector separate from the walls of said chamber and movably secured therein, but in a predetermined relation to said transparent wall.

30 7. A liquid gage for indicating the varying level of liquids, comprising a liquid chamber having communicating passages and adapted for connection with a boiler or other liquid containing receptacle, a transparent wall therefor, and a reflecting surface within said chamber in close proximity and in predetermined relation to said wall, said reflecting surface, and a surface of said wall being relatively curved.

8. In a liquid gage, a liquid chamber, a transparent wall therefor, and a convex reflecting surface opposed to said transparent wall and in predetermined relation thereto.

9. In a liquid gage, a liquid chamber, a transparent wall therefor, and a transversely and vertically curved metallic reflector frictionally held within said chamber.

10. In a liquid gage, a liquid chamber, a transparent wall therefor, and a laterally convex opaque stationary reflecting mirror within said chamber opposed to said wall.

11. In a liquid gage, a liquid chamber, a transparent wall therefor, and a stationary aluminum reflector curved vertically and transversely, located within said chamber.

12. In a liquid gage, a liquid chamber, a transparent wall therefor, and an axially curved reflector in close proximity to said wall and in predetermined relation thereto, said chamber having also a liquid space behind said reflector.

13. In a liquid gage, a liquid chamber, a transparent wall therefor, and a curved reflector in close proximity to said wall and in predetermined relation thereto, said chamber having also a liquid space behind said reflector.

14. In a liquid gage, a liquid chamber, a transparent wall therefor, and a removable curved reflector for said chamber in predetermined relation to said wall.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

GEORGE E. WHITNEY,

Witnesses:

THOMAS B. TAYLOR,
VICTOR LINDEROTH.