

J. J. HICKS, L. J. CROSSLEY & R. HANSON.

WATER GAGE TUBE.

No. 182,192.

Patented Sept. 12, 1876.

Fig. 1.

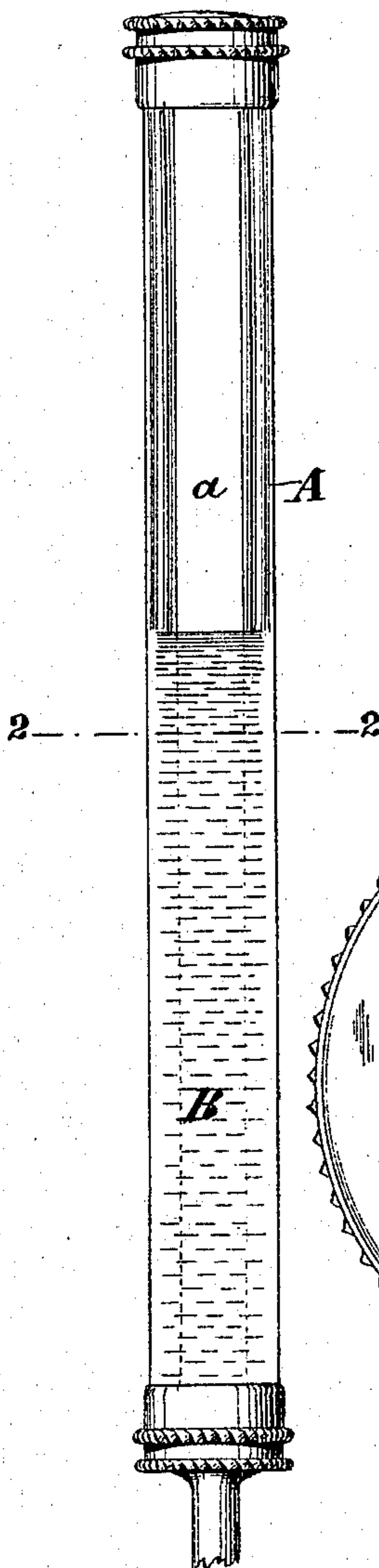


Fig. 2.

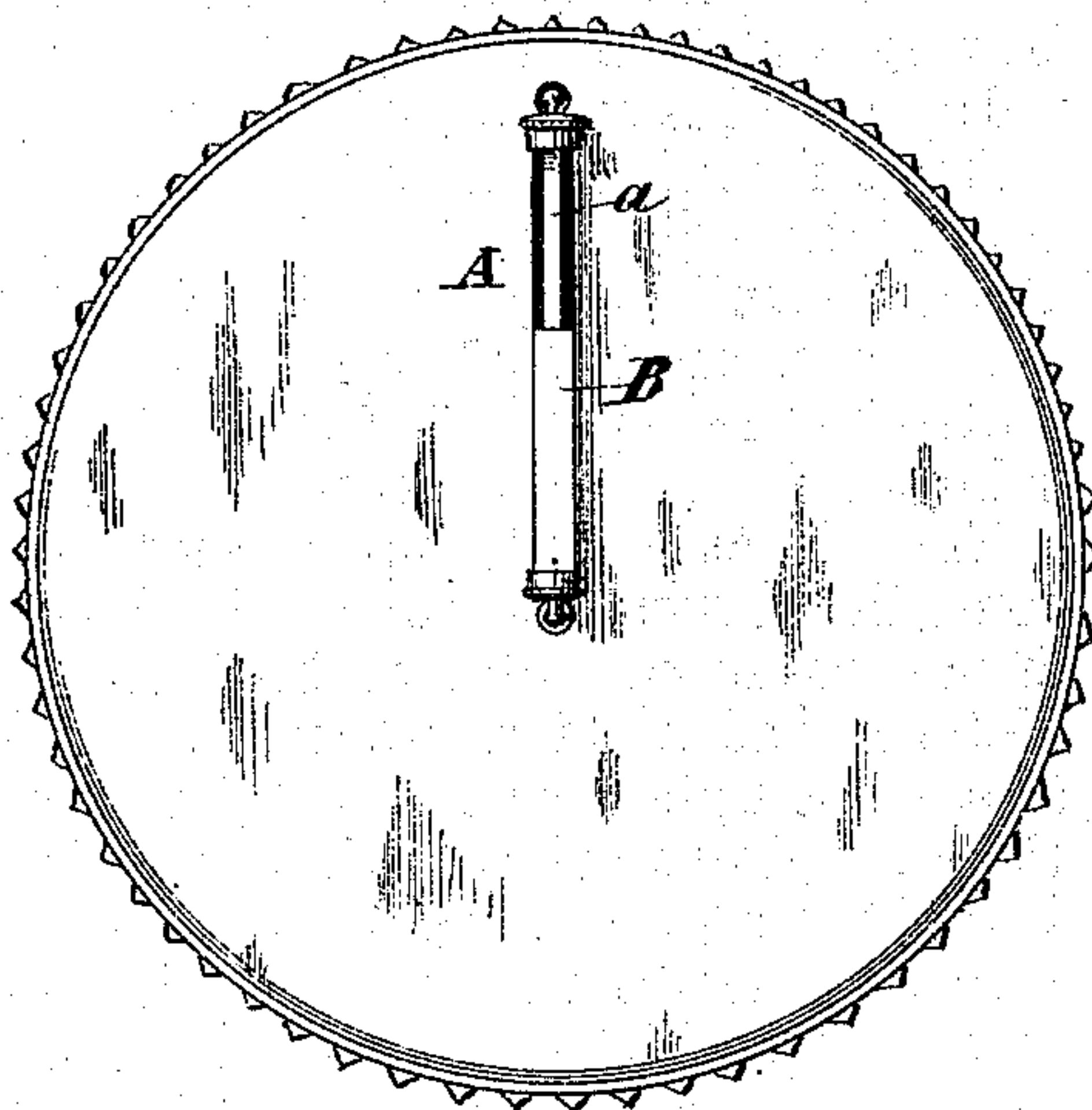
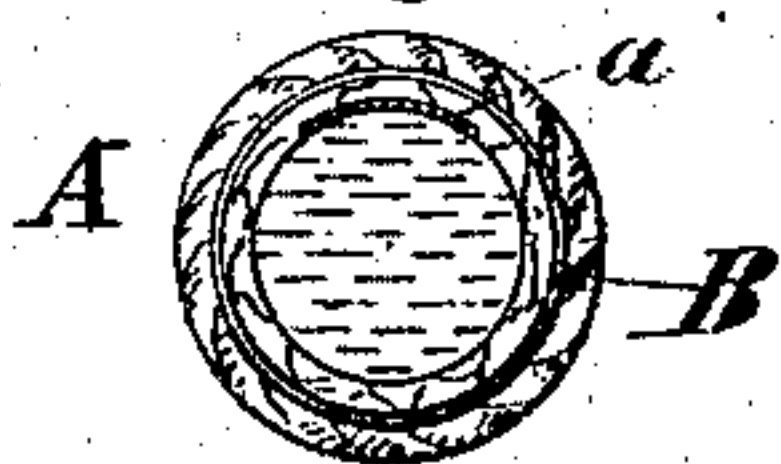


Fig. 3.



WITNESSES

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JAMES JOSEPH HICKS, OF HATTON GARDEN, AND LOUIS JOHN CROSSLEY
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IMPROVEMENT IN WATER-GAGE TUBES.

Specification forming part of Letters Patent No. **182,192**, dated September 12, 1876; application filed
June 16, 1876.

To all whom it may concern:

Be it known that we, JAMES JOSEPH HICKS, optician, of Hatton Garden, in the county of Middlesex, England, and LOUIS JOHN CROSSLEY, carpet manufacturer, and RICHARD HANSON, engineer, both of Halifax, in the county of York, England, have invented a certain new and useful Improvement in Water-Gages, of which the following is a specification:

The improvement relates to that class of water-gage in which the level of the water is seen through a glass tube, or in a chamber having a glass front.

In such description of water-gage a difficulty is frequently experienced in seeing the water through the glass, in consequence of the glass and water being nearly of the same color, or of the glass becoming discolored and fouled by the deposit thereon of dirt and other solid matter from the water.

The object of our improvement is to overcome this difficulty, as in our device the height of the water can always be seen at a great distance and in dark situations. It can also be seen at a glance whether the water is above the top or down below the bottom of the gage. The absence of this facility of observation is a serious defect with plain tubes or gage-glasses, in which it is almost impossible to ascertain whether the boiler is full or otherwise. This defect is a frequent cause of boiler explosions.

Our invention consists in the application of white or colored enamel, or other reflecting means, of a certain width to the back of the tube, or to the back of the chamber. This we effect by painting or otherwise covering the outside of the tube to the required width with enamel-glass powder, and fusing the same thereon by the application of heat. Or we embed a layer of enamel-glass of the required width in the body of the glass forming the tube.

In cases where a chamber with a glass front is used in lieu of a glass tube, we apply enamel of the required width to the inside of the back of the gage-chamber, or we place a sheet of enamel-glass in such position.

By these means the light is powerfully reflected through the water, whereby the level

thereof is rendered more readily visible. The light, when reflected from a white enameled background, shows the water white as milk, thus producing the results above described.

In the accompanying drawing, Figure 1 represents a water-gage of our improved construction. Fig. 2 represents the appearance of the same to the eye when applied to a boiler. Fig. 3 represents a transverse section of the gage on the line 2 2, Fig. 1.

A may represent a water-gage, whose tube B is provided with a backing or strip, *a*, of white or colored enamel, or other reflecting means, of the required width to adapt it to change the appearance of the liquid without changing the dark appearance of the tube above said liquid.

The appearance of the device to the eye, as shown in Fig. 2, will cause the invention to be more readily understood, the liquid within the tube being of milk-white color. The milk-white appearance of the water is caused by the light passing through a refracting medium onto a white back, forming a reflector. The tube above the liquid not being changed in appearance, because of the absence of the refracting medium, forms a dark portion, indicating distinctly the height of the liquid.

We are aware that it is not new to apply a milk-white or other colored backing to a thermometer-tube to render the graduations thereon or the contained liquid readily visible, or to a hydrometer-stem for the purpose of rendering the graduations thereon easily readable, and therefore do not claim such a device.

The white or colored backing thus used with thermometer and hydrometer tubes is of such a width as to change the dark appearance of the entire tube, and is, therefore, incompatible with our invention, the design of which is to indicate the height of the colorless liquid, not to change the appearance to the eye of the entire tube and liquid.

Having thus described our invention, the following is what we claim as new and desire to secure by Letters Patent—

1. The tube B, provided with a backing or strip, *a*, of white or colored enamel, or other reflecting means, of the required width, to

adapt it to change the appearance of the contained colorless liquid to a milk-white or other color without changing the appearance of the tube above said liquid.

2. A water-gage tube, B, having a strip, *a*, of white or colored enamel or other reflecting means, of such a width as to adapt it by refraction to change the appearance of the contained water to a milk-white or other color, to render said water readily visible.

3. A water-gage tube, B, having a strip, *a*, of white or colored enamel, of such a width as to adapt it to give color to the contained liquid without changing the dark appearance of the tube above the liquid on each side of the strip.

4. A tube having a strip or backing, *a*, of less width than the bore of the tube, and adapted to color the contained colorless liquid.

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