(No Model.)

2 Sheets—Sheet 1.

E. H. ASHCROFT.

MERCURY PRESSURE GAGE.

No. 256,814. Patented Apr. 25, 1882.

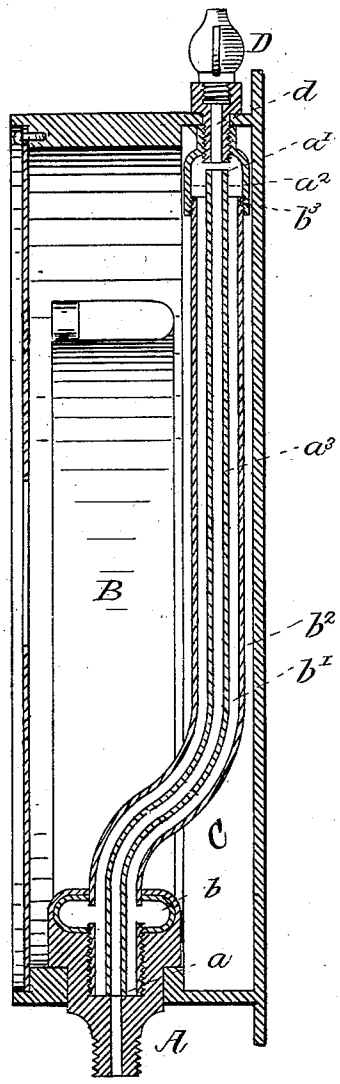


Fig. 1

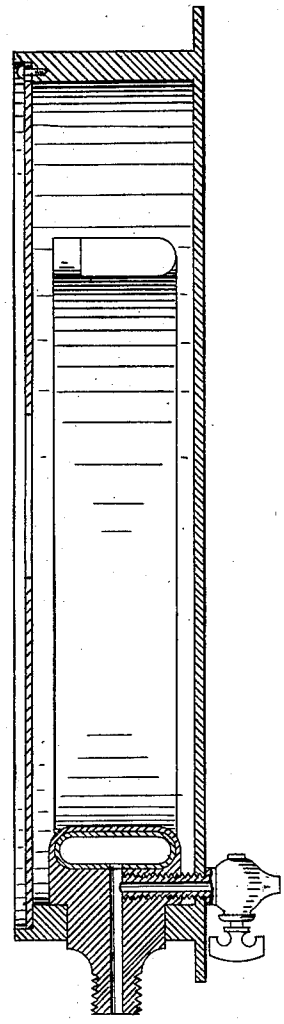


Fig. 2.

WITNESSES

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(No Model.) 2 Sheets—Sheet 2.

E. H. ASHCROFT.

MERCURY PRESSURE GAGE.

No. 256,814. Patented Apr. 25, 1882.

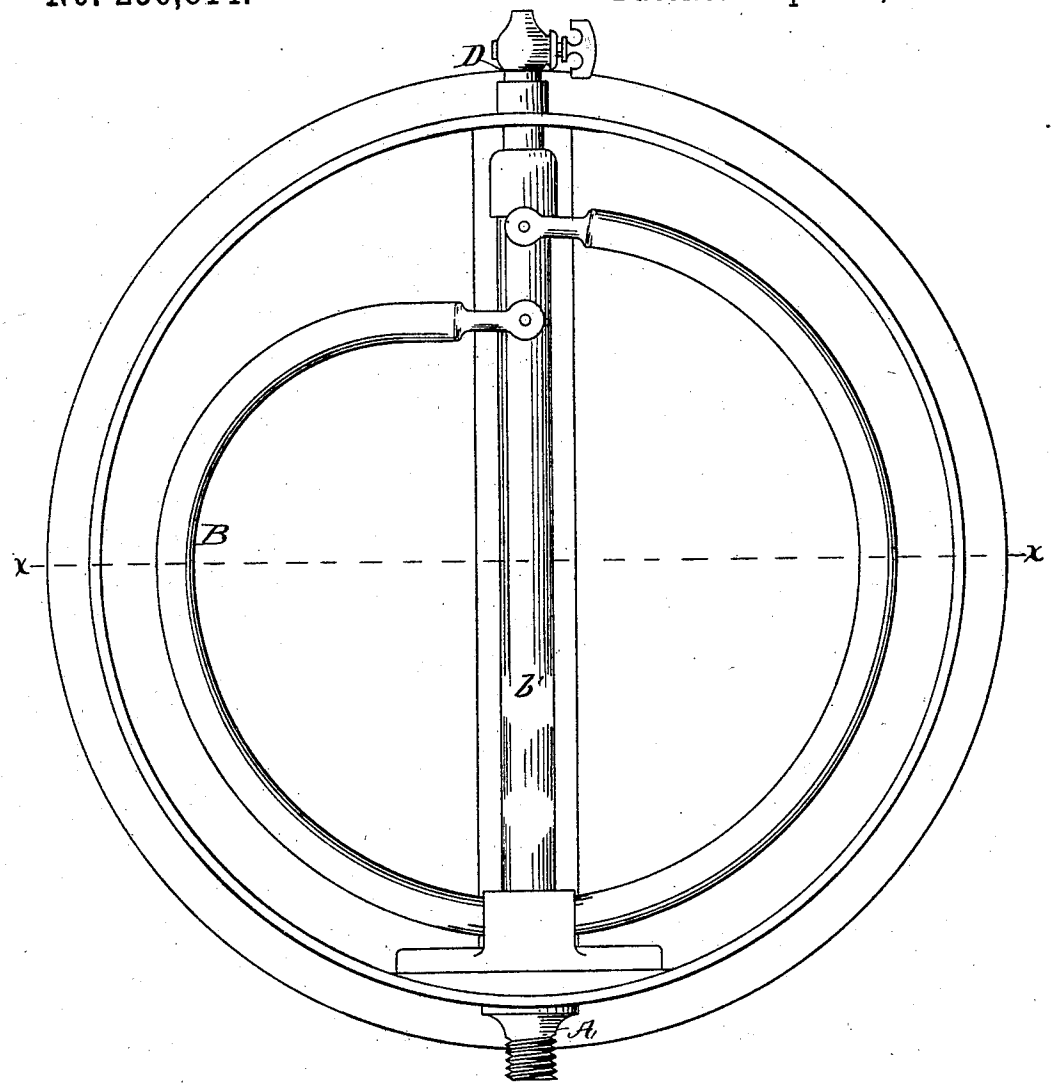


Fig. 3.

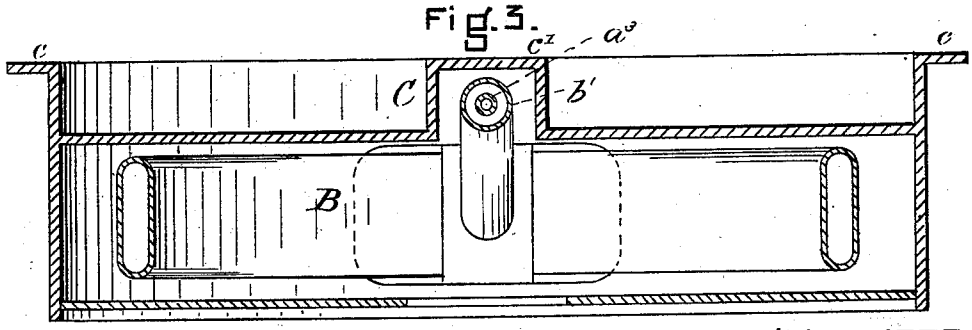


Fig. 4.

WITNESSES

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UNITED STATES PATENT OFFICE.

EDWARD H. ASHCROFT, OF LYNN, MASSACHUSETTS.

MERCURY PRESSURE-GAGE.

SPECIFICATION forming part of Letters Patent No. 256,814, dated April 25, 1882.

Application filed August 8, 1881. (No model.)

To all whom it may concern:

Be it known that I, EDWARD H. ASHCROFT, of Lynn, in the county of Essex and State of Massachusetts, a citizen of the United States, have invented a certain new and useful Improvement in Steam-Gages, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification in explaining its nature, in which—

Figure 1 is a vertical section, illustrating my invention. Fig. 2 is also a vertical section, illustrating a modification hereinafter described. Fig. 3 is a front elevation of the devices shown in Fig. 1. Fig. 4 is a horizontal section on the line *x x* of Fig. 3.

My invention relates, first, to the method of operating a Bourdon spring by means of mercury under steam-pressure; and, second, means whereby the clogging of the steam-passage connecting the boiler with the gage is made known, and whereby the matter or material stopping the passage may be removed.

It is a well-known fact that the passage or tube connecting the boiler with the gage-operating mechanism contained in the casing of the steam-gage is very liable to be clogged by the lodging of sediment within by the rusting of the pipe or by the freezing of water condensed therein, and that when a Bourdon spring is used for the device for actuating the index the same trouble is likely to arise in its passages, and that these disturbances and interruption of the action of steam upon the spring or upon any other instrumentality submitted to its action are liable to result very seriously, as they will cause the gage to register a less number of pounds of steam than the actual pressure. Therefore it is very essential that the Bourdon spring or other device used for communicating motion to the registering mechanism be connected with the boiler in such a manner that it can be ascertained at any moment whether the steam has free passage therein and free access to the said spring or other instrumentality, and if not, have said obstruction removed immediately, and also that it be constructed so that the danger of the freezing of the condensed steam is made as slight as possible.

In the drawings, A represents the passage or steamway in the tube connecting the steam-gage with the boiler.

B is a Bourdon spring. Instead, however, of making the spring of a composition containing more or less copper, I prefer to make the same of steel. This tube, instead of connecting at the point *b* directly with the steam-passage A, as in the ordinary gage, opens into the vertical chamber or passage *b'* in the tube b^2, and this tube, together with the chamber or chambers of the Bourdon spring, is filled with mercury to or about to the point b^3. The steam-passage extends from the point *a*, where it connects with the direct passage A, vertically to the point *a'*, where it enters the chamber a^2, which connects it with the tube containing the mercury-column. This passage *a* may be within the tube a^3, which is itself within the tube b^2, the mercury-tube *b'* inclosing it. Of course the mercury by this construction is under direct steam-pressure from the boiler, and it of course imparts that pressure to the Bourdon spring in substantially the same manner that the direct steam-pressure within would impart pressure; and the Bourdon spring itself is provided with the same, or substantially the same, movement that would be given it if the steam or condensed steam directly entered its passage or passages, instead of exerting its force thereon through the medium of mercury, while at the same time the arm or arms of the spring have a steadier, more regular, and uniform movement, owing to the steadying effect obtained by the method of communicating the steam-pressure and by the weight of the mercury than when steam alone is used. Besides these advantages the use of mercury effectually precludes any danger from freezing. Steel or iron is used for the spring because they are substantially the only metals that can resist the action of mercury.

It is unnecessary to herein describe the mechanism employed for converting the motion of the end or ends of the Bourdon spring into a movement of an index-hand or other device for indicating the pressure of steam in pounds or units, and reference is made to various patents already granted to Bourdon, Lane, and myself for further information concerning the construction and operation of such mechanism. In order, however, that the mercury and steam-passages or tubes may not interfere with the operation of such mechanism, I have provided a chamber, C, in the back of the gage and

curve the steam and mercury tubes, so that they enter the same, and are therefore removed from interference with the registering mechanism. The gage-case also has a flange, *c*, extended backward so that it shall come in line with the outer surface, *c'*, of the chamber C. To ascertain whether there is a clear passage of the steam to the Bourdon spring, the chamber a^2, or to the gage I provide the steam-passage with a blow-off cock, D. This may be located, as represented in Fig. 1, so that its passage *d* shall connect with the chamber a^2, or when a mercury column is not used or the tube a^3 shall be not inclosed, as described, the blow-off can be located where shown in Fig. 2 or at or near the end of said passage connecting with the said chamber. Of course the chamber a^2 must be sufficiently large to provide for suitable steam-pressure upon the mercury column.

It will readily be seen that by opening the blow-off cock it is at once obvious whether or not the passage connecting the boiler with the gage is clogged or interrupted. It is also obvious that if it is opened once or twice a day and the steam allowed to blow through the tube it becomes practically impossible for it to clog.

I am aware that English Patent No. 986 of 1874 describes the use of mercury in a steam-gage for transmitting steam-pressure to the device for actuating the registering mechanism; and I therefore do not broadly claim the same, but simply the manner of its use as herein described.

Having thus fully described my invention, I claim and desire to secure by Letters Patent of the United States—

1. The combination, in a steam-gage, of a Bourdon spring, a steam-chamber, a^2, a steam supply pipe or tube, a^3, entering said chamber, and a passage, b^2, connecting the chamber with the passage or passages in the Bourdon spring, filled with mercury, all substantially as and for the purposes described.

2. The combination of a Bourdon spring, the tube b^2, connected with the passages or chambers in the Bourdon spring, and with the steam-chamber a^2, the tube a^3 within said tube b^2, and the said chamber a^2, all substantially as and for the purposes described.

3. In a steam-gage, the combination of the steam supply-pipe, a pipe or passage connecting it with the passages of a Bourdon spring and adapted to contain mercury or other pressure-transmitting medium, and upon which the steam is brought in direct contact, and a passage communicating with the outer air extending from the end of the steam-passage, having a suitable cock or valve for opening and closing the same, all substantially as and for the purposes described.

EDWARD H. ASHCROFT.

Witnesses:
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