

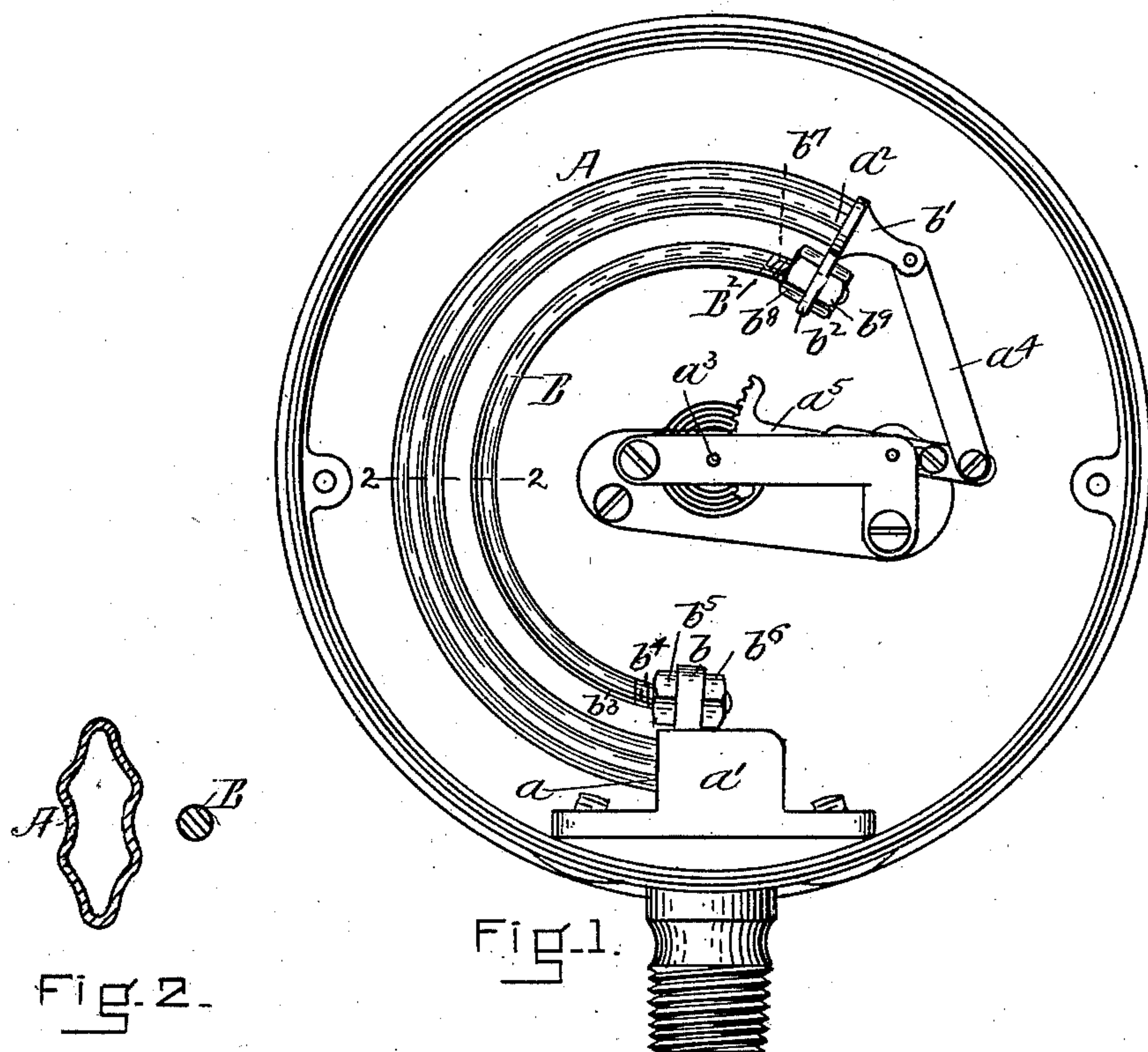
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C. A. G. WINTHER.
PRESSURE AND VACUUM GAGE.

(Application filed July 5, 1900.)

(No Model.)



WITNESSES.

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PRESSURE AND VACUUM GAGE.

SPECIFICATION forming part of Letters Patent No. 686,179, dated November 5, 1901.

Application filed July 5, 1900. Serial No. 22,490. (No model.)

To all whom it may concern.

Be it known that I, CHARLES A. G. WINTHER, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Pressure and Vacuum 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.

The invention relates to the herein-described improvement in pressure and vacuum gages.

It consists in providing the Bourdon tube with an auxiliary spring made of spring metal of any kind—round, square, flattened, or of any other shape—attached at one end to the socket or base holding the Bourdon tube, extending parallel with the tube and attached to the tube at its tip or free end arranged on the inner side of the tube. This auxiliary spring may or may not come in contact with the Bourdon spring itself. I prefer that it should not.

The purpose of the invention is twofold—first, to restrict or do away with the so-called “setting” of the Bourdon tube, and thereby create an instrument of the utmost precision and reliability and for a long period of time, and, second, to enable the use of a more open dial and one more easily and accurately read.

Referring to the drawings, Figure 1 is a view in elevation, the dial removed, showing a pressure-gage having the features of my invention. Fig. 2 is a view in section upon the line 2 2 of Fig. 1. Fig. 3 is a view in elevation representing the construction of Fig. 1 slightly modified. Fig. 4 is a view in elevation of a further modification, and Fig. 5 is a view in section upon the dotted line 5 5 of Fig. 4.

Referring to the drawings, A represents a Bourdon tube. I have represented the type shown and described in my Letters Patent No. 500,830, dated July 4, 1893. It is attached at its end a to its holder a' in the usual manner and is operated in the usual way of such tubes, and its end a^2 is connected with the indicator-shaft a^3 by a link a^4 and sector-lever a^5 , the toothed sector of which engages a pin-

ion on the indicator-shaft. Any way of coupling the end a^2 of the tube with the indicator-shaft may be employed. The tube-support a' has a lug or ear b , and there is also arranged to extend from the end piece b' of the tube a lug or ear b^2 . These are arranged upon the inner side of the arc of the tube, but may be upon the outer side of the tube or may be arranged to intersect a parallel arc, if desired. They serve as supports and abutments for the ends of the spring B and also to maintain said spring removed from the Bourdon tube A in order that it may not be affected by variations in the temperature of the tube and also to permit of action independent of the tube throughout its length. It is preferably made of steel, but not necessarily so, and it may have any desired section. I have represented it as circular in section in Figs. 1, 2, and 3 and as thin, flat, and wide in Figs. 4 and 5. The abutment b is fixed or stationary, and the end b^3 of the spring is secured to it in any desirable way. In Fig. 1 it is represented as provided with the thread b^4 , and this threaded end extends through a hole in the abutment b and receives the nuts $b^5 b^6$, one upon each side of the abutment. These nuts serve to lock the end of the spring B to the abutment, and thereby hold it stationary, and also as a means for the adjustment of the tension of the spring, as by varying the position of the nuts upon the threaded portion of the spring its length may be increased or diminished and its tension thereby changed. I do not confine myself, however, to this manner of attaching the fixed end of the spring to the abutment, but may secure it thereto by welding or soldering, as represented in Fig. 3, or by a holder or clamp, as represented in Fig. 4, or in any other desired way. Likewise the movable end b^7 of the spring may be secured to the ear b^2 in any desired manner.

In Fig. 1 I have represented the end of the spring as having the thread b^8 and the threaded end is extended through a hole in the ear and as receiving the nuts $b^9 b^{10}$, one upon each side of the ear and by means of which it is fastened or locked to the ear and also made adjustable with relation thereto for the purpose of permitting the original attachment

of the spring to the Bourdon tube to be readily made and also for the purpose of varying the tension of the spring or of the Bourdon tube or of both. The construction of the fixed end shown in Figs. 3 and 4 may also be used for these additional purposes. In Figs. 2 and 4 the free end of the spring is represented as attached to the ear a^5 by welding or soldering.

It is not necessary that the connection between the moving end of the spring and the free end of the tube be rigid so long as it is of a nature to communicate the action or movement of the end of the spring to the end of the tube.

It will be seen that one end of the spring B is secured to a fixed support and abutment and that the other end is secured to the movable support and abutment which is attached to the free end of the Bourdon tube, and that between the fixed and movable abutments the spring is free, so that all its pressure or action is delivered to the free end of the tube. It will also be seen that it is held from contact with the tube, and is therefore not affected by variations in its temperature. It will further be seen that the spring is of considerable area in section, and that it is long and is curved to an arc, and that its free end has a short or limited movement, and this insures a combination of strength, delicacy of action, and the continued life of uniform strength or power it should have in order that it may not in any way and at any time affect the regular action of the Bourdon spring when it is once suitably adjusted to and combined with it.

It will be understood that the ordinary gage of the market is very liable to set, either from excess of pressure or from long use, and that when it does set the Bourdon spring does not then serve to return the indicating-hand to a position indicating no pressure on the dial, and for this reason it is now customary for purchasers of gages to use gages having a larger range than would otherwise be necessary. For instance, a two-hundred-and-fifty-pound gage will be purchased for indicating a two-hundred-pound pressure to provide a sufficient extent of dial for the movement of

the indicating-hand in indicating the pressure in case the tube shall set and the zero or no-pressure point should be changed from zero to a figure indicating pressure when no pressure exists, for if upon the setting of the tube the indicating-hand indicates when there is no pressure fifteen or twenty pounds on the dial under two hundred pounds pressure the indicating-hand will then be moved to a point to indicate two hundred and fifteen or two hundred and twenty pounds by the dial. This not only may cause false readings of pressure, but also force the manufacturer of gages to divide the dials into a greater number of subdivisions than is desirable for the proper action of the tube and for reading; but with my improvement no allowance of this kind will be necessary. The indicator will always return to zero when there is no pressure and in indicating pressure will not be moved to a position against a number on the dial showing an excess of the actual pressure. In other words, no allowance will be made from the actual figures of the indicator in reading the gage, and this permits the use of a larger extent of dial for indicating a given number of pounds pressure than would otherwise be employed, and thus make the reading surer and easier.

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

The combination of a Bourdon tube having a fixed and a movable end with a spring adjustably held and attached in relation thereto, a means for effecting such attachment and adjustment, the same consisting of an ear stationarily attached at or near the fixed end of the Bourdon tube, having a hole through which one end of the spring extends, a thread upon said end and nuts to screw upon said thread, one on each side of said ear, like attaching and adjusting means at the other end of said spring, the ear or lug, however, being attached to the free end of the Bourdon tube, as set forth.

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Witnesses:

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