(No Model.) 2 Sheets—Sheet 1.

W. DÜRR.

PRESSURE GAGE.

No. 542,631. Patented July 16, 1895.

Fig. 1.

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(No Model.) 2 Sheets—Sheet 2.

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PRESSURE GAGE.

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Fig. 2.

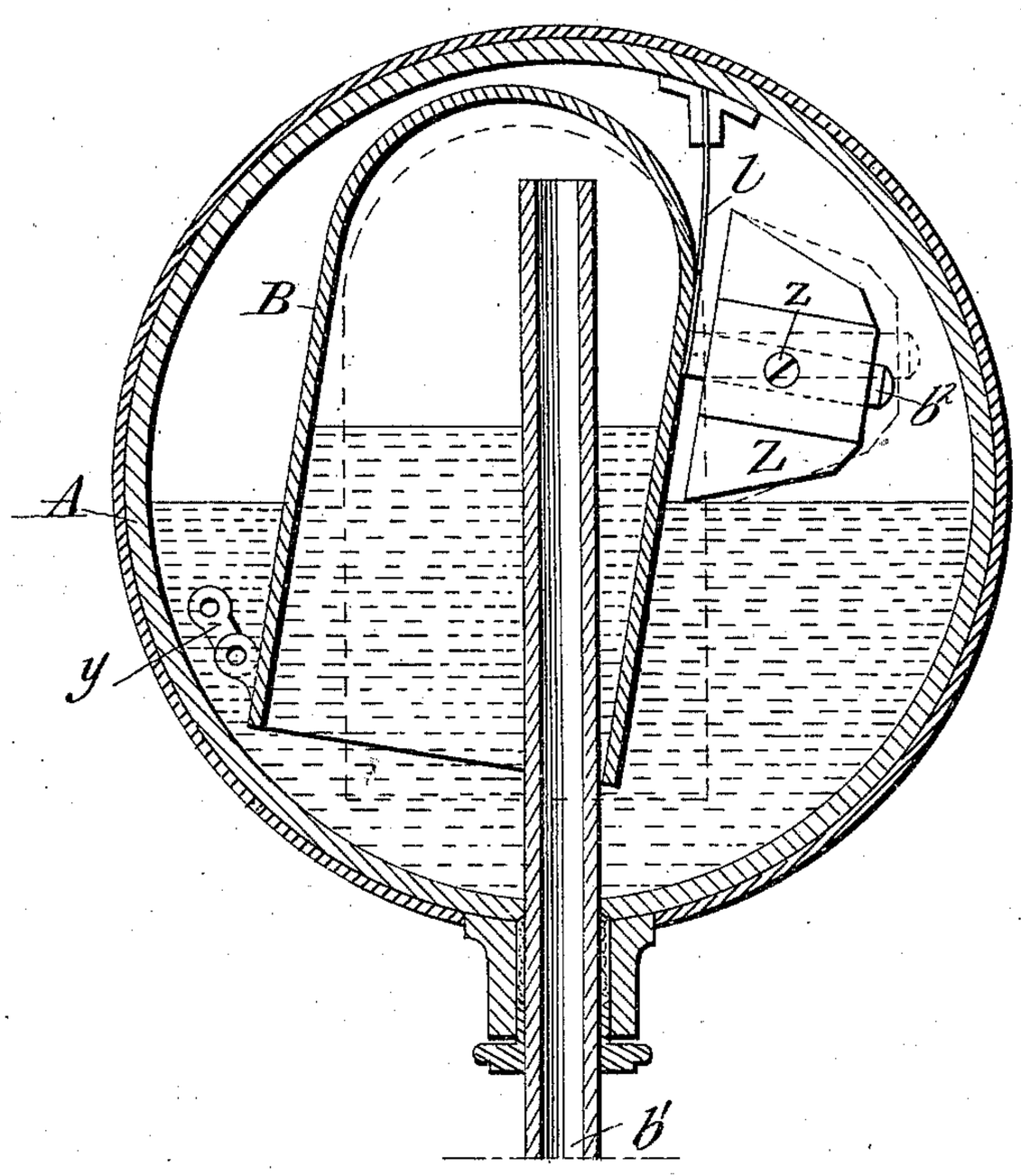
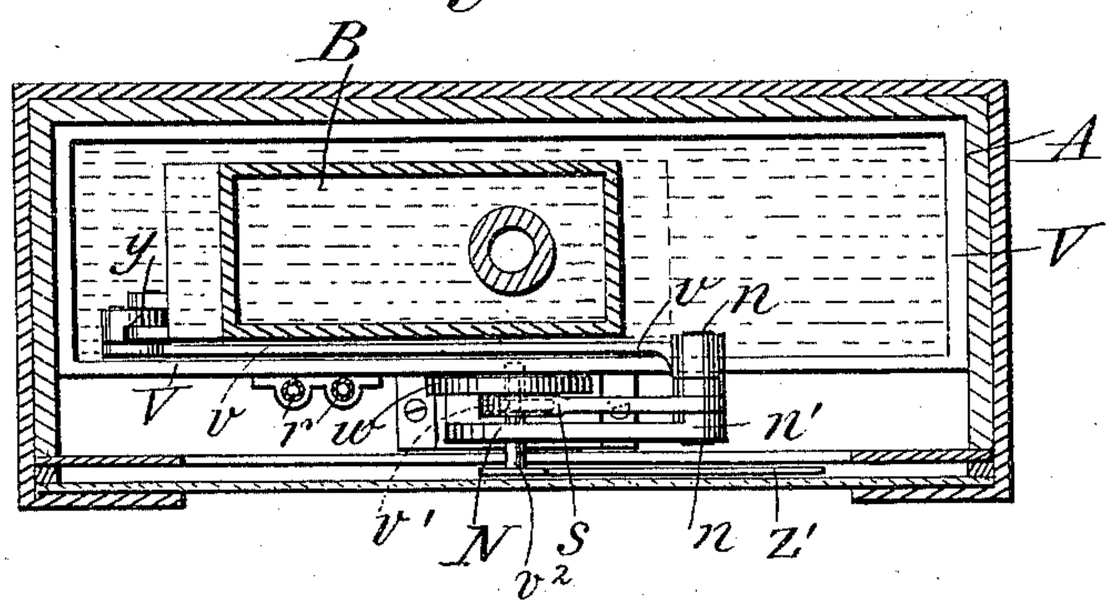


Fig. 3.



Attest:
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UNITED STATES PATENT OFFICE.

WALTHER DÜRR, OF MUNICH, GERMANY.

PRESSURE-GAGE.

SPECIFICATION forming part of Letters Patent No. 542,631, dated July 16, 1895.

Application filed November 5, 1894. Serial No. 527,958. (No model.) Patented in Belgium December 31, 1887, No. 88,838; in Switzerland December 13, 1889, No. 1,706; in England December 14, 1889, No. 20,139; in Austria-Hungary April 2, 1890, No. 53,572 and No. 12,103, and in Germany June 5, 1890, No. 52,318.

To all whom it may concern:

Be it known that I, WALTHER DÜRR, a citizen of Germany, residing at Munich, Kingdom of Bavaria, Germany, have invented certain new and useful Improvements in Pressure-Gages, (patented in Germany June 5, 1890, No. 52,318; in Belgium December 31, 1887, No. 88,838; in Austria-Hungary April 2, 1890, No. 53,572 and No. 12,103; in England December 14, 1889, No. 20,139, and in Switzerland December 13, 1889, No. 1,706;) and I do hereby 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.

My invention relates to improvements in pressure-gages.

The object of my invention is to produce a device specially adapted for use in connection with a tension air-pyrometer or as a draft-meter for measuring the difference in pressure existing in chimneys, flues, and the like.

The invention consists in such features, details of construction, and combination of parts as will first be described in connection with the accompanying drawings, and then particularly pointed out in the claims.

In the drawings, Figure 1 is a front view of a device embodying my invention with the dial removed. Fig. 2 is a detail view of the same, partially in section. Fig. 3 is a horizontal section on the line 3 3, Fig. 1.

Referring to the drawings, A is a casing, within the lower portion of which may be placed a receptacle V filled with liquid, or the casing itself may receive the liquid without the intervention of the receptacle. Projecting into the interior of the casing is an inlet-pipe b', which passes through the bottom of the casing and also through the bottom of receptacle V, if one is employed, the joint around the pipe where it enters said casing or receptacle being rendered air and water tight. Over the top of the pipe end is mounted an oscillating receiver or bell B, which may be held from the casing A in any suitable manner to permit oscillation, as, for instance, by a leaf-spring l, which is secured to one side of the bell and to the top of the casing, whereby the bell may swing or oscillate, as desired, for a purpose hereinafter set forth. The bell is counterweighted by a weight Z adjustably secured by a screw z to a stem b^2 projecting from the bell. In order to retain the said bell in a particular normal or zero position, a spring w is provided, being in this case a spiral spring secured at one end to the shaft and at the other end to the casing. To one side of the bell is attached a lever v by means of a link y, the other end of said lever being fixed to a spindle or shaft n, revolubly mounted in a bracket-arm n' and provided with a toothed sector s, which engages with a pinion v' fixed on a spindle v^2 journaled in the bracket N which supports the bracket-arm n' and is carried from the casing A in any suitable manner. To the spindle v^2 is fixed an index-finger or pointer z', which is arranged to move over a suitable dial, (not shown,) as will be fully understood by those skilled in the art. The lower end of the inlet-pipe b' is provided with a cock C, to which is connected a small pipe f, which is put in connection with the receptacle containing the air or gas whose tension is to be gaged, being shown in Fig. 1 as connected to an air-pyrometer K, of porcelain or other refractory material. To the pipe f is also connected a tube d, provided with a mouthpiece, a cock a being interposed between said tube and pipe.

To the top of the casing is attached a small cock b, which serves to open or close communication between the interior of the casing A and the flexible tube e, also provided with a mouthpiece.

A compensator, consisting of a U-shaped tube r, is secured to the interior of the casing, being provided with a glass bulb at one end and a fine orifice at the other, said compensator also having at its bend a small quantity of sealing-liquid, such as mercury or paraffine-oil, and being provided with a zero-line or normal-mark m, which indicates the point to which the sealing-liquid will rise when the casing of the gage contains air of the same tension as that which it contained when the gage-dial was originally set at zero.

The operation of my device is as follows: The pipe f being put in communication with the receptacle containing the air whose ten-

sion is to be measured—as, for instance, with the air-pyrometer K—the valve C is opened, thereby establishing communication between the air to be measured and the air in the bell B, whereby both bodies of air soon arrive at the same tension. The air contained under the bell, being prevented from escaping into the casing by the sealing-liquid into which the lower end of the bell projects, acts to force the bell upward if the tension of said confined air is greater than that of the air in the casing, or if less permits the bell to fall, the amount of rise or fall of the bell being proportional to the tension of the confined air. As the bell is capable of oscillating, it moves the lever *v* and thereby operates the segment S and pinion *v'*, thus moving the pointer *z'* over the dial.

In my construction the bell oscillates—that is to say, swings—about a fixed point or center, thus being partly supported, so that the air confined within the bell does not have to raise the entire weight of said bell, but only a portion of it, the remainder being carried by the support. Therefore the instrument may be operated by very slight differences in pressure between the air confined within the bell and that exterior to it, which is not the case in the previous constructions of which I have any knowledge, wherein it is necessary that the difference in tension between the air within the bell and that exterior to it be great enough to lift the entire weight of the bell.

In case the temperature of the air in the casing above and around the bell is not the same as that at which the gage was originally set the tension in said air would be altered, and hence the difference between the amount of movement of the bell and what it would be if the said air were at its original tension would constitute an error in the record of the pointer. When such an error exists, it is shown by the compensator, the liquid in which will not stand at its zero-line *m*. In such case it becomes necessary to establish a proper tension in said air in the casing, which is done by opening the cock *b* and either blowing into the tube *e* or sucking the air therefrom until the liquid in the compensator is again level with the zero-mark, whereupon the cock *b* may be closed and the indication of the pointer Z' on the dial read off. This reading will be the true one, properly compensated. When the reading of the dial has been taken, the cock *b* is opened, and after the pointer has ceased vibrating the cock *a* is opened to relieve the pressure under the bell, the cock C finally being closed.

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

1. In a pressure-gage, the combination, with a receptacle containing a sealing liquid, and a bell inverted over said receiver and dipping therein, of means for compelling the bell to move in the arc of a circle when operating, and an indicating device actuated by the bell, substantially as set forth.

2. In a pressure-gage, a receiver containing a sealing liquid, a bell inverted over and dipping into the sealing liquid, and means for indicating the movements of the bell, in combination with a compensator, consisting in a U-shaped tube provided with a globe or enlargement on one arm of the tube, a sealing liquid confining atmospheric air in the globe, and a mark for indicating the normal level of the sealing liquid on the other arm of the tube, substantially as set forth.

3. In a pressure-gage, the combination, with a receptacle containing a sealing liquid, and a bell inverted over said receiver and dipping therein, of means for compelling the bell to move in the arc of a circle when operating, an inlet-pipe opening below the bell, and an indicating device actuated by the bell, substantially as set forth.

4. In a pressure-gage, the combination, with a casing containing a sealing liquid, of a receiver open at its lower end and dipping into the sealing liquid, a compensating device in communication with the interior of the casing outside the receiver, and means for varying the pressure in that part of the casing with which the compensator communicates, substantially as set forth.

5. In a pressure-gage, the combination, with a casing containing a sealing liquid, of a receiver open at its lower end and dipping into the liquid, a leaf spring from which the receiver is suspended, a lever attached to the receiver at one end, a spindle secured to the lever at the other end, a toothed segment secured to the spindle, a gear pinion in mesh with the segment, and an indicator operated by the gear pinion, substantially as set forth.

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

WALTHER DÜRR.

Witnesses:
EMIL HENZEL,
G. DEDREUX.