H. A. CLUM.

AMERICAN BAROMETER.

No. 32,050. Patented Apr. 16, 1861.

Fig. 1.

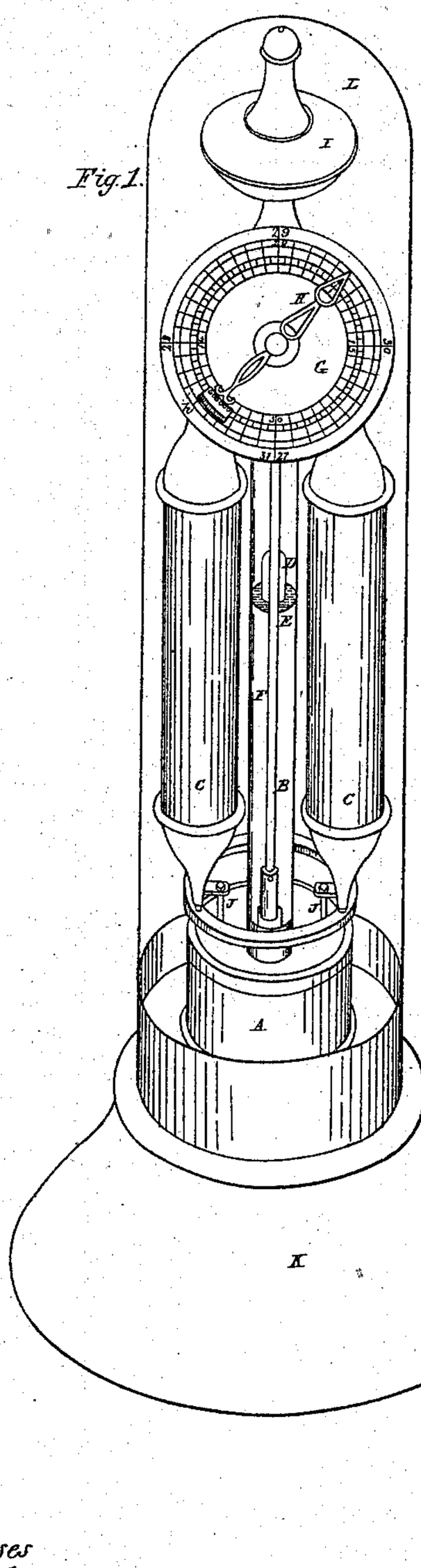


Fig. 4.

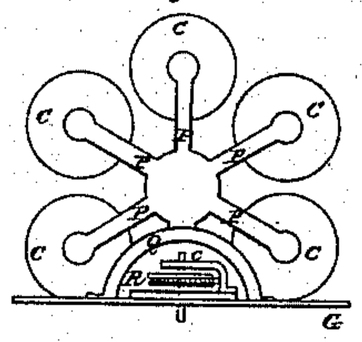


Fig. 3.

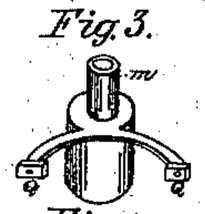


Fig. 5.

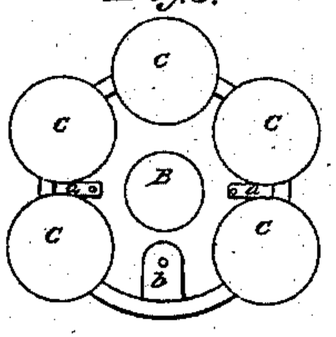
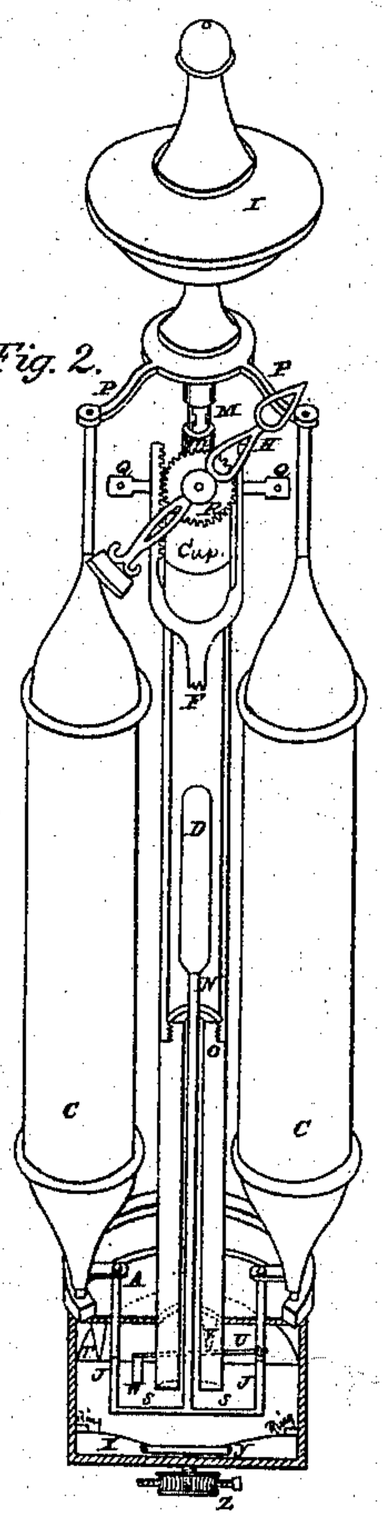


Fig. 2.



Witnesses
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Henry A Clum

UNITED STATES PATENT OFFICE.

HENRY A. CLUM, OF AUBURN, NEW YORK.

BAROMETER.

Specification of Letters Patent No. 32,050, dated April 16, 1861.

To all whom it may concern:

Be it known that I, HENRY A. CLUM, of Auburn, in the county of Cayuga and State of New York, have invented a new and Improved Barometer; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is a perspective view showing front and only two of the auxiliary chambers. Fig. 2 is a longitudinal section of the same, in which the dial, dome, and base are omitted; Fig. 3, the cap. Fig. 4 is a vertical view of the top of the instrument. Fig. 5, a view, also vertical, of the lower portion of the floating apparatus, all lettered and further explained as follows, to wit, like letters referring to like parts in all the figures.

Fig. 1 is a perspective view of the barometer showing at A the cistern, B the tube; C, C, the auxiliary chambers; (two only here shown) and their connections with the ring and upright arms above the top of the cistern; D the buoy inside of the tube; E the mercury in the tube; F the controlling rod; G the dial; H the hand; *h* the vernier on the hand; I the crown chamber; J, J, upright arms upon which the auxiliary chambers are erected; K the base of the instrument; L the glass cover or dome.

Fig. 2, also in perspective shows the tube and cistern in section—the dial, base and dome removed; thus further showing the manner of moving the index or hand H by the controlling rod F, having at its upper end a ratchet, meshing in a pinion mounted upon the axis of the hand, as shown at R, also the steadying pivot M moving upward and downward in socket *m*—N the shaft in the tube upon which the buoy is erected—O the sections of the tube screwed together; P, P the rafters to which the auxiliary chambers are attached above; Q Q the arms to which the dial is attached; S, S, the arms projecting from the upright floating shaft inside the tube; T the zero point; U the compensating lever; V the fulcrum of the compensating lever; W the compensating plunger; X the diaphragm at the bottom of the cistern; Y the disk upon which the diaphragm X rests for adjusting the zero point; Z the endless screw arrangement for elevating and lowering the mercury in the cistern.

Fig. 3 shows the cap, cap upon which the socket *m* is fixed, also the arms Q Q to which the dial is attached. Similar arms are to be attached to the other sides of the cap as may be required by additional dials. This cap is attached to the upper end of the tube and is permanent.

Fig. 4 is a vertical view showing the auxiliaries C. C. C. C. C, rafters P. P. P. P. P, cap, cap dial arms Q Q, ratchet work R, cock *c* which holds the hand axis in its place, and dial G.

Fig. 5, also vertical, shows the ring upon which the auxiliary chambers rest and the arms *a*, *a* projecting from the ring to complete the connection with the shaft in the tube, by the upright arms J. J Fig. 2—also the socket into which the foot of the controlling rod is fixed.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

I construct my cistern (which I mount upon a suitable base) of the usual material, and employ a tube of larger dimensions than is used in other barometers; this tube may be entire or put together in sections, of any material usually employed, including iron and steel. Within this tube I place a shaft, of any material upon which mercury cannot corrode; which serves by the displacement of mercury to buoy up the auxiliary chambers C. C. on the outside, to which this shaft and buoy are connected by the projecting and upright arms as shown at S. S and J. J. Fig. 2.

To secure a greater steadiness to the mercurial column, when required, I have the tube contracted through its lower portion to a small bore, and have a small rod (in lieu of the shaft) running up through it to the larger caliber above, where it is attached to the buoy D which by its tendency to float upon the surface of the mercury, will keep the auxiliary chambers in suspension leaving said auxiliaries and also the crown-chamber (they being attached) to move upward and downward, as they with the mercury are influenced by the atmospheric pressure without. The object of the auxiliary chambers is (being large and light—displacing much air, consequently easily influenced by atmospheric pressure) to aid the motions of the mercurial column in the tube, overcoming friction and the unavoidable sluggishness of the mercury; they acting like so

many balloons. These auxiliaries may be filled with hydrogen, or air, then tightly sealed.

The auxiliaries, and crown chamber (which also serves as an auxiliary) form one piece of floating machinery being connected by the rafters P, P the whole being balanced by the buoy within the tube, will move upward, and downward, as the surrounding atmosphere becomes heavier and lighter.

The cistern, (A Fig. 2) is so constructed, and the tube is so fixed within it, as to allow the floating apparatus to move upward and downward through the extreme space of barometric fluctuations. This upward and downward motion is communicated to the dial, (which is fixed to the cap, cap Fig. 2) by means of the controlling rod F, and rack work, as shown at F, Fig. 1, and F, and R Fig. 2. This controlling rod being a portion of the floating apparatus, and attached thereto is carried upward, and downward with it—carrying the hand H around upon its axis.

The entire floating apparatus outside, consisting of the auxiliaries, C^s controlling rod F, crown chamber I and rafters P^s are kept in their place upright by a jeweled pivot M which moves upward and downward in socket *m:* this socket is fixed to cap, cap, (Figs. 2 and 3) which in its turn is attached to the upper end of the tube.

The unequal action of the mercury in the cistern upon the upright arms J, J, is compensated by the lever U, and plunger W, (Fig. 2). One such plunger and lever is attached to each arm when required and moves with the floating apparatus.

The zero point is the same that has been heretofore employed in all fine Troughton barometers. The adjustment is made by the use of an endless screw arrangement Z, fully shown in model. The mercury in the cistern resting upon the diaphragm X secured to the cistern bottom is raised and lowered by the disk Y, which is controlled by screw arrangement Z, worked by a key, from the outside of the base Fig. 2.

The graduation upon the dial, (or dials if more than one are used) is made in inches, tenths and hundredths, or even thousandths; which are subdivided by the vernier cut upon the hand as shown at *h*, Fig. 1; the reading is also carried to pounds, and fractions as shown in drawings.

The dial is fastened to the arms Q Q Figs. 1 and 2 and forms a part of the permanent portion of the barometer.

I do not claim the use of the mercurial column—the cistern, nor the dial and hand, as such; they having been in use many years; but

What I do claim as my invention, and desire to secure by Letters Patent is as follows:

1. The use of the auxiliary chambers C (one or more) in the construction of barometers, as set forth and described in Figs. 1 and 2 in drawing and specification.

2. The buoy and shaft D and N, Fig. 2 and the manner in which they are employed as set forth in drawing and specification.

3. The connection of the auxiliary chambers to the shaft N and buoy D shown at S. S and J J Fig. 2.

4. The compensating lever and plunger, for equalizing the action of the mercury upon the upright arms, in the cistern, as shown at U. V. W. Fig. 2.

5. The manner of communicating the motion of the floating apparatus to the hand H as shown at R, Fig. 2, and F, Fig. 1.

6. The readings of pounds, and fractions of pounds, in combination with the usual inches and fractions upon a circular dial.

7. The tube B composed of two or more sections and their combination, as shown at O, Fig. 2, and explained in specification.

8. The combination of the auxiliary chambers C. C with the shaft N and buoy D, the rack work R and their connections, as shown at P P. M. J. J. and S. S Fig. 2 and their united use with the mercurial column.

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Witnesses:

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