

(No Model.)

H. J. WINTERLICH.

DEVICE FOR INDICATING THE CONDITION OF THE AIR.

No. 429,078.

Patented May 27, 1890.

Fig. 1.

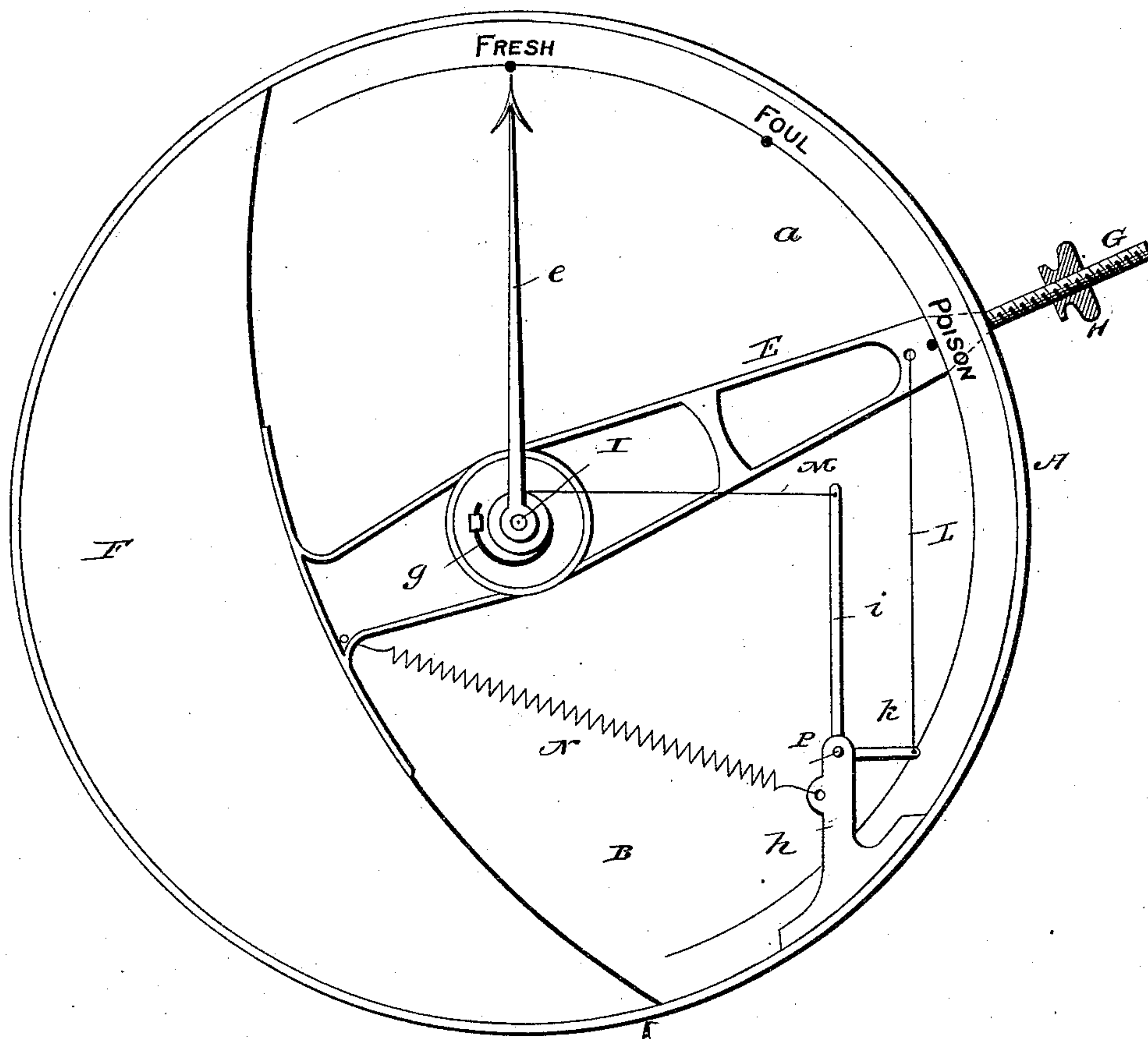
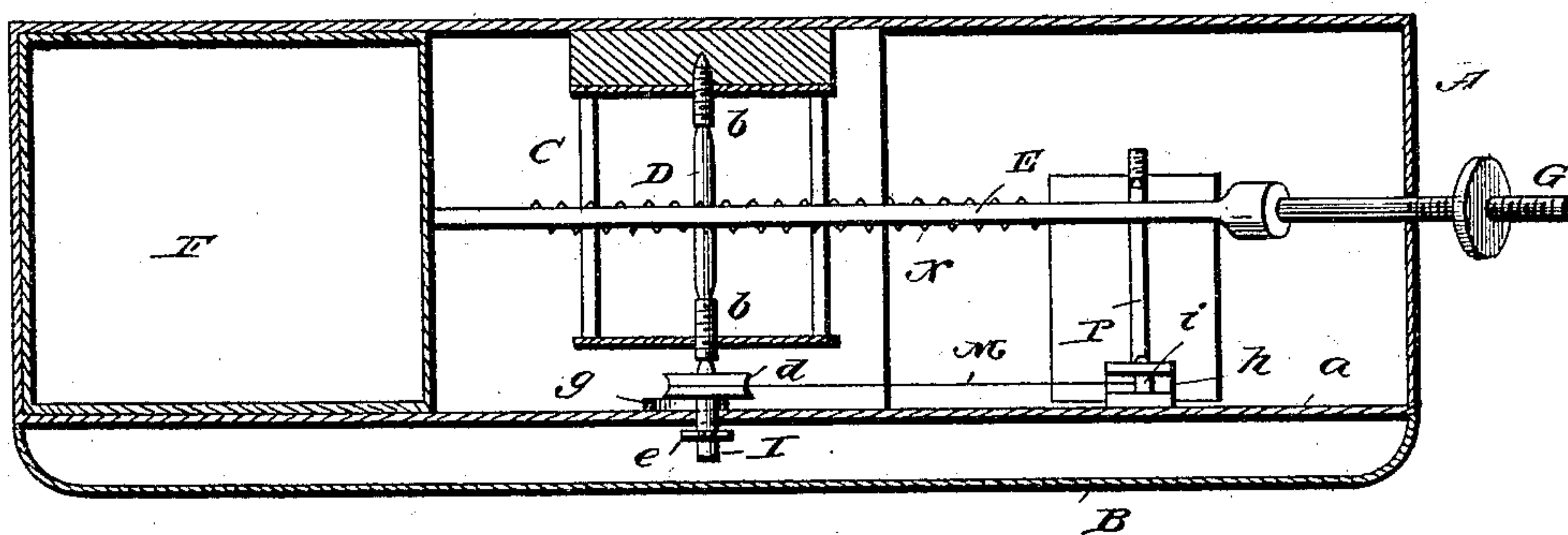


Fig. 2.



Witnesses

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DEVICE FOR INDICATING THE CONDITION OF THE AIR.

SPECIFICATION forming part of Letters Patent No. 429,078, dated May 27, 1890.

Application filed June 11, 1889. Serial No. 313,908. (No model.)

To all whom it may concern:

Be it known that I, HANS J. WINTHERLICH, a citizen of the United States, residing at Omaha, in the county of Douglas and State of Nebraska, have invented certain new and useful Improvements in Devices for Indicating the Condition of Air; and I do 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.

This invention relates to improvements in devices for indicating the condition of air in a room or apartment, and the novelty will be fully understood from the following description and claims, when taken in connection with the annexed drawings, in which—

Figure 1 is a face view of my improved device, and Fig. 2 is a diametrical section taken through the balloon.

In school-rooms, churches, hospitals, and other places where people are required to remain for any length of time the air is apt to become foul or impure from the consumption of the oxygen in it, or rather the conversion of a portion of it into carbonic acid by passing through the lungs of the people in the room. It is a well-known fact that this gas, which is poisonous or incapable of supporting life, is heavier than pure air and settles to the bottom of the room. Experiment has shown that a cubic foot of pure atmospheric air at a temperature of zero weighs 1.2783 ounce and that an equal amount of carbonic acid at the same temperature weighs 1.8174 ounce, or over half an ounce more than pure air. In other words, a cubic foot of atmospheric air and carbonic acid mixed would weigh 1.5478 ounce, or the sum of 1.2783 and 1.8174 divided by two, which will thus make over a quarter of an ounce difference in weight between it and pure air. It is also known that the heavier the atmosphere becomes the greater its pressure, and consequently the greater its power to force an object upward which is suspended within the air. Taking advantage of these facts, I have devised an instrument which will indicate the presence of carbonic acid in the air by reason of the greater density of the air, and which will in-

dicate such condition by means of an automatically-moving pointer and a graduated scale. By means of suitable electrical mechanism the condition of the air can be automatically changed by permitting the escape of the foul air and the admission of pure air in its place. By means of properly-arranged mechanism the least movement of the body suspended in the air will be indicated by the pointer, which can be made to pass over a greater or less amount of the scale by any change of the proportions of the parts in manufacturing the instrument. In this way the change or condition of the air is noted and called to the attention by the organs of sight, as well as to the lungs of the inhabitants of the room.

Referring by letter to the said drawings, A indicates the casing, which is preferably of a circular form and may resemble that of an ordinary clock casing or frame. In the face of this casing is a plate *a*, which is covered by a glass face-plate B. This plate *a* has printed upon it the following: "Fresh," "Foul," "Poison." These words are around the periphery of the dial or plate at points which by the action of air upon the balloon F, which will be presently explained, the hand or pointer will be moved to indicate the condition of the air in the room or apartment within which the device is placed.

C indicates a frame secured to the rear wall of the casing for the support of a shaft carrying the balloon. In this frame and at opposite points are arranged two threaded bearings *b*, having at their adjacent ends a concave seat to receive the tapering opposite end of a horizontal shaft D, so that the friction at the bearing-point may be reduced as much as possible, and the bearings *b* may be set up to accommodate the wear of said shaft D.

E indicates an arm or lever which is secured to the shaft D and carries at one end within the casing a balloon F, which may be made of light metal or other suitable material. The opposite or outer end of this arm E, which extends beyond the periphery of the casing, terminates in an externally-screw-threaded portion G and receives an internally-threaded nut or weight H, which is adapted to be ad-

justed thereon, so as to balance the balloon in fresh or pure air.

I indicates a short horizontal shaft which has its bearing in the front plate or dial *a* of the casing and has its inner end tapering and bearing in the outer concave end of the outer threaded bearing *b*. This short shaft I carries a fixed pulley *d* and at its outer end a hand or pointer *e*.

g indicates a flat spring which has one end secured to the shaft I, and its opposite end is secured to the inner front plate of the casing.

h indicates a post or arm which is secured to the lower portion of the casing and has journaled in its upper end a bell-crank lever or angle-lever, the short branch *k* of which is connected with the outer portion of the arm E by means of a wire L, and the opposite or longer branch *i* of said lever has its upper end connected with the pulley *d* by means of a wire M.

N indicates a coiled spring which connects the inner portion of the arm E adjacent to the balloon with the post *h*, and this spring, together with the spring *g*, serves to insure a steady working of the apparatus.

I have shown the balloon of an approximately crescent shape; but I do not wish to confine myself to any particular shape.

This invention is more particularly adapted for use in connection with a steam-heater for which I am about to make a separate application for patent, and it is designed by the aid of electricity to open and close the different valves for fresh and foul air in the heater.

The bearings for the shaft P, upon which the bell-crank lever is journaled or secured, may carry threaded bearings similar to those in which the shaft B is supported.

Having described my invention, what I claim is—

1. A device for indicating the condition of air, consisting of a case, an arm journaled therein and carrying at one end a balloon

and at its opposite end a balance-weight movably secured thereto, and a pointer connected with the said arm, whereby the arm and pointer may move synchronously, substantially as specified.

2. The combination, with a case, of an arm journaled therein, a balloon secured to one end of the shaft, a balance-weight movably secured to the opposite end, a pointer also journaled on a shaft, a bell-crank lever journaled in the case, a wire connecting the short branch of the lever with the arm carrying the balloon, and a wire connecting the pointer with the long arm of the lever, substantially as specified.

3. The combination, with the main case, of the arm carrying at one end a balloon, at its opposite end an adjustable balance-weight and journaled within the case, a pointer journaled on a shaft in the case, an angular or bell-crank lever journaled in the case, a wire connecting one branch of the lever with the arm carrying a balloon, a wire connecting the opposite branch of the lever with the pointer, a spring connecting the inner portion of the balloon-arm with the case, and a spring connecting the shaft of the pointer with the case, substantially as specified.

4. A case having at points upon its face words indicative of the condition of air, in combination with an arm journaled in said case and carrying at one end a balloon to be acted upon by the air and a counterbalance-weight movably secured upon the opposite end, and a pointer connected with the arm bearing the balloon, so that they may move synchronously, substantially as specified.

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

HANS J. WINTHERLICH.

Witnesses:

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