

No. 666,676.

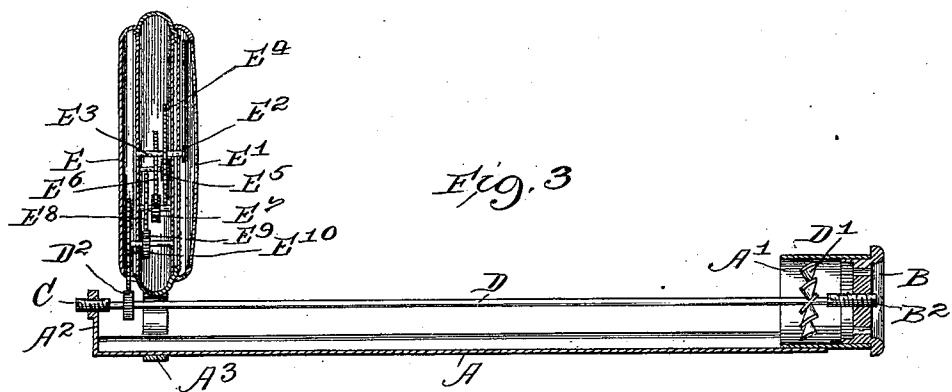
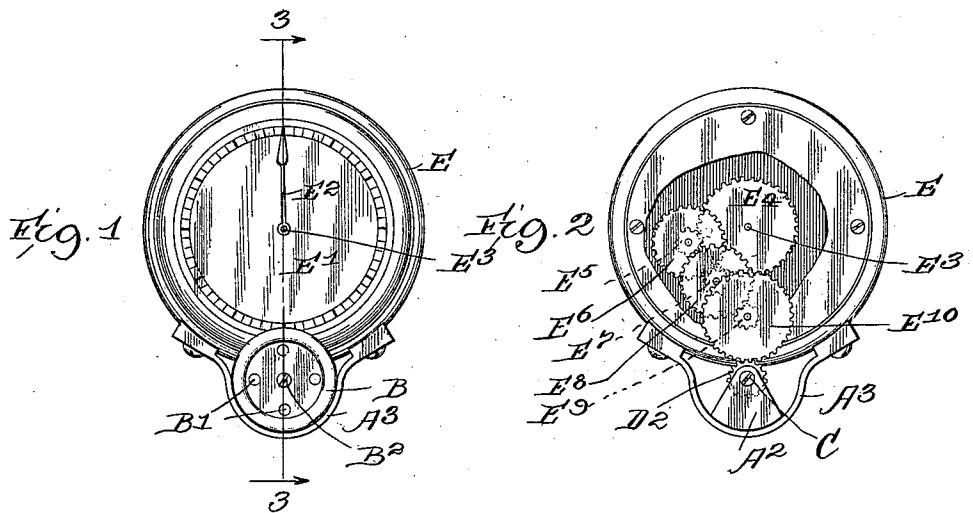
Patented Jan. 29, 1901.

I. HOGELAND.

SPIROMETER.

(Application filed Aug. 27, 1900.)

No Model.)



Witnesses:

Ray White.
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UNITED STATES PATENT OFFICE.

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SPIROMETER.

SPECIFICATION forming part of Letters Patent No. 666,676, dated January 29, 1901.

Application filed August 27, 1900. Serial No. 28,160. (No model.)

To all whom it may concern:

Be it known that I, ISRAEL HOGELAND, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Spirometers, of which the following is a specification.

The object of this invention is the production of a spirometer for voice culture and lung development embodying the improvements hereinafter set forth.

In the accompanying drawings, Figure 1 is a front elevation of my spirometer. Fig. 2 is a rear view, a portion of the gear-casing being removed to show the gearing therein. Fig. 3 is a longitudinal central section on dotted line 3-3 of Fig. 1.

Like letters of reference indicate corresponding parts throughout the several views.

20 In the production of this spirometer I provide the frame A, having the tubular portion A' at the forward end of the frame and the upwardly-extending ear A² at its rear end. Two arms A³ extend upwardly from the frame 25 A, the purpose of which arms will be mentioned later herein.

The tubular portion A' of the frame A is provided with the mouthpiece B, communicating with the tubular portion A' by means 30 of the openings B'. A bearing-screw B² is threaded centrally through said mouthpiece, and a similar bearing-screw C extends through the ear A² of the frame A. The two bearing-screws B² and C are in axial alinement, supporting between their countersunk inner ends 35 the shaft D, the latter having pointed ends to lie within the countersunk cups of the screws B' and C and being free to rotate between said screws. A fan D' is fixed on the shaft D, the

40 blades of which fan are set at a slight angle to the plane of its rotation in order that it may be rotated by a current of air passing through the tubular portion A' of the frame A. The opposite end of the shaft D is provided with a 45 pinion D², fixed on said shaft. The upwardly-extending arms A³ of the frame A support a casing E, intended to inclose the reducing-gear of the mechanism. The forward side of this casing is arranged in dial form, as shown 50 at E', and is provided with an index-hand E², fixed on its central bearing-shaft E³. Within

the casing E this bearing-shaft E³ carries the gear E⁴, fixed thereon. This gear meshes with the pinion E⁵, fixed relative to the gear-wheel E⁶, and the last-mentioned gear-wheel meshes 55 with the pinion E⁷ of the wheel E⁸. The wheel E⁸ meshes with the pinion E⁹ on the gear-wheel E¹⁰ and the latter with the pinion D² before mentioned. It will thus be seen that the speed of the shaft D is "geared down" very 60 considerably.

In operation the mouthpiece B of this instrument is applied to the lips of the user, who after taking a deep inspiration forcibly expels the air from his lungs through the perforations B' in the mouthpiece B. The currents of air coming from said openings impinge upon the vanes of the fan D', turning the latter rapidly and rotating the shaft D, upon which it is mounted. The rotation of 70 the shaft, with its gear D², fixed thereon, imparts rotatory motion to the train of gears E¹⁰, E⁹, E⁸, E⁷, E⁶, E⁵, and E⁴, gearing down the speed of the shaft D. The movement of the gear E⁴ moves the index-hand E² upon the 75 dial E'. The extent of the travel of this hand indicates the amount of air expelled from the lungs of the user.

The instrument may be used for testing the amount of inhalation as well as that of exhalation. The air drawn into the mouth of the user through the tubular portion A' of the frame A rotates the fan D' in a direction contrary to that caused by exhalation.

By means of this device the capacity of the 85 lungs is tested and by its use they are strengthened.

I claim as my invention—

1. In a spirometer, in combination, a longitudinal frame, having a tubular portion at 90 one of its ends, a shaft rotatably mounted axially of said longitudinal frame, a fan fixed on said shaft and situated within said tubular portion, an indicator-dial mounted on said longitudinal frame near the end thereof opposite to said tubular portion and projecting to one side of the frame so the dial shall be visible to the person using the spirometer, a movable indicator-hand for said dial and a train of gearing for transmitting rotatory motion from said shaft to said indicator-hand. 95

2. In a spirometer, in combination, a lon-

gitudinal frame, having a tubular portion at one of its ends, a mouthpiece for said tubular portion, a shaft rotatably mounted axially of said longitudinal frame, a fan fixed on 5 said shaft and situated within said tubular portion, a bearing in the mouthpiece for one end of said shaft, a bearing in the frame for the other end of said shaft, a pinion rigidly secured to said shaft, a gear-casing mounted 10 on the frame to one side and near the end

thereof opposite to that having the tubular portion, a dial for the gear-casing so situated as to be visible to the person using the spirometer, an indicator-hand for said dial, and a train of gearing for transmitting rotary motion from said pinion to said hand. 15

ISRAEL HOGELAND.

Witnesses:

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