

No. 820,259.

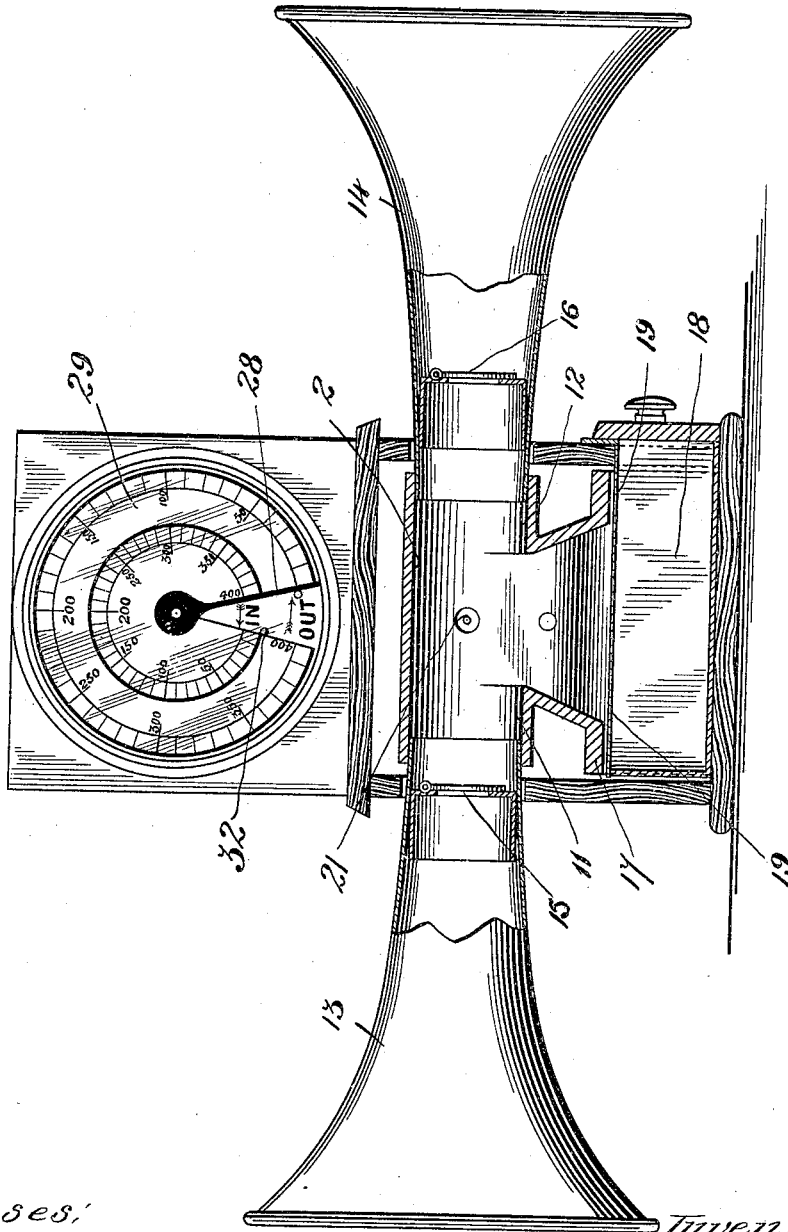
PATENTED MAY 8, 1906.

J. S. RENVOIZE.
SPIROMETER.

APPLICATION FILED JAN. 29, 1906.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses:

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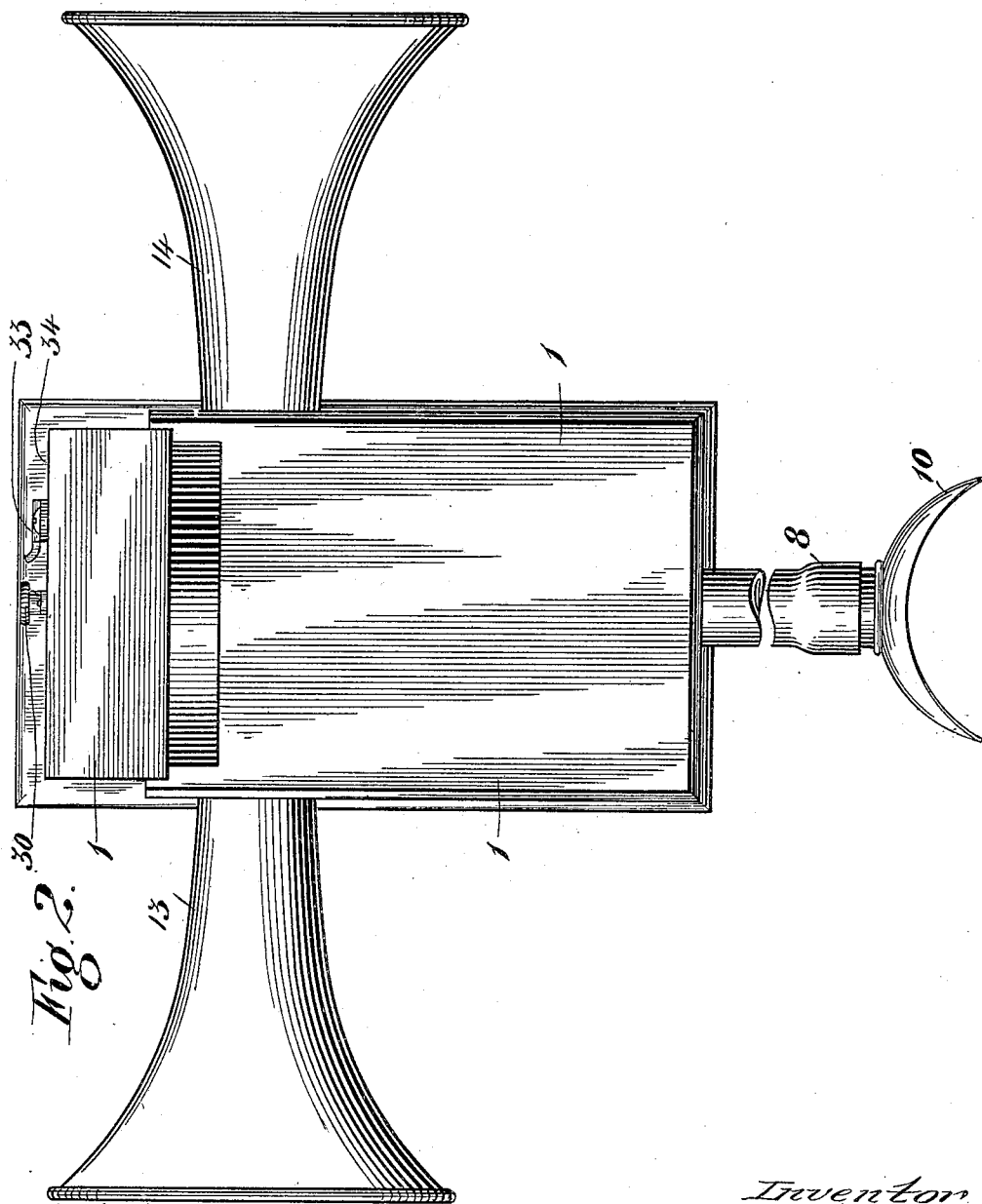
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3 SHEETS—SHEET 2.



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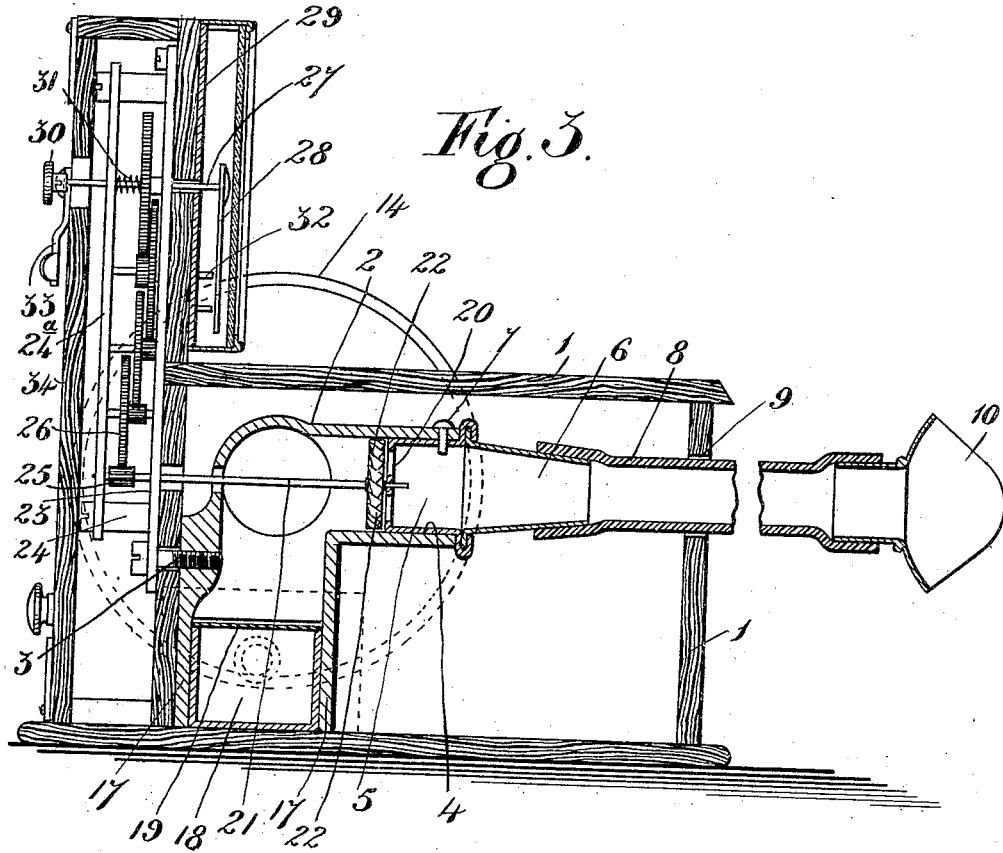
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

JAMES SIDNEY RENVOIZE, OF LONDON, ENGLAND.

SPIROMETER.

No. 820,259.

Specification of Letters Patent.

Patented May 8, 1906.

Application filed January 29, 1906. Serial No. 298,528.

To all whom it may concern:

Be it known that I, JAMES SIDNEY RENVOIZE, a subject of the King of Great Britain, residing at 62 Colverstone Crescent, Dalston, London, England, have invented certain new and useful Improvements in Spirometers, of which the following is a specification.

The object of this invention is to construct an apparatus whereby the lungs of a person can be exercised and at the same time the cubic-air capacity of the lungs exhaled into the apparatus or inhaled therefrom can be indicated on a dial.

My invention will be clearly understood from the following description, aided by the accompanying drawings, in which—

Figure 1 is a part sectional elevation of an apparatus, Fig. 2 a plan of the apparatus, and Fig. 3 a central longitudinal section of the apparatus.

1 is the box or casing containing the mechanism.

2 is a hollow casting of metal having openings in four directions and held to the casing 1 by a screw 3. The front opening 4 of the casting 2 is of circular or tube-like shape and carries a thimble 5, having a conical extension 6 projecting from the opening 4, which thimble 5 is held in the opening 4 by a pin 7 or otherwise, and on the extension 6 is placed a flexible tube 8, projecting through a hole 9 in the box 1 and carrying at its end a mouth-piece 10. Branches 11 12 are situate on each side of the casting 2, and these carry horn or other shaped extensions 13 14, each having a non-return valve 15 16, arranged in opposite directions, so that in action one is closed while the other is open. The base or bottom 17 of the casting 2 is hollow and rests on the bottom of the box 1 and is shaped to receive a drawer 18, inserted and removed from the side of the casing 1, a slide 19 being situate above the drawer 18 to shut it off from the hollow casting 2.

The thimble 5 has perforations 20 in one end and a central bearing-hole for receiving one end of a spindle 21, which carries a fan or vane 22 situate immediately behind the thimble 5, the other end of the spindle 21 passing through the case 1 and a plate 23 attached thereto and having a bearing in a plate 24^a, secured by posts 24 to the plate 23. The spindle 21 carries at the end opposite the fan 22 a pinion 25, this meshing with and actuating a train of gear-wheels 26, having

bearings in the two plates 23 24^a, the axle 27 of the top gear-wheel projecting through the plate 23 and carrying a pointer or indicator 28 in front of a dial 29, fixed to the upper front part of the casing 1.

The axle 27 is provided with a thumb-button 30 on its free end and situate outside the casing, and a spring 31 encircles the axle 27 between the top gear-wheel and the plate 24^a, stops 32 being provided on the dial to limit the movement of the pointer 28 when indicating.

In Fig. 3 the pointer 28 is shown as being free of the pins 32 and therefore capable of movement to test and indicate the cubical capacity of the lungs; but when the axle 27 is pulled back by its knob 30 and held in the pulled-back position by placing the catch 33 under the knob the top gear-wheel will be out of mesh with the other part of the train of gear and the machine can be used without any indication of the cubical capacity of the lungs. On the release of the catch the spring 31 will return the pointer 28 to clear the stops.

34 is a door at the back of the casing 1 to enable a person to get at the mechanism and to remove the screw 3 that the casting 2 can be removed for cleaning purposes by undoing the top or front of the casing 1, so that by removing the tube 8, ferrule 6, thimble 5, the vane 22, horns 13 14 the casting 2 can be removed and all the parts cleaned and sterilized when required.

On an operator blowing into the apparatus through the mouthpiece 10 the breath will pass through the casting 2, revolve the fan 22, and through the train of gear operate the pointer to indicate the cubical capacity of the lungs, the pressure of the breath closing the valve 15 and opening the valve 16 for the breath to pass to the atmosphere; but on drawing air into the lungs the suction will close the valve 16 and cause the air to enter through the valve 15. Thus the operator sucks pure air into his lungs and not his breath back again.

The box 18 is intended for containing chemicals or giving off fumes or odors, such as eucalyptus, and when the slide 19 is removed the drawing of the air will take up the fumes and carry them to the lungs, so that the apparatus can be used as an inhaler as well as a lung tester and exerciser.

The dial bears indications of capacity for

both expelling from or drawing air into the lungs, as will be understood by the wording "In" and "Out" on the dial.

What I claim, and desire to secure by Letters Patent, is—

1. The improved construction of apparatus for exercising the lungs and indicating the cubic air capacity of same, consisting of a box, containing a casting having four openings, one for connection of a flexible tube, two leading to the atmosphere, and being controlled by non-return valves, and the other opening to a box adapted to contain chemicals for inhaling purposes, a fan or vane in such casting and operating a train of gear-wheels for moving a pointer around a dial on the revolving of the fan in either direction, substantially as described and shown on the accompanying drawings.
2. A spirometer comprising a casing hav-

ing a plurality of openings, two of the openings provided with means having non-return valves for communication with the atmosphere, a flexible tube having a mouthpiece having communication with one of the remaining openings, a drawer in said casing adapted to contain chemicals and having communication with the other of said openings, a rotatable vane-wheel, gear mechanism having connection with said wheel and adapted to be actuated thereby, a dial on said casing, and a pointer actuated by the gear mechanism.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JAMES SIDNEY RENVOIZE.

Witnesses:

HENRY MAYKELS,
PERCY E. MATTOCKS.