

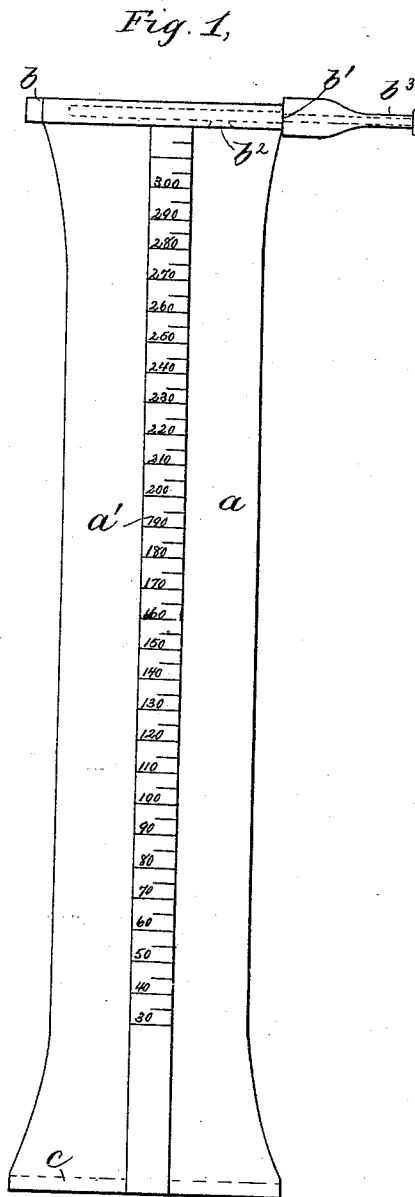
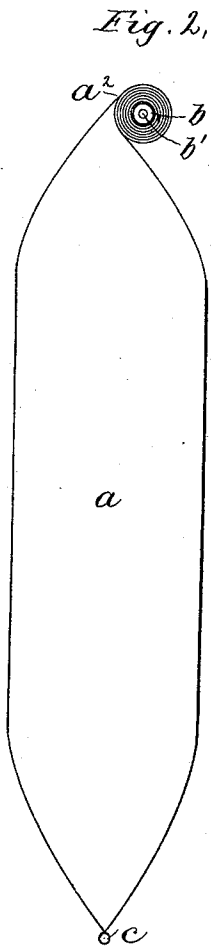
(No Model.)

W. H. H. BARTON.

SPIROMETER.

No. 392,711.

Patented Nov. 13, 1888.



*Witnesses,*  
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# UNITED STATES PATENT OFFICE.

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## SPIROMETER.

SPECIFICATION forming part of Letters Patent No. 392,711, dated November 13, 1888.

Application filed November 21, 1887. Serial No. 253,789. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM H. H. BARTON, of Brockton, county of Plymouth, State of Massachusetts, have invented an Improvement in Spirometers, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

The object of my invention is to produce a simple, inexpensive, and convenient spirometer.

The instrument consists, essentially, of a flexible, collapsible, non-elastic reservoir or bag, preferably elongated or substantially cylindrical in shape, provided with a scale that indicates the cubic contents of the different portions of the said bag when distended or filled.

The bag or reservoir is provided at one end with a spindle or roll upon which the unfilled portion may be wound, so that the scale will indicate the cubic contents of the part of the reservoir that is filled. The said spindle or roll preferably forms the inlet to the reservoir and is provided with a suitable mouth-piece. One important advantage of this kind of a spirometer arises from the fact that there is no back-pressure of the atmosphere, and the instrument is very light, compact, and inexpensive.

Figure 1 is a front elevation of a spirometer embodying this invention in the condition assumed when being filled; and Fig. 2, a side elevation thereof in the condition assumed after it has received its contents and the unfilled portion has been rolled up, so that the contents of the portion which is filled may be indicated by the scale.

The instrument comprises a flexible collapsed bag, *a*, of material that is impervious to air and non-elastic or inextensible, being preferably composed of a thin fabric coated with gum or rubber to render it air-tight. The said bag or reservoir is preferably cylindrical in shape and is provided with a scale, *a'*, properly graduated to indicate the cubic contents of the different portions of the length of the bag when filled to its full capacity or, in other words, when expanded to substantially circular cross-sectional shape.

The bag is made of sufficient length to have

a capacity somewhat greater than the maximum capacity of the human lungs, and it is provided at one end with a roll or spindle, *b*, which is preferably bored lengthwise and open at one end and closed at the other to form an inlet-passage, *b'*, provided with a lateral port or orifice, *b''*, opening into the bag. The said roll *b* may itself be properly shaped at its open end to constitute a convenient mouth-piece, or may receive a detachable mouth-piece, *b'''*, through which the user blows. In order to empty the bag after it has been filled, it is rolled up from the lower end, which may be provided with a small roll, *c*, for this purpose, or the hem in the fabric may be sufficient. Then when it is to be used it is unrolled and permitted to hang down from the roll *b* in its collapsed condition. The person whose lungs are to be tested then blows through the mouth-piece *b'''* to the full capacity of the lungs, and will thus partly expand the bag for its entire length. Then the person turns the spindle *b* so as to wind the upper part of the bag upon it, as shown in Fig. 2, and thus empties the upper part, and at the same time completely fills or distends the lower part. In thus winding the upper part of the bag the scale *a'* is kept at the outside of the roll, and when the enclosed air smooths out the wrinkles in the lower part of the bag the point of the scale at *a'*, Fig. 2, where it comes onto the roll, is read, and indicates the cubic capacity of the filled part of the bag below the roll.

The scale may be properly constructed to allow for the tapering portions at either end of the bag where it passes from the cylindrical shape at the main portion of its length to the straight rolls in which it terminates.

When the instrument is not in use the bag may be rolled up on the spindle *b* and the mouth-piece *b'''* removed, if desired, when the instrument will occupy but little space.

The lateral port or orifice *b''* opening into the bag should be chamfered or rounded at its edges, so as not to injure the material of the bag.

I claim—

1. As an improved article of manufacture, a spirometer composed of a flexible, collapsible, and non-elastic reservoir provided with a scale that indicates the cubic contents of the

portion of said reservoir that is distended or filled, substantially as described.

2. The combination of a flexible collapsible reservoir with a roll upon which the empty  
5 portion of said reservoir may be wound and a scale that indicates the cubic contents of the distended portion, substantially as described.

3. The combination of a flexible collapsible bag or reservoir provided with a scale, as de-  
10 scribed, with a roll connected with the said reservoir at one end, and provided with an inlet-passage communicating with the said reservoir, substantially as described.

4. The combination of a flexible collapsible

bag or reservoir provided with a scale, as de- 15  
scribed, with a roll connected with the said reservoir at one end, and provided with an inlet-passage communicating with the said reservoir and a removable mouth-piece, substan- 20  
tially as described.

In testimony whereof I have signed my name to this specification in the presence of subscribing witnesses.

WILLIAM H. H. BARTON.

Witnesses:

WARREN T. COPELAND,  
PARKER P. WILDER,  
IRA A. LEACH.