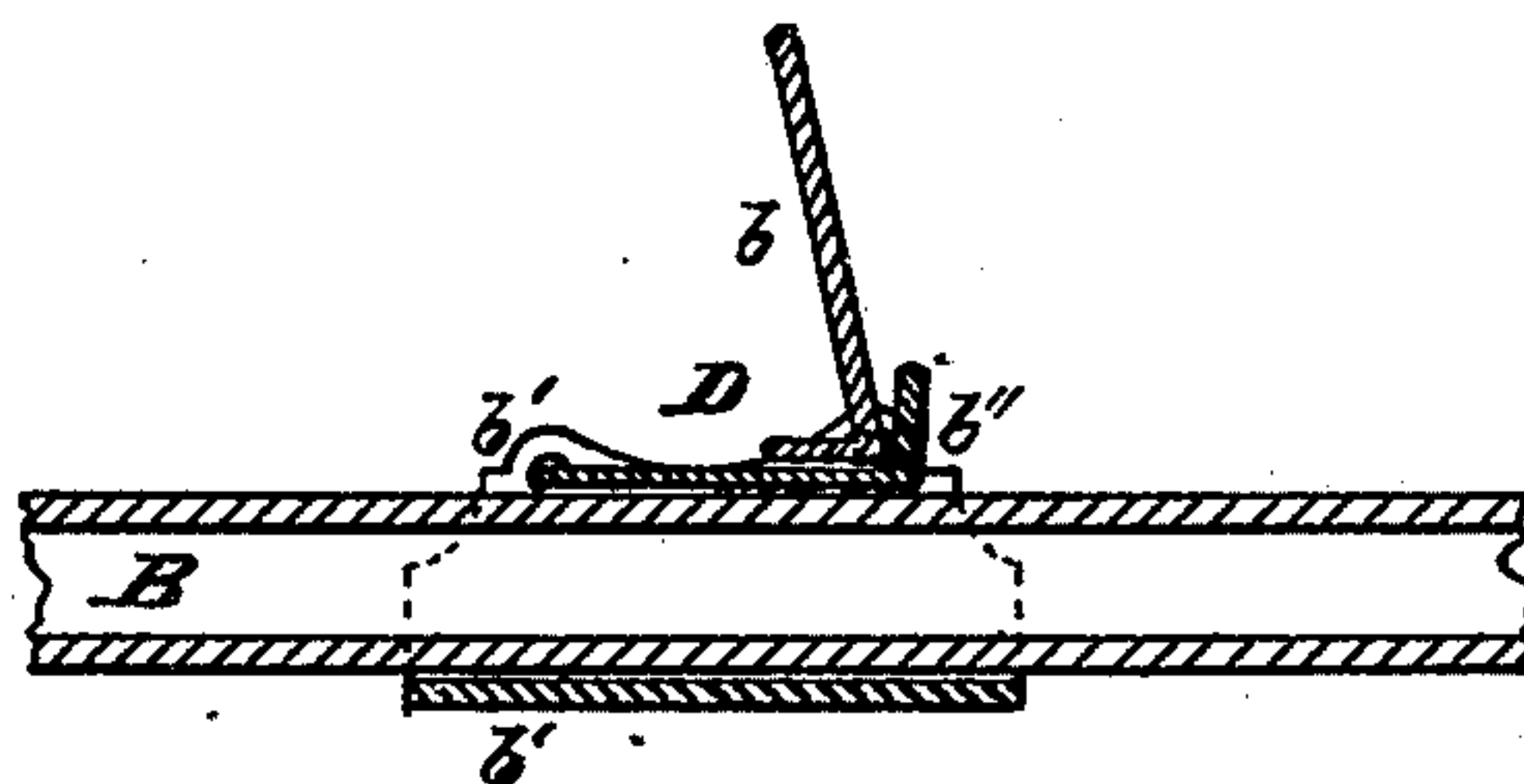
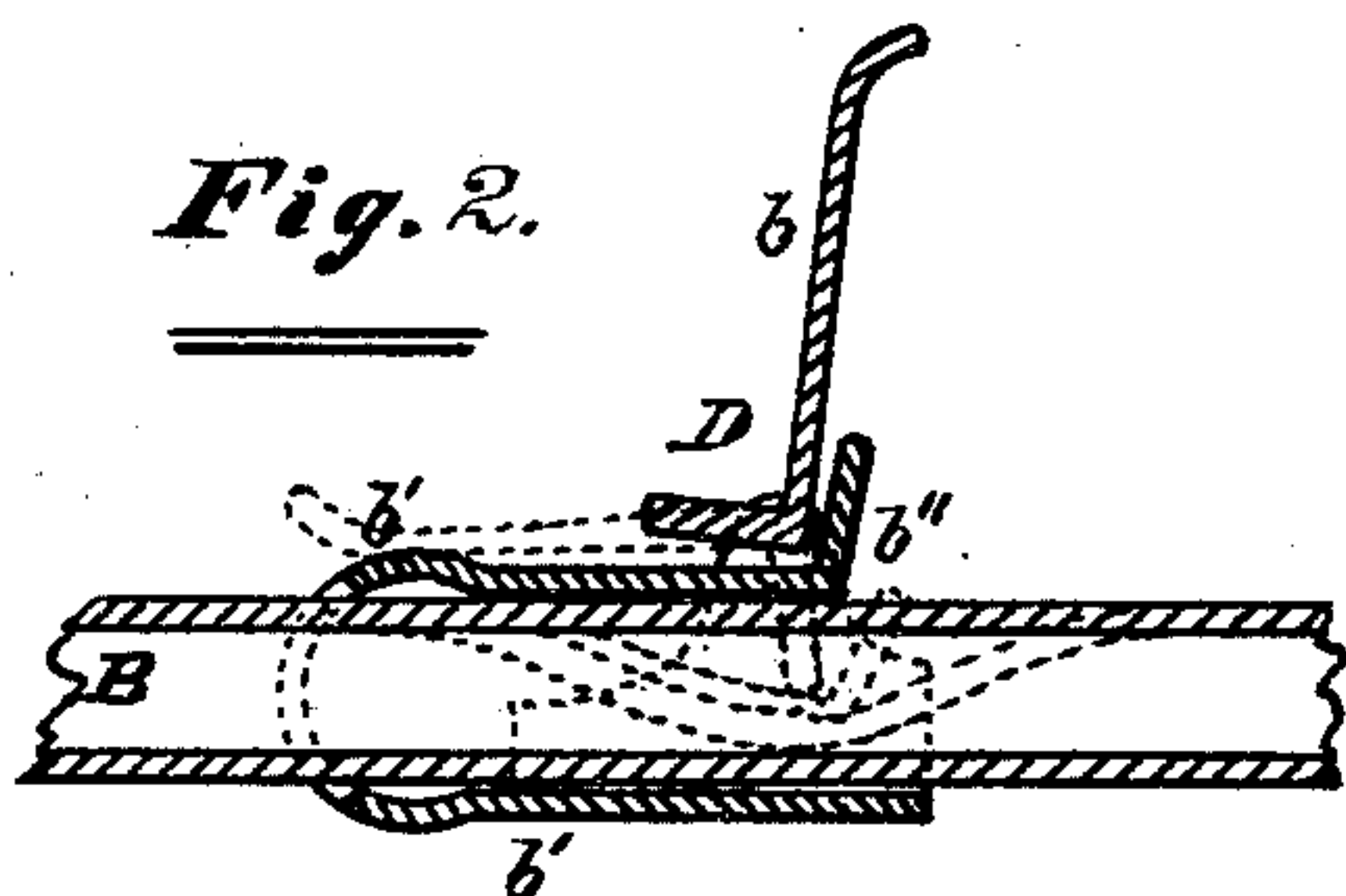
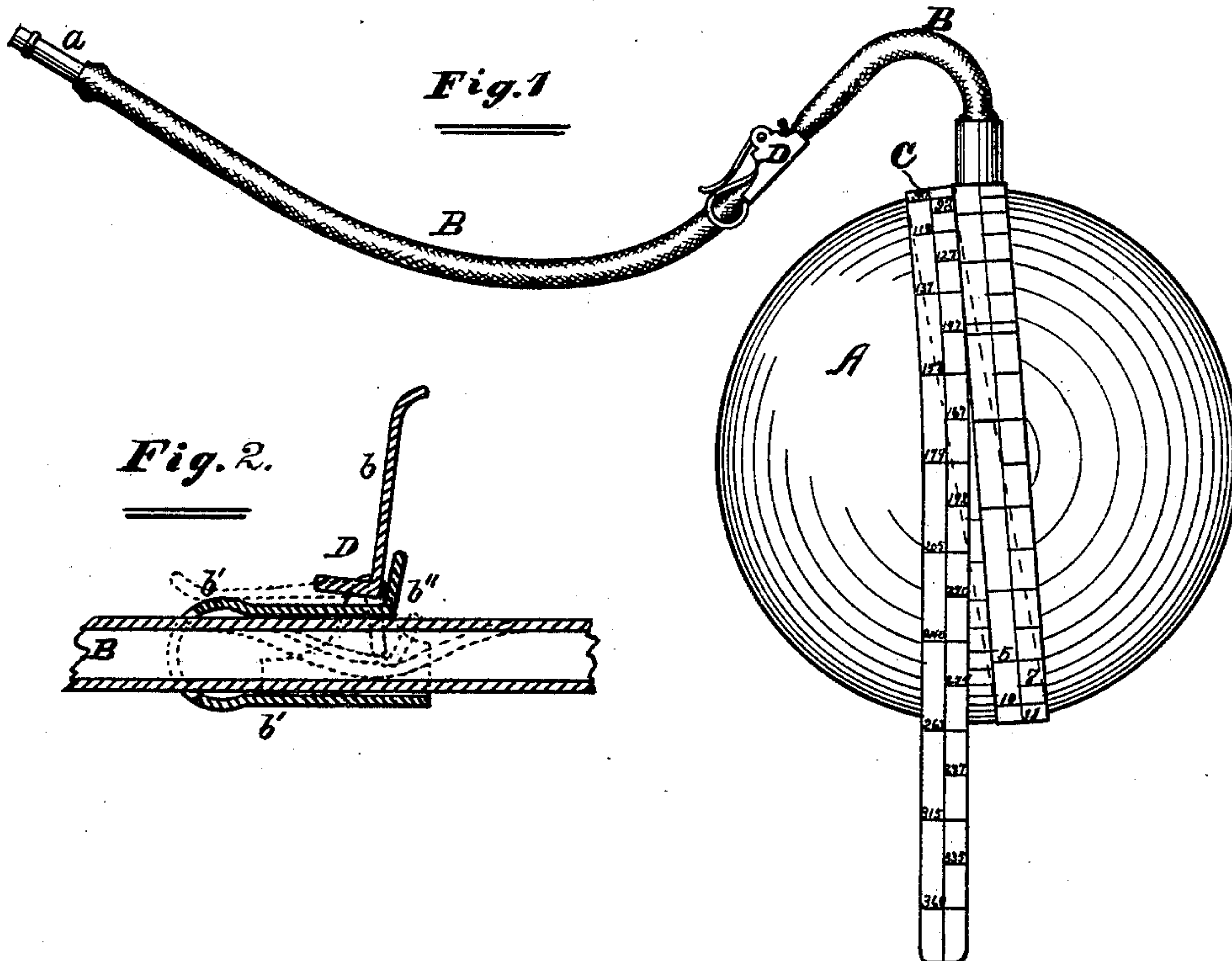


J. P. MARSH.  
Spirometer.

No. 225,710.

Patented Mar. 23, 1880.



**Attest:**

W. S. Baker  
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**INVENTOR:**

James P. Marsh  
By F. F. Warner, his  
Attorney.

# UNITED STATES PATENT OFFICE.

JAMES P. MARSH, OF CHICAGO, ILLINOIS.

## SPIROMETER.

SPECIFICATION forming part of Letters Patent No. 225,710, dated March 23, 1880.

Application filed September 1, 1879.

*To all whom it may concern:*

Be it known that I, JAMES P. MARSH, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Spirometers, of which the following, in connection with the accompanying drawings, is a specification.

Figure 1 in the drawings is a side view or representation of a spirometer embodying my invention. Figs. 2 and 3 are vertical central sections taken through the shut-off.

Like letters of reference indicate like parts.

A is a flexible bag or receiver, made of india-rubber, by preference, and expansible to such a degree as to be capable of being distended with facility by air expelled from the human lungs into the receiver.

B is a flexible tube coupled to the part A. The tube B should be provided with a mouth-piece at its free end, as indicated at *a*.

C is a gage or measuring-tape, connected at one end to the part A, preferably at the place where the tube B is coupled thereto.

In using this device as a spirometer, the piece *a* is inserted into the mouth of the user, and the remaining part held in any convenient way which will not interfere with the inflation of the part A. The part A may then be inflated by being blown into, and as soon as the capacity of the lungs is thus sufficiently tested the tube B should be pinched together to prevent the air from escaping from the receiver. The gage C should then be passed around the inflated receiver, as indicated in Fig. 1, and where the fixed end of the gage meets the encircling part thereof will be found figures indicating the amount in cubic inches of air in the receiver, whether there be more or less therein, it being understood that the part C is graduated for that purpose, and that it will be taken up more or less by encircling the receiver, according to the amount of air forced therein from the lungs of the user. In this way the user may test the capacity and strength of his lungs, and note their condition in these respects from time to time, and a proper use of the device will, it is believed, be found to be a healthful exercise for the lungs.

It is not absolutely essential that a flexible induction-tube should be used, but I regard a flexible tube as preferable.

When a rigid induction-tube is used, a suitable shut-off or cock should be employed in

connection with it to prevent the escape of air from the receiver until after its contents can be measured in the way described.

It may also be regarded as a convenience if a cut-off be used in connection with a flexible induction-tube; and D represents such a device, which consists simply of an articulated bent lever, *b*, applied to a tubular piece, *b'*, slipped upon the tube B, and having a yielding tongue or arm, *b''*, arranged as shown, to be depressed by the short arm of the lever *b*, and pinch the tube B together, so as to prevent the escape of air from the receiver, it being understood that the lever *b* is made and arranged to lie in its closed position after being depressed and until it is raised by the hand of the user after the capacity of the receiver is ascertained, in which latter position it will also remain until it is again depressed.

There are, as is well known, many suitable cut-off devices which may be employed with advantage for the purpose herein set forth, and I do not, therefore, here intend to restrict myself to any particular device of this class.

It is obvious, however, that a cut-off is not an absolutely essential part of my invention, for the receiver may be held in such a position that the figures on the gage may be viewed during the expansion of the part A, and so that the capacity of the receiver, at its utmost extension during the expulsion from the lungs, may be thereby ascertained.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A spirometer consisting of the combination of the easily-extensible receiver A, made of rubber, the stem or induction-tube B, and the flexible gage or measuring-tape C, graduated and numbered on one side, all arranged substantially as and for the purposes specified.

2. A spirometer consisting of the combination of the easily-extensible receiver A, made of rubber, the induction-tube B, the flexible graduated and numbered gage or measuring-tape C, and a cut-off or cock applied to the said tube, substantially as and for the purposes specified.

JAMES P. MARSH.

Witnesses:

F. F. WARNER,  
JAS. LLOYD.