

(No Model.)

2 Sheets—Sheet 1.

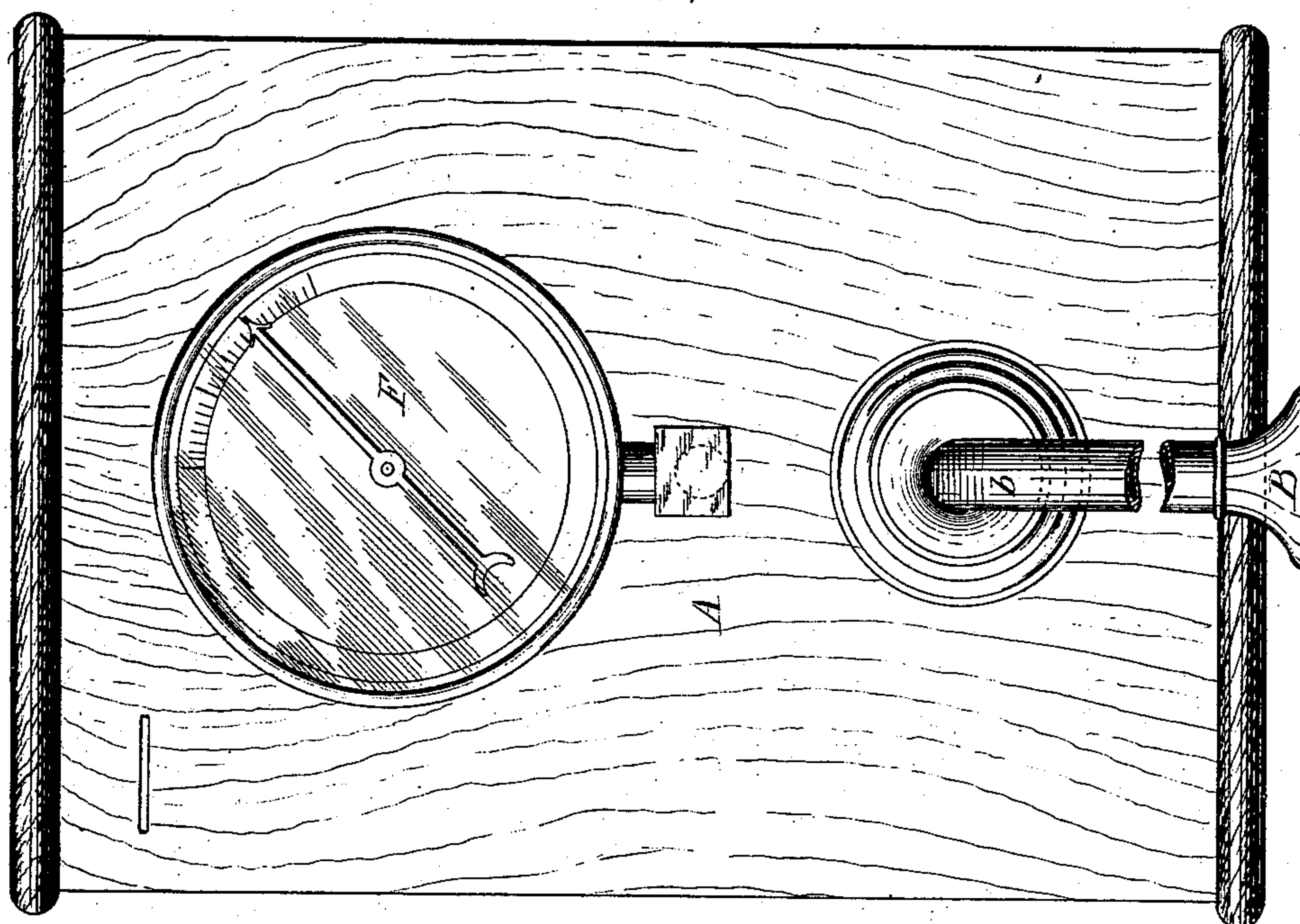
R. HOWSON & E. CROWE.

COIN RELEASE SPIROMETER.

No. 389,748.

Patented Sept. 18, 1888.

Figure 1.



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att'y.

(No Model.)

2 Sheets—Sheet 2.

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No. 389,748.

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Figure 2.

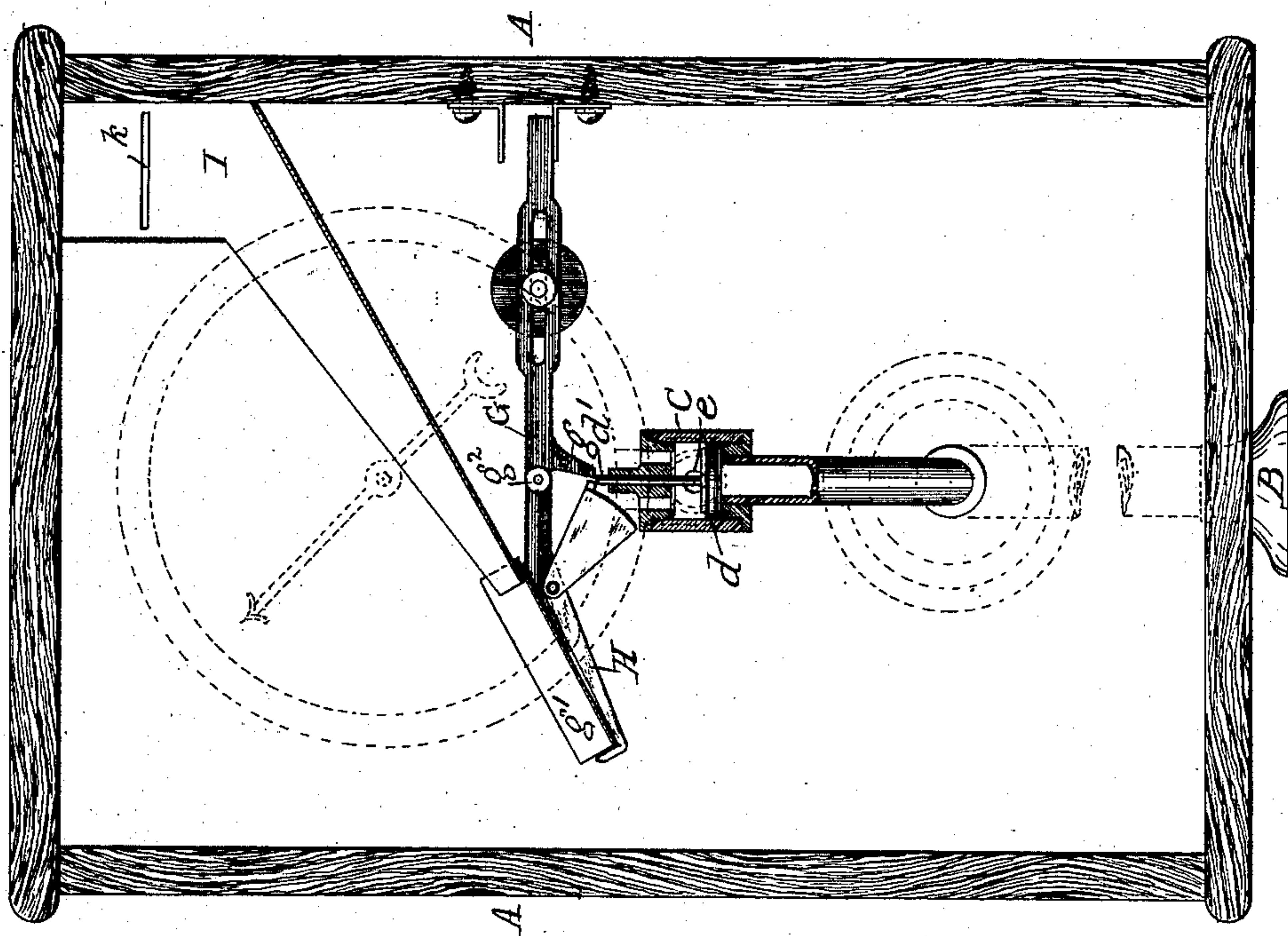
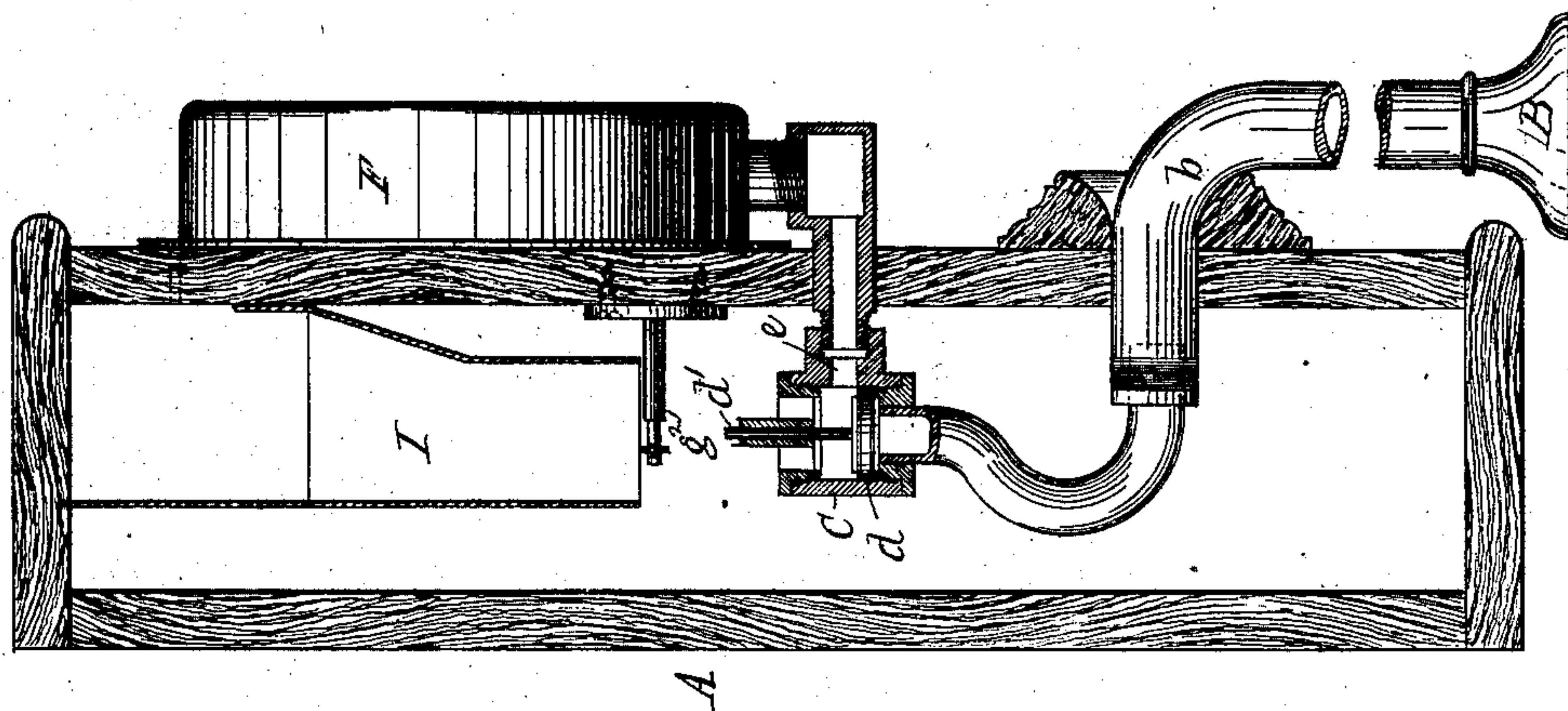


Figure 3.



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# UNITED STATES PATENT OFFICE.

RICHARD HOWSON AND EDWARD CROWE, OF MIDDLESBROUGH-ON-TEES,  
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## COIN-RELEASED SPIROMETER.

SPECIFICATION forming part of Letters Patent No. 389,748, dated September 18, 1888.

Application filed May 31, 1888. Serial No. 275,585. (No model.) Patented in France September 22, 1887, No. 186,019, and in Belgium September 27, 1887, No. 79,018.

*To all whom it may concern:*

Be it known that we, RICHARD HOWSON and EDWARD CROWE, engineers, subjects of the Queen of Great Britain, residing at Middlesbrough-on-Tees, in the county of York, England, have invented a new and useful Improved Spirometer or Lung-Testing Apparatus, (for which we have obtained patents in France, No. 186,019, bearing date September 22, 1887, and in Belgium, No. 79,018, bearing date September 27, 1887,) of which the following is a specification.

This invention relates to the construction of an improved spirometer or apparatus for testing the lungs by means of a pressure gage actuated through the medium of a mouth-piece and blow-pipe, which are constructed and arranged in the ordinary manner; and this invention consists in arranging in combination therewith certain mechanism which will prevent the gage with which the apparatus is provided being acted upon until a coin has been introduced into a slot or receptacle provided for its reception.

We will now describe our invention with reference to the accompanying drawings, in which the same letters of reference indicate like parts in all the figures.

Figure 1 is a front view of the apparatus; Fig. 2, a back view of the same with the back of the case removed and part of the mechanism in section; and Fig. 3 is a side view with the side of the case removed and part of the mechanism in section. In the last figure the lever G is removed; but the pivot  $g^2$ , on which the same is mounted, is shown.

The mechanism constituting the subject of this invention is arranged within a case, A. The mouth-piece B is connected by the blowing-tube  $b$  with the cylinder C, in which the piston  $d$  is arranged to work freely. In the side of the said cylinder is an air-passage,  $e$ , leading to the pressure-gage F. To the upper face of the piston  $d$  is attached the spindle  $d'$ , which passes through an aperture in the cover of the cylinder. When the mechanism is in its normal or locked position, the piston  $d$  rests on a seat at the bottom of the cylinder C and closes the inlet-orifice, and it is retained in that position by a catch,  $g$ , which forms

part of the rocking lever G, of which  $g^2$  is the pivot. The cover of the cylinder C is perforated to allow of the escape of any air which may be forced past the said piston when the same is locked, as lastly described. One end of the lever G is counterweighted, and to the opposite end is attached the shelving-plate  $g'$ . The lever H, which is pivoted to the last-mentioned end of the lever G, is counterweighted at one end and is turned up or provided with a projecting stop at the opposite end. The lever H is so arranged in reference to the spindle  $d'$  that the latter in its upward movement will come into contact with the weighted end of the said lever and will turn it on its pivot, whereby the coin is released, as hereinafter described. I is the chute down which the coin passes from the slot in the case A to the shelving-plate  $g'$ .

The action of the mechanism hereinbefore described is as follows: When the mechanism is in its normal position, the piston  $d$  is retained by the catch  $g$  against its seat at the lower end of the cylinder C; consequently the air-inlet is closed. On a coin being passed through the slot  $k$  it slides down the chute I onto the shelving-plate  $g'$ , where it is retained for the time by the turned-up end of the lever H. The weight of the said coin overbalances the counter-weight and causes the lever G to turn on its pivot, whereby the catch  $g$  is disengaged from the end of the spindle  $d'$ . On air being blown through the tube  $b$  the piston  $d$  rises to the top of the cylinder C, closes the perforations therein, and opens the passage  $e$ , through which the air passes to the gage. In its upward movement the spindle  $d'$  catches the lever H and, turning it on its pivot, causes the turned-up end thereof to be moved from the end of the shelving-plate  $g'$ , thus allowing the coin to slide off, the consequence being that on the descent of the piston the lever G resumes its normal position and again locks the mechanism.

We wish it to be understood that we do not desire to confine this invention to the exact details hereinbefore described, as they admit of many modifications. For instance, a flexible diaphragm or a hinged valve may be substituted for the piston  $d$ , and springs may be



used instead of counter-weights. With regard to the pressure-gage, we have hereinbefore referred to it as an ordinary dial-gage; but, if desired, a mercurial column might be substituted therefor.

What we claim is—

1. In a spirometer or lung-tester, the combination, with the pressure-gage and with the air tube or passage leading thereto, of a valve located in said tube or passage to open and close the same, and a movable stop connected with a counterweighted lever for locking said valve while the lever is controlled by the counter-weight and for unlocking it when the counter-weight is overbalanced, substantially as set forth.

2. In spirometers or lung-testers, the combination, with the pressure-gage and with the tube or passage leading thereto, of a valve located in said passage to open and close the same, and a counterweighted lever provided with a stop which locks the valve while the lever is controlled by the counter-weight, said lever being provided with a plate or receptacle adapted to receive and hold a coin or weight to overbalance the counter-weight and unlock the valve, substantially as set forth.

3. In spirometers or lung-testers, the combination, with the pressure-gage and with the tube or passage leading thereto, of a valve located in said passage to open and close the same, a pivoted counterweighted lever provided with a stop or shoulder which locks the valve and closes the tube or passage while the lever is controlled by the counter-weight, and a secondary lever pivoted to said counter-weighted lever and carrying a plate or recep-

taele adapted to receive and hold a coin or weight for overbalancing the counter-weight, the end of said secondary lever standing normally in the path of a stem of the valve, whereby the movement of the latter will trip the said lever and discharge the coin or weight from its plate or receptacle, substantially as shown and described.

4. In spirometers or lung-testers, the combination, with the pressure-gage and with the tube or passage leading thereto, the latter being provided with a valve-chamber and valve, of a counterweighted lever, G, pivoted above the valve-chamber and having an arm or shoulder which in the normal position of parts stands above the projecting stem of the valve and holds the latter to its seat, a secondary lever, H, pivoted to the lever G and carrying at one end a plate or receptacle to receive and hold a coin or weight to overbalance the counter-weight of lever G and tilt the latter, whereby the valve is released and allowed to rise and trip the said secondary lever to discharge the coin or weight from its receptacle, and a chute leading from an aperture in the case to the plate or receptacle on the secondary lever, substantially as shown and described.

In witness whereof we have hereunto set our hands this 10th day of April, 1888.

RICHARD HOWSON.

EDWARD CROWE.

Witnesses:

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