R. C. PHILLIPS.

GAS METER.

No. 180,631. Patented Aug. 1, 1876.

Fig. 1.

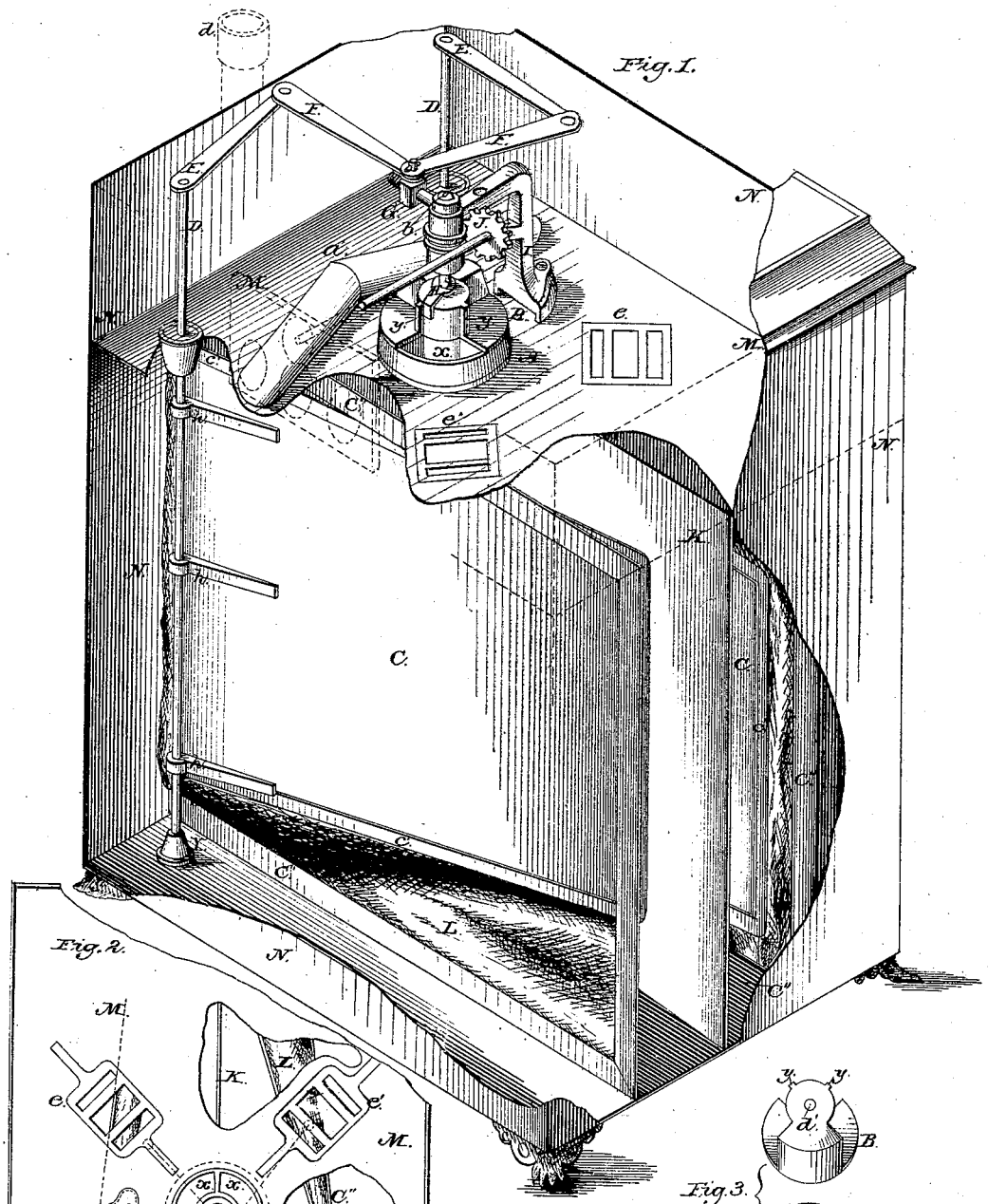

Fig. 2.

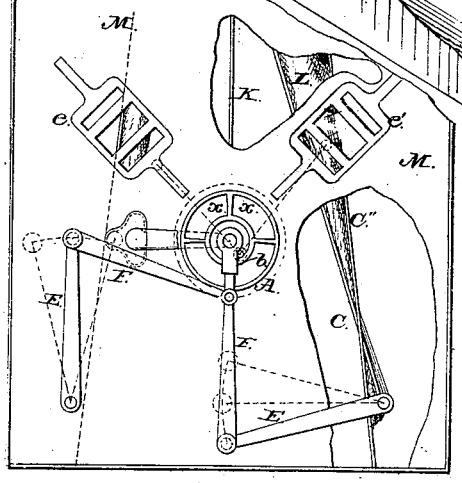

Fig. 3.

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IMPROVEMENT IN GAS-METERS.

Specification forming part of Letters Patent No. **180,631**, dated August 1, 1876; application filed June 8, 1876.

To all whom it may concern:

Be it known that I, ROBERT C. PHILLIPS, of the city of Cincinnati, in the county of Hamilton, in the State of Ohio, have invented a new and useful Improvement in Gas-Meters, which improvement is fully set forth in the following specification, reference being had to the accompanying drawings.

The object of my invention is to secure a more accurate measurement of the gas, increased durability of the meter, simplicity and economy in construction, facility of getting at the working parts for purposes of repairs, adjustment, &c., and obtaining a greater measuring capacity in a given size meter.

In the accompanying drawings, Figure 1 is an isometrical projection, showing a cut-section of the meter.

The same letters refer to the same thing in all the figures.

A is the seat of my rotary valve; B, the cover for same; *a*, the inlet-pipe; *a'*, the cross-channels; C C, the two diaphragm-plates; C' C', thin bands; D D, the spindles on which they swing; *h h*, &c., the hinges connecting them with C; E E, two arms rigidly attached to D D; F F, two pitmen connecting with the crank G, which crank or tangent is secured to the spindle *b*, which revolves in the bearings on the standard I, and carries the worm which engages the wheel J. The driver H is secured to the lower end of *b*, and carries the valve-cover B in its revolutions. The wheel J transmits the motion to the counter or register. (Shown in dotted lines in Fig. 1.) K is the partition between the two diaphragm-chambers; L, the leather portion of the diaphragms; M, the cover of the diaphragm-chambers and table on which the valves and other parts are secured; N, the outside or shell of the meter; C'' C'', the frames to which the leather of the diaphragms is attached by its outer edges. These frames C'' C'' are soldered to the table, bottom, and sides of the meter, in the manner shown, and divide the two diaphragm-chambers into two measuring-chambers each. *e* and *e'* are the two slide-valve seats, used when a slide-valve meter is desired, in which case the seat A and its cover B are omitted, and the small crank shown at *b*, Fig. 2, is substituted for the carrier H, the slide-valves being located as shown at *e* and *e'*, Figs. 1 and 2, all the other parts of the meter except the channels remaining as in the rotary-valve meter.

Fig. 2 is a plan of the meter, showing more clearly the location of the several parts, a portion of the table being cut away, showing the partition K, the frames C'' C'', &c., and the diaphragm-plate C at one of its extreme strokes; also the uncovered seats of the valves A and *e* and *e'*. Fig. 3 is a top and bottom view of the cover B.

I construct my diaphragm in the following manner: The frame C'' has its opposite sides parallel, usually, and is so constructed as to clamp the leather all round its outer edge, in the usual manner—a form or mold of a size at its lower side the thickness of the leather all round less than the inside of C'', and of a wedge shape, being about three-eighths of an inch thick at the thin or hinge end, and something more than a full half-stroke of the meter at the opposite end. The edges and head of this wedge are beveled, so that its top is the size of the back plate C, the leather being formed over this block and the back plate secured to it in any of the ordinary ways. The plate C being a little smaller than the frame C'' at the hinge end, and from one-fourth to three-quarters of an inch less than the inside of C'' (according to the size of the meter) at the opposite end, allows the plate C to pass through the frame C'', and beyond it to the full limit of the stroke on both sides, as shown, carrying the leather with it back and forth, simply bending it where it connects with the frame and plate, and not folding it upon itself; or it may be so constructed as to fold upon itself, as in the ordinary meter.

In order to secure the desired action of the diaphragms and transmit it to the other parts of the meter, I secure the hinges *h h h* to the plate C, and also to the spindle D, rigidly, step the foot of the spindle D in the bearing Y, Fig. 1, and in its stuffing-box, as shown; thence, by means of the arms and pitmen, the movements are transmitted to the revolving shaft *b*, the valves, counter, &c., in the most perfect manner, giving a result approaching absolute accuracy.

Operation: The gas is admitted by the inlet-

pipe *a*, Fig. 1, to the circular opening in the seat A, which is always covered by the chambered portion of the cap B, from which it passes by proper channels to the several measuring-chambers in their order, while the gas from the opposite chambers is expelled in their order through the uncovered ports in A into the upper chamber of the meter, and thence through the outlet-pipe to the burners.

In the rotary-valve meter two of the channels *x x*, from the valve to the measuring-chambers, are direct, the other two are crossed.

When the slide-valve is used the operation is the same, except that the inlet-channel must be branched, so as to connect with the central port in each of the two valves. The upper chamber of the meter may be used as the inlet in both cases, and the operation be reversed. When this is desired, the tangent or driver of the rotary valve must be changed, it being an important peculiarity of this valve that upon reversing the supply it seals itself at once, thus securing the meter against "backing" by dishonest users. My slide-valve meter may be "backed" by reversing the currents, as in other meters, and therefore a "back-stop" is necessary. I prevent backing in the rotary-valve meter by placing two abutments, *y y*, on the cover B, the projecting portion of the cover forming two others, so that the circumference or circle of the valve-cover is divided into four parts or quadrants, the carrier H acting against one of these abutments, while the gas flows in the proper direction; but upon the current being reversed, H marks about one-fourth of a revolution backward, when it engages one of the abutments *y y*, carrying the cover to a position where the valve is effectually seated, and the flow of gas is cut off.

The balancing and adjusting of this meter is effected by shifting the crank or driver, and by lengthening or shortening the crank by means of the tangent-screw G or other proper device.

The valve-cover B is kept in its proper position on its seat and made to rotate concentrically with it by the point or lower end of *b* projecting into a hole in the center of the cover. *d*, Fig. 3, shows the boss for this hole, and *d'* the hole.

I claim as my invention—

1. The diaphragm consisting of the back plate C, the bands C′, the leather portion L, the outer frame C″, and the spindle D, these parts being combined for joint operation, as shown and set forth.

2. The diaphragms constructed as herein described, in combination with the valve or valves, the counter or register, and the described intermediate mechanism connecting the diaphragms with said parts, for operation as set forth.

3. In combination with the carrier H, the rotary valve A and the valve-cover B, provided with stops, substantially as set forth, whereby the valve is caused to seal itself and stop the passage of gas upon reversing the direction of supply and discharge, thus preventing the backing of the meter.

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Witnesses:
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