

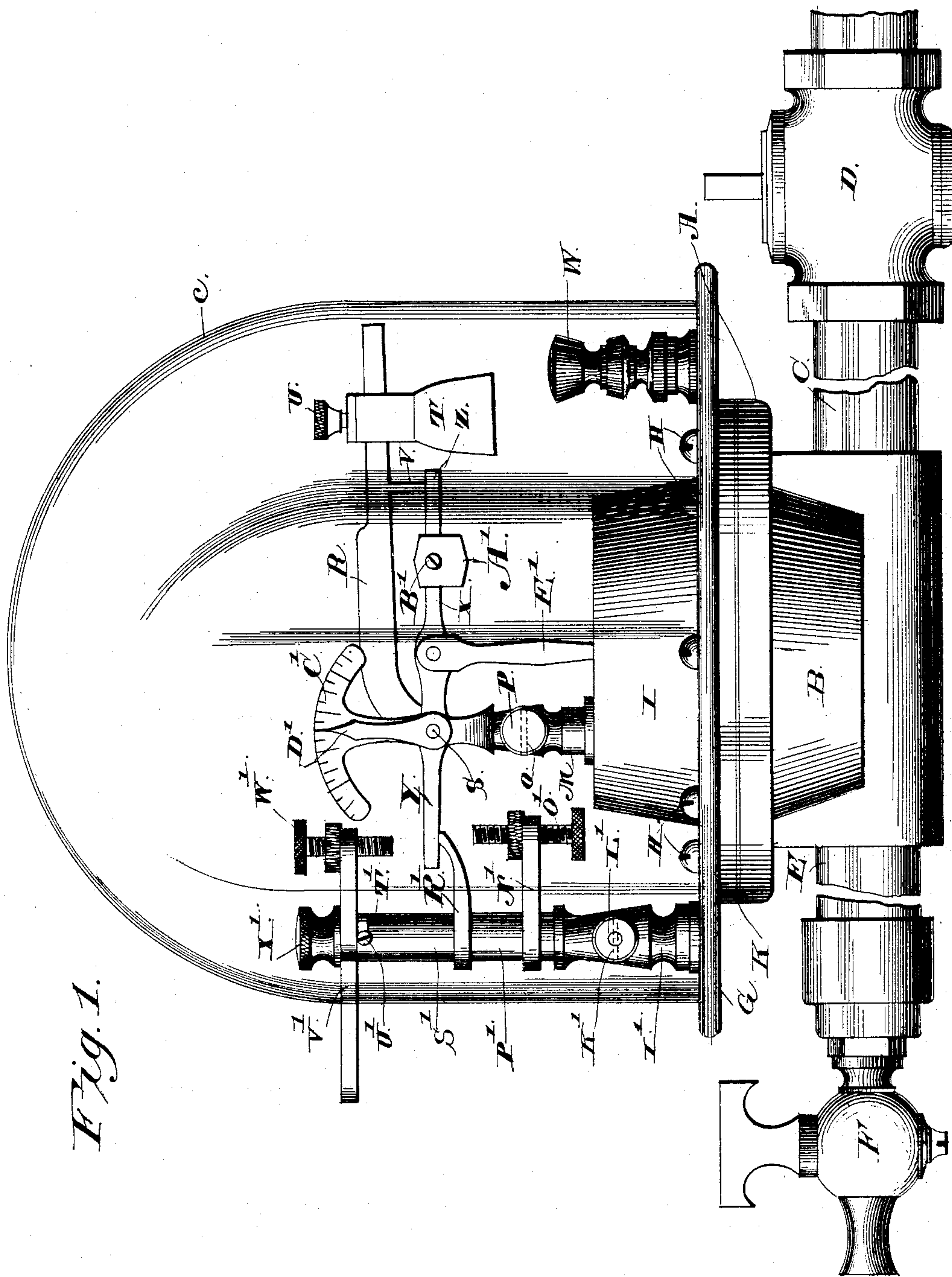
(No Model.)

3 Sheets—Sheet 1.

R. L. SIMONS.
GAS PRESSURE INDICATOR.

No. 409,375.

Patented Aug. 20, 1889.



Witnesses

M. E. Fowler
E. J. Bigger

Inventor

Richard L. Simons

By *His* Attorneys

C. Snow & Co.

(No Model.)

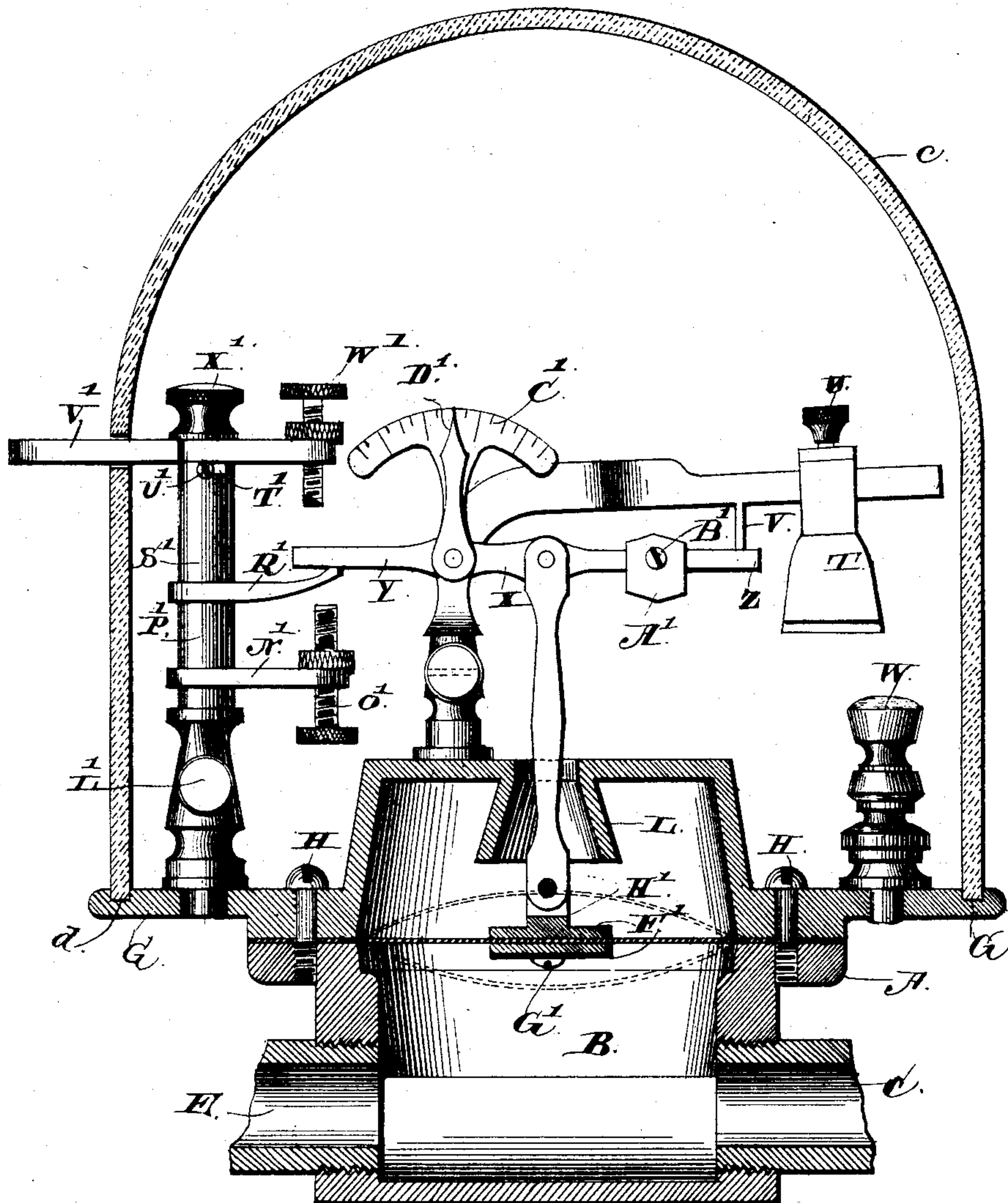
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Fig. 2.



Witnesses

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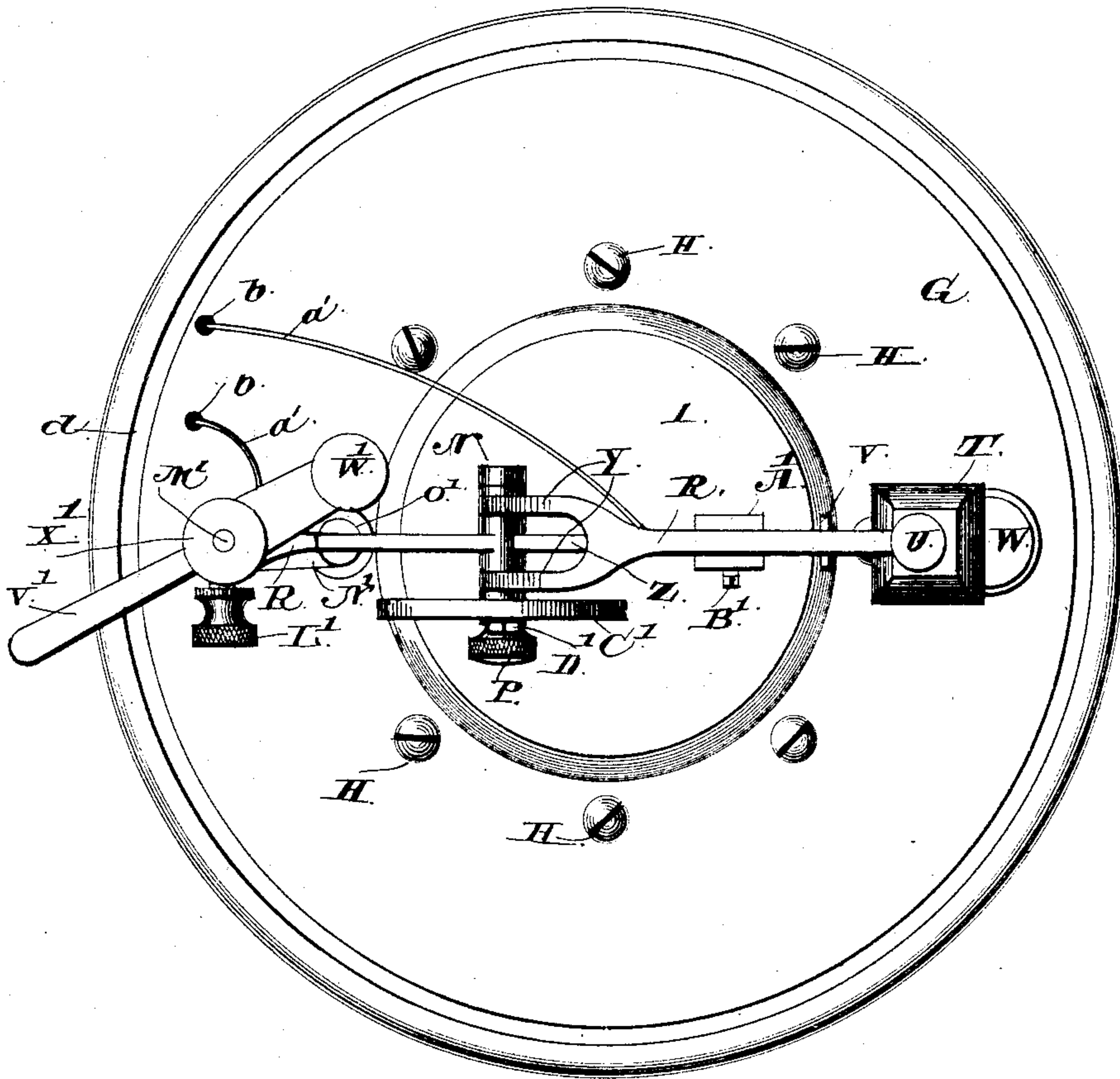
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Fig. 3.



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UNITED STATES PATENT OFFICE.

RICHARD L. SIMONS, OF LIMA, OHIO.

GAS-PRESSURE INDICATOR.

SPECIFICATION forming part of Letters Patent No. 409,375, dated August 20, 1889.

Application filed September 27, 1888. Serial No. 286,504. (No model.)

To all whom it may concern:

Be it known that I, RICHARD L. SIMONS, a citizen of the United States, residing at Lima, in the county of Allen and State of Ohio, have invented a new and useful improvement in Gas-Pressure Indicators, of which the following is a specification.

My invention relates to an improvement in gas-pressure indicators and it consists in the peculiar construction and combination of devices, that will be more fully set forth hereinafter, and particularly pointed out in the claims.

The object of my invention is to provide an apparatus which is adapted to indicate the pressure of gas in a pipe or vessel, and which is adapted to sound an alarm when the gas is at abnormally high or low pressure, and may be adjusted so as to sound an alarm when the gas is at an intermediate pressure; and a further object of my invention is to provide a gas-indicating apparatus which is cheap and simple in construction, is strong and durable, is not likely to get out of order, and is automatic in operation.

In the drawings, Figure 1 is a side elevation of a gas-pressure indicator embodying my improvements. Fig. 2 is a vertical longitudinal sectional view of the same. Fig. 3 is a top plan view thereof.

A represents a circular base-plate, which is provided on its lower side with a depending circular chamber B, that has threaded openings on opposite sides. In one of the said openings is screwed a gas-inlet pipe C, which is provided with a stop cock or valve D, and in the other opening is screwed a gas-outlet pipe E, which is provided with a mixer or stop-cock F.

G represents a circular metallic plate, which is of greater diameter than the plate A, and is secured on the upper side thereof by means of screws H, and is arranged concentrically with relation to the plate A. The said plate G has a chamber I formed on its upper side, which is of the same size and shape as the depending chamber B and registers therewith, the opposing sides of said chambers being open.

K represents a circular diaphragm, which is made of a sheet of vulcanized rubber of suitable thickness, that is stretched between

the chambers I B and has its edges clamped between the plates A G, as shown in Fig. 2. The central portion of the said diaphragm is slack, and thereby the said diaphragm is rendered exceedingly sensitive to the pressure of gas in the chamber B, and is adapted to be vibrated by variation of the gas-pressure in said chamber B, the amplitude of vibration of the said diaphragm being indicated in curved lines in Fig. 2. From the top of the chamber I depends a central sleeve L.

M represents a vertical post, which is secured on the top of chamber I, near one side thereof. The said post M is made of electric conducting material, and is insulated from the chamber I. The upper end of the said post is forked or bifurcated, and thereby provided with a pair of ears N, and the said post is provided, further, with an opening O for the reception of an electric conducting-wire, and has a binding-screw P to secure the wire in the said opening.

R represents a lever, which has its inner end forked or bifurcated and pivoted loosely on a shaft or arbor S, that is journaled in the ears N of the post. On the outer end of the said lever is suspended a weight T, which is adjustable longitudinally on the said lever and has a set-screw U, by means of which it may be secured to the lever at any desired adjustment. A stop V depends from the lever R at a suitable distance from the outer end thereof.

W represents a stop or post, which projects from the upper side of the plate G, is made of non-conducting material, or is insulated from the said plate, and is so arranged that the weight T is caused to engage therewith when the lever R descends.

X represents a lever, which is rigidly secured to the central portion of the shaft or arbor S, and has a shorter forwardly-projecting arm Y and a longer rearwardly-projecting arm Z. On the arm Z is an adjustable weight A', which has a set-screw B', by means of which the weight may be secured to the arm at any desired adjustment.

C' represents an arc-shaped dial, which is supported by the post M, and D' represents a hand or pointer, which is rigidly secured to one end of the shaft or arbor S, and is adapted to sweep over the dial when the lever X is moved.

E' represents a link, which has its upper end pivoted to the lever X at a suitable distance from the fulcrum thereof, and the said link extends downward through the sleeve L into the chamber I. A pair of plates F' are clamped to opposite sides of the center of the diaphragm by a screw G', and the upper of said plates has a central boss or offset H', to which is pivotally connected the lower end of the link E', and thereby the weighted lever X is attached to the diaphragm and is adapted to be operated by the diaphragm, as will be readily understood. The rear arm Z of the lever X is arranged under the lever R, and is adapted to engage the stop V.

I' represents a conducting-post, which is secured to the plate G and insulated therefrom, and has an opening K' for the insertion of a conducting-wire and has a binding-screw L'. The upper portion of the post is reduced in diameter to form a vertical spindle M'.

N' represents a conducting-arm, which is rigidly secured on the lower end of the spindle, extends toward the post M in a horizontal direction, and is provided at its outer end with an adjusting stop-screw O', which is adapted to be engaged by the arm Y of the lever X when the diaphragm is at the upper limit of its movement.

P' represents a collar or washer which is arranged on the spindle M' and bears on the upper side of arm N'. An arm R' is pivoted on the spindle M', bears on the upper side of the collar or washer P', and is keyed to a cylindrical sleeve S'. In the upper end of the latter is a transverse slot or recess T' of suitable width. A set-screw U' projects from one side of the spindle and enters said slot or recess and serves as a stop to limit the axial movement of the sleeve S' and arm R'.

V' represents an arm, which is pivoted on the upper end of spindle M', and is keyed to the sleeve S', and is thereby adapted to move in unison with the said sleeve and with the arm R'. The said arm V' is arranged at a suitable angle with relation to the arm R', so that the outer ends of the arms R' and V' are in different vertical planes. One end of the arm V' is provided with an adjusting stop-screw W'. The extreme upper end of the spindle M' is threaded, and a clamping-nut X' is screwed thereon and serves to maintain the arm V' thereon in place.

a' represents a pair of electric conducting-wires, which are passed through insulated openings b in the plate G, and are attached to the posts I' and M. The said wires form part of an electric circuit, in which is included a suitable electric generator and a suitable annunciator or gong, which is adapted to be operated when the circuit is closed.

c represents a glass cover or bell, the lower edge of which fits in an annular groove d in the plate G, said cover serving to exclude dust from the indicating apparatus and to render the same distinctly visible.

The operation of my invention is as follows: When the arm V' is turned so as to bring its stop-screw W' in the path of the arm Y of lever X, the arm R' is turned to one side out of the path of the said lever, and consequently the arm Y thereof is adapted to play between the stop-screws O' and W'. The gas which passes through the chamber B and the inlet and outlet pipes presses under the diaphragm and normally raises the latter to a horizontal position, so as to cause the link E' to support the weighted lever X in a horizontal position and arrange the hand or pointer at the center or normal pressure-point of the arc-shaped dial. When the lever X is in this position, it engages the stop V and raises the weighted lever R to its normal horizontal position. In the event that the pressure of the gas should be increased to an abnormal extent, the diaphragm will be moved to the upper limit of its stroke, and thereby cause the link E' to raise the rear end of lever X and the weighted lever R until the arm Y of lever X engages the stop-screw O', and thereby complete the electric circuit, and consequently sounds an alarm. In the event that the flow of gas should be interrupted by accident, or as the result of leakage or from any other cause, the pressure on the diaphragm will be relieved and the weight T will drop upon the stop-post W, incline the lever R downward, and cause the latter to likewise incline the lever X until the arm Y thereof engages the stop-screw W', when the electric circuit will be complete and an alarm sounded, as before. In order to prevent the gas from escaping through an open mixer when its pressure is again resumed, the person in charge of the apparatus will immediately, after the low-pressure alarm has been sounded, turn the arm V' so as to move the stop-screw W' out of the path of the lever X and move the arm R' into the path of the said lever, thus breaking the circuit and silencing the gong or annunciator. When the gas again starts to flow through the inlet and outlet pipes and the chamber V, a very slight pressure thereof will suffice to raise the diaphragm sufficiently to cause the lever X to come in contact with the arm R', and thus sound the gong or annunciator by closing the electric circuit and announce the fact that the gas is at normal or intermediate pressure. The person in charge of the apparatus will then restore the arm A' to its former position, with its stop-screw W' in the path of lever X and the arm R' out of the path of said lever, and thereby arrange the apparatus so that the same will give the alarm at high or low pressure of the gas, as before.

By means of the stop-cock D the amount of gas maintained under pressure in the chamber B may be regulated.

Having thus described my invention, I claim—

1. The combination, in a gas-pressure indicator, of the chamber, the diaphragm therein,

the weighted lever X, connected to the diaphragm, the weighted lever R, having the stops adapted to engage the lever X, the dial, and the hand or pointer secured to and operated by the lever X, substantially as described.

2. The combination, in a gas-pressure indicator and alarm, of the electric circuit having the electrodes W' O' at one pole, the lever X, forming the electrode of the opposite pole, the chamber, the diaphragm therein, and connections between said diaphragm and the lever X, whereby the latter will play between the electrodes O' and W' and complete the electric circuit at abnormally high or low pressure, substantially as described.

3. The combination of the pressure-chamber, the diaphragm therein, the circuit-closing lever X, connected to the diaphragm and operated thereby, the contact-arm N', and the connected pivoted contact-arms V' and R', arranged at an angle to each other, whereby said arms may be alternately moved to the path of the circuit-closing lever, for the purpose set forth, substantially as described.

4. The combination of the plate A, having chamber B and inlet and outlet pipes, the plate G, having chamber I registering with chamber B and closing the upper side thereof, the top of said chamber I having the depending sleeve L, the diaphragm secured between the plates A G and stretched over the chamber B, the weighted lever X, and the link

connecting the said lever to the diaphragm, substantially as described.

5. The combination of the pressure-chamber, the diaphragm therein, the weighted lever X, having the circuit-closing arm Y, the conducting-post M, carrying the fulcrum of said lever, the link connecting the lever to the diaphragm, the lever R, having the weight T and the stop V to engage lever C, for the purpose set forth, the conducting-post I', having contact-arm M', and the arms V' R', pivoted on said post, arranged at a suitable angle to each other and connected together, whereby the same are caused to move in unison, and either may be thrown into the path of contact-arm Y and the other thrown simultaneously out of the path of said arm, substantially as described.

6. The combination, in a gas-pressure regulator, of the chamber, the diaphragm therein, the lever-arm connected to the diaphragm and operated thereby, the stops at the limits of the movement of said lever, and the intermediate stop, the same forming electrodes of an electric circuit, for the purpose set forth, substantially as described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

RICHARD L. SIMONS.

Witnesses:

W. F. STECKEL,
JAS. NICHOLAS, Jr.