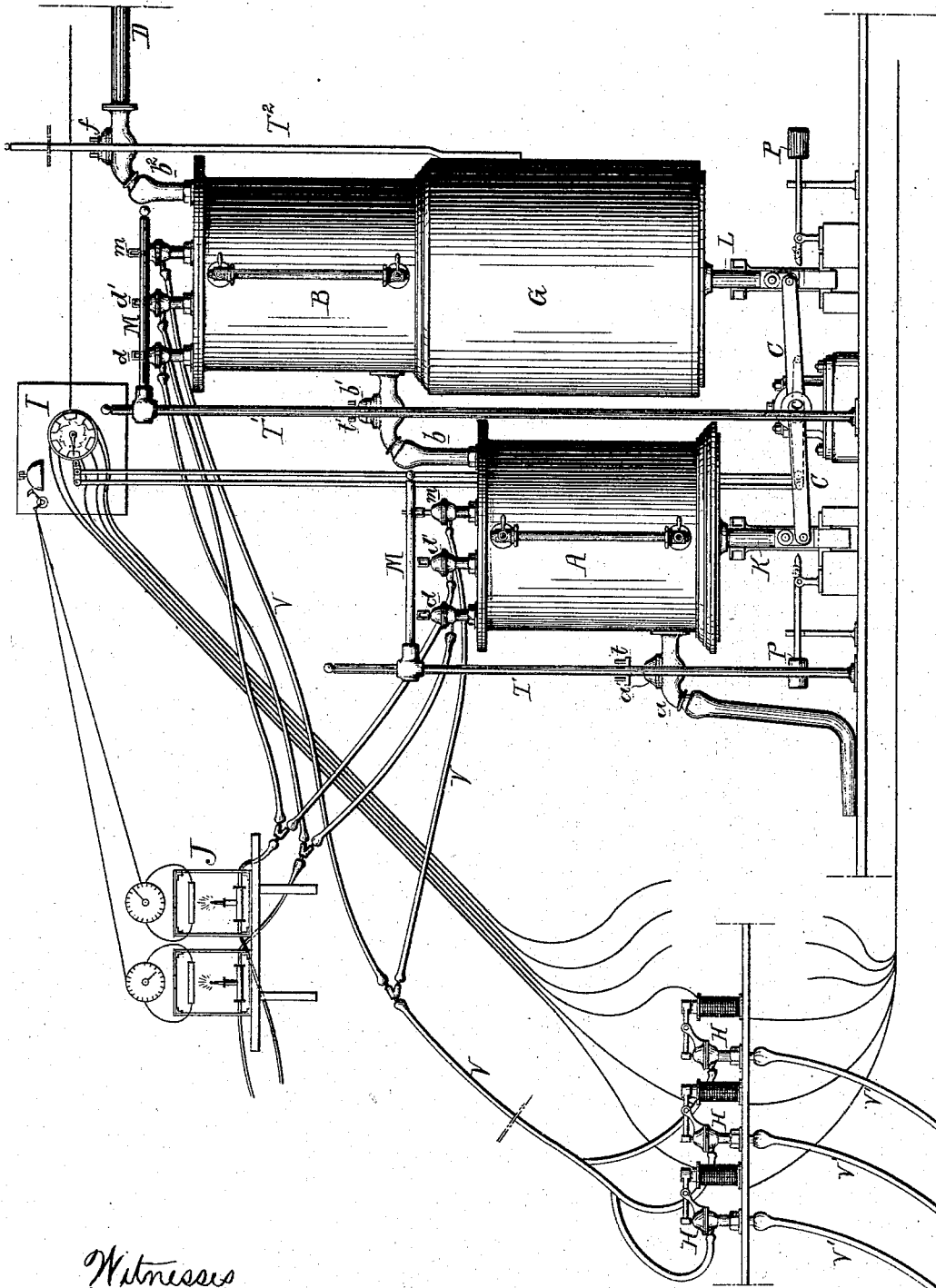


A. L. DOUCHY.

APPARATUS FOR TESTING MINE GASES.

No. 182,423.

Patented Sept. 19, 1876.



Witnesses
Harry Howson Jr
Harry Smith

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UNITED STATES PATENT OFFICE.

ALEXANDRE LEMAIRE DOUCHY, OF PARIS, FRANCE.

IMPROVEMENT IN APPARATUS FOR TESTING MINE-GASES.

Specification forming part of Letters Patent No. 182,423, dated September 19, 1876; application filed July 24, 1876.

To all whom it may concern:

Be it known that I, ALEXANDRE LEMAIRE DOUCHY, of Paris, France, have invented a Process of and Apparatus for Ascertaining the Composition of Gases in Mines, &c., of which the following is a specification:

The object of my invention is to be able to ascertain at all times at the surface of mines, collieries, &c., the exact condition of the gases and noxious vapors in the different portions of said mines; and this object I attain as described hereafter, reference being had to the figure in the accompanying drawing, which illustrates the apparatus by which my invention is carried into effect.

A and B are two cylindrical vessels, the latter being situated on a higher level than the former, and having a lower portion, G, forming a continuation of its cylindrical casing, as shown in the drawing. These cylinders rest on plates having central stems K L, which are supported by the opposite ends of a balance-lever, C, pivoted at *c*, and each cylinder is counterbalanced by a weighted lever, P, the short arm of which abuts against a lug connected to the stem. The cylinders A and B communicate with each other through the flexible tubing *b* and the cock *b*¹ fixed on the cylinder B, which has an inlet-tube, *b*², communicating with a water-supply pipe, D, while the cylinder A has an outlet-tube, *a*, supplied with a cock, *a*¹. On the top of each cylinder are three cocks, *d*, *d*¹, and *m*, the latter communicating through a tubing, V, with the different subterranean chambers of the mine, while the cocks *d* *d*¹ communicate through tubing with an apparatus, J, for analyzing the air and gases brought from the mine.

T and T¹ are vertical rods, having projections *t* and *t*¹ for operating the outlet-valves *b*¹ and *a*¹ of the cylinders B and A, respectively, and these rods have horizontal arms M M, with projections for operating the valves *d*, *d*¹, and *m* of the cylinders, as described hereafter.

The operation of the apparatus is as follows: Water is first allowed to run into the vessel B, through the pipe D, until the said vessel is full, when the latter is caused by the weight of the water to overbalance the counter-weight P, and by its descent raise the vessel A at the

opposite end of the balance-lever C, the outlet-valve *b*¹ and the valve *m* of the vessel B being at the same time opened by coming in contact with the projections on the stationary rod T¹ and its arm M, while the cocks *d* and *d*¹ of the vessel A are opened by coming in contact with projections on the arm M. As the water in the vessel B flows out into the vessel A the vacuum created will draw the gases from the mine through the tubing V and cock *m* into the vessel B. Then, as soon as the vessel B is emptied and the vessel A filled, the former rises and the latter descends, the cocks *d* *d*¹ of the vessel B being opened and the corresponding cocks of the vessel A closed, and the outlet-valve *a*¹ is opened and the valve *b*¹ closed by the same movement. The gases in the vessel B immediately pass through the cocks *d* *d*¹ to the analyzing apparatus J, by which the condition and nature of the gases in the mine can be ascertained at all times. These operations and the continuous supply of the gases to the analyzing apparatus continue as long as the water is supplied to the vessel B, the water-inlet valve *f* being automatically operated by a projection on the rod T², which is attached to the vessel B and moves with it.

It will be evident that one of the vessels A and B may be readily dispensed with; but I prefer to employ two or more, as the same supply of water will then suffice for both.

In order to be able to ascertain the condition of the gases in each distinct gallery, each of the branches V' V' of tubing from the different portions of the mine, before reaching the apparatus at the surface, is supplied with a valve, H, controlled by an electro-magnet, the wires from which connect with an indicator, I, from which may be ascertained the portion of the mine supplying the gas under analysis.

Any desired form of analyzer J may be used without departing from my invention. Plates of fusible metal or platina, pumice-stone, or chemical re-agents may be employed, or a gas which renders the gases from the mine more explosive may be admitted to the analyzer so as to enable the attendant to ascertain if the gases in the mine are apt to explode.

I claim as my invention—

1. The combination of tubing for conveying

the gases from the mines with an analyzing apparatus, J, and means, substantially as described, for automatically drawing the said gases from the mines.

2. The combination of the balanced cylinder B, its water inlet and outlet, with the gas-valves *d*, *d'*, and *m*, and the analyzer J.

3. The combination of the balanced cylinder B, its water inlet and outlet, with the valves *d*, *d'*, and *m*, and the rod T, and its projections, as set forth.

4. The combination of the analyzer J, and the tubing V and V', with their valves H H and electro-magnets, and the indicator I, as set forth.

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

ALEXANDRE LEMAIRE DOUCHY.

Witnesses:

AUGUSTE CHÉRUT,
JOSEPH DELAGE.